

# The In/Visible: "Common Senses" Architecture

By Cherry Yeung, B.A.S.

A thesis submitted to  
The Faculty of Graduate Studies and Research in partial fulfillment of  
The requirements of the degree of  
Master of Architecture (Professional)

School of Architecture  
Carleton University  
Ottawa, Ontario  
2006

© Cherry Yeung 2007



Library and  
Archives Canada

Bibliothèque et  
Archives Canada

Published Heritage  
Branch

Direction du  
Patrimoine de l'édition

395 Wellington Street  
Ottawa ON K1A 0N4  
Canada

395, rue Wellington  
Ottawa ON K1A 0N4  
Canada

*Your file* *Votre référence*  
*ISBN: 978-0-494-26979-4*  
*Our file* *Notre référence*  
*ISBN: 978-0-494-26979-4*

**NOTICE:**

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

**AVIS:**

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

---

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

  
**Canada**

## Abstract

Architecture is judged not only with its visual beauty but also enjoyed as a synaesthetic journey by our Common Senses. The Common Senses, as defined by Aristotle of the unity of senses, is the key to join architectural space and our bodies, increasing the level of intimacy between the two to develop an all-embracing relationship. Our perception is not limited to sight; architecture that deals with sight only limits the possibility and our understanding of space. Hearing, smell, touch and taste can record a better memory than sight alone can; thus putting effort in creating synaesthetic architecture will result in spaces that speak in a more powerful dialogue with our body and memory.

This thesis project challenges the idea of visual architecture by creating a museum that focuses on the unity of all senses, encouraging visitors to perceive space with their Common Senses.

## **Acknowledgements**

First of all, thank you Marco Frascari, my thesis supervisor, for his ingenious teaching and guidance, and to Greg Andonian, who taught me the importance of laughter and happiness. Thanks beyond expression to my parents and Cyril Ma for their love and care all through the years. Special thanks to Gladys Ma for her editorial help on the writing. This thesis cannot be done without their support. Last but not least, I want to send my special thanks to my friends, Christine Wang, Linda Liu and Alla Cheung, for their encouragements during the hard times.

## Table of Contents

Abstract	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	v
List of Illustrations	vi
Introduction	x
Prologue	xv
1 Photogenic Architecture versus Synaesthetic Experience	
1.1 Photogenic Architecture	1
1.2 Synaesthetic Experience	13
2 A Sensorial World	
2.1 Our World of Perception	21
2.2 The Common Senses	29
2.2.1 Aristotle's Definition	32
2.2.2 Common Senses in Practice	38
2.3 Conception	43

3	The Making of Colour	
3.1	The History of Colour	45
3.2	The Origin of Colour	47
3.3	Colouring the Senses	50
3.4	Colouring the Museum of Colour	53
4	The Museum of Colour	
4.1	The Sight of the Site	56
4.2	The Design	62
5	Conclusion	71
	Epilogue	74
	Appendix I – Plans, Sections and Elevations	78
	Appendix II – Synaesthetic Design Details	85
	Glossary	95
	Bibliography	96

## List of Tables

- Table 1. Sense involvement in stair design. Created by Joy Monice  
Malnar and Frank Vodvarka. Sensory Design, 57.
- Table 2 The Program of the Museum of Colour

## List of Illustrations

- Figure 1 The Treachery of Images (La Trahision des Images) by René Magritte.
- Figure 2 The Guggenheim Museum, Bilbao, Spain. Photographed by the author.
- Figure 3 Model of the Royal Ontario Museum Addition. Photograph by Lenscape Incorporated.  
  
<[http://canada.archiseek.com/unbuilt/ontario/toronto/rom\\_extension/index.html](http://canada.archiseek.com/unbuilt/ontario/toronto/rom_extension/index.html)>.
- Figure 4 The OCAD Sharp Centre for Design. Photograph Courtesy & Copyright Shane O'Neill.  
  
<[http://canada.archiseek.com/ontario/toronto/ocad/3\\_lge.html](http://canada.archiseek.com/ontario/toronto/ocad/3_lge.html)>.
- Figure 5 The Blind Architect. Frame still from documentary by Alexander Pilis. < [www.theblindarchitect.com/04\\_video.html](http://www.theblindarchitect.com/04_video.html)>.
- Figure 6 The Booba and Kiki test. Illustrated by V. S. Ramachandran. A Brief Tour of Human Consciousness (New York: Pearson Education Inc., 2004) 72.
- Figure 7 The Common Senses: two objects as two entities. Illustrated by the author.



- Figure 8 The Common Senses: two objects perceived simultaneously.  
Illustrated by the author.
- Figure 9 The Born Loser, Comic by Chip Sansom. 25 Mar 2006.  
<www.comics.com>.
- Figure 10 The Colour Experience Pyramid. Illustrated by Mahnke, Frank H.  
Color, Environment, and Human Response: An Interdisciplinary  
Understanding of Color and its Use as a Beneficial Element in the  
Design of the Architectural Environment (New York: Van Nostrand  
Reinhold, 1996) 11.
- Figure 11 The Murex Shell. Sketched by the author.
- Figure 12 The Crocus Flower. Sketched by the author.
- Figure 13 Empedocles's theory of the elements.
- Figure 14 The Oriental Concept of the Five Elements.
- Figure 15 The Nearby Neighbourhood.
- Figure 16 Quartier des Spectacles, Montreal, Quebec.
- Figure 17 Site Location within the Quartier des Spectacles.
- Figure 18 Aerial view of the neighbourhood.
- Figure 19 Scene from Saint Catherine Street.

Figure 20 Immediate site, view from Saint Laurent and Saint Catherine intersection.

Figure 21 Immediate Site, View from Saint Catherine and Saint Dominique intersection.

Figure 22 Massing Model.

Figure 23 Visualization of the Museum on Site.

## Introduction

To understand architecture we use our senses, the media of communication between our body and the environment. Without our senses we lose contact with our surroundings; we are left alone in a dark void, with no feeling, no emotion, no experience and no memory.

Contemporary architecture has been so heavily based on visual qualities. There has been much controversy on the validity of giving that much emphasis on the sense of sight in architectural space. While the majority of architects focus on the sense of sight by making it a priority, Walter Benjamin (1892-1940) argued that buildings should celebrate not only by sight but also “by use and by perception – or rather, by touch and sight.”<sup>1</sup> Our eyes alone are not enough to enjoy a complete architectural experience. By means of photography and mechanical composition of spaces, the art of architecture has lost its aura. To facilitate production and duplication, many architects sacrifice architectural details to striking visual impact. These pieces of architecture, being so stunningly reproduced in photographs, are tempting to become replicates in cities worldwide. They may distort viewers’ focus from full body appreciation to

---

<sup>1</sup> Benjamin, Walter, “The Work of Art in the Age of Mechanical Reproduction”, Selected Writings. 1936. (Cambridge: Harvard University Press, 1999) 868.

*addiction of visual beauty.*

Reproductions and duplications of architecture assure equality in design but are only capable of capturing the essence of the surface. Uniqueness is sacrificed in mass production. In the age of mechanical reproduction, our perceptions gradually adapt to the phenomenon. When our perceptions are tamed, architecture is only to fulfill the requirements for duplication and not for body enjoyment; aura slowly disappears in architecture.

When its aura is lost, architecture cannot connect itself to the human soul. Architecture cannot be experienced through two-dimensional surfaces. It pulls away from our bodies, making us feel alienated because our bodies are not involved in the experience, and such disconnection between these architectural spaces and our human bodies has led to architecture that lacks heart and soul.

We do not perceive with one sense at a time but with a mix of senses to grasp the overall impression of a space. This impression involves comprehending depth of space that the eyes are incapable of measuring. The unity of the senses as defined by Aristotle as the Common Senses<sup>2</sup> are the key to recording our perceptions for memorable experiences.

---

<sup>2</sup> For a thorough explanation of the term Common Senses, please refer to chapter 2.

By answering questions posed around how the notion of the Common Senses can be applied to architectural design and how the Common Senses can enhance architectural experiences, this thesis will assert the importance of human senses and their indivisible relationships to architectural spaces. The thesis will show that the Common Senses should be exercised so as to prevent the domination of the sense of sight in order to experience architecture.

Colour is the essential in architecture but not merely ornamentation for the eyes alone. Each colour represents a unique meaning to our body. Instead of using eyes as the only instrument to read colour we read and understand colour through the whole human body with the Common Senses.

This thesis studies both neurology and architecture to illustrate the intricate relationships among our senses, architecture and colour. The design project – the Museum of Colour – is to show that colour not only resides on the surface of a building but is also an interpretation of our mind using combinations of sight, sounds, touch, smell and taste. The design challenges the contemporary concept of museum by redefining the process of learning from the conventional audio-visual method to Common Sensual experiences. To contrast with the idea, the site of the Museum is chosen to be in Montreal, Quebec, at the junction of a

shopping district and an urban area full of visual art. The neighbourhood is in the process of being redeveloped and the site currently is vacant with the remnant of an adult movie house destroyed by a fire in 1993. A neighbourhood full of visual excitement from miles-long shopping windows, an area not lacking character, and the former sensual use of the site make it the perfect candidate to house this Museum of Colour.

Unlike a finished project of Museum of Colour where visitors can experience with their Common Senses, readers of this thesis are reminded that they can use only their eyes to understand the design. Written descriptions and drawings are used to guide readers' imagination to explore the colour in their minds.

The thesis project shows a better way to connect the human body and its surrounding environment, while extending the design boundaries for multi-sensorial experiences within architectural spaces. Architecture should not only design for the eyes, but also be a celebration for all of our senses. The design of a museum that is enjoyable with a variety of combinations of senses awakens the visitors' perception of spaces and enlivens their demand for more sensual architecture.

The thesis is divided into five sections. Chapter one begins with the

definition and comparison of photogenic and synaesthetic architectural experiences. Chapter two explores our sensorial world and discusses perception and conception. Chapter three, a section on colour, renders the history and origin of colour and explains its role in architecture. Last but not least, chapter four describes the details of the museum design to illustrate how the Common Senses can be applied to enable visitors to form at each visit their own perception of the architectural space.

## 1. PHOTOGENIC ARCHITECTURE VERSUS SYNAESTHETIC EXPERIENCE

### 1.1 Photogenic Architecture

Our sense of sight becomes more important in architectural design. It has been amplified by over-publicizing architecture through visual media. To obtain more coverage and publication in return for fame, there is an



Figure 1. The Treachery of Images (La Trahison des Images) by René Magritte.

increasing number of photogenic architecture aiming to capture the attention of the public. Architecture has been reduced to seductive images to enhance front covers of magazines. However, there is a large gap between visual representation and the object itself.

Architecture is not only about capturing beauty by visual means but should also take care of our natural gift of the realm of senses. Our visual sense is in no position to represent our full body experience and therefore an object cannot be fully rendered on a two-dimensional surface. *The Treachery of Images* (1929) by surrealist René Magritte (1898-1967) illustrates the limitation of representing an object on a flat surface. (Figure 1) The statement "This is not a Pipe" (*Ceci n'est pas une pipe*) creates a satire of this issue and illustrates the limitation of visual arts. The



painting of a pipe is only a visual representation of a pipe, but does not equal to the pipe itself. The flattened “object” can only replicate the colour and shape of our general perception of a pipe on a two-dimensional surface. Besides the visual representation, there is no other supportive information to prove that it is a pipe. The lack of sensual information distinguishes this painting from the actual object. Although the highlight depicted on the painting suggests the pipe’s smooth, polished texture, it has no form or texture to physically verify what we see. The flat version lacks heat from the previous burning of tobacco and gives off no aroma. It cannot be lit and used. The representation of the pipe cannot give the viewers a sensory experience as a real pipe would, thus, Magritte asserts, it is not a pipe.

Painting and other visual forms of visual arts are different from the art of architecture. The former focuses on formal elements and pictorial principles but the latter emphasizes on experience.<sup>1</sup> The size and volume that architecture deals with should speak of its relation at a human scale. It allows all of our senses, not only one, to enjoy since we do not rely on one sense to perceive the outside world. Therefore, architecture should never be restricted to one type of perception such as those involving two-dimensions.

---

<sup>1</sup> Formal elements include colour, space and composition; whereas pictorial elements include line, shape, colour, value, surface, texture and the illusion of space.



Figure 2, 3 and 4. The Guggenheim Museum, the Royal Ontario Museum Addition and the OCAD Sharp Centre for Design.

Among our contemporary collection of architecture, it is not difficult to find pieces that have been put in tremendous efforts in preparing for visual excitement. These pieces often make remarkable landmarks of the city and they instantly gain praises of the public. Frank Gehry's Guggenheim Museum in Bilbao, Spain; Daniel Libeskind's Royal Ontario Museum Addition and Will Alsop's OCAD building both in Toronto, Canada, are world famous architecture that stand out in their respective cities because of their extraordinary forms. The curvilinear titanium walls of the Guggenheim Museum, the projecting angular glazing of the Royal Ontario Museum Addition and the coloured piloti-raised black and white patterned rectangular box of the OCAD building catch the eye instantly. They successfully make visual statements among their adjacent buildings; however, once visited, they are no more than beautiful shells of spaces. They may serve their function visually and programmatically but their architectural journeys are difficult to be recalled after

their visits. Their overpowered casings capture all of our perception; their form and colour dominate our memories.

Architectural designs that focus only on pleasing the eye are no different from paintings. They care less on providing sensorial environments but concentrate on the visual elements. These pieces of architecture have become flat, reduced to façades and surfaces made up of compositions of windows, openings and opaque areas, making them candidates to be named as “flat architecture”. Flat architecture unquestionably serves great purposes as icons of a city; however, after visitors enter it and the beautiful façades fall out of sight, those façades serve no more purpose other than a shell. Such contemporary buildings do not encourage any sensual interactions as visitors move within them. The eyes of the visitors are busy following the forms of the spaces, of which seize their attention to their other body senses. Since forms and colours can be captured at a distance, there is no need for viewers to slow down and feel the place. The architectural experience is traced on our memory as vague visual images. Architecture should be more than just creating breathtaking views to capture our attention. It should be read by our body using a variety of senses. When all of our senses take part in an architectural journey, the memory becomes secure because it provides more information to be

remembered.

Memories are mental images but are by no means static or limited to sight. Frances Downing describes mental images as “active, vital repository of information gathered through sensual experience – through sight, sound, smell, touch, and taste.”<sup>2</sup> The numerous flashbacks of images contain not only direct replays but also emotional involvement which then again is transformed to new heights with personal influences. However, sensory memory is selective, so it chooses only the dominant senses to strengthen and reinforce in the memory. During a public lecture, architecture professor Marco Frascari mentioned that images are not limited to visual images but are derived from all senses, the intuition of the whole. Blind people can draw images that are recognizable by people who can see because an individual can create his or her own mental images from other senses he or she possesses.<sup>3</sup>

Sadly, the importance of senses other than sight is often overlooked. Alexander Pilis, an artist and architect working on the concept of Blind Architecture, has taken note of the visual architecture that exists today. Noticing the impossibility to appreciate contemporary architecture without sight, he criticizes the massive

---

<sup>2</sup> Malnar and Vodvarka 22

<sup>3</sup> Frascari, “Intuition”

amount of visual projection in our everyday lives which blinds us from seeing the reality.<sup>4</sup> The visual projection, rather than praising our gift of sight, plays a joke on our singularity of senses. When one sense is too powerful, it blinds our other senses. He insists that future architecture should focus more energy on the tactile qualities as well as the other senses, because architecture is not only for the eyes but also for the other senses.



Figure 5. The Blind Architect.

We are all blind, except the blind can teach us again how to see, how to sustain attention.... We see too much. There is no end of seeing. There is too much to see. If we do nothing else we see. We live in a culture so filled with things to be seen that visibility is what determines the being or non-being of objects, experiences, and identity. There is so much to see, and rarely an offer, hardly ever the offer of a space or a time for looking. Even less the offer of a space or time where one need not look at all, but rather...<sup>5</sup>

The unfinished sentence of his reflection on his concept leaves space for readers to ponder on the validity of our visually overwhelmed lives. To testify his statement, he conducted an experiment that temporarily stripped off a person's sense of sight. A man was given a pair of goggles to obstruct his view and a cane before he was

<sup>4</sup> Pilis, Alexander, exhibition CD, 2005.

<sup>5</sup> Ibid.

introduced to a square, white room. (Figure 5) Without knowing anything about his environment he immediately felt lost and confused. He slowly moved around to explore the room with the help of his cane. Once he could hit his cane against the wall, he followed the tapping sound created by its collision with the wall and walked around the room. It took him a good amount of time to get familiar with the room, to examine its scale, dimension, proportion and texture with the help of echoes, resistance and friction created by the surfaces of the room. By taken away the sense of sight that he primarily depends on, his other senses took over and surprisingly provides him a more detailed study of his environment.

The term “flat architecture” has both literal and metaphorical meanings. From the literal perspective, a *flat* space is self-evident such as photographs; while metaphorically the term refers to the lack of meaning behind a pictorial scene. Very little attention is paid to the relative spatial relationship between the space and the human scale as it becomes minor issue compared to intricate geometrical forms. Flat architecture remains at the surface and loses the opportunity to incorporate layers of meaning. Consequently sensual experience becomes less critical because the experience of flat architecture is identical to a photograph.

Architect Juhanni Pallasmaa reminds contemporary architects to be aware of

the pitfalls of the domination of the eye and the insufficient reason for granting it the power to rank a higher importance over the hands and skin:

As a consequence of the power of the eye over the other sensory realms, architecture has turned into an art form of instant visual image. Instead of creating existential microcosms (and) embodied representations of the world, architecture projects retinal images for the purpose of immediate persuasion. Flatness of surfaces and materials, uniformity of illumination, as well as the elimination of micro-climatic differences, further reinforces the tiresome and soporific uniformity of experience.... Our buildings have lost their opacity and depth, sensory invitation and discovery, mystery and shadow.<sup>6</sup>

In his article "The Architecture of the Seven Senses", he further explains how vision alone is inadequate in our daily life experience:

The eye is the sense of separation and distance, whereas touch is the sense of nearness, intimacy and affection. During overpowering emotional states we tend to close off the distancing sense of vision; we close our eyes when caressing our loved ones. Deep shadows and darkness are essential, because they dim the sharpness of vision and invite unconscious peripheral vision and tactile fantasy. Homogenous light paralyses the imagination in the same way that homogenization eliminates the experience of place.<sup>7</sup>

It is interesting to compare the essentiality of touch during the communication between architectural spaces and that between lovers. By obstructing sight with darkness, we are forced to use our hands and our body to uncover the shadows to observe our immediate surroundings. Our fingers will guide our mind to create a journey of our own.

---

<sup>6</sup> Pallasmaa, "Hapticity and Time" 78.

<sup>7</sup> Pallasmaa, "The Architecture of the Seven Senses" 34.

Sarah, whose eyesight was lost during the war, explained her tactile experience to Kevin Hetherington, a sociologist from Lancaster University:

When I am touching something there is no 'me' and the object I am touching. It is just the object. So the 'me' disappears... for 'me' it's just touching, identifying with the actual thing there.... The way I touch is identification with something somewhere inside of you; you have got a relationship with it.<sup>8</sup>

When touching an object, forms, temperatures, textures are all perceived at the same time. Such sensation cannot be perceived with a gaze at the object. For Sarah, when she was blind, touch replaces sight and is even more powerful than sight alone. During the process of touch, there is a game of identification involved to match her feeling with her past memory. Instead of narrowing her sensorial world, her blindness widens her spectrum by contact and communication with the object and of the space. Although touching takes her longer to perceive, the prolonged experience makes her memory intimate and dearly.

Architect Djamel Zeniti has also noted the importance of tactile experience during his pursuit of architecture. The following paragraph by him regarding the experience of the body engagement with a door renders the importance of the sense perfectly. He explains that by focusing on architectural details, the simple act of opening a door can be a rich sensual journey.

---

<sup>8</sup> Hetherington 1934.



Opening a door to a building is indeed a multi-modal experience, combining visual, tactile and kinaesthetic information. Entering a building usually provokes a change in temperature, in acoustic properties, smells, etc. A door handle thus is mediating a different experience of architecture than what could be gleaned or collected from architectural plans. Instead of conceptualizing a building as an abstract geometrical order, a door handle suggests movement, action, tactile perception and a bodily experience that is unlikely to form a systematic whole.<sup>9</sup>

The negligence of architectural details in today's design is likely the result of misbelieve in aesthetically driven architecture. Wrong emphases are put to produce visual beauty. Since jewel-like architecture can easily gain appraisal of the public, less thought is put into consideration of the interaction between people and between the spaces and full attention is focused on aesthetic beauty. Architecture should not only fulfill spatial but also spiritual needs. Therefore, more attention should be contributed to the sensual quality of design.

Form and pattern are the first priorities in flat architecture. Their production process becomes a geometric puzzle that repeats every time a new building is required. The repetitive process of geometric spatial studies is similar to mass producing hamburgers in a fast food chain because it does not require individual attention.<sup>10</sup> The choice of materials becomes less important. Imitation materials can substitute the genuine ones to cut cost, time and labour. These imitated,

---

<sup>9</sup> Zeniti.

<sup>10</sup> Frascari, "Semiotica Ab Edendo, Taste in Architecture" 192-193.

simplified and economically produced architectural meals are only enough to satisfy the hunger of space and surface texture. They are meant to be devoured together with artificially flavoured carbonized-water but not enough to fulfill sensual and psychological needs. The memories of the spaces exist only temporarily because the senses did not get involved in the architectural journey.

At the beginning of his essay "*Semiotica Ab Edendo, Taste in Architecture*,"

Marco Frascari critiques the tastelessness of contemporary architecture.

Contemporary architecture is almost entirely tasteless.... The postmodern condition presents an approach grounded in the generation of new 'morality' for architecture. This 'morality' stressed the visual components of signification. This tendency ... evolved into the visually dominated manipulation of meanings proposed by the postmodern condition of architecture. Both the style and the condition strip away from architecture any pleasure to be had in either its use or conception. Such architectural products are rich in voluptuous processes of signification, but are completely bereft of tactile pleasures, that is, 'taste'.<sup>11</sup>

The "taste" that Frascari mentions does not refer to sweetness on our tongue, but is a metaphor for pleasure that is often associated with our tactile and gustatory devices.<sup>12</sup> As Frascari uses the term *taste* to represent beauty and the appreciation of the aesthetic quality, the lack of taste in contemporary architecture indicates the reduction of architecture to spaces bereft of enjoyment.

Contemporary architects should keep in mind that architecture's basic function

---

<sup>11</sup> Frascari, "*Semiotica Ab Edendo, Taste in Architecture*" 191.

<sup>12</sup> Kormeyer 42.

is to provide shelter and comfort for both the body and the human soul. The experience of shelter and comfort can not merely come from the visual sense but with a mix of senses to form an entire experience. When sensorial experience is incorporated into architecture, it really deepens people's memories of places because it facilitates interaction and intimacy between the human body and the space and memorization of the experience. Strong memory further aids in developing a sense of belonging to the place by attaching present experience to the past.

The bias against sensuality in the design of architecture is to be blamed on not making sensuality a compulsory part of the design process. Architects are responsible for the lack of investment in multi-sensorial architecture. If it speaks the wrong language by making sight a priority over the other senses, the resulting architecture sours, degrading the quality of the architectural experience to an incomplete experience solely for visual pleasure. Since vision can be used at a distance, our body does not have enough attachment to make the architectural journey memorable. In order to encourage interaction of the body and of the space, a study on synaesthesia can widen our spectrum to understand how the human body perceives experience.

## 1.2 Synaesthetic Experience

The word synaesthesia is a compound Greek word formed by the prefix *syn*, meaning union, or together, and the suffix *aesthesia*, meaning sensation.<sup>13</sup> It describes a condition in which a person involuntarily raises one sensation when a different sense is stimulated.<sup>14</sup> People with synaesthesia are common to have a stable connection between two of their senses, and the combination differs from each synaesthetes. Some of them pair up taste with sight, whereas the majority of synaesthetes bridge sight with sound, claiming to see colours by hearing names and other nouns.<sup>15</sup> Their claims are not to be mistaken as hallucinations or as plays of metaphors, but synaesthetes can actually experience the sensations. Their experience is unique to themselves; one person may involuntarily link the letter A with the colour red, whereas the other person disagrees and claims his in blue. The synaesthetes exercise their condition to aid with their memories. They are also more involved to their surroundings because of the extra sensation that aid memorization and increase attachment to their environment.

When discussing patients diagnosed with synaesthesia, neurologists Dr. Cytowic

---

<sup>13</sup> Harrison 3.

<sup>14</sup> Ibid 254.

<sup>15</sup> Ibid 30.

and Dr. Wood try to understand why patients have a comparatively strong ability to memorize names. They concluded that "it is the sensation that is memorable, not the name."<sup>16</sup> Thus, in order to have memory securely implant in our mind, it is necessary to relate the memory to be remembered to a sensation. Likewise, the richer the sensation, the stronger the memory is going to be. This explains why it is difficult to recall exhibits from museums that are designed to communicate with limited senses. Exhibitions that involve a wider range of senses, a rich Common Sense, help visitors to easily recall their experience in the museum long after their visit.

Synaesthetic experience differs for each individual. These experiences, however, stay constant all of their lives. Synaesthetes give identical responses when presented with the same test objects in experiments that last as long as several years. Those children who have lost the ability as they grow up give inconsistent answers to identical tests. Neurologist Dr. Cytowic with his patient, Michael Watson, recorded a series of tests on gustatory-tactile synaesthesia. When a mint solution was given to Michael without revealing the nature of the liquid, he claimed he could feel a smooth transparent glass column with his fingers. The column was so close it

---

<sup>16</sup> Cytowic 94.

seemed as if he could reach out and touches the real object. As the taste washed away with the uncontrollable dispersion of saliva, the column receded into perspective.<sup>17</sup> The test was repeated several times throughout the long research period and the result was the same. The association of the taste of mint and the glass column was not due to an actual merging of the two, but rather was a sensory translation of instant feeling that Michael owned. The taste of mint always felt like a glass column and probably a glass column (although unrealistic) tastes like mint to him. The feeling was presented as a reality in Michael's mind and is a unique phenomenon non-synaesthetes could ever imagine. His one-of-a-kind sensual experience of his everyday life makes his architectural journey livelier and animated, embedding stronger memory than architecture perceived mono-sensorially.

If synaesthetes benefit from their rich sensual experiences, then we can assume that additional sensations can help make everyday experiences more enjoyable and memorable. Unfortunately, not all of us have true synaesthetic ability that can be detected by neurologists. Statistics show that only one in 2,000 of the population is granted naturally with synaesthesia and the condition runs within families; however, there are neurologists who have a different opinion.

---

<sup>17</sup> Cytowic 122.

These neurologists believe that everybody is born with synaesthesia. They agree that children until the age of three months generally have joined senses.<sup>18</sup> As they grow up, the sensory receptors bloom and ripen, and the distinction between the senses sharpens and converges to particular specialties either with the separation of the nerves as they mature, or by education. At school, children are taught the differences between eyes, ears, hands, noses and mouth and their corresponding functions. Daphne and Charles Maurer try to describe the infants' synaesthesia in *The World of the Newborn*.

His world smells to him much as our world smells to us, but he does not perceive odours as coming through his nose alone. He hears odours, and sees odours, and feels them too. His world is a m el e of pungent aromas – and pungent sounds, and bitter-smelling sounds, and sweet-smelling sights, and sour-smelling pressures against the skin. If we could visit the newborn's world, we would think ourselves inside a hallucinogenic perfumery.<sup>19</sup>

The description seems exciting to the non-synaesthetic population; however, this event does not stop us from wondering whether growth and change come naturally, or are forced subconsciously through knowledge? Is there a way for non-synaesthetes to regain their ability to get a more voluptuous everyday experience?

---

<sup>18</sup> Ibid 16.

<sup>19</sup> Ackerman 289.

Is it possible for non-synaesthetes to experience synaesthesia? V. S. Ramachandran, a physician specialized in the study of brain and cognition, commented

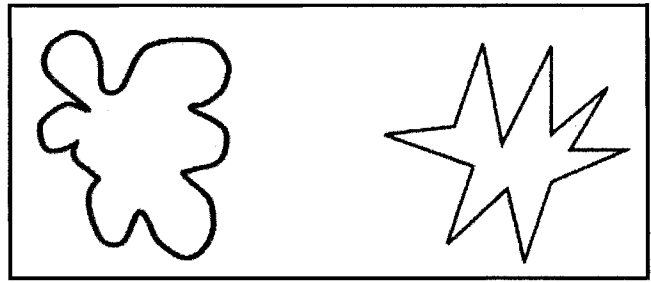


Figure 6. The Booba and Kiki test demonstrated the cross-modal abstraction of properties across our senses.

that we all possess the ability.<sup>20</sup> To verify, he organized a test for 100 people on visual-sound association. He gave each individual two meaningless words, *booba* and *kiki*, and asked them to link the words to two given shapes. (Figure 6) 98 percent of test subjects linked *booba* to the bubbly shape and *kiki* to the sharp angled shape while two percent failed the task. Ramachandran suggested that this might be due to similarities with their corresponding shapes and sounds. Most tested people commented that the sound of *booba* has a softer character, projecting a much lighter sound which is similar to the round corners of the shape on the left; whereas the sound of *kiki* has a sharper character and uses more energy to pronounce, similar to the abrupt, acute and sharp corners of the shape on the right. This kind of visual-verbal connection is an abstract concept and there is no firm agreement on whether particular sounds are more suitable and appropriate to be

<sup>20</sup> Ramachandran, V.S. 72.



given to particular shapers. We did not learn this association from knowledge and no evidence has been given to support the idea that this ability is learnt from school. To prove that it is not language related, Ramachandran performed the same test to foreigners with a remote language background and received the same result. Synaesthesia is indeed common across the population, only we are unaware of it.

Maurice Merleau-Ponty explains our senses are separated "because scientific knowledge shifts the centre of gravity of experience, so that we unlearn how to see, hear, and generally speaking, feel."<sup>21</sup> The process of translating our feelings into words breaks up the possibility of enjoying the common sense. During the process the joined experience separates into independent senses. Verbal descriptions are only metaphors to describe similarity. It is inappropriate to say that one sees colour while hearing a sound, because we have been trained to believe that sound is distinct from colour; however, some synaesthetes actually perceive a combination of the two senses without realizing it. They might describe the sound of a trumpet as the colour red because to them they are the same. In their mind sound and colour appear instantaneously and they have difficulty differentiating the two. The description of feelings separate into individual senses.

---

<sup>21</sup> Merleau-Ponty 266.

The English language has been hinting at the cross originality of the senses. The use of some adjectives reveals the fact that feelings, or our sensory perception, comes from the same whirlpool. Using words that portray one sense also strengthens the description of the other senses. For example, we often describe tastes of cheeses to be sharp, pungent and earthy. The word *sharp*, according to the *Oxford English Dictionary*, has an origin in touch, initially used to represent the fine point of a tapered end; however, the word has also been applied to other extreme feelings. It may mean a high-pitched sound, strong acidic taste, severe pain or extremely cold weather.<sup>22</sup> Words to describe the cheese not only involve taste on the tongue but the word *sharp* also suggests multiple feelings from other sensual sources. It may involve other senses like a sting to the taste buds. The cross reference of the meaning of the word opens up our imagination and makes description of vague feelings more difficult. Without expressing feelings with words, feelings remain as single forms of combined senses. Other examples of cross reference in language are easy to spot: a bright light, a bright sound; a light texture, a light taste; warm temperature, a warm colour. The joined meaning of words in

---

<sup>22</sup> [Oxford Online Dictionary](#).

the language indicates the similarity and intimacy of our sensory perception.<sup>23</sup>

Our synaesthetic ability does not limit to simple shapes, sounds and language but is extended to the perception of architecture as well. As a Professor at Columbia University, New York, James Marston Fitch takes note of the natural way architecture is perceived by the human body. Rather than depending on visual sensibilities, our perceptions involuntarily unify the divided senses as a whole. "Far from being narrowly based upon any single sense of perception like vision, our response to a building derives from our body's total response to and perception of the environmental conditions which that building affords."<sup>24</sup>

Since synaesthetes are proven to have better memories due to their combined sensations, architecture that encourages synaesthetic experiences, both to true and to potential synaesthetes, can result in more memorable experiences. For this reason, a museum that exhibits artifacts in transparent display cases is less capable of making a strong imprint in visitors' minds. The design of the Museum of Colour will therefore rebel the idea of exhibition to the eyes to illustrate architecture that engages synaesthetic experiences.

---

<sup>23</sup> For more information on language and senses, read The Unity of the Senses, Interrelations among the Modalities by Marks, Lawrence E. (NY: Academic Press, Inc. 1978.) 190-192, and chapter 8, "Synesthetic Metaphor in Poetry".

<sup>24</sup> Pearson 68.

## 2 A SENSORIAL WORLD

### 2.1 Our World of Perception

It is commonly known that we possess five senses: sight, smell, touch, smell and tastes. Of the lesser known, there are also senses of heat, pain, balance and direction, that is, thermoception, nociception, equilibrioception and proprioception respectively. Our body uses all of these senses to perceive our surroundings; our perception is multi-sensorial. We depend on education to learn, but ironically, the education process has taught us to single out each sense and to believe that our perceptions involve one sense at a time and made us more dependent on our visual sense than any other senses. In fact, each of our senses bears responsibility in perceiving architecture.

Our sight is a construction in our minds, a result of our interpreting and judging the information collected through our eyes. Since it is our own construction, prejudice might get involved and chances of error might occur.

Our cultural backgrounds affect the way we see. Studies have shown that students of European culture paid more attention to the foreground subject when a photograph is presented, whereas students of Chinese culture spent more time on

the background to study its harmony with the foreground subject.<sup>25</sup> The difference in perception between these two cultures dates 2,000 years, when the Chinese focused on harmony and balance and the Greeks emphasized on individuality. These cultural differences prejudice our eye movements and affect our observation of objects. Their views and perspective are hence different.

Because of the nature and our differences of sight, vision is not always the best tool and the most reliable for communication. It is subject to misunderstanding and misinterpretation across individuals of all cultures. Our visions are actually subjective constructions in our minds. On top of sight, architects should therefore seek other ways to express their work to result in a more complete form of architecture. In this way the architecture can open up more opportunities to be experienced by the visitors.

Categorized by Greek philosophers as the second most important sense, the sense of sound still maintains its same ranking in contemporary thinking. It is the main tool to carry out verbal communication of which knowledge is passed on. Sound is the source of intelligence. Without sound, there would have been no language to pass on knowledge.

---

<sup>25</sup> Randolph.

When considering sound in relation to architecture, it is often misunderstood as the discussion about acoustics. In fact, sound is very important in our daily perception of places. It is a very useful tool to warn us of intruding objects (cars for example), give us information about place and space. For example, sound helps us distinguish between places such as a loud boisterous market and a quiet museum, while telling us the size and composition of the space, even without the help of the other senses. This subconscious information we have gathered through our ears is not usually identified and thus its importance in space-making is often overlooked. We depend on resonance, loudness, intensity and environmental noise to recognize different places.

It is difficult for people with hearing disabilities to carry out their daily lives. They feel alienated and detached from the outside world because they cannot listen to conversations, cannot enjoy birds' chirping in the morning, nor hear an alarm clock to alert them to a particular time. The silence leads to these people's weaknesses in their sense of space. Since sound is so important in people's sense of space, therefore environmental sound is important in architectural design. It contributes instantly to the sense of space better than any other senses could.

Compared to other senses, touch is the most obvious sense to verify sight.

When we look in a mirror, or at something that we are not sure of, the most direct reaction is to use our hands to confirm its existence. The first time we looked in a mirror when we were young, we walked towards the mirror attempting to shake hands with the non-existent person in front of us. It was only when our hands came into contact with the cold, flat surface that we realized our vision was not real.

In fact, all physical senses are an extension of touch. Our skin which facilitates touch is our largest sensory organ, covering most of our body surface area and is our first defence in the external world. Medical evidence confirms the hegemony of touch, claiming that it is the parent of the eyes, ears, nose and mouth.<sup>26</sup> Our olfactory and gustatory abilities rely on the contact of elements with the nostrils and the tongue. Our auditory ability transforms moving air to vibration in the ear drum. Sight, which is very remote from tactility, has also been explained in terms of rays of light contacting the retina of the eye. The contact involved in the five senses, either directly with the object or distantly receiving energy in forms of sound and light waves, supporting touch as the mother of all senses.

Although touch is the origin of the other senses, it cannot be used to replace sight, nor dominate the other senses. The haptic sense can never replace or

---

<sup>26</sup> Pallasmaa, "Hapticity and Time" 78.

compensate for the use of sight, but it is the only medium for someone without sight to access the world.<sup>27</sup> The caress of the skin can pick up what the eyes cannot see. A sense that requires direct contact with our skin, it is the tool for verification of the sight and sound. The physical contact strengthens the attachment of our bodies to the space, reduces alienation of our bodies to the surroundings.

Objects carry smells because particles evaporate and float freely in the air. All living things have a distinct scent that gives off during respiration and perspiration. Organic materials release particles as they perish. On top of that, liquids, gases and some non-living things also have smells. Rocks from different geographical location give off a variety of faint odours because of their different mineral contents. Some metals, for example copper, have a green, rustic scent that is unlike other types of metals. Clay bricks note a tone of earthiness and fire. The smell from each material is different and unique, but we rarely notice these minute differences in our surroundings because of the dominance of our other senses.

The sense of smell is distinct from other senses because odours “are not recalled by words, images, or other items” but can only be recalled by experience.<sup>28</sup> Our descriptions of smells are metaphors of our past experiences. If a person tries to

---

<sup>27</sup> Hetherington 1936.

<sup>28</sup> Trygg Ungen 119.



imagine a smell described by others but is not familiar with the metaphor, communicating the experience is impossible. “The wine has a fruity smell, with a hint of floral and oak” or “this room smells like fresh paint” are good examples. If an individual has never come in contact with fruits, flowers, oak or fresh paint, he or she can never imagine the scent within his or her creative mind. Smell, therefore, is the “mute sense, the one without words”, as described by Diane Ackerman in her book *A Natural History of the Senses*.<sup>29</sup> Smelling is impossible to control because it is of the same process as respiration. We can close our eyes to prevent sight, plug our ears to mute hearing, clap our hands to keep out of touch and shut our mouths to hold the tongue, but the process of breathing is unstoppable because is involuntary and continuous.

Smell has the power to unlock our memory to access series of experiences and emotions and likewise our experiences are scent associated. Since each person has his or her own unique experience and smell is personal and subjective, the same odour may have different meanings to each of us. A space with filled with a particular scent may recall happy memories of the childhood to a person, while the others may find it undesirable because of their past experiences. Each person’s

---

<sup>29</sup> Ackerman 6.

smell related synaesthetic journey is one-of-a-kind. Therefore, architecture that plays with scents can develop personal and unique experiences across visitors with varieties of histories and memories.

Villagers in the movie *Babette's Feast* suppress their desire to indulge in the sense of taste, as they proclaim its power in a song to God. "The tongue, the tongue, this strange little muscle, has accomplished great and glorious deeds for man. But it is also the source of unleashed evil and deadly poison."<sup>30</sup> When food is put into the mouth, it is the most intimate contact between the external and internal body. By restricting a person's obsession to taste, the person's health is secured. In the movie it was considered evil to indulge in the sense of taste because it prevents the pursuit of wisdom.<sup>31</sup> Addiction to the pleasure of taste will result in narcissism and pollute one's soul.

This personal and subjective sense works coherently with the olfaction channel. It is also the only sense that can extend the feeling after the object is removed from the mouth until all molecules become diluted by saliva. The prolonged feeling in the mouth is addictive and it explains why the tongue is "evil" and the desire for taste should be suppressed by the villagers in *Babette's Feast*.

---

<sup>30</sup> *Babette's Feast*

<sup>31</sup> Korsmeyer 18.

It is hard to relate taste to architecture. When one thinks about taste, there is a direct connection between the object and the tongue. It is unreasonable to build with walls that require licking – that would not be hygienic or practical. However, it is not impossible to have spaces that provoke the sense of taste by generating a desire and ignite a little imagination. In a radio interview, Juhanni Pallasmaa claimed the following:

To me...I have experience on a number of occasions that certain qualities of stone, for instance, certain metals, detailing of wood, can be so subtle that you feel it in your mouth, and I am myself, in my own work, conscious of that possibility. I don't think it is an essential quality of architecture, but I have made the observation that architecture can be subtle enough to even evoke a sensation of taste. Maybe 20 years ago in California I was just about to enter a grey, rough stone building by the Green Brothers and when I opened the door, I saw the shining white marble threshold, and that whiteness of marble juxtaposed with the rough stone almost made me automatically kneel and taste the surface with my tongue.<sup>32</sup>

Pallasmaa's metaphor might be exaggerated, but it gives us an idea on how taste can be incorporated in architecture. The juxtaposition of the rough stone and the shining white marble provokes an urge for the human body to make closer contact. Using contrasting textures is one of the ways to bridge the gap between the space and the body in architecture.

Our other senses are less noticeable but they are of no less significance to our perception. Thermoception, the sense of temperature, detects the most

---

<sup>32</sup> The Comfort Zone, "Beyond Appearances - Architecture and the Senses" 4 Nov. 2004.

comfortable temperature to maintain a healthy life. Nociception signals pain to warn us when we get hurt. We keep our balance by reacting to our equilibrioception and keep our bearing by proprioception. It is not common to recognize these senses but they are essential to our everyday life.

## 2.2 The Common Sense

Senses are distinguished for the ease of biological and medical studies. It is impossible to not differentiate them for the pursuit of knowledge. Although our senses are the origin of knowledge, but we should also understand that our body perceives the external as a union.

*Sentire* describes the all-around senses, to feel, to experience. *Sentire* means “the condition or quality of being sentient, conscious (and) susceptible to sensation”<sup>33</sup>. It has a Latin root *sentire*, which means *to feel*. It is about the general idea of a place or a space, without pinpointing any information depending on an individual sense. Feelings are mixtures of all the above senses, processed in the mind and inputted into memory in use. “Full comprehension of place relies not just on sensation (the flow of data received through the sense organs) but also on

---

<sup>33</sup> Oxford English Dictionary.

perception (the result of processing and interpreting the data)."<sup>34</sup> The involuntary union of sensation and perception is the idea of the common sense.

French phenomenologist Maurice Merleau-Ponty reinforced the idea of the unionized sensorial perception: "My perception is not a sum of visual, tactile, and audible givens. I perceive in a total way with my whole being; I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once."<sup>35</sup> His idea is not unlike the deficiency of language mentioned above. Our body grants the privilege of experience; it is not due to any single part of the body but involves the cooperation of the whole. Without the body there cannot be experience, and that experience alone cannot be conjured without the body's participation. David Abram wrote a follow up on the idea:

If this body is my very presence in the world, if it is the body that alone enables me to enter into relations with other presences, if without these eyes, this voice, or these hands I would be unable to see, to taste, and to touch things, or to be touched by them – if without this body, in other words, there would be no possibility of experience – then the body itself is the true subject of experience.<sup>36</sup>

The idea of our body as a subject of experience is getting more common in recent days. In several European cities there are restaurants promoting eating in

---

<sup>34</sup> Malnar and Vodvarka 21.

<sup>35</sup> Merleau-Ponty, Maurice, "The Film and the New Psychology," Sense and Non-sense, 48.

<sup>36</sup> Abram, David 45.

the dark. The fad initially started in Berlin by a group of visually impaired; the Dunkelrestaurant serves dinner in the dark.<sup>37</sup> After making a choice on the menu in a dimly lit reception area, customers are led by visually impaired waiters through a dark corridor to a pitch-black dining area where they are seated. There, visually capable customers are imprisoned by the darkness. They cannot go anywhere without the leadership of a sightless waiter as they might hit a table, plates and glasses are knocked down when searching for a drink. Diners even experience difficulty in bringing food with their forks to their mouths. Eating, a normal event, now becomes the biggest challenge of the day. Eventually the discouraged diners surrender the utensils and eat with their hands. Since sight is abandoned, table manners are pardoned and the security bubbles of individuals burst, resulting in more lively conversation. The darkness encourages the replacement of sight by touch as diners enjoy their meals. Conversations between diners become intimate as touching is involved during the process. The active dining experience changes the ordinary concept of eating by highlighting the experience with a combination of senses.

All of our senses have an important role in perceiving architecture. However,

---

<sup>37</sup> Tse, Catherine.

instead of concentrating on how each sense works individually, we should remember firmly that it is our entire being that goes through an experience and not just the eyes, ears and noses. The “common senses” describes the combinations of senses we use to perceive. Architecture that is designed for the enjoyment of the “common senses” leave a well-defined image in our minds. These multi-sensorial experiences are similar to those of synaesthetes. Therefore, architecture should be designed to facilitate people’s experiences and never be merely to please with anyone of the senses alone.

### 2.2.1 Aristotle’s Definition

When we think of the phrase “common sense”, the first definition that springs to mind is about the common knowledge that mankind generally agrees upon. This meaning of the common sense is based on the philosophical meaning behind knowledge, of which all knowledge originated from our senses.<sup>38</sup> For example, ice is cold and fire is hot, water is in liquid form above 0°C, the freezing point, and vaporizes at 100°C when it reaches the boiling point. These facts are commonly known because they have been perceived by our body time after time, and it is

---

<sup>38</sup> Aristotle, *Metaphysics*.

obvious that neither the phenomena nor our perception of them is going to change in the near future. This knowledge is thus named “common sense”, meaning the facts that are common to our senses.

However, the phrase “common sense” carries another meaning in this thesis. Here it is used to describe Aristotle’s concept of the human senses. Also known as “common sensibles” by some translators, it is the union where the five basic senses meet before connecting to the *Soul*.<sup>39</sup> Aristotle believes that the *Soul* is an organ which resides in each of our head. If the *Soul* is damaged, the connection from the sense organs is cut off and our ability of perception stops. It is where all sensorial information is collected to produce as one perception.

Aristotle agrees that our bodies possess five senses. Each of the senses is guarded by a sensory device – eyes to see, ears to hear, skin to touch, nose to smell and tongue to taste. Among the five, sight has supremacy over the others; followed by the sense of hearing.<sup>40</sup> The former, he commented, provides the most information valuable for understanding any object, whereas the latter receives language which is the source to nourish the intelligence. The other three senses

---

<sup>39</sup> *Soul* represents Aristotle’s idea of the conscious. The *Soul* receives common sensible and produces thoughts, emotions and knowledge.

<sup>40</sup> Aristotle, *On Sense and the Sensible*, Section 1 part 1.



are considered of lower grade because they require direct engagement of the body and the object to be perceived. Regardless of the validity for contemporary theories to allow categorization on the importance of the senses, Aristotle's definition of *Common Senses* remains a good and strong reference to understand of perception.

According to Aristotle, all senses are created to have contraries. For sight, there are the poles of black and white; for hearing, there are pitches of high and low. For touch, there are quite a few opposites: rough and smooth, hot and cold, blunt and sharp, hard and soft. For smell and taste, the concepts are more abstract, as their formation depends on mixtures of the four basic elements: earth, water, air and fire. These four elements represent the extremities for the two senses.<sup>41</sup> Each of our perception falls within anything bounded by these extremities and is in fact varieties of combinations of the opposite poles. According to his theory colours are anything within true black and white, sounds are notes that have frequencies within range to process by the ears; surfaces are mixtures of different textures and temperatures; and tastes and smells are conjured by different ratios of the four elements.<sup>42</sup>

Aristotle also stated the impossibility to perceive two objects at the same

---

<sup>41</sup> Ibid, Part 5.

<sup>42</sup> Ibid, Part 7.

moment with the same sense, unless the two objects are incorporated to project as one sensible; by then the two objects become one.<sup>43</sup> He explained that if two stimuli are presented to a singular sense simultaneously without one stimulus overpowering another, the *Soul* is incapable to process the information separately. That means each of our sense are mixtures of their corresponding contraries, the conjured sense produced by the two stimuli should be a marriage of two ratios of the contraries. In other words, contraries sensed simultaneously belong to one sensation. (Figure 7 and 8)

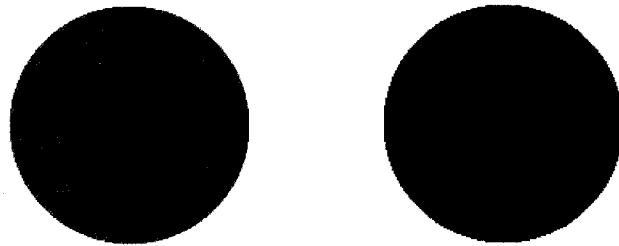


Figure 7. Two objects as two entities, one red circle and one blue circle in this case. They are perceived separately as two objects and are two tones within the black and white contraries.

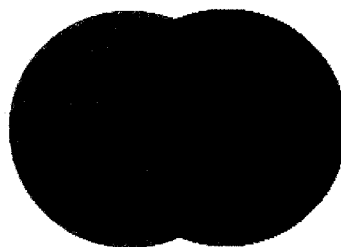


Figure 8. Two objects perceived simultaneously. Since they belong to the same category, i.e. colour, to perceive them at the same time is to integrate the two as a combined object. The two objects are then perceived as one entity. The two circles now appear as a red and a blue eclipse on the sides of a violet ellipse. The object is one and not two. The violet ellipse is a new creation from the two shapes.

---

<sup>43</sup> Ibid, Part 6.

Red and blue are both colours and are bounded by the contraries of black and white; however, circle is a shape and is not bounded by the colour realm. Although both shape and colour are perceived with sight, since they belong to two different contraries, they can be perceived within a single perception. This explains why we can identify the shape at the same moment when we recognize the colour. Two characteristics of different contraries can be perceived simultaneously. This same concept can be extended to the other senses. Since sound is bounded by a different set of contraries than colour, it is possible to perceive both colour and sound at the same time. One object can produce as many sensations from different set of contraries as it can be and still belong to a single perception.

The process of joining the senses is an automatic procedure during the moment of perception. It is a process that comes naturally without our cognition. The idea of red circle is conceived by our Common Senses automatically without our acknowledgement.

Another example of Common Sense can be illustrated by the piano. When the fingers of a musician pushes the middle C key, he or she sees, touches and hears at the same time. All three senses are involved simultaneously and therefore belong to a single perception. It is the Common Sense produced by the piano key. If he

or she claims to have three senses at that particular moment when the note is played, it is because those three pieces of information are from different sensory organs and that he or she recognizes them after the phenomenon is perceived. There are three senses involved in this perception but they come from a single Common Sense.

For this same reason, one object can project only one perception per person at the same moment. If a person claims having two perceptions of the same object, what he really means is he has perceived it at two different moments. More so, if the person insists that he has the two perceptions of the same object at the same time, then he or she must have mistakenly confused perception with conception.<sup>44</sup>

On the topic of Common Senses, Aristotle concluded that although our body perceives a different sense through a different organ, there must be a faculty within our Soul to conceive the differences to create a single perception.<sup>45</sup>

Although his definition seem ancient and philosophical without contemporary biological or neurological support– for example his idea on the Soul as a separate device as our brain – Aristotle’s notion on perception and Common Senses reminds us we should treat our senses as a union. Different from the definition we generally use in today’s English language, Aristotle interpreted the Common Senses as

---

<sup>44</sup> Please refer to the definitions of the terms “perception” and “conception” at the glossary.

<sup>45</sup> Ibid, Part 7.

subjective perceptions rather than as public agreements on natural phenomenon. From this point onwards, the term Common Sense referenced in this thesis is of the definition by Aristotle's.

### **2.2.2 Common Sense in Practice**

We exercise our Common Senses subconsciously. When restricted to perceive only one sensual feeling of an object, our Common Sense gets involved instantaneously and connects the feeling with our other senses. If the association is different than reality, our brains get confused. A simple demonstration can illustrate this point. Try imagining in front of us there is a strawberry in blue colour instead of red. Because the object is of a different colour than what is usually perceived, we immediately start to wonder the reality of the object. Is it more similar to strawberries or to blueberries? Does it feel right to our teeth when one bites into it? The shape, the colour, the texture, the odour and the taste together form the perception of a strawberry. The association cannot be separated, but are combined to deliver an idea of a strawberry to our brain. Any mismatch of feelings sends an error signal to tell us something has gone wrong. For this reason we find out that every object has its own set of designated qualities and our conception of the object

is embedded automatically in our mind. Even a person tries to intercept most senses but one, he or she may activate his or her imagination to associate other qualities with the object. (Figure 9) This is the reason why we have conceptions and prejudice to particular objects.



Figure 9. The Red-Flavoured Gelatine. By answering the colour red as the flavour of the gelatine, his father can get an idea of what the flavour should be. Assuming the boy is not a synaesthete, the gelatine should be of either strawberry or raspberry flavour because they are common among gelatine products.

Applying this idea to architecture, when we describe a space as square and harmonic, we are labelling the Common Sense of the space. The word "square" describes a shape to be seen with eyes, and "harmonic" a description of hearing. The feeling comes spontaneously and is inseparable because it came from the same source, object and space. It belongs to a unity of our sensorium.

The design of the Museum of Colour uses the idea of the Common Senses to exhibit colour. Ordinary museums show off exhibits by limiting visitors to sight. Artifacts and artworks are either kept in transparent boxes or kept out of reach.

Distances between the objects shown and visitors prevent Common Senses to be used. The singular way of observation makes full understanding of the exhibits difficult.

Even the smallest amount of details we collect with our sensory organs contributes to our perception. Take a flight of stairs as an example. Seeing from afar gives information on its location, material and colour; rarely can a viewer perceive more than that. Therefore, if sight is singled out when designing stairs, shape and form takes over so the stairs become only a tool to elevate the body to a higher altitude. In fact, stairs if designed carefully can make an elevation of the human body to an artful, memorable experience. To do so, architects should put extra attention to architectural details to stimulate our Common Senses, at the same time creates more opportunities for interaction between space and the human body.

It should not omit effects on the body when making decisions on the lengths of the rise and the run for the stairs. They dictate the cadence of movement.<sup>46</sup> Is the flight of stairs best made out of moulded concrete or wood? How should the nails be inserted? What is the perfect height for the railings? These questions are some of the many that an architect should consider because all of these issues play a role

---

<sup>46</sup> Malnar and Vodvarka, "Sensory Cues" 147.

in the way users perceive. Using pine as the construction material for a wide flight of stairs in a public library where silence is essential, for example, is inappropriate as heavy traffic step on the insufficiently supported tread produce squeaky noise that break the tranquility of the library. On the contrary, using hardwood in a narrow stair in a church has a different effect. Solid, warm and harmonic tones echo around the church as the pilgrims rise and fall along the steps. It encourages pilgrims to slow down and move with lighter paces. The resonances add formality to the house of God, similar to a knock on the door before entering someone else's house. When designing stairs, users' average body types and the stairs' traffic loads are necessary to take into consideration as all these factors contribute to the experience. These considerations are outside the realm of the visual elements of design but do make a lot of difference in enhancing user's experience with the stairs when architects design with care. Table 1 shows possible considerations of sensorial stair design.



Sensory System	Stairs
Visual system	<ul style="list-style-type: none"> <li>• Colour, material pattern, size of staircase, location of staircase in space, and whether in an enclosed or open space</li> </ul>
Auditory system	<ul style="list-style-type: none"> <li>• Treads made of materials that emit tone when stepped on or tapped with a cane</li> <li>• Space echoes or absorbs the sound of footsteps</li> <li>• Mechanical sound introduced into enclosed stairwell</li> </ul>
Taste-smell system	<ul style="list-style-type: none"> <li>• Venting to include whiff of fragrance to indicate stair room or beginning and end of stair run</li> </ul>
Basic orienting system	<ul style="list-style-type: none"> <li>• Continuous run or changes in direction</li> <li>• Rectangular or spiral</li> </ul>
Haptic system Touch	<ul style="list-style-type: none"> <li>• Treads – material texture gradient, and change in degree of hardness; selection of material for its thermal conductivity to facilitate temperature transfer when walking barefoot</li> <li>• Railings – material texture gradient (rough vs. smooth), change in degree of hardness (rubber vs. steel), thermal conductivity (copper vs. wood), drag (leather vs. marble)</li> <li>• Vibration transfer between treads and railing or mechanical system and railings</li> </ul>
Kinesthesia	<ul style="list-style-type: none"> <li>• Change in tread-to-riser to decrease or increase exertion and speed of person (take into consideration stairs typically thought of as going below ground level or up into attic or loft space)</li> <li>• Landings located to provide moments of rest</li> </ul>
Temperature and Humidity	<ul style="list-style-type: none"> <li>• Heating and air-conditioning vents located at ankle, hand, or head height to indicate first and last stair treads</li> <li>• Air vents located at top or bottom of stair to coincide with direction of main movement on stair</li> <li>• Distinct air velocity, temperature, and/or humidity change at top and bottom of stair</li> </ul>

Table 1. Sense involvement in stair design.

## 2.3 Conception

Besides the Common Sense that involves physical receptions, the conceptual sense also plays a significant role in architecture. Different from the Common Senses which involves physical stimulation, our conceptual sense relates to the mind only. It does not require external stimulation but is generated in the mind according to previous experiences. It is the product of perception after it is conceived in the mind. It formed through a process of thought and interpretation of our memory.

The colour experience pyramid can be

borrowed to explain the factors that influence our personal conception.

(Figure 10)

The pyramid lists the hierarchy of both external and personal influence to colour conception and experience.

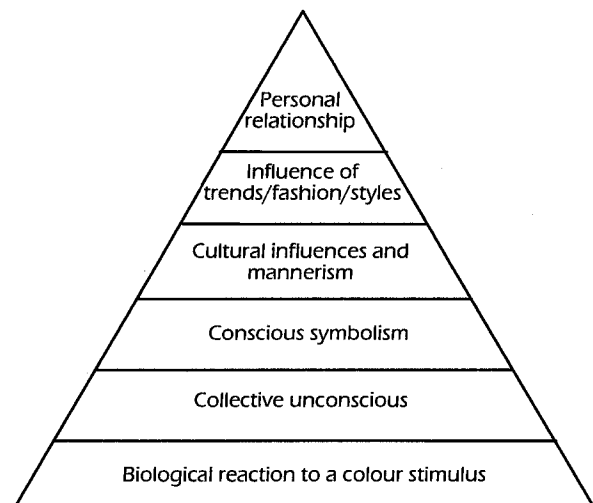


Figure 10. The colour experience pyramid.

External factors, fashion trends and styles for example, have some influence on our conception of colours and of beauty by repeating the same image to our perception.

By then our minds get accustomed to the images and slowly adapt to the trend.

Cultural influences and conscious symbols have even greater influences than trends,

the pyramid indicates, because we have been taught since at young age certain characteristics and meanings are associated with certain colours. Personal relationships with certain colour, meaning subjective preferences, are of a small but major factor that affects our conception. Conception does not equal to perception but is a subjective product of perception. Colour is more than a visual stimulus. It is the construction of our conception after it is perceived.

In his article "Making Sense of Architecture," Architect David Pearson claims that humans produce the sense of place, space and form, fitness and culture, and spiritual power through sensory experiences.<sup>47</sup> These rational senses connect our perception to familiarity by linking the present to the past. Without these senses humans will always feel alienated from their surroundings. Constant lack of familiarity with the environment causes detachment of the relationship between the body and space. Conception relates our perception to reality.

---

<sup>47</sup> Pearson 68.

### 3 THE MAKING OF COLOUR

#### 3.1 The History of Colour

The study of colour has a long and interesting history. Colour has been stretched to a wide range of application and is not just for the eyes alone.

As early as in the prehistoric era, humans started to use colour to aid their living. On the walls of their caves our ancestors collected different samples of earth to use as paint to record diaries of the animals. When more civilized, the Greeks applied colours on white marble temples as gifts to their Gods while the Romans used colours in the form of fresco and tiles as decorations in their houses. Pigments were also strategically painted on the bodies of British tribes to protect themselves from enemies in the Roman times. These painted men, referred to as the Picts, covered their faces with animal tattoos to scare off the invading Romans, pirates and Viking raiders across the English Channel.<sup>48</sup> Until this point, the application of colour had already developed into a great tool to assist personal lives and public well-being. Under the feudal systems, the use of colour was extended to social class identification. Black, for example, was used to symbolize death. It was the colour of widowhood, slavery and treason. Red represented bravery and fortune, and

---

<sup>48</sup> Lethbridge 70.

purple was reserved for royalty. Colours became symbols, representations of power and were used for classification of race.

The classification of colour is directly related to the discovery and development of the dye and pigment industry. The following description will prove that colour can be perceived by the Common Sense. Among the most famous dyes, the colour of saffron and violet were the most expensive to extract and were once legendary.

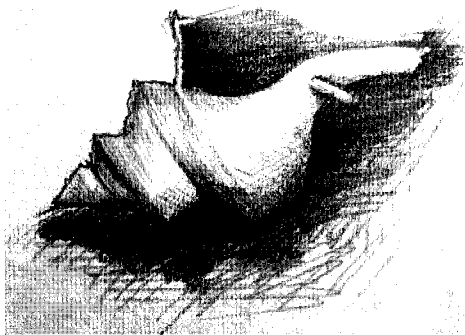


Figure 11. Murex shell, sketched by the author.

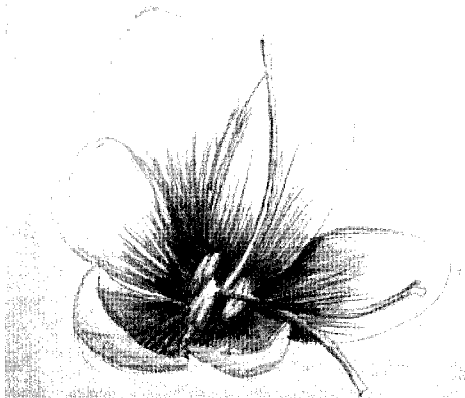


Figure 12. Crocus flower, stigmas are hand picked, dried as saffron, sketched by the author.

The traditional production of the royal purple, or Tyrian purple, was produced through a long and labour intensive process. (Figure 11) First, pale yellow secretion of the Murex molluscs were collected by three days of salting, ten days of boiling, followed by soaking the wool or silk fibres for five hours. The fibres were then exposed to light of which photosynthesis nourishes the colour and turned the dye from deep yellow, green, blue and finally to a rich purple.<sup>49</sup> The consumption of time and labour was reflected at

<sup>49</sup> McLaren 9.

the high price, which led to the colour's dedication to the royalty.

Saffron, another expensive natural dye, takes as much time and labour to prepare as Tyrian purple did. Stigmas are needed to be hand picked from the crocus flowers and to be dried. (Figure 12) It takes a farm the size of a soccer field to produce enough flowers for one pound of saffron. Hence it is more expensive than gold. Unlike murex which carries a malodorous smell, these small stigmas are wonderful aromatics and has been a favourite ingredient in European cuisines.

From the above description of the origin of murex purple and golden saffron, obviously their associated smell, touch and taste are noticeable. Colours are never for the eyes alone, but are multi-sensorial as well.

### 3.2 The Origin of Colour

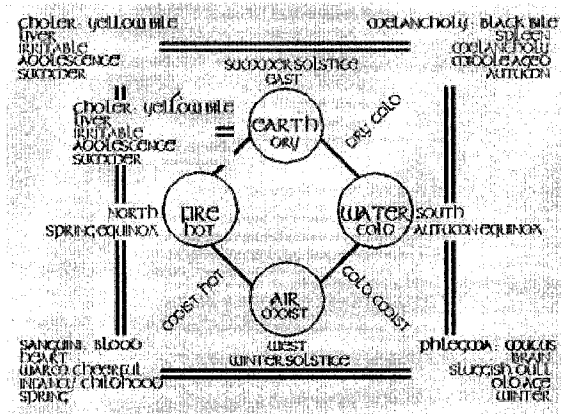


Figure 13. Empedocles's theory of the elements.

The Greeks were probably the first to investigate the kaleidoscopic quality of colours. Empedocles (c.490-430 BCE) considered colour as the "soul of life and

the root of all existence."<sup>50</sup> According to him, all substances were mixtures of four basic elements: earth, air, fire and water. The four elements together in different combinations held the magic of nature and were the secret to all colours on Earth. Each of these four basic elements had a corresponding colour – yellow, black, red and white, respectively – which formed the paint palette of our sensorial world.<sup>51</sup> He believed that the continuous circulation of substances was the origin of the cosmos. All matters on Earth were the alchemy of these coloured elements and that each colour shared the quality of the elements.

Besides Empedocle's belief in colour as mixtures of basic elements, there were other beliefs similar to his. Aristotle and his disciples added aether, a medium to mend all unknown substances, as the fifth element to the earth, air, fire and water.

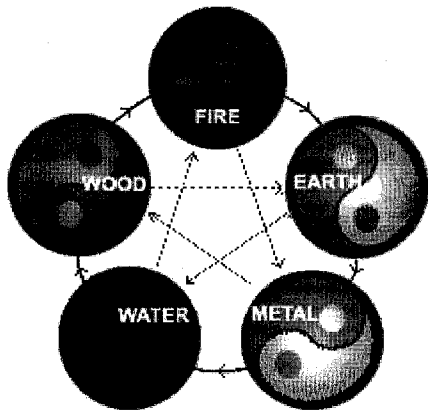


Figure 14. The oriental concept of the five elements.

Likewise, oriental culture believed in its own set of five – metal, wood, water, fire and earth. (Figure 11)

Regardless of the cultural differences and the formation of the sets, they all agreed that all

<sup>50</sup> Brusatin 24.

<sup>51</sup> Ibid.

substance was made up of basic elements. Colour went along side with the change of matters, since each colour was also a creation by the basic elements. The formation of materials directly affects the colour, not only to our visions but also to our Common Senses. The study of Venetian glass production can be used as an example to demonstrate the relationship. To make clear, colourless glass, manganese dioxide is added to silicon sand mixture, whereas manganese alone produces violet and black.<sup>52</sup> Silver, sulphur and carbon make different shades of yellow, while copper alchemizes into aquamarine and red.<sup>53</sup> By adding twenty four percent lead, glass turns into crystals with higher density. The addition of elements to the production not only makes the glass more visually attractive by introducing colour but also changes the density, hardness, weight and sound of the glass. Similarly, the theory applies to any materials. The choice of colour in architecture is more than making decision on aesthetics; it affects our perception of the Common Senses. Material, therefore, should play an important role in making choices of designs.

---

<sup>52</sup> Mentasti 194.

<sup>53</sup> Ibid.



### 3.3 Colouring the Senses

Architectural colour is not an adornment or an ornament but is the source and the main component of architecture. Ornamentation is decoration, cover up on surfaces that can be removed without interfering the architecture itself; however, "if the so-called ornament is critical to an object's message qua\* object, as when a capital and base denote a particular sort of column, then it is not merely ornament, but an essential part of architecture."<sup>54</sup> Colour is fundamental to architecture as order is to Greek temples. Both colour and order are not applied for the sake of visual beauty but are major components of architecture and Greek temples. Colour is part of architecture because it is the source of building materials. All architectural designs are colourful works of art using different materials. Without colour, there will be no material and no architecture. For an architecture design, selecting the right material to paint in the mind's eye means providing a more exciting journey, enriching the experience and making the architectural journey more memorable.

Since our eyes are not always the best instrument for our perception, colour can be convinced through our other senses. By doing so, the idea of a particular colour used in an architectural piece becomes multi-sensual, which helps reinforce in our

---

<sup>54</sup> Malnar and Vodvarka 162.

\* "qua" means "in the character or capacity of".

memory.

The application of colour in architecture is not about the colour of the paint or the choice of the linoleum for the floor; it is neither for decoration nor for ornamentation but is about making the right decisions choosing the best materials and construction methods to express the concept of the building. However, in creating a synaesthetic environment, many factors should be considered when choosing materials. In today's economically driven world, speed in the construction industry is a critical factor in evaluating the success of the project. Every minute counts and any delay increases the risk of going over budget. Architecture today has a shorter lifespan compared to that of the past. Thus, there has been development of new materials that costs less and cuts down installation time. It is not difficult to spot these new materials in various applications. Gypsum boards, laminated panels, metal studs, glues and sealants are all commonly used in the industry. From high end residential towers to low end strip malls, from world-renowned architecture to commercial offices, these construction materials become part of the ingredients in the recipe. It is not that these materials are bad in any way; it is that they are incapable of providing the correct Common Sense to our bodies. The purpose of material in architecture is much more than its colour;

therefore, visual quality should not be the sole consideration. The discussion of material does not stop at the cladding. What is inside and what is behind the beautiful façade are also important because these qualities trigger human's Common Senses. Take white marble and black granite as an example. What makes white marble different from black granite besides the tone? The two of them, given the same polish and same condition, react differently to the surrounding space. They both look stunning on applications, providing natural richness and giving out depth along the veins, yet their differences are beyond their visual beauty. When felt by hand, the crispness and coolness from the white marble grabs attention. It wakes up the touchers' nerves and outstands itself among other adjacent materials that are of room temperature. The black granite also gives cool feelings to the hand once it is touched but warms up faster than the white marble as it adapts the warmth of the touching hand. The warmth creates a more intimate link between the heavy black stone and the toucher than the white marble.

The above example shows two different materials with two different colour. Nonetheless, even materials are of the same hue, intensity and tint, they can signal differently to our Common Senses.<sup>55</sup> The feelings, textures and temperatures of

---

<sup>55</sup> Merleau-Ponty 5.

the same material in different settings are incomparable. Two pieces of red carpet of the same tone and quality are different in different surroundings. It might add too much warmth to a south facing room but is just of the right temperature for the north end of a house. The heat is not generated by the carpet itself, but the perceived temperature varies by its relative surroundings. Our perception of the Common Senses not only changes according to location, but the time of the day, the changes of weather and the sun angles throughout the year also affect our perception of colour.

### **3.4 Colouring the Museum of Colour**

To explore and verify this thesis, a design project has been initiated to explore the possibility of creating multi-sensorial architecture. The program for the project is chosen to be a Museum of Colour (the "Museum"). This Museum tries to prove that Colour is to be enjoyed by our Common Senses and not by our eyes alone. Visitors should be capable of producing their own colour conception with the involuntary help of the other senses, because their hidden ability of synaesthesia can help them associate colour with their sensual perception. Since synaesthetic association can be unique to each person – either given at birth to true synaesthetes

or adjusted by non-synaesthetes' conception – the colour visualized may differ from person to person.

Materials play an important role in the Museum because they are the origin of colour. The Museum concentrates on creating depth – of colour, of architectural composition and of memory. It focuses on architectural details to enrich the Common Sensual experience. The Museum will be perceived differently according to atmosphere, time, season, weather, like an organism living on the site. The exterior façades wear out by nature, recording time by the angle of the sun, strength of sun energy, temperature and humidity, and the direction of the wind, while the interior wears out by users. As it age, the Museum records memory, merging with the city and growing with the city.

As the Museum grows, visitors' experiences in visiting it grow at the same time. Since each visitor has his or her own synaesthesia, each visit will be unique, inviting visitors to come back for another one-of-a-kind experience.

This thesis is about sensorial architecture that is perceived by our Common Senses. Although we have discussed in this thesis on the deficient role of sight, readers should not misunderstand it as a museum designed mainly for the visually impaired. It is not created for a single group of people or to show the majority how

the less gifted perceives space. It is open to all sensations, adaptations and interpretations according to different adjustments, age, gender and cultural backgrounds. The Museum is not an empty shell for paintings of colour and exhibits, but rather is an exhibition itself for the discovery of the colour in the mind's eye. Visitors of the Museum should experience their own synaesthetic colour through their perceptions and conceptions of the carefully designed architectural space.

## 4 THE MUSEUM OF COLOUR

### 4.1 The Sight of the Site



Figure 15. The nearby neighbourhood.

A vibrant metropolis, Montreal is a suitable stage to promote and educate people about the importance of the Common Senses. Located at 1229 Saint Laurent Boulevard, the selected site is at the intersection of Saint Laurent Boulevard and Saint Catherine Street, both are historic main streets rich in cultural influences. It is also part of the *Quartier des Spectacles*, a neighbourhood redevelopment project at the cultural heart of Montreal rich in artistic creativity. (Figure 16, 17 and 18) Incorporating the residential, commercial and institutional use, the goal of this project is to anchor the pivotal intersection of all activities in the neighbourhood. The project is coordinated by the *Quartier des Spectacles Partnership*, a non-profit organization that has set out a guideline of the downtown neighbourhood development, with a goal to enhance cultural activities, to bring the neighbourhood communities together for creative activities and to upgrade the area into one of the

city's icons.<sup>56</sup> Bordered by City Councillor Street, Berri Street, Sherbrooke Street and René Lévesque Boulevard, this future heart of the city will host international festivals, art galleries, exhibition centres and alternative cultural broadcasts.

---

<sup>56</sup> Partenariat du Quartier des Spectacles.



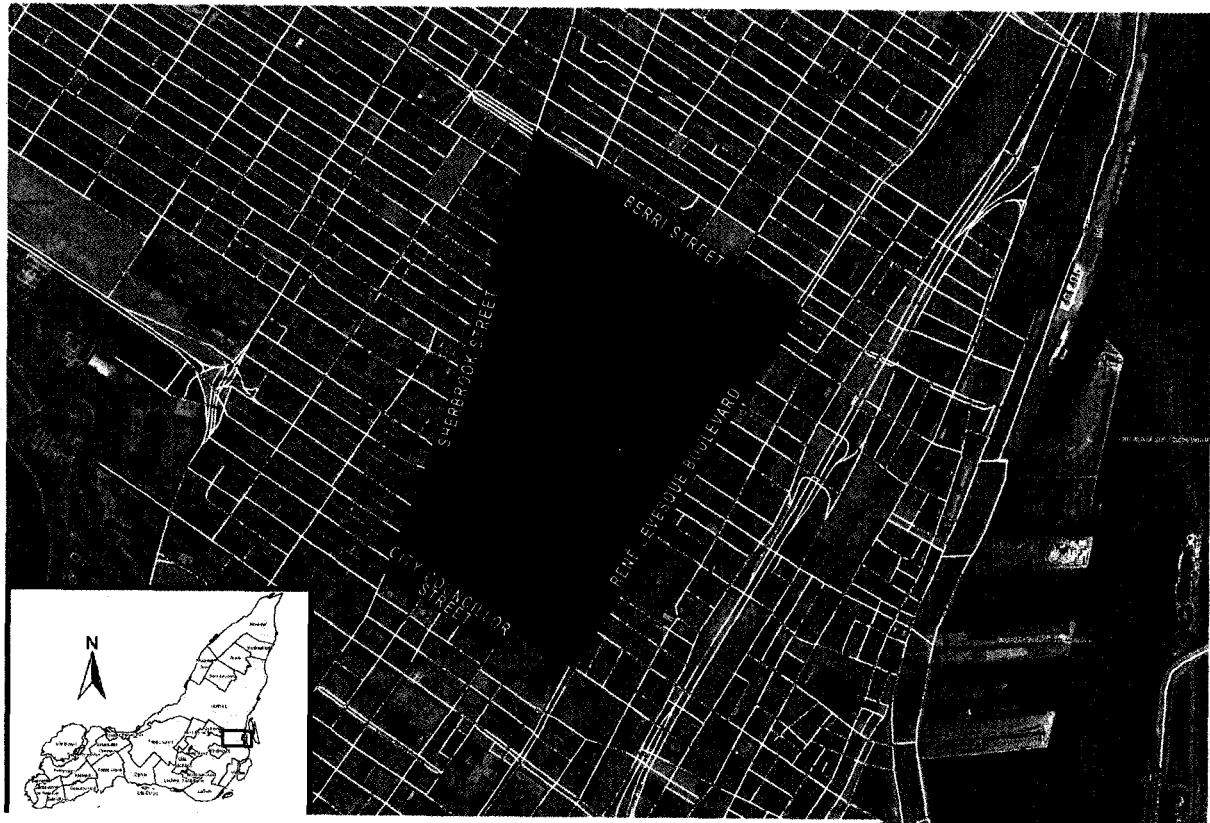


Figure 16. Quartier des Spectacles, Montreal, Quebec.

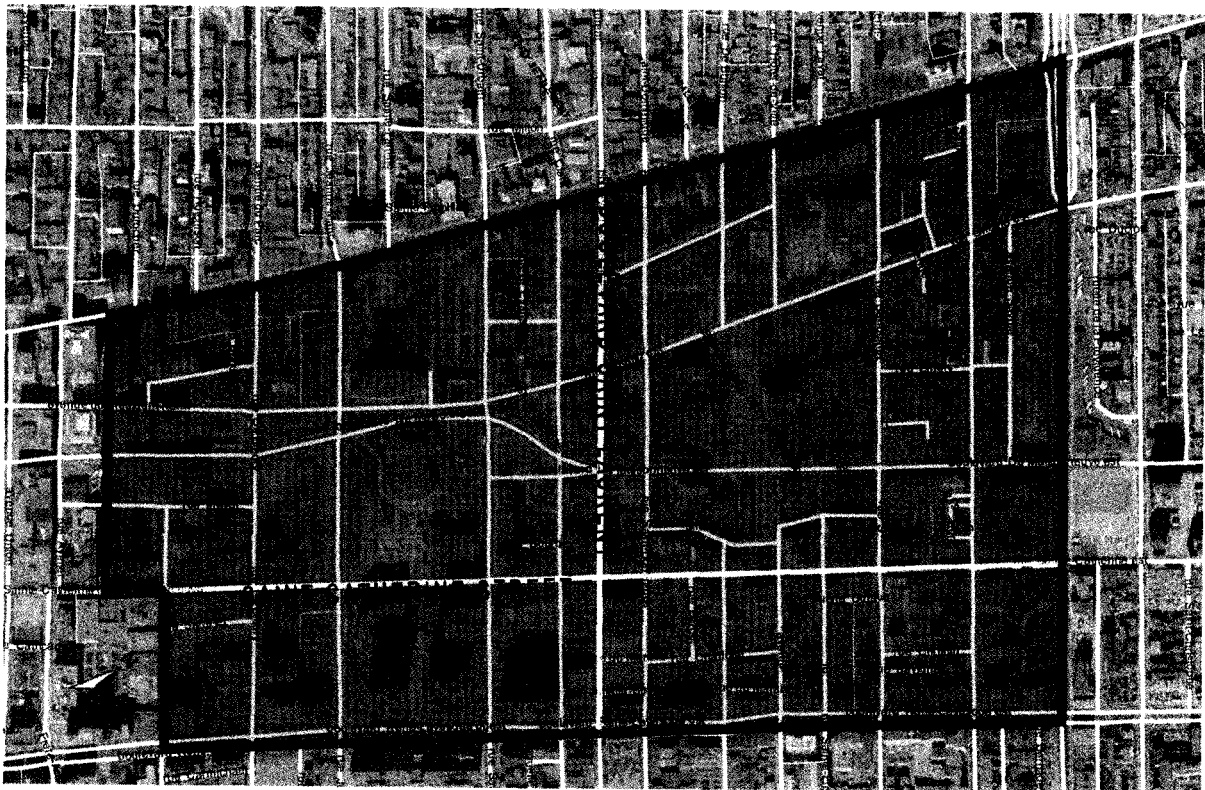


Figure 17. Site location within the Quartier des Spectacles.



Figure 18. Aerial view of the neighbourhood.



Figure 19. Scenes from Saint Catherine Street.

Saint Catherine Street is famous for its visual excitement. During summer months, Saint Catherine Street is closed for pedestrian and performance stages to accommodate different celebrations and festivals that attract locals as well as tourists who come to Montreal. Continuous storefronts are filled with manikins looking out on the busy street all year round. Although it is a one way street for cars, pedestrian traffic works in both directions. Eyes of pedestrians are constantly swiping through polished glass. Shoppers rarely have time or space to stop and inhale the environment. The shops are public spaces limited to individual activities. There is not much public space but sidewalks. Shopping on Saint Catherine Street begins at Crescent Street and ends at a block before Saint Laurent Boulevard. The latter seems to be the border of all the activities or action. The Saint Laurent and

Saint Catherine intersection is the ideal place for public space to extend motion through to the other side of the street, to anchor the intersection as the core of the city as proposed by the *Quartier des Spectacles*.

The selected location was the site of an adult theatre, destroyed by fire in 1993. The proposed Museum of Colour will take the structural ribs of the ex-movie theatre, an entertainment venue for the eyes, to let the museum visitors to enjoy an enlightened experience for their whole body.

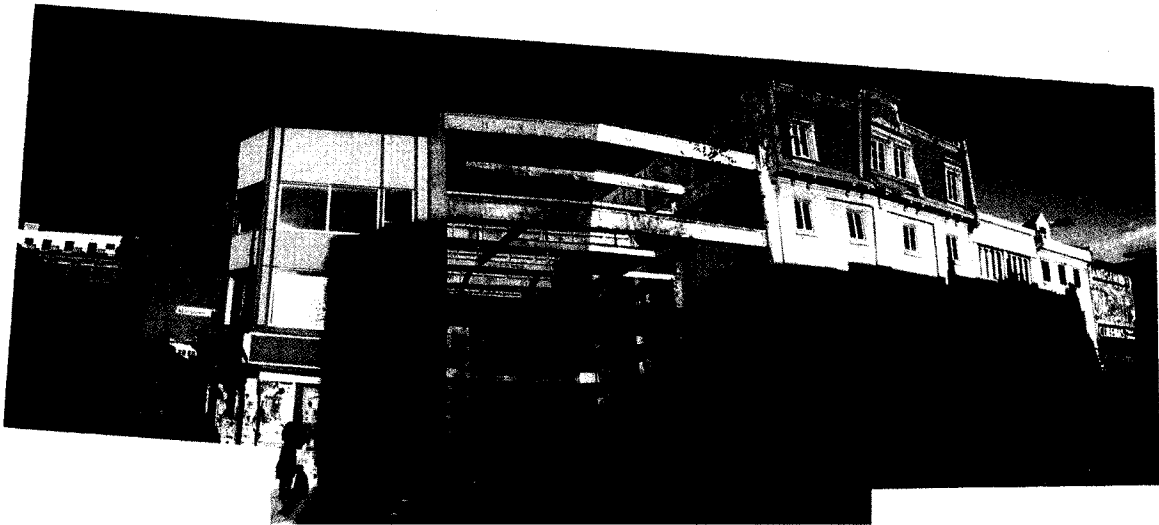


Figure 20. Immediate site, view from Saint Laurent and Saint Catherine intersection.

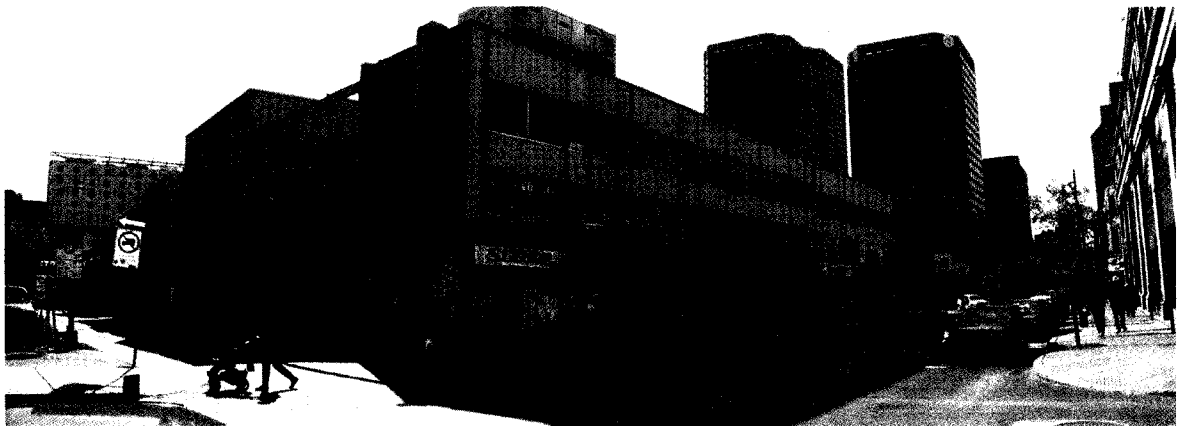


Figure 21. Immediate site, view from Saint Catherine and Saint Dominique intersection.

## 4.2 The Design

Program	
Basement	Entrance from the underground city Bookstore Kitchen Washrooms Storage
Ground floor	Street level entrance Foyer Coat check Gallery towers Xylophone stair with harp railing Restaurant Public washrooms
Second floor	Children's playground Auditorium Public washrooms Stair to the roof
Roof	Outdoor music studio Administrative Office Washrooms

Table 2. The Program of the Museum of Colour.

As listed in Table 2, the design of the Museum consists of an auditorium, a children's playground, a restaurant connected with a series of galleries. It also includes a lobby and coat check, a gift shop/bookstore, office/administration space and service spaces for washrooms and storage. The following paragraphs and the Appendix describe major spaces of the Museum in the sequence simulating visitors' visits.



Figure 22. Massing model. The façade of the Museum stands out from the streetscape not only because of visual purpose but also makes a statement to the nearby “flat” buildings. The projecting cylindrical towers set back from the usual sidewalk in order to create public spaces. The walls of the towers with distinctive textures give the public a sample of the richness of Common Sensual colour of the Museum. The public space created by the cylindrical towers provides a meeting place for visitors.



**Legend** ■ lobby / entrance ■ public interactive space ■ auditorium □ gallery ■ circulation ■ roof garden ■ restaurant ■ bookstore

Figure 23. Visualization of the Museum on site.

Since this Museum of Colour speaks of the relation between space and the human body, the size is relatively small compared to other museums that utilize sight as the main instrument. Although the smaller space can accommodate fewer visitors at a time, the condition facilitates more personal synaesthetic experiences because the visitors and the exhibitions are of closer proximity.

Different from ordinary art museums, where art works are mounted and hung on walls in huge spacious rooms, the gallery spaces for the Museum are small and confined. The galleries are not for art display, but are pieces of art themselves to express what synaesthetic architecture should be like. The walls, floors and ceilings of each gallery space become exhibits showing colour to our Common Senses.

The gallery spaces reveal colour in a subjective manner. The design of them forgo the idea of presenting colour in a direct way but let visitors to explore and to imagine in their minds' eyes with their hidden abilities of synaesthesia. Colour in the gallery spaces is shown through the materials and the architectural details are rich to the human senses. Visitors will enjoy their own Common Sensual journey in the galleries by seeing, hearing, touching and smelling, interpreting the colours with their Common Senses and conceptions.

The galleries are designed based on the oriental idea of the five basic elements:

fire, wood, water, metal and earth. Following the philosophy of where colour comes from, the galleries are organized according to the idea and each element is represented by cylindrical towers of various heights. Fire, an element without form, is expressed with a gallery in the form of coat storage. Placed right at the entrance, this is a transparent tower installed with a spiral track. It is a protected display case visible from both the interior and the exterior of the Museum, showcasing the colour of fire, which is represented by the visible colour and the warmth of the visitors' belongings. Visitors cannot touch the colour rotating in this tower but can only observe from far. This tower symbolizes sight, heat, and the untouchable character of the element.

The next tower presents Common Senses in the form of wood. It features glulam structure, a raised birch floor and cedar beams. Birch decking long enough to stretch across the area is nailed sparingly. When a person walks across the room, it produces dry, crackling sound. To induce convection of air, a six-inch gap pulls the floor away from the perimeter wall of the tower, sending warm air up towards the ceiling. The air cools down near the ceiling and descends, bringing down the aroma of cedar beams from above. As for the exterior part of the cylindrical wall, extra thin veneers of different species – maple, oak and cherry to name some – are



sandwiched between double glazing to reveal colours of the wood grains with the help of natural light. A mixture of sounds, temperature changes, colour changes to the eyes, aroma and textures present the alchemic quality of wood to visitors.

While the wood tower plays with convection of air, the design of the water tower plays with condensation of water. First, the hollow single-glazed interior wall traps snow coming from the roof in winter seasons. Room temperature slowly melts the white snow into light blue water. The changes in density of snow alter the colour of reflection. The exterior wall is made of discontinuous single and continuous double glazing. During summer months the single glazing traps moisture while the double glazing keeps the room warm and condenses the trapped moisture in the system. The clear view to the outside world becomes blurry because of the condensed moist air. The water tower changes our normal conception of colour the carefully designed architecture.

To accentuate the invisible quality of metal, the metal room is dimly lit. Visitors are encouraged to use their hands to guide their way through this gallery room. The perimeter of the space is surrounded by brass tubes hanging from the ceiling. These tubes are of various diameters and lengths to produce different musical tones when brushed by visitors' hands. Since the room's proximity to the humid water

tower, the brass tubes rust slowly, giving off rusty scent of the colour patina. In this dim room the colour of the patina is represented by smell and sound instead of sight, but the visitors of the Museum can utilize their Common Senses to imagine the kaleidoscopic colour growing on the brass.

Next, the tower representing the element of earth is made of two thick stone walls. The thick walls block the outside light but work as thermal masses to capture heat from the sun, making the interior cool in the morning and warm in the evening. In between the two rough surfaces is a stair of the width of an arm's stretch. Forced to touch the sides of the narrow space, visitors cleanse their sensual palate to get ready for a gustatory experience while descending to the restaurant.

The art of food begins at the kitchen. The process of cooking adds heat in the food, changing the colour and flavour of the original food. The kitchen and the restaurant at the Museum set the stage and the observatory for visitors to feel the transformation. Similar to the orchestra pit and the opera house relationship, the kitchen in the basement level plays the symphony to perform for the visitors in the restaurant on the level above. In the restaurant, three levels seating are arranged facing the center. The railings of each level are designed as dining tables. Beautiful aroma of food ascends from the Kitchen to visitors in the restaurant

through the gap incorporated in the table design. Besides the food to be eaten at the table, dining experiences are enhanced with the addition of aroma exhaling from the Kitchen. The colour of food is experienced with sight, smell, texture and taste of food, and with the sound and aroma of cooking.

On the second floor, a playground is designed for children to learn and experience the idea of Common Sense. By utilising colourful displays, playing interactive games and carrying out experiments with colour, children of all ages enjoy playtime with old and new friends while learning about natural dyes and pigments. Instead of the traditional see-and-learn method, the playground focuses on learning through hands-on experiences.

On the same level the auditorium is designed for various public lectures and plays. Since this museum focuses on the Common Senses, this auditorium confronts the conventional idea of one-way stage-audience performance by merging the stage and the audience area together. Chairs are omitted and audience is invited to sit freely on the cushioned slope. The soft cushion absorbs sound for acoustic reason, whereas the bumps and dents are ergonomically designed for visitors to sit or lie down according to their comfort. The continuous stage and sitting area eliminates the invisible barriers between the audience and

presenter. The design helps the audience to get more involve in presentations because the two areas are interchangeable. Knowledge is not restricted to one way, presenter to listener situation, but the audience can also share his or her experience with other visitors. Knowledge is gained through the Common Senses in replace of the traditional audio-visual method. The chair-less sitting area provides enough space for visitors to move freely, allowing participation in lectures or other presentations. Thus, the organization of the Auditorium encourages the sharing of Common Knowledge.

On the roof level, an outdoor music studio celebrates our senses through music. Architectural features are turned to music instruments: percussion canopies and flute fence. The design of the canopies is based on the idea of a drum; translucent skins are stretched over metal frames. The skins provide shade from the sun and record rhythms of raindrops when there is rain. The flute fence is designed not only for safety reason but also as lighting for visitors to play with, and to enjoy the music it may release. Each translucent tube has a hole at a different spot relative to its neighbour. Combined together, the sound they produce results in musical notes similar to that of an organ. When a visitor in the outdoor music studio rotates a metal ring on a translucent tube, he or she in fact switches on the light bulb and the

valve to let air pass through the tube with a simultaneous effect that the entire cylinder is lit up and a musical note is released.

The Museum of Colour is a place where the exhibits are incorporated into the design. The confined spaces encourage visitors to touch the exhibits by hands, listen and smell to imagine the associated colours. The architectural design of the Museum specifically avoids bombarding visitors with coloured paintings hanging on the walls but facilitates them to exercise their Common Senses and even their synaesthetic ability in order to create their own conceptions.

## 5 CONCLUSION

The phrase Common Sense has double meanings.

It is the source of very general beliefs which are agreed as unquestionable truths of the everyday life. It is also used to describe our perception of which all senses are joined together. In Aristotle's philosophy, it is a device where all sensations are collected and mixed before sending off to our *Soul*. The *Soul* perceives all sensations as one, without differentiating sight from sound and taste from smell. There is only one sensation in our perception, and that is our Common Sense.

In this era of visual media reproduction, we often neglect the concept of our Common Senses as sight becomes dominant. Digital pictures, videos, printed matters and virtual modelling are all helpful tools in contemporary architectural designs and their contribution to our lives cannot be questioned; but their products bias on sight is distant from our body. Reproductions cannot capture the invisible side of our perception.

Memory has snowball effect. Similar to a snowball rolling down a hill of infinite length and growing in size as time goes by, our memories also deepen as our experiences involve our various senses. We were pieces of white paper when we were born and perceive the world as it is. As we grow older and our memory

snowballs get bigger, our cognitions interfere our perceptions, changing our views, perspectives and cognizant of things. The change strengthens our perceptions to secure it in our memories. Our memories are our dearest properties which need to be nurtured from time to time. Therefore we should exercise our Common Senses often to colour our memory.

Colour is essential in architecture; however, it should neither be an ornament nor an addition to the surface of architecture. To design architecture for the Common Sense the idea must be incorporated early in the design process so that the colour of materials becomes part of the building and not just on the surface. If and only if forms, proportions, materials, construction methods and compositions are so carefully considered that spaces rich to our Common Senses can be achieved. Common Sensual architecture recognizes our existence, listens and pays attention to our own bodies. Our mind is a witch pot within which synaesthetic perception is stirred. Adding the Museum of Colour to a flat city with Flat Architecture might not create instant alteration to the cityscape, but is a catalyst to educate the public by providing them first-hand multi-sensorial experiences and the synergy of Common Senses.

Since our synaesthetic conceptions depend on the Common Senses of our daily

lives, the conceptions are ever-changing. Visitors of the Museum may feel differently every time they visit. To add even more interest that welcomes visitors return, the design of the Museum plays with seasonal changes. The fountain outside the building's main entrance, the water gallery tower and the rooftop music studio bring back visitors throughout the years.

This thesis uses both drawings of plans, sections and detail drawings, as well as extensive notes and paragraphs to highlight the design project. Words are used to compensate what an image is incapable of. The colour is left for the imagination of the readers to interpret.

It has been said that a pot of gold lies at the end of every rainbow. Now that we understand the secrets of colour, it is up to us to search for the treasure in our mind's rainbow.



## Epilogue

Pondering about what the blind philosopher just said, the boy is wondering if he could revive his hidden ability to experience colour.

He eventually came across a difference under his feet and woke up from his thoughts. At the corner of two ordinary smooth sidewalks sat an unusually shaped building with rough stones under his feet. Interest brought him towards the entrance door.

There was something unique about this door. First, he noticed it was in the shape of a comb with long teeth stretching across the width of the door. The smooth, polished chrome surface produced a reflective sheen on the surface and his hand naturally bonded with it and pushed without hesitation. The hinge of the door started to rotate, the long teeth danced with the ups and downs of the cylindrical hinge and beautiful musical notes released. After leaving his jacket at the counter, which was sent up the spiral glass cylindrical tower, he went to explore the other towers.

He was captured by a raw aroma of cedar. Shades of warm yellow and walnut veins revealed the liveliness of wood under the nurture of the natural light. The floor crackles as the breath of hot air along with the weight of his body. He felt in

love with the space.

Passing through the crackled floor he arrived at another tower, this time made of glass. There was a wall of snow reflected a sea of light blue. The coldness of the snow attracted a layer of condensation which magnified the amount of blue in the air. Turning around he got attracted by the smokiness in front of the view to the outside world. Although the smoke is colourless, it was like a screen that absorbed and blocked out the smog on the busy street. He felt like enwrapped in a bubble, standing in the middle of the city but distanced at the same time. He enjoyed the tranquil moment to cleanse his mind.

White snow melted slowly by the interior temperature into light blue of the sky. Walking on the melted sky and through the snow wall he came into the dark chamber. Rustic smell rushed to his nose. It was so dark inside that he did not know where he was going, so he opened his arms trying to look for guidance. He finally grasped some cool tubes in front of him and he slowly walk towards them. These tubes are made of brass, as he could smell the patina resulted from the moist air. They collided to make beautiful tunes to light up the path around the tower.

The smell of the patina fainted as darkness swallowed. The atmosphere changed and the boy realized he was sandwiched in between two rough, hard

walls. It must have been noon by then and the walls started to heat up by the sun. The sandwiched walls led him down the gentle steps, with the welcoming view to the light fountain. The alternate strips of light and dark spots along the path revealed the hidden beauty of the rough stone walls.

He followed the steps and found himself the exit, which a pungent but pleasing smell awaited him. Moving his body through the wide threshold he found himself in a big round theatre filled with rich aromas. A mix of golden saffron and blueberries of deep violet danced happily up the chimney. Warm breezes of coloured air conjured as a delicious four-course meal. The boy sank into an imaginary ocean of colours.

\* \* \*

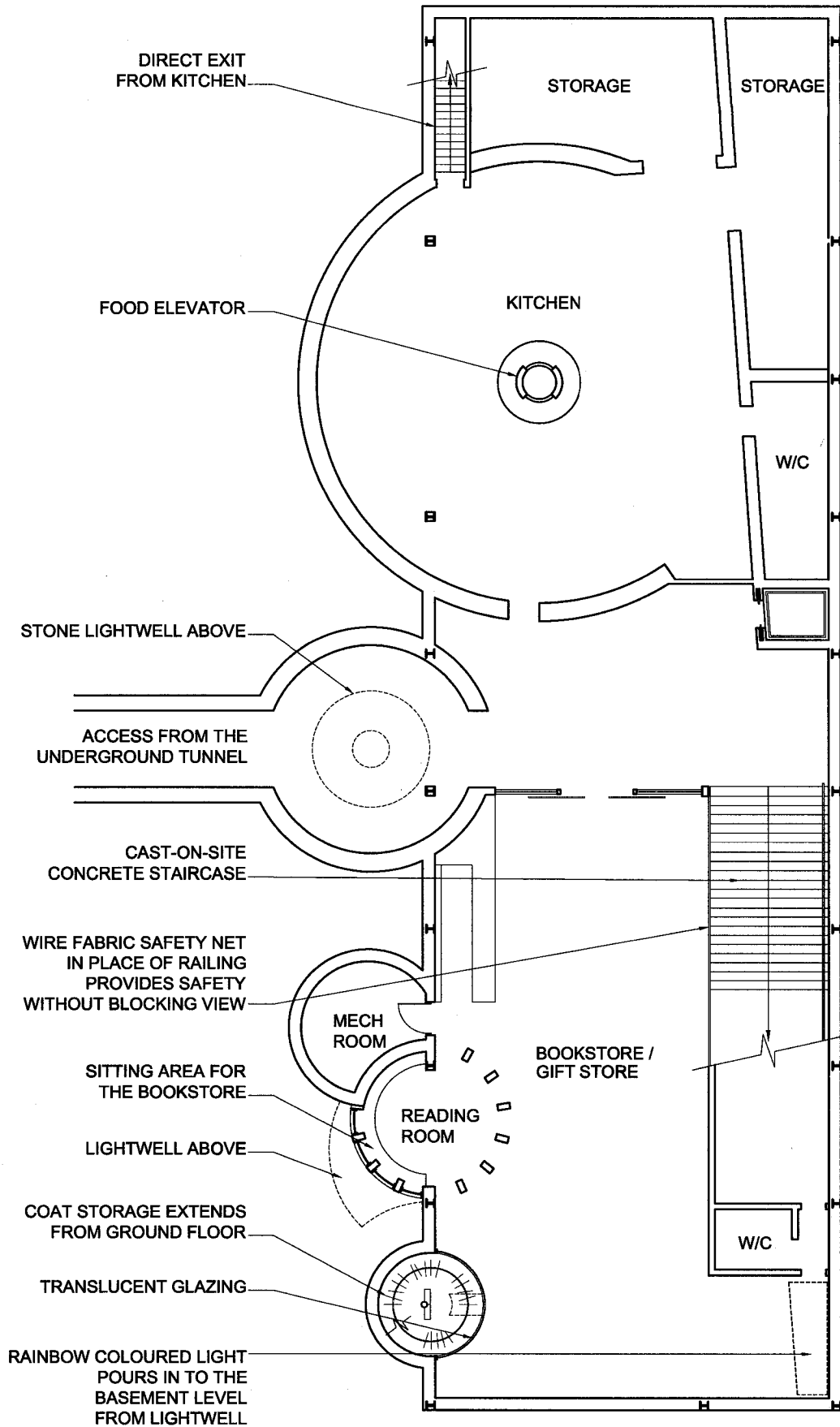
After a sweet dessert he was anxious to search for more. Satisfied in the stomach but hunger for his newly adapted colour-sensing ability, he wended up the tight, narrow stairs and appeared in a place filled with laughter. Stepping on soft and bouncy cork tiles of bright hues children were enjoying themselves playing in groups. In this open concept colour laboratory, one of the groups was learning how to dye in a big cauldron, while the other was creating dry pigments out of plants and rocks. The boy joined one of the groups and had a great time.

\* \* \*

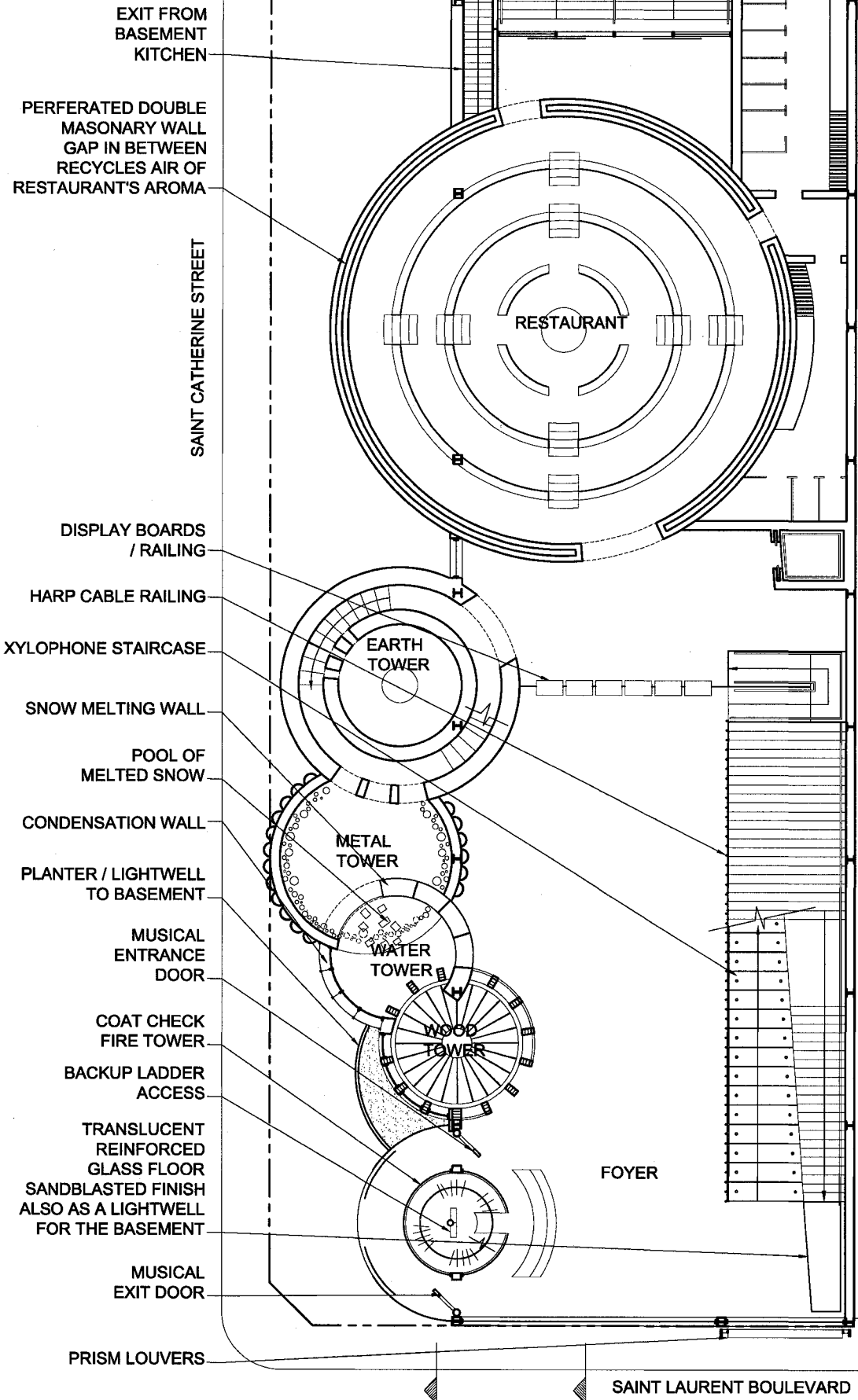
Sliding panels behind him opened and it was time for a lecture. The boy climbed up the felt-cushioned hills in the dim auditorium, found an empty spot and cuddled up. Listening to music and talks he looked up to the ceiling of projected images. He imagined himself lying down on a grassy hill looking up on a starry sky.

When it was time to leave, he descended on the xylophone stair while playing with the harp railing. Light in the colour of the rainbow showered on his body and highlighted his path before him. Together the movements of his body and the kaleidoscopic light created a harmonic symphony.

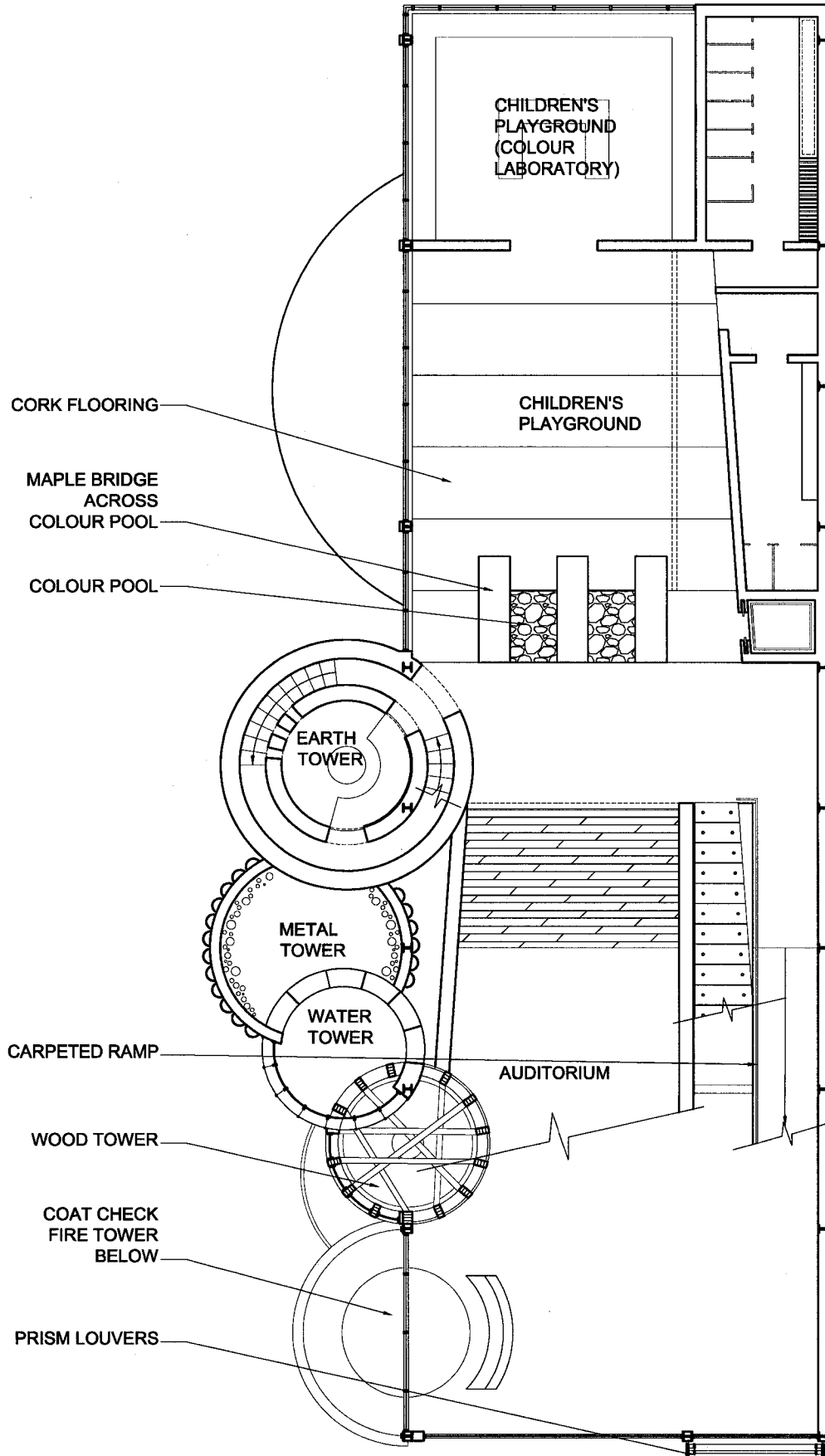
The boy pushed the heavy metal door once again. The chimes from the door painted the outside world with every shade of colour. He had found the legendary philosopher's stone and it had always been in his heart. Colour was not only to be found by the eye but his whole body could be an instrument to feel their existence. Since then he had revived his own painter's palette and his world was once again as beautiful as his long forgotten past.



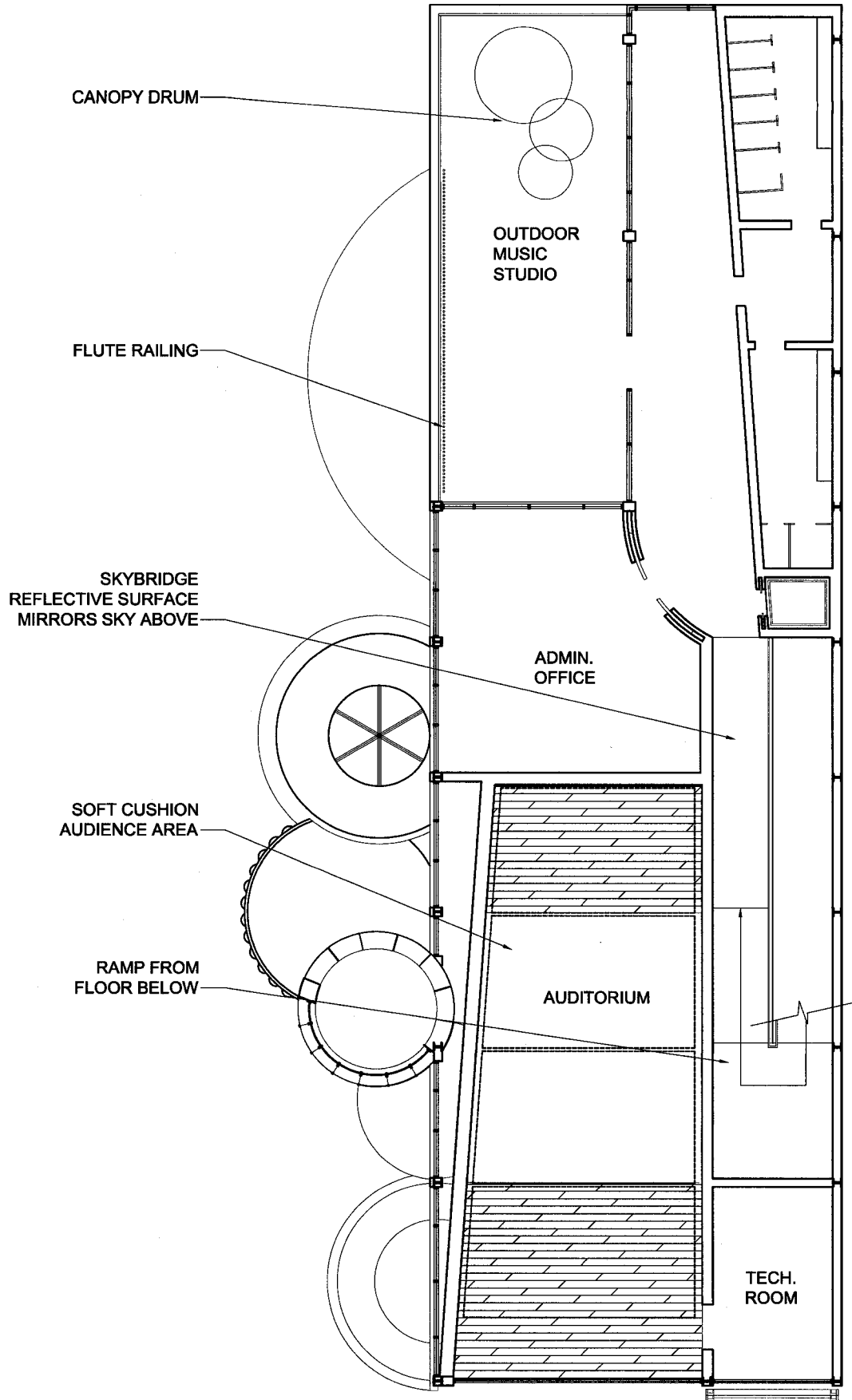
BASEMENT FLOOR PLAN. SCALE = 1:200



GROUND FLOOR PLAN. SCALE = 1:200

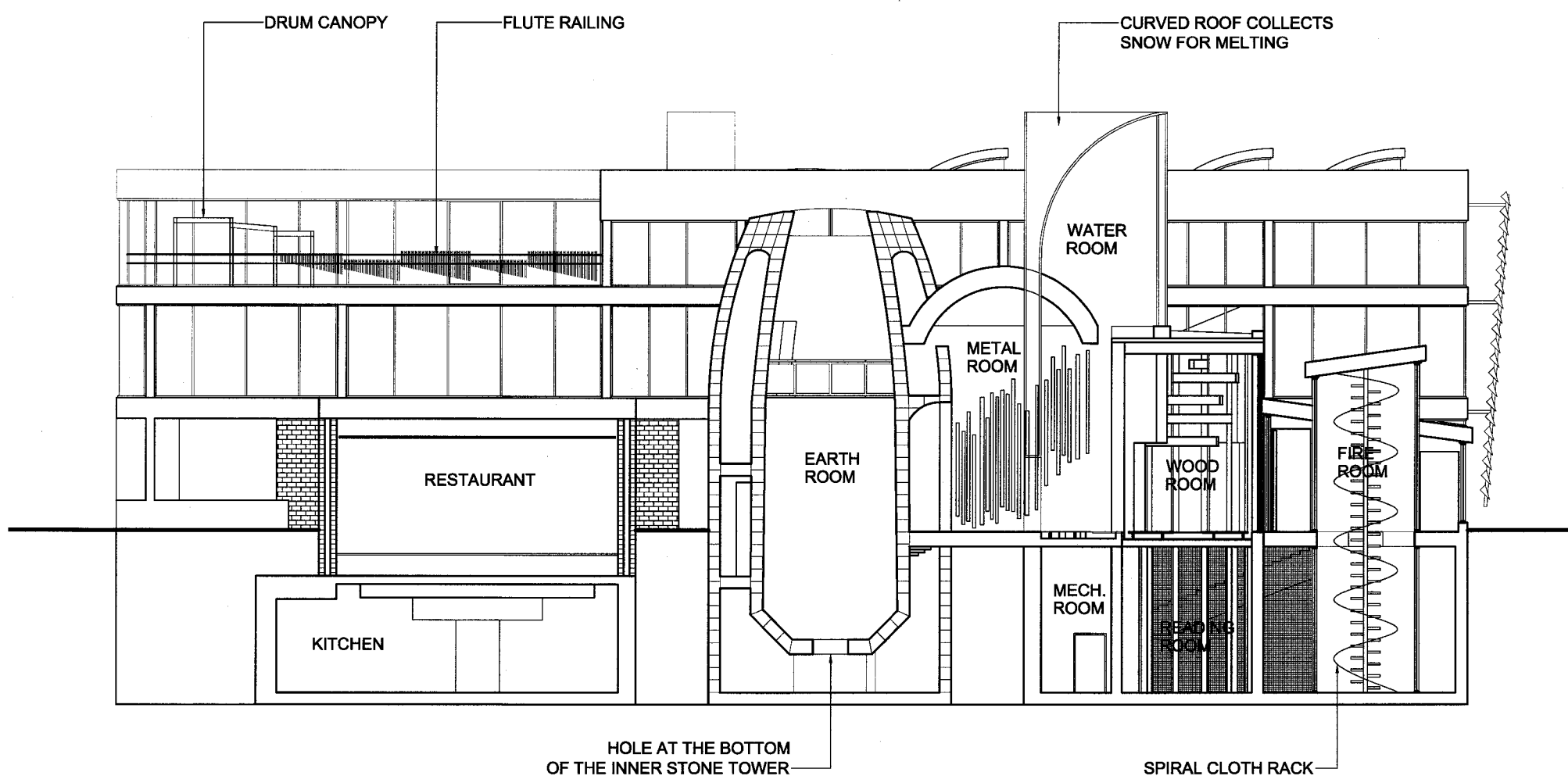


SECOND FLOOR PLAN. SCALE = 1:200

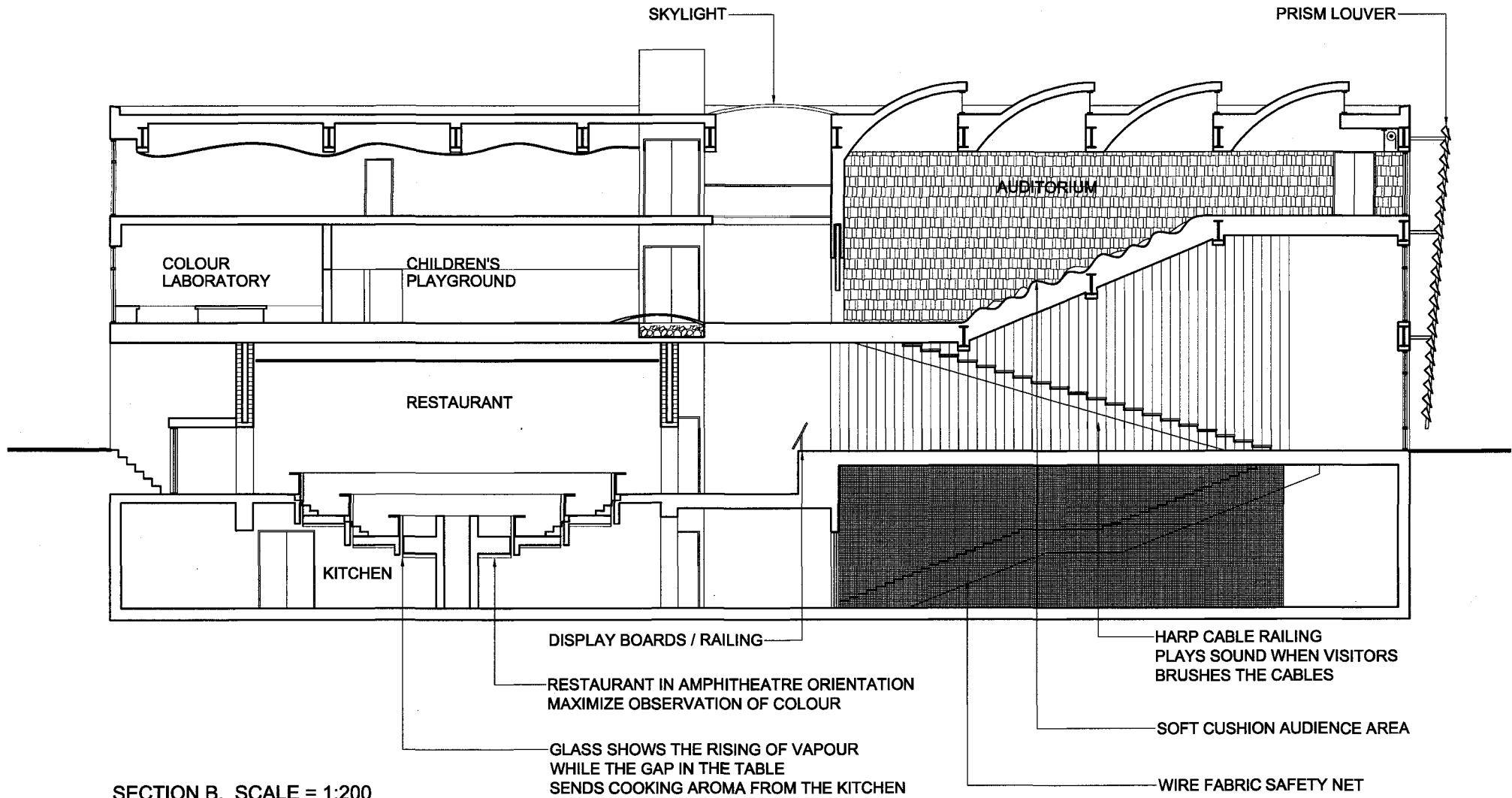


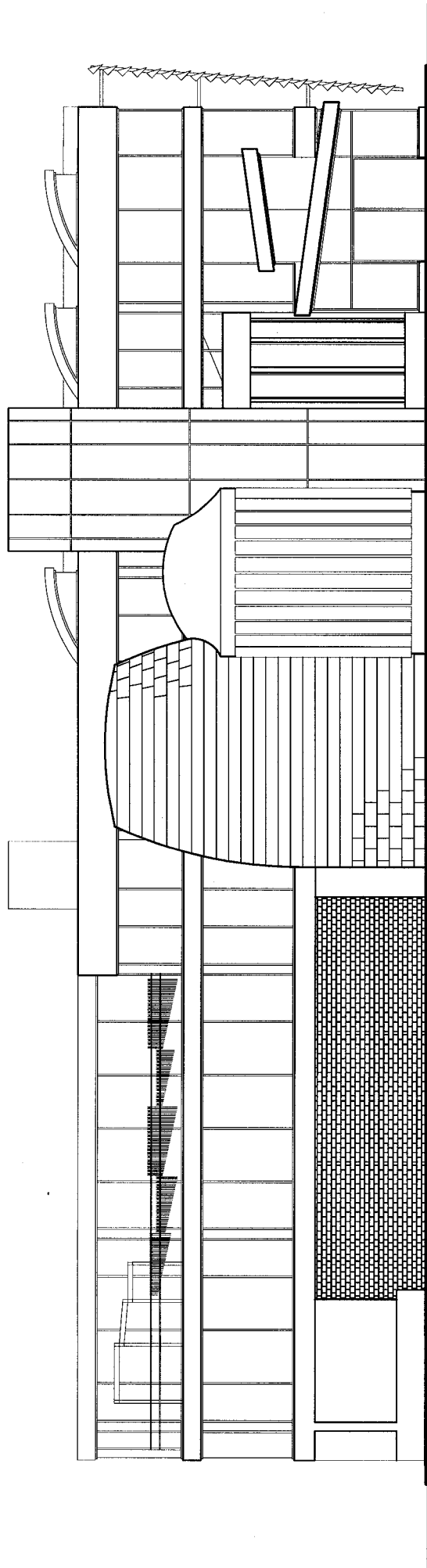
THIRD FLOOR PLAN. SCALE = 1:200



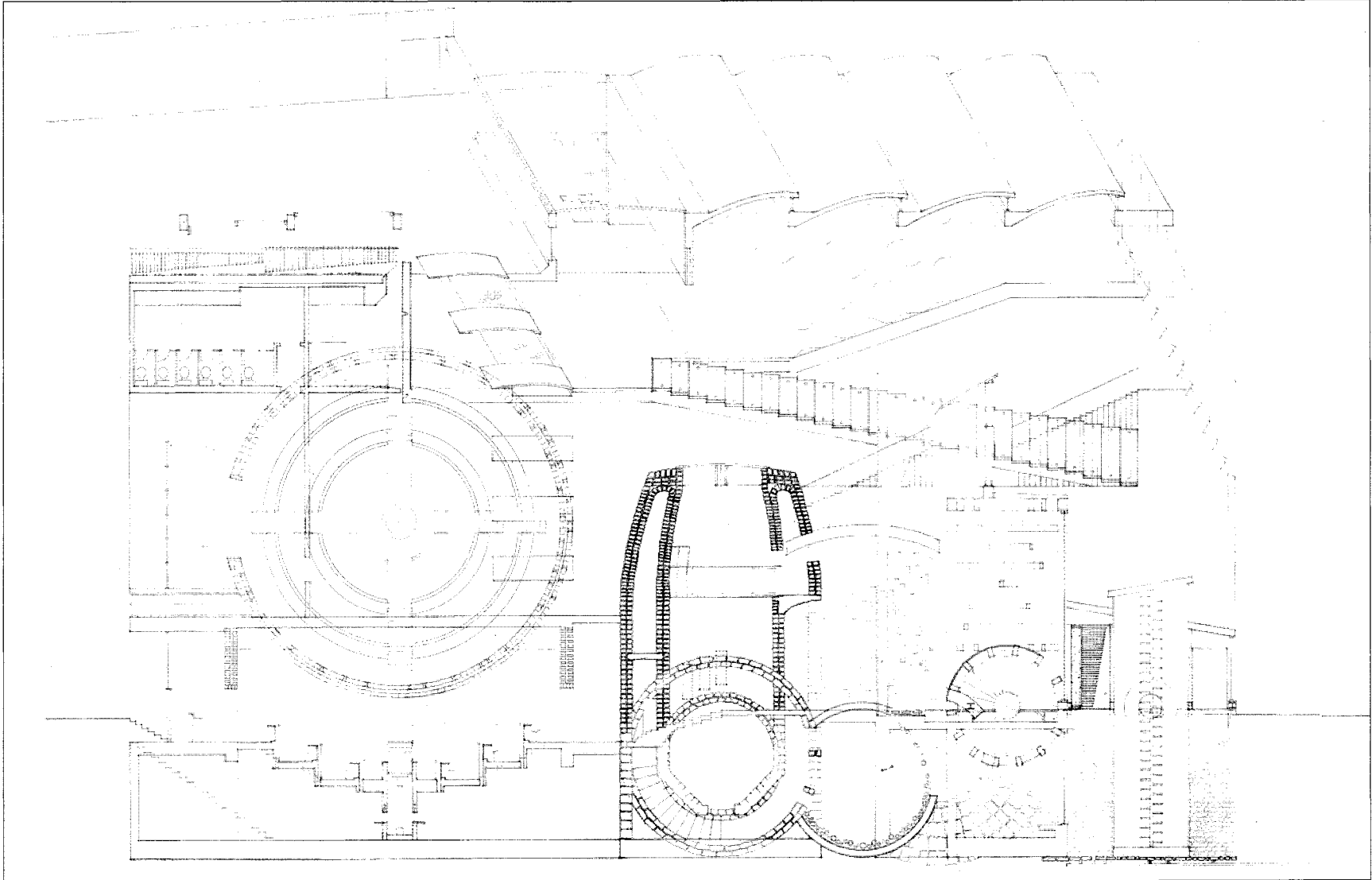


SECTION A. SCALE = 1:200

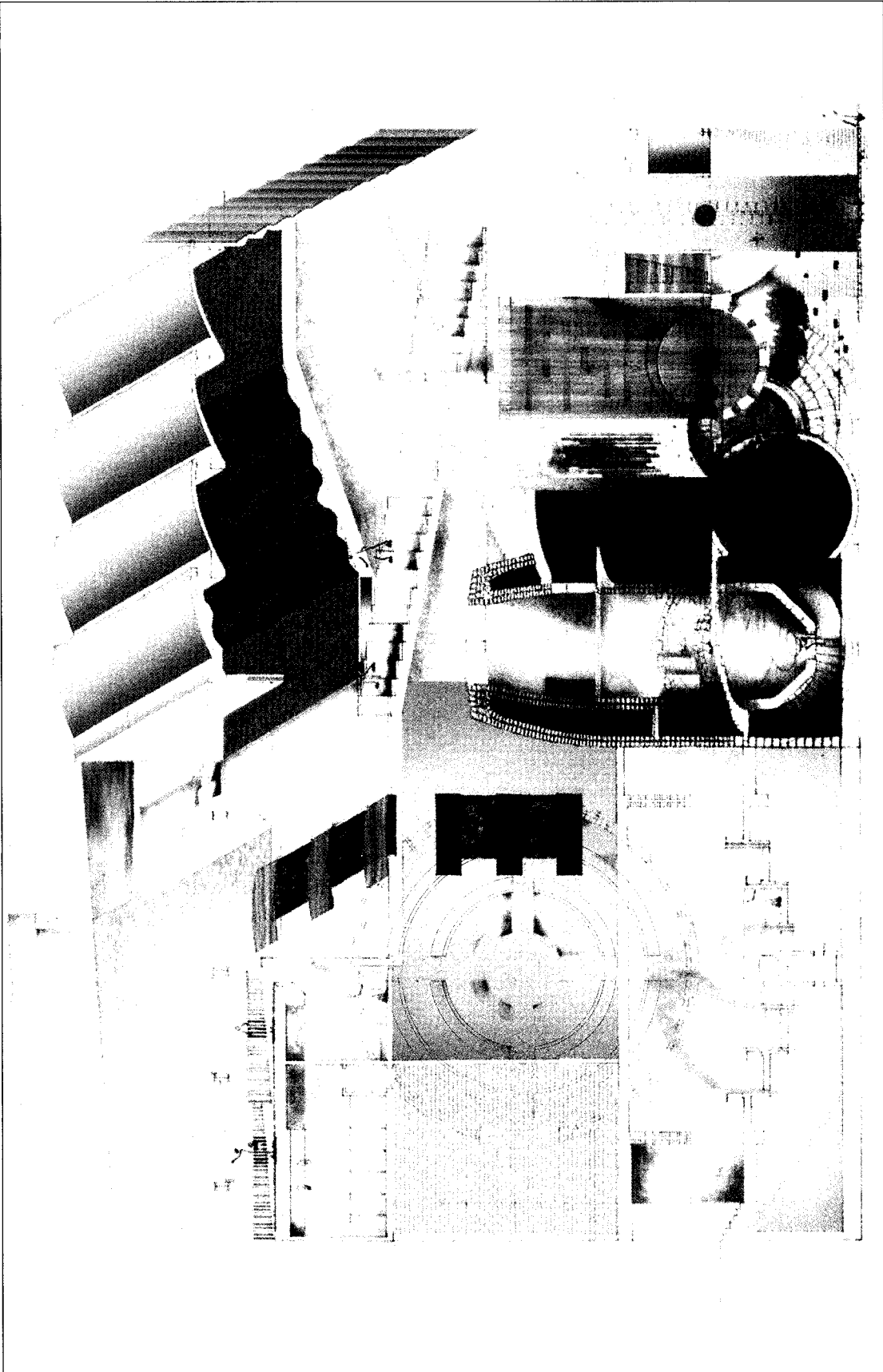




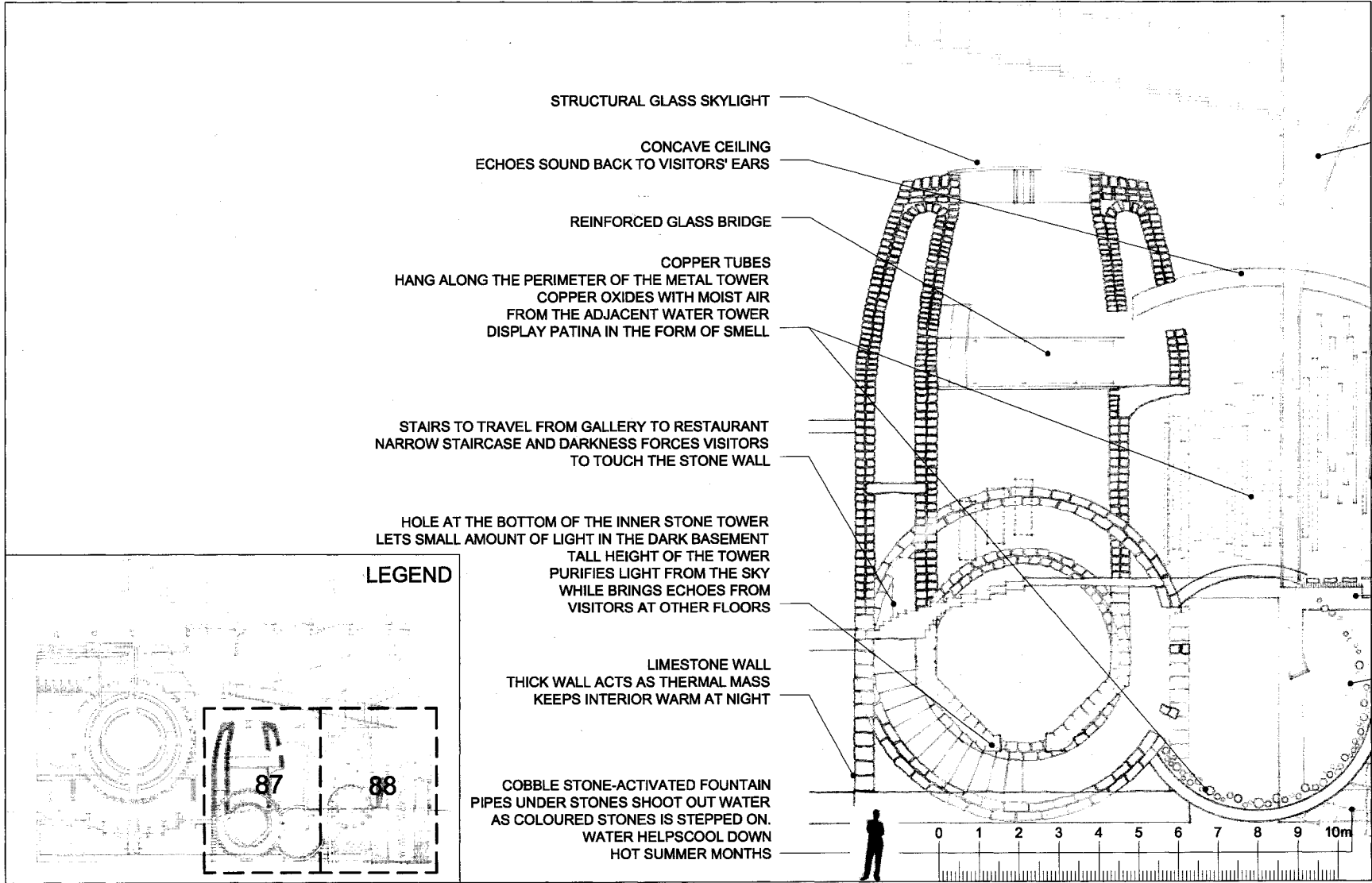
SAINT CATHERINE INTERSECTION. SCALE = 1:200



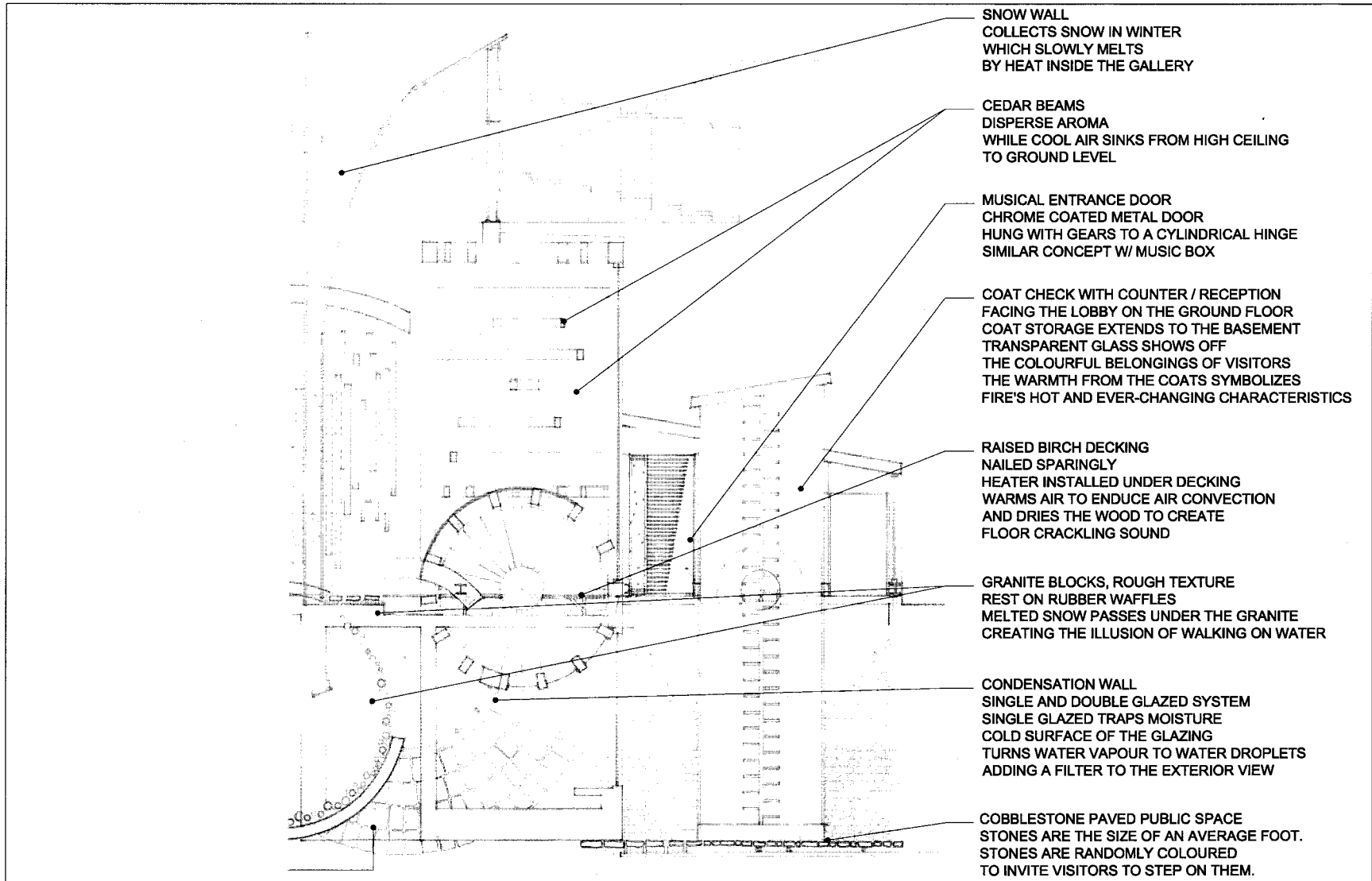
Drawing of architectural details of the Museum of Colour. Scale = 1:250



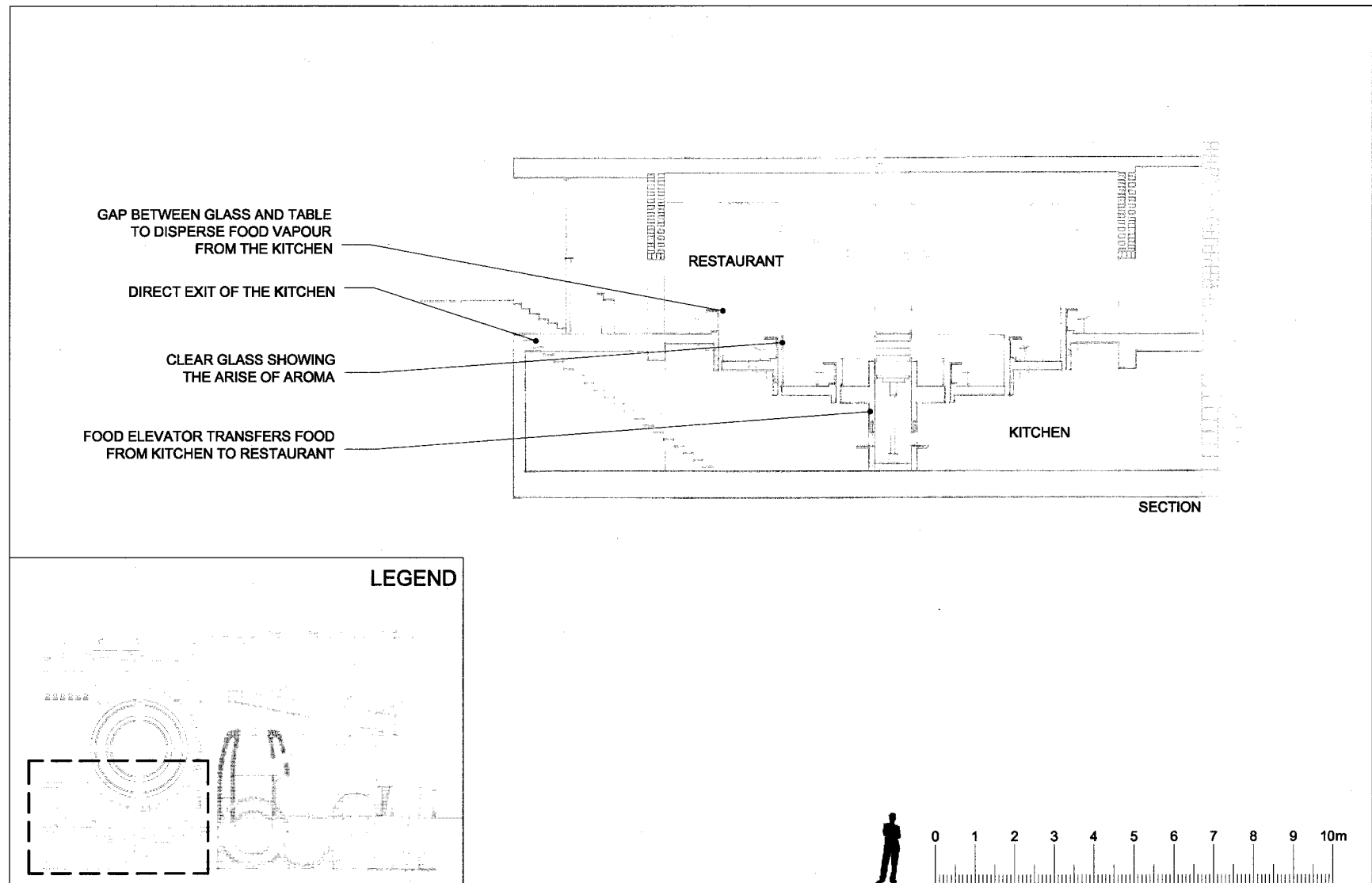
Common Sense transformed colour. This shows one possible way to read the Museum of Colour. Scale = 1:250



Detail of the stone and metal galleries. Scale = 1:150

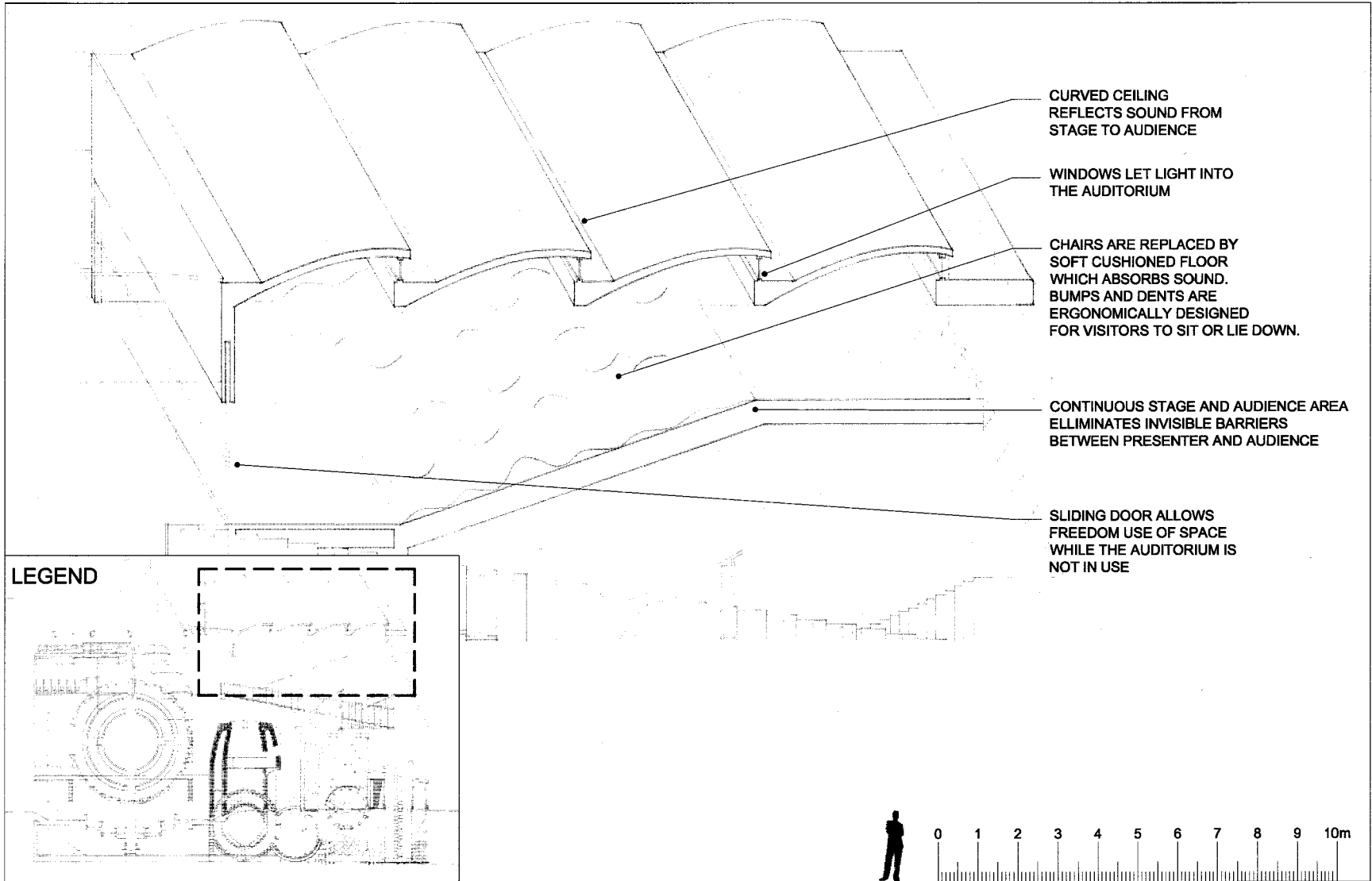


Detail of the fire, wood and water galleries. Scale = 1:150

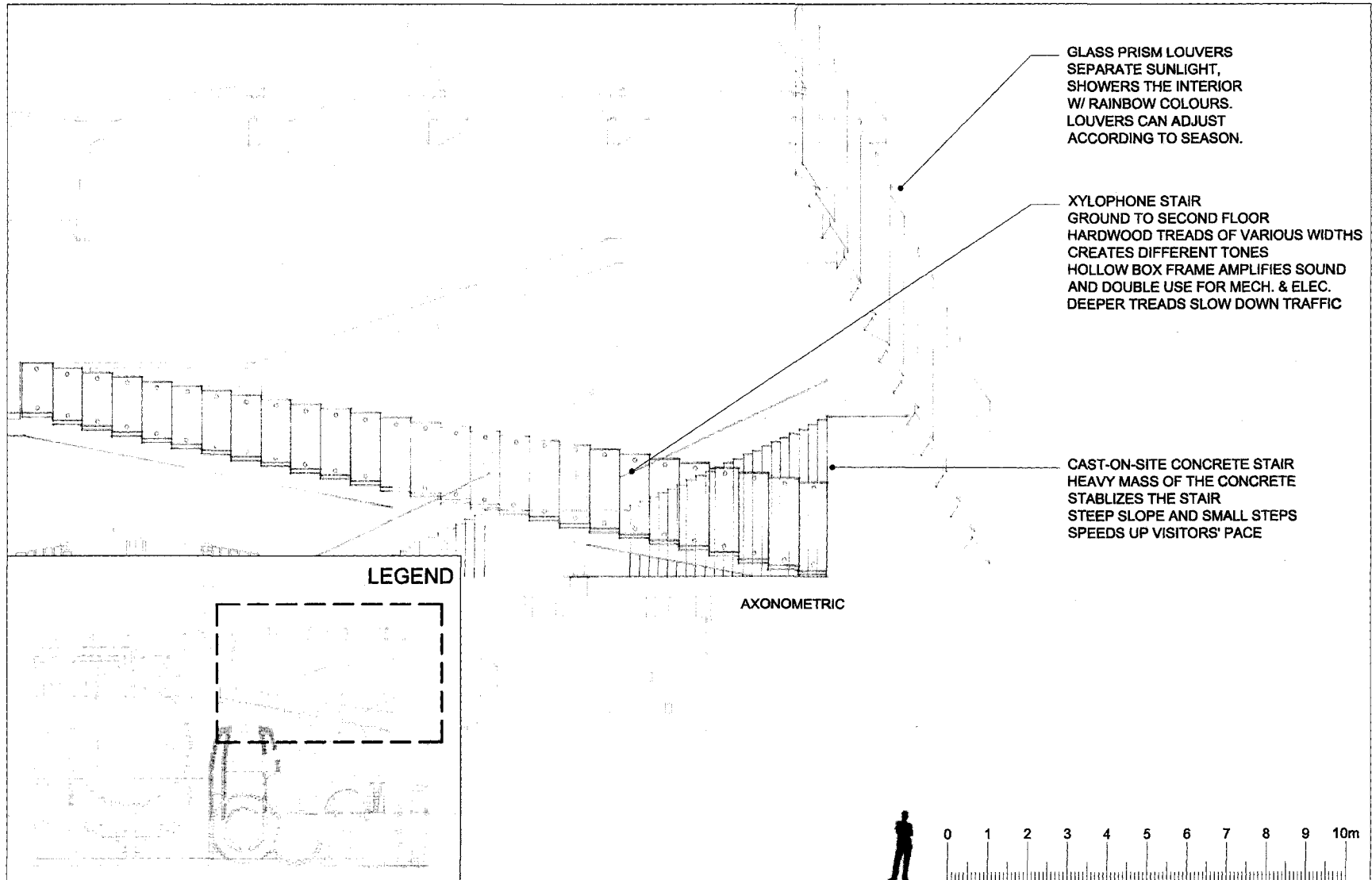


Detail of the kitchen and restaurant. Scale = 1:150

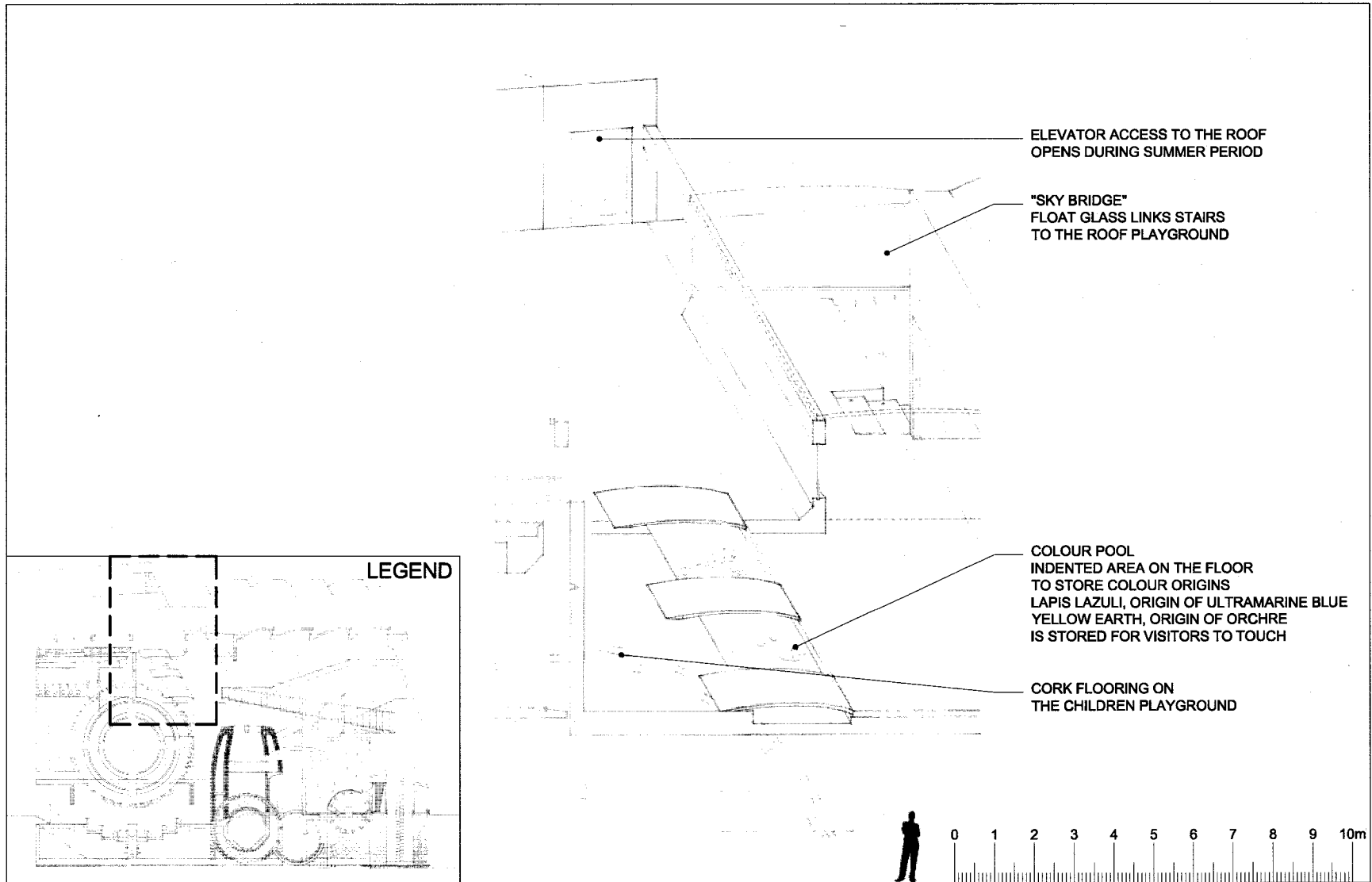




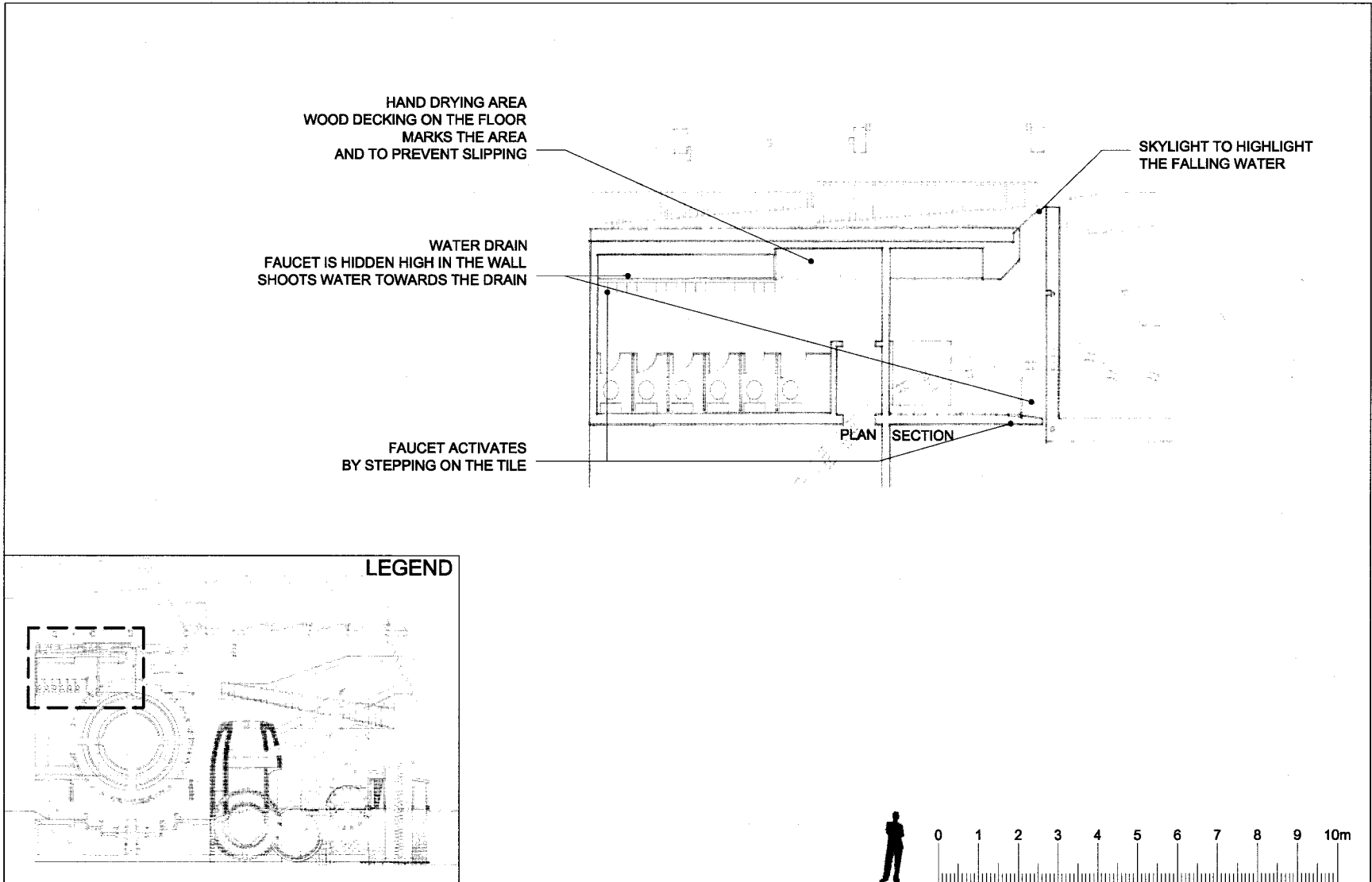
Detail of the auditorium. Scale = 1:150



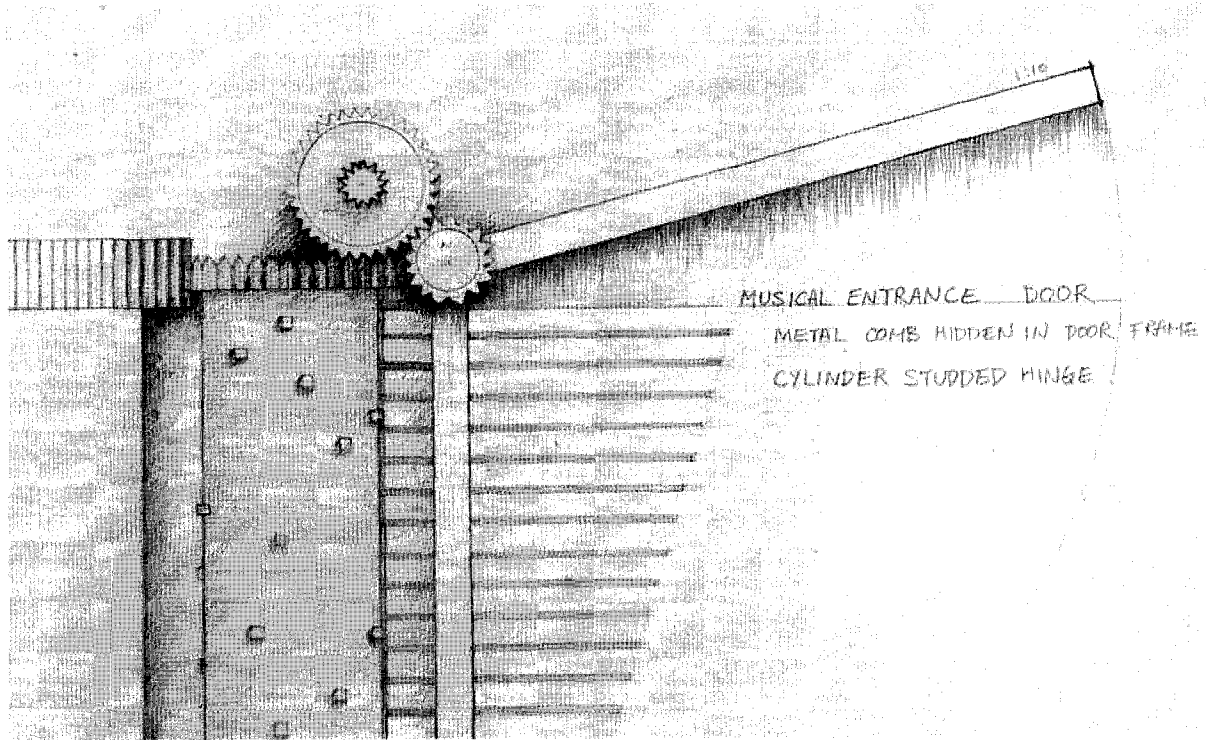
Detail of the basement and xylophone stair. Scale = 1:150



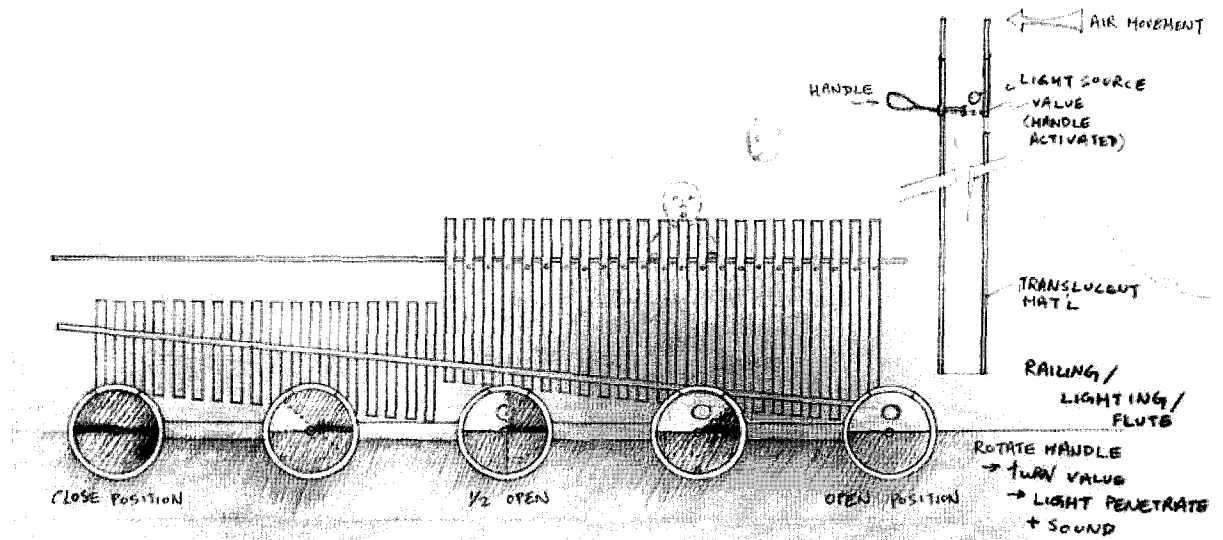
Detail of the second floor playground and skybridge. Scale = 1:150



Detail of the second floor washroom. Scale = 1:150



The musical entrance door. Comb-shaped metal door is hung with gears and cylindrical hinge. When the door is turned, the teeth of the comb brush the studs on the hinge, thus producing music.



Section, cross section and elevation detail of the flute railing design.

## **GLOSSARY**

### **Common Sense**

The phrase refers to Aristotle's explanation of perception. Rather than meaning common knowledge, he uses the term to explain our joined senses that forms our perception.

### **Perception**

Perception means the act to perceive. It is the impression of all senses gathered at a single moment. Information is objective rather than subjective, because it does not involve any thinking but is the purest sensation of physical objects and phenomena through the common senses.<sup>57</sup>

### **Conception**

It is the faculty of forming a concept. It involves interpreting perceptions with the influence of personal choices and past experiences. Conception is subjective and often involves subjective prejudices.

---

<sup>57</sup> Oxford English Dictionary.

## BIBLIOGRAPHY

- Abram, David. The Spell of the Sensuous. New York: Vintage Books, 1996.
- Ackerman, Diane. A Natural History of the Senses. New York: Vintage Books, 1995.
- Aristotle. Metaphysics. Trans. W. D Ross. The Internet Classics Archive, n.d. 8 Nov. 2006 <<http://classics.mit.edu/Aristotle/metaphysics.mb.txt>>.
- Aristotle. On Memory and Reminiscence. Trans. J. I. Beare. The Internet Classics Archive, n.d. 8 Nov. 2006 <<http://classics.mit.edu/Aristotle/memory.txt>>.
- Aristotle. On Sense and the Sensible. Trans. J. I. Beare. The Internet Classics Archive, n.d. 8 Nov. 2006 <<http://classics.mit.edu/Aristotle/sense.mb.txt>>.
- Babette's Feast. Dir. Gabriel Axel. perf. Stephane Audran. 1987. DVD. MGM Home Entertainment, 1989.
- Benjamin, Walter. "The Work of Art in the Age of Mechanical Reproduction", Selected Writings. 1936. Cambridge: Harvard University Press, 1999.
- Brusatin, Manlio. A History of Colors. Trans. Robert H. Hopcke and Paul Schwartz. Boston: Shambhala Publications Inc, 1991.
- Cytowic, Richard E. The Man Who Tasted Shapes. Massachusetts: MIT Press, 1993.
- Finlay, Victoria. Color: A Natural History of the Palette. New York: Ballantine Publishing Group, 2003.

Frascari, Marco. "Intuition." Carleton University, Ottawa. 9 Nov. 2005.

Frascari, Marco. "Semiotica Ab Edendo, Taste in Architecture." Eating Architecture.

eds. James Horwitz and Paulette Singley. Boston: MIT Press, 1999.

Harrison, John. Synaesthesia, the Strangest Thing. New York: Oxford University

Press, 2001.

Hetherington, Kevin. "Spatial Texturas: place, touch and praesentia," Environment

and Planning A, vol. 35, no.11, Nov. 2003: 1933-1944.

Holl, Steven, Juhani Pallasmaa, and Alberto Pérez-Gómez. "The Architecture of the

Seven Senses." Questions of Perception - Phenomenology of Architecture, a+u

July 1994: 28-37.

Korsmeyer, Carolyn. Making Senses of Taste: Food, and Philosophy. Ithaca: Cornell

University Press, 1999.

Lawlor, Robert. Voices of the first day: Awakening in the aboriginal dreamtime.

Rochester: Inner Traditions International, 1989.

Lethbridge, T.C. The Painted Men. 1954. 2nd ed. London: Andrew Melrose, 1956.

Mahnke, Frank H. Color, Environment, and Human Response: An Interdisciplinary

Understanding of Color and its Use as a Beneficial Element in the Design of the

Architectural Environment. New York: Van Nostrand Reinhold, 1996.



Malnar, Joy M., and Vodvarka, Frank. Sensory Design. Minneapolis: University of Minnesota Press, 2004.

McLaren, K. The Colour Science of Dyes and Pigments. 2nd ed. Bristol, Britain: Adam Hilger Ltd, 1986.

Mentasti, Rosa Barovier, Venetian Glass: 1890-1990, trans. Matthew McParland. Venice: Arsenale Editrice, 1992.

Merleau-Ponty, Maurice. Phenomenology of Perception. trans. Colin Smith. New York: Routledge Classics: 2002.

Merleau-Ponty, Maurice, "The Film and the New Psychology," Sense and Non-sense. Evanston: Northwestern University Press, 1964.

Pallasmaa, Juhanni. "Hapticity and Time." Architectural Review. vol. 207, #1239. May 2000.

Pallasmaa, Juhanni. "The Architecture of the Seven Senses." Questions of Perception – Phenomenology of Architecture, *a+u*. July 1994.

Partenariat du Quartier des Spectacles. Quartier des Spectacles. 2006. 8 Aug. 2006 <<http://www.quartierdesspectacles.com/en/partenariat/>>.

Pearson, David. "Making Sense of Architecture." Architectural Review. Oct. 1991: 68-70.

Pilis, Alexander, "Architecture Parallax," exhibition CD, 2005.

Ramachandran, V. S. A Brief Tour of Human Consciousness: from Impostor Poodles to Purple Numbers. New York: Pearson Education Inc, 2004.

Randolph, Schmid E. "Asians, Americans Show Perceptual Divide." The Canadian Press. 23 Aug. 2005.

<[news.yahoo.com/s/cpress/20050823/ca\\_pr\\_on\\_sc/different\\_views](http://news.yahoo.com/s/cpress/20050823/ca_pr_on_sc/different_views)>

Reiser, Oliver L. The Alchemy of Light and Color. New York: W.W. Norton & Co., Inc, 1928.

Rosa, Mentasti B. Venetian Glass 1890-1990. Venice: Arsenale Editrice, 1992.

Schmid, Randolph E. "Asians, Americans Show Perceptual Divide." The Canadian Press 23 Aug. 2005. 24 Aug. 2005

<[news.yahoo.com/s/cpress/20050823/ca\\_pr\\_on\\_sc/different\\_views](http://news.yahoo.com/s/cpress/20050823/ca_pr_on_sc/different_views)>.

The Comfort Zone. Beyond Appearances - Architecture and the Senses. e-bility.com.

4 Nov. 2004. 4 Sep. 2006

<<http://www.e-bility.com/articles/beyondappearances.php>>.

Tse, Catherine. "Berlin Diners Journey into Tasty Heart of Darkness." The Georgia Straight. 14 Apr. 2005. [Travel]: 31+.

Wigley, Mark. White Walls, Designer Dresses: The Fashioning of Modern

Architecture. Massachusetts: The MIT Press, 1995.

Zeniti, Djamel. "Sensing Aalto." ptah (2003). 7 Aug. 2006

<<http://www.alvaraalto.fi/ptah/issue/0301.htm>>.