**Dissecting Architecture:
*Defining the Pieces Worth Keeping***

by

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Figure 1.1
Frontispiece

ABSTRACT

This thesis addresses a growing tension between heritage conservation and the pressures of urban densification. The First Baptist Church is recognized by the city of Ottawa as a site containing cultural value. Preserving architecture is an attempt to maintain physical qualities that create links to the past. Analogous to Leonardo da Vinci's anatomical studies, drawing can reveal the tangible and intangible qualities of a historic building. An architectural dissection of the First Baptist Church energizes hidden knowledge through drawing, language and architectural detailing. Hidden layers narrate historic events that demonstrate how the congregation used the building to grow and evolve. Their understanding of the structure's permanent and malleable parts inform a system of adaptable architecture. The Church reveals its cultural value and inspires the creation of new architecture. Uncovered and remaining pieces from a virtual dissection catalyze design of a new main branch for the Ottawa Public Library.

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[1] INTRODUCTION

Public awareness of cultural value in heritage architecture has legislated conservation strategies to ensure physical preservation. In an age of rapid cultural production, objects tagged with the term ‘heritage designation’, are protected from social change that might eradicate a temporal link. While the intentions that guide heritage conservation may be well intentioned, I argue that before an architect can critically analyze the decision to preserve a building, the cultural value of that building, acknowledged by the community and recognized by government bodies, must be fully understood. Certain elements in the psyche of a group of people allow buildings to assume the position of social permanence. Qualities cemented in form and space lay faith in the ability of architecture to stand indefinitely as a cultural symbol. Contemporary appreciation for craft, form, and detail in such buildings sustains their permanence, despite an unstable or diminished function. This thesis uses drawing as a device to uncover the soul of a building, to energize its cultural value, and to inspire the creation of new architecture. To identify parts of a structure that characterize permanence I explore a process analogous to dissection. Performing a dissection of the First Baptist Church in Ottawa, ON tests a methodology that fuses the conservation of heritage and the making of architecture.

The premise behind heritage conservation is a theoretical belief that if an object is frozen in time it is therefore protected. Although it is commonly believed that most heritage architecture survives because of legislation, temporal links are anchored by virtual and physical remnants. The physical condition of a structure does not necessarily correlate to measurable heritage value. If the primary focus of heritage

conservation is to maintain a link to the past, physical condition should be secondary to believing and imagining the object's history. We are surrounded by evidence that places, fragments, ruins, and even empty spaces can cultivate memories of the past. Although removed from its original condition, architecture that is fractured or even reinvented has the potential to elicit cultural value. Understanding how certain buildings become cultural treasures can help us in conceptualizing this reinvention. For well over a century, the First Baptist Church, along with many religious buildings of its time in Ottawa, have held their ground in a dense urban context.

Analogous to architecture is a relationship between two types of theatre. Defined by accomplished theatre director Peter Brook in his book *The Empty Space*: each type takes a critical position on theatre, an art form similar to architecture that lives in an evolving culture. 'Living theatre' acknowledges at each new day that the true play escapes the grasp of its authors. 'Deadly theatre' on the other hand believes the true play is palpable and once discovered should remain eternally static.¹ Despite being described as one living and one dead, both believe in the true play. The fundamental difference is that one believes grasping it is possible and the other, willfully, does not. A similar difference in attitude exists in architecture. If a building such as the First Baptist Church was forged by a 'deadly theatre' approach, can the 'living theatre' be found or introduced? The fact that the qualities of the church have convinced a city to legislatively protect it, suggests there is something at its core worth revealing and reliving through architecture. The process of searching for

¹ Brook, Peter. *The Empty Space*. New York: Touchstone, 1996.

the ‘true play’ is comparable to Leonardo da Vinci’s search for the soul in human anatomy. His search is conducted by dissections of the human body, using drawing as a tool to uncover the essential knowledge of a form.

The success of examining or dissecting a form hinges on an understanding of the distinct relationship between observation and knowledge. Leonardo’s investigation of human anatomy proceeds from two concepts: his faith in the presence of soul, and that absolute understanding is achieved only by synthesis through drawing. His faith in the existence of the soul, in universal laws, motivate his desire for a complete understanding. His knowledge of plant anatomy paired with belief in the underlying unity of the macrocosm and the microcosm, enlightens a fundamental understanding of the human body. Next to his drawings of the vascular system is a rough sketch of a germinating seed. By first identifying parts and layers of the human anatomy, Leonardo composes joints, organs, and systems into a series of structured viewpoints in order to capture every informative angle through drawing. This process demonstrates his attitude toward scientific inquiry. A disciplined method of acquiring sequential viewpoints leads to the development of drawing techniques that break the restrictive barrier of typical anatomical drawing methods. Exploded and transparent three-dimensional drawings formulate an image of synthesis, proving the crucial relationship of parts within a system. The outcome is a drawing that communicates layers of information in one single image. Rather than observing a form, knowledge is selectively revealed. Can this method of inquiry through drawing be brought to architecture?

Transforming Leonardo's methodology of dissection into architectural strategy will reveal hidden qualities that rationalize the permanence of the First Baptist Church in Ottawa's dense urban core. Exposed and remaining pieces of the church, post-dissection, will allow it to become a contemporary expression of its past. The process is not only a critical challenge to the treatment of heritage buildings; it also allows the church to evolve as architecture. Essential elements serve as a catalyst for the creation of new architectural forms.

This thesis proposes a re-purposing of the First Baptist Church as the new home of the Ottawa Public Library. Following Leonardo, the soul of the church, revealed through dissection and made tangible through drawing, will be brought forward into the new building. Parts revealed in the church and constructed for the library program share the ability to reciprocate cultural change. Physical alterations, which have been disguised in the past, are now exposed to reveal a history of adaptation. In doing so, the church is reborn and harnesses an embedded architectural energy that reconsiders the way architectural heritage is experienced.

**[2] LEONARDO'S
METHOD OF
DISSECTION**

Figure 2.1

Leonardo da Vinci. *The bones of the foot and dissections of the neck*. Pen and brown ink (R L 19002v). From *Anatomical Drawings from the Royal Collection*. 1977

To interpret the physical and temporal permanence of a building, one must indulge in every quality of its form. Analogous to this process is “Leonardo’s references to the soul, imagination, judgment, the senses- and one should add, memory. . . .”¹ Leonardo da Vinci’s search for the soul in his anatomical studies is a thread found in every representational technique he adopts. He compares the relationship between the brain, heart and liver to a seed, roots, and branches of a tree. Belief in universal laws allow him to parallel the anatomy of a plant to the ‘seat of the soul’ in the human body. By way of analogy, I will employ the same faith to dissect the anatomy of a building. Leonardo studies each part and system of the human body through as many as eighty-eight different perspectives for one form. From each study, specific knowledge is obtained then synthesized through a three-dimensional image. Transparent and exploded views create a composition that escape the boundaries of physical observation. The drawing reveals a view otherwise hidden.

Rather than dissecting portions of the body, Leonardo identifies its systems—from osteological to cardiovascular. Within a classified system are bones, muscles, nerves, organs, veins, etc., each presented by “a three dimensional picture of each physiological system – by a process of synthesis – always bearing in mind the macro- microcosm theme”.² Leonardo’s representational technique allows for a multi-faceted view and ultimate understanding of each anatomical system. His

1 Pardo, Mary. *Leonardo da Vinci and the ethics of style*. Manchester: Manchester University Press, 2008.

2 Kemp, Martin. “Dissection and Divinity in Leonardo’s Late Anatomies”. *Journal of the Warburg and Courtauld Institutes* 35 (1972): 203.

Figure 2.2

Leonardo da Vinci *Muscles of the shoulder* Pen and brown ink (R L 19003v) From *Anatomical Drawings from the Royal Collection*, 1977

Figure 2.3

Leonardo da Vinci *Muscles tendons and veins of the arms and legs* Pen and brown ink (R L 12617R) From *Anatomical Drawings from the Royal Collection* 1977

combination of “three-dimensional plasticity with magic transparency”³ trumps the act of simple dissection, a process that denies a single synthetic image that can provide complete knowledge of the system. Dissecting with a scalpel rather than a pen would be more informative “if it were possible to see all these things which are shown in such drawings in a single figure”.⁴ Leonardo describes his drawings as holding each member of the body in your hand and turning it slowly until you have complete knowledge.⁵ Even then, the collected images in the memory do not present themselves in a single image. Although each individual drawing might be regarded as a dissection, Leonardo refers to this representational process as *monstruosa*, as only he could describe:

“you will draw the outlines of the members with a single line
and in the middle you will place the bones . . . the shape of the limb
that you describe shall not remain a monstrous thing from having its
parts removed”.⁶

The end goal is a series of complex drawings with three-dimensional transparency. Information derived from each dissection migrates into his final synthesis. This process draws a definitive line between observation and knowledge,

3 Kemp, Martin. “Dissection and Divinity in Leonardo’s Late Anatomies”. *Journal of the Warburg and Courtauld Institutes* 35 (1972): 203.

4 Kemp, Martin. “Dissection and Divinity in Leonardo’s Late Anatomies”. *Journal of the Warburg and Courtauld Institutes* 35 (1972): 203.

5 Kemp, Martin. “Dissection and Divinity in Leonardo’s Late Anatomies”. *Journal of the Warburg and Courtauld Institutes* 35 (1972): 203.

6 Kemp, Martin. “Dissection and Divinity in Leonardo’s Late Anatomies”. *Journal of the Warburg and Courtauld Institutes* 35 (1972): 204.

in order to present a system of the natural world, whether it is the human body or a building, Leonardo's approach is dependant on absolute understanding of the universal laws at work, no matter how complex. This can be found in his paintings as well, where he could not depict a scene without complete knowledge of the dynamic forces at work. The "battle of anghiari" for example, demands the painter's understanding of a horse's hoof in turbulent water, struggling to cross a river. Leonardo gave the same degree of attention and detail to the visual effects of dust cloud densities in this painting as he did the aortic pulmonary valves in his heart studies. His obsession with universal dynamics at every level of study is honest and forthright. Dissecting a building structure must borrow from that level of thoroughness in order to derive knowledge, not simply observation. An architect has the ability to go beyond observation.

Even in Leonardo's early drawings, he challenges formal complexity further by visualizing at least eleven layers of membrane covering the bones. In his earlier work, each layer is drawn from four different aspects, totaling forty-four drawings. This endless pursuit of complete formal representation is met by self-inflicted complications. The rigid structure he has set, does not allow him to explore the organic complexity of each form. To resolve this Leonardo chooses what he believes to be the most revealing viewpoint. Therefore, I question whether the four-part presentation is a device that leads him to this ultimate view, or simply an unnecessary architectural method. Regardless, Leonardo creates a tension between his intellectual commitment to a holistic system of representation and his internal desire to find

the one view that says it all. His answer to this problem is to increase the number of projected views to six, then eight, challenged by the asymmetry of the foot and complexity of the shoulder joint. The number of views he works with corresponds to the intricacy of the form in hopes of finding a desired angle. Compounding the number of views exponentially is not a practical solution to presentation, especially if not one of those views can satisfy the artist's eye. Complexity of the shoulder joint challenges Leonardo to the point where he begins extracting muscles and bones to develop the technique of 'explosion'. This reveals the dynamic relationships between each piece in one drawing, rather than a series of successive ones.

Exploiting the freedom of drawing is much more successful than being bound by its restrictions. Portraying the most revealing view often lead Leonardo outside the fixed method of four-part architectural presentation. As he earlier alludes, this freedom exists only in the realm of drawing, not in a post mortem examination.⁷ Leonardo virtually peels back and removes the coverings of body parts, a method of dissection only possible through drawing. Each three-dimensional dissection drawing is not shown without a series of preparatory sketches, outlining the shape of each composing part. The final drawing is a synthesis of several side sketches, 'in preparation for its transformation from a 'monstruosa' into a three-dimensional transparency of refined beauty.'⁸ The preparation for the final drawing emphasizes his internal motive to leave no sketch or study lacking in complete detail or

7 Kemp, Martin. "Dissection and Divinity in Leonardo's Late Anatomies". *Journal of the Warburg and Courtauld Institutes* 35 (1972): 203.

8 Kemp, Martin. "Dissection and Divinity in Leonardo's Late Anatomies". *Journal of the Warburg and Courtauld Institutes* 35 (1972): 204.

understanding. The simple line drawings are where he contemplated the form and dynamics involved.

Leonardo's method of studying human anatomy translates to a dissection of architectural anatomy. Preparatory sketches, transparency, explosion, and synthetic three-dimensional images are integral to virtual dissection. His process, defined by these techniques, identifies drawing as the only way to gain complete understanding of a system otherwise concealed. Before a physical dissection of the First Baptist Church can occur, drawing must lead the way to a comprehensive understanding of its structural anatomy. Virtually uncovering concealed areas will identify the role of each part and layer, reveal the original construction assembly, narrate a history of alterations, and inform the possibilities for structural intervention. Historic photographs, documents, drawings, and physical study of the church are part of the process, similar to Leonardo's preparatory sketches, waiting to be synthesized into a final drawing.

**[3] RE-PURPOSING
HERITAGE**

Why should architecture accept the conventions of heritage conservation? Ignoring a building's role in a 'new mode of cultural production'¹ jeopardizes its chance for long-term survival. Defining the pieces of the First Baptist Church that characterize permanence will inform a method of designing where heritage conservation is an integral part to new construction. Whatever remains from the dissection will be embedded in the fabric of an evolving architecture. Holding on to part of a structure is not the act of preservation for preservation's sake; rather it creates a catalyst for invention. This methodology challenges the erroneous argument that a building can stand and serve a community indefinitely without considerable change. New architecture will face the same questions heritage buildings must answer to. When the permanence of a new building is inevitably questioned, what fragments of its structure are worth exploring? Determining the parts worth keeping relies on a process analogous to Leonardo da Vinci's dissection studies, where knowledge is gained through drawing. Architectural detailing can reveal a structure's bones, layers, and parts that are telling of a rich past. Uncovering a clear relationship between permanent and malleable parts informs possibilities of structural change. In this way, fragments are exploited for their physical and cultural value, rather than preserved. Not to be enforced or even suggested, but discovered as details that speak of the building's soul, both past and present. I intend to rationalize heritage designation in order to subsequently question and propose treatment of the First Baptist Church as it faces the pressures of urban densification.

1 Kirshenblatt-Gimblett, Barbara. "Theorizing Heritage". *Ethnomusicology* 39 (1995): 367-380.

WHERE IS HERITAGE VALUE?

For a place or thing to be branded heritage it must relate to a historic time period or event. The condition and value of heritage objects typically dictates one of two attitudes to ensure protection: restoration or preservation. Restoration attempts to recreate the object to its original condition. However, restoration is not always economically or physically possible. Buildings in a heritage state rarely hold the same social stature as they once did, and are therefore protected by their former selves. The First Baptist Church, once an integral piece to a prospering congregation, now serves a dwindling group of approximately seventy people who struggle with maintenance costs. Although the heritage value of the building remains strong, the same cannot be said for the institution that owns it. Preserving an object is another way a link to the past is created. Conceptually, if an object is frozen in time it is protected from any sort of change that might interrupt the link to its former self. The value that is given to such an object often comes years after its creation. This is where an object will be left, but protected in its current state, perhaps even in ruins. All that is necessary to create a link to the past is the faintest of fragments of that object. Pieces of a building's foundation can have as much heritage value as if the entire structure remained in pristine condition. Physical evidence is second to knowledge of past existence and importance. In her essay titled '*Theorizing Heritage*', Barbara Kirshenblatt-Gimblett cites an in-flight magazine article titled '*The Phantom Church of Cluny*':

“A museum dedicated to the church stands a few feet away from the excavation. Inside, I look at an animated, three dimensional computer re-creation. . . . Back outside, I stare again at the void. The computer model is still so fresh in my mind that an image of the enormous edifice seems to appear before me. I’m not alone in this optical illusion: everyone leaving the museum seems to do the same double take outside. It’s as if we’re having a mass hallucination of a building that no longer exists.”²

The Abbey Church of St. Peter and St. Paul once stood the size of two football fields in the village of Cluny, France. After simply outliving the Benedictine monastic order, the church was demolished in 1804 and sold for its stone. It was not until the late nineteenth century that value was recognized in what was already gone. The vacant site, where the church once stood, now attracts up to 700, 000 tourists per year. The museum has created a digital model of the site to be viewed in conjunction with the corporeal remnants of the church’s foundation. Both the physical and virtual evidence of this massive edifice rely on one another. If either realm is removed the visitor is either unable to contextualize the digital model or unable to mentally reconstruct an image from a crumbled foundation. The ruins of the church’s foundation are not essential to this process. Visitors are left in awe, imagining that a building once occupied the large empty site. The more physical evidence that remains, the less faith one must invest into the virtual recreation. Heritage value is based on

² Kirshenblatt-Gimblett, Barbara. “Theorizing Heritage”. *Ethnomusicology* 39 (1995): 376-377.

Figure 3.1
Abbey Church of St. Peter and St. Paul (1088-1804). Cluny,
 France. 19 November 2009.

Figure 3.2
Abbey Church of St. Peter and St. Paul (1088-1804). Cluny,
 France. 19 November 2009.

the belief of real things and events. If seeing is believing, as tourists we do not have to physically see that much. Preservation and restoration are heritage strategies used to allow a building to recreate itself. The only separation between terms is financial will to repair human or environmental damage that has removed it from an ideal state. The Cluny museum is no different — pairing virtual imagery with imagination to recreate a demolished church. If heritage conservation is a re-creative act, exhibiting something as its former self, I believe we can go further than preservation. Dissecting the First Baptist Church and adding new pieces will narrate the structures past, as the museum does for the Abbey Church of St. Peter and St. Paul. In contradiction to this strategy, conventional social attitudes focus on legislatively protecting buildings from the moment heritage value is realized.

Force and *quality* lift certain pieces of architecture above the pack. Ostensibly impervious to the effects of style, economy, development, and other social trends, some buildings are excluded from this evolutionary process or at least experience it at a much slower rate:

“Its force and its quality enabled it to survive way beyond its time like a monument — but the time came when the gap between it and the life of the society around it became too great”³

The *force*, which allows architecture to assume the position of permanence, is backed by its iconic role as an institution. Conversely, the *quality* the building

3 Brook, Peter. *The Empty Space*. New York: Touchstone, 1996. pp. 15

possesses is backed by a body of people that appreciate craft, form, and detail.

THE LIVING AND THE DEADLY THEATRE

The opening passage describes the nature of heritage architecture by defining two words that begin to explain the permanence many places and structures have in cities. However, the text is only a parallel to this phenomenon as Peter Brook is discussing something in a completely different context. In his book, 'The Empty Space', Brook recalls when the Peking Opera came to London and maintained its roots by creating the same ancient patterns each night. At the same time, a rival Chinese Opera company attempted the same act by imitating, excluding details, and missing the overall meaning. The real Peking Opera, seemed as though it could carry on forever as a piece of theatrical art, remaining unchanged. Eventually, society evolved and the Red Guards reflected a very different China. The discourse between traditional Peking Opera and present ways of thought destroyed this heritage. Brook terms 'living theatre' and 'deadly theatre' as two distinct methodologies to theatrical art.

“In a living theatre we would each day approach the rehearsal putting yesterday’s discoveries to the test, ready to believe that the true play has once again escaped us. But the Deadly Theatre approaches the classics from the viewpoint that somewhere, someone has found out and identified how the play should be done. This is the running problem of what we loosely call style The moment we try to

pinpoint this style we are lost.”⁴

Brook believes Westerners view this as a callous treatment of cultural heritage. The destruction of one of the most treasured Chinese arts should be held onto and preserved, suggesting a ‘deadly theatre’ approach. The Chinese attitude, on the other hand, he finds at the core of ‘living theatre’. Brooks admittedly refers to theatre as a self-destructive art. I would agree and suggest this notion is not independent to the art of theatre, but in any discipline of art, including architecture. Congruent to the Peking Opera, the First Baptist Church was conceived by the belief that a structure could resolve to an indefinite symbol of an undying institute. The First Baptist congregation erected an edifice that would represent and anchor them in the community for several years to come; architecture would be the symbol of their establishment. Their religious institution is passed on from generation to generation; the place they call home was built on the same faith. The scale of the structure, along with articulation of high-end materials, created a quality that would convince the community of this claim. For well over a century its appreciation remains sturdy. Similarly, the Peking Opera seemed as though it was frozen in time and would last forever. Believing a building possesses the same qualities ignores the presence of ‘living theatre’, invisible but present in all architecture. Death to a building or an opera does not imply fragments of it are not present in the shadows of the new.

“Attitudes and meanings of the traditional Peking Opera relate

4 Brook, Peter. *The Empty Space*. New York: Touchstone, 1996. pp. 14-15

to the new structure of thought in which this people now lives. Today in Pekin the emperors and princesses have been replaced by landlords and soldiers, and the same incredible acrobatic skills are used to speak of very different themes.”⁵

The new is always a manifestation of what came before it. Taking a positive position on this systematic progression, Brook’s ‘living theatre’, actually acknowledges it. Believing that a true piece of architecture is out there and obtainable, as the First Baptists once did, should never be removed from the act of creating a building. This belief is not ignorant to cultural evolution, rather the force that gives architecture permanence. If a building informs an entirely new construct then its permanence remains intact. The quality of a building, such as the First Baptist Church is vital to how it will adapt, be perceived, and tested by future generations. It gives substance, definition, memory, and triggers, as Leonardo describes, the ‘*sensory stimuli*’. Failing to believe that a definitive piece of architecture is achievable would lack the qualities, which allow architecture to move forward. Leonardo’s anatomical drawings search for the qualities in a form that define its essence. He draws all systems of the body, searching for this quality in the complexity of its composition, multiple layers, physical movement, and the relationships of all parts. His final studies reveal a synthesized image that best portrays the subject’s quality. This is precisely what new architecture must derive from its predecessors, the qualities worth keeping. By identifying these qualities, Leonardo obtains knowledge,

5 Brook, Peter. *The Empty Space*. New York: Touchstone, 1996. pp. 15

towards complete understanding of the natural laws in order to honestly represent it through drawing, painting, etc. I am convinced Leonardo did not believe complete understanding of natural law was possible, yet he remained motivated to find it. His practice parallels Peter Brook's endless pursuit of something eternally beyond reach, the 'true play'. An architect should employ the same faith by deriving knowledge in historic buildings in order to honestly represent and recreate them in the form a new one. My project for the First Baptist Church is responsible for translating Leonardo's techniques of dissection, into architectural ones. The anatomy of the building will be studied through, drawing, peeling back layers, and identifying individual parts and systems. The synthesis of these images, as a narrative to the buildings essence, will not come to life in a final drawing, rather in the experience of the finished piece of architecture itself. Detailing the building's form will reveal knowledge to the users of the recreated space, and to the design of new architectural pieces on the same site. Dissecting the church educates me (the designer) and the users as to which parts of the building have allowed it to survive and be recreated.

DRAWING FOR KNOWLEDGE

Leonardo da Vinci demonstrates drawing as the only strategy to derive complete physical knowledge and perhaps even the soul of an object, in his case the human body. By developing a method that rejects any observatory notion, he dissects the human anatomy in a ruthless pursuit of knowledge. This is conducted through a series of drawings representing parts from multiple viewpoints, each one

revealing every possible layer: skin, muscles, bones, tendons etc. A synthesis of these drawings on a single page, or even in one image, gives him and any viewer complete understanding of the motion and operations of a given form. Leonardo references structures in nature, which parallel those present in the human body. Inspired by those relationships, I have identified his techniques of dissection as an analogue for the study of a heritage building. Recognizing structural systems, materials, the order and process of assembly, and events of alteration and adaptation has allowed me to represent the anatomy of the building through drawing and language. The final parallel drawn from Leonardo's method of dissection stimulates a conceptual framework by which to construct new architecture, in the form of a new central library for the city of Ottawa. To this point, a great importance has been realized in acquiring *knowledge* from an object, necessary in any attempt to represent it. For Leonardo, discovering every complexity and universal law at work, resulted in understanding the essence of an anatomical form. Exercising *knowledge* is as critical as the process of acquiring *knowledge*. A dissection of the First Baptist Church has allowed me to honestly represent it as a synthesis of its former self. The building is not defined by its current state, rather detailed in such a way to narrate past events, analogous to Leonardo's synthesis of several anatomical drawings. New architecture, the second part to my physical project, consciously demonstrates the importance of a building's anatomy to express, not disguise, knowledge in order to evolve, adapt and survive in an age of rapid cultural production.

Prior to studying Leonardo's shoulder dissection drawings, one might casually observe this part of the body. It is the joint that allows the arm to move, independent

from the torso in an almost limitless range of motion. There is a concentration of muscle in that area and the joint itself must be complex to allow the arm to move as freely as it does. One would use these assumptions to form a general understanding of how the shoulder operates. After observing Leonardo's drawings of the shoulder one can begin to understand the shape of the humerus and its connection to the scapula bone, the web of rotator cuff tendons that link to chest and back muscles, and the elasticity of muscles and tendons in different motions. It is clear that the joint itself is dependent on components of other systems, even nerves from the brain and blood pumped from the heart. Almost every drawing is referenced to the figure's physical position. Leonardo goes to such lengths as drawing the head and facial expression of a man, in conjunction with the shoulder, to demonstrate posture and attitude towards the motion under examination. Leonardo does this not only to place the shoulder in context to the anatomy as a whole, but also to allow the viewer to relate to a common human movement. Viewing each image almost simultaneously bears knowledge of a very complex system. With this knowledge one could understand the cause of pains and limitations. In a medical context, this understanding allows for diagnosis and corrective surgery if the joint is damaged. The benefit of knowledge over observation in human anatomy is similar to that in a building. Architecture is too often experienced through a casual lens, masking its true identity as a structure containing layers of meaning and possibility for physical and cultural intervention.

A new public library for the city of Ottawa will be cultivated from the knowledge found in a dissection of the First Baptist Church. The relationship created

between new and old structures initiates a process of evolving architecture. History was imbedded in the walls of the church, now relived and retold through architectural detailing, it reveals the story of a building's past. The church is used to explore, through drawing, the interweaving of tangible and intangible. New architecture that manifests from this device will not hide its identity in the attic, wall cavities, or between lines in a heritage document, rather expose them as the root of design. Architecture that is as transparent as Leonardo's synthetic drawings, communicates knowledge in hope of understanding the complexity of an assembled system.

[4] THE DISSECTION

ORIGIN
ANNEX
INTERIOR
ROOF
SPIRES
ICONIC OBJECT

Figure 4.1

Sanctuary Space (First Baptist Church, 13 October 2010).
Photograph from author.

Figure 4.2

View from Laurier Avenue (First Baptist Church, 15 August 1954).

Figure 4.3

Longitudinal Section

section through sanctuary

First Baptist Church

140 Laurier Avenue West, Ottawa, Ontario

Drawn by author. November 1, 2010

Designed by James Mather, AJ Hazelgrove

Figure 4.4

North Elevation

First Baptist Church

140 Laurier Avenue West, Ottawa, Ontario

Drawn by author. November 1, 2010

Designed by James Mather, AJ Hazelgrove

Figure 4.5

Cross Section

section through sanctuary and annex

First Baptist Church

140 Laurier Avenue West, Ottawa, Ontario

Drawn by author. November 1, 2010

Designed by James Mather, AJ Hazelgrove

Figure 4.6

Ground Floor Plan

First Baptist Church

140 Laurier Avenue West, Ottawa, Ontario

Drawn by author. November 1, 2010

Designed by James Mather, AJ Hazelgrove

Figure 4.7

Cross Section

section through tower

First Baptist Church

140 Laurier Avenue West, Ottawa, Ontario

Drawn by author. November 1, 2010

Designed by James Mather, AJ Hazelgrove

ORIGIN

With hopes of establishing a Baptist congregation in Ottawa, Reverend William Dick began meetings in 1844. After seventeen years of weekly worship service, moving from private homes to city halls, the growth of the congregation finally allowed the purchase a lot on the south side of Queen Street, between Elgin and Metcalfe Street. One year later, in 1862, a limestone building was erected with the skilled assistance of community members and named the Queen Street Chapel. The construction of the chapel prominently positioned the First Baptist congregation in a rapidly expanding city. In fact, the expansion of the new national capital and corresponding growth in the congregation meant that, in short time, the chapel was too small to service its growing base. It became necessary to decide whether the chapel should be modified or expanded. From 1873 to 1877 there was debate concerning the decision to purchase new land or enlarge the current building. Ultimately, architects were retained to prepare estimates for the costs associated with an addition versus a new building. The cost for enlarging the chapel was estimated at \$8, 000 and the total cost of a new stone church was \$12, 000. The decision was made easier by other denominations answering the same issues by constructing large stone and brick churches, built to last centuries. The building committee sought out and purchased the new site at the corner of Maria (now Laurier) and Elgin streets for \$ 2, 000 in 1873. Three years after this purchase, debate continued on whether to enlarge the chapel. The members of the church identified with this building, not only as their weekly meeting place, but also as the place that established their congregation

Figure 4.8
View from Laurier Avenue (First Baptist Church, 15 August 1954)

Figure 4.9
View from Laurier Avenue (First Baptist Church, 13 October 2010)

in Ottawa. It was not until 1890 that the Queen Street property was finally sold for \$5,000. The proceeds of the sale were put towards the debt of the new building. In the years after being vacated by the First Baptist congregation and prior to its sale, the City of Ottawa rented the space for use as a police court. Today, all that remains of the Queen Street Chapel is the corner stone, now situated under the baptistry in the current church.

Construction of the new church began in 1877 and saw the foundation walls rise to grade level by mid summer of that same year. Before a large gathering of the community and representatives of the government, the corner stone was laid at three o'clock on the afternoon of Thursday, July 26, 1877. Prime Minister Alexander MacKenzie was in need of no technical assistance laying the stone, as he himself was a stonemason. Laid with a ceremonial trowel he spoke "Now I declare this stone well and truly laid".¹ The trowel remains on the back wall of the sanctuary. The construction schedule was structured to accommodate use, setting to finish the basement hall first, so the congregation could meet for the latter seven months of construction, until the inaugural service was held in the main sanctuary space on September 29, 1878. The church was designed by architect James Mather in a Gothic revival style and built with limestone. Prior to a later addition, the original building measured approximately 30 meters in length by 20 meters in width. The main entrance is off of Laurier Street at the north end of the building. Two staircases branch off the main entrance in opposite directions, allowing access up into the sanctuary

¹ Frith, Rowley. *First Baptist Church, Ottawa, 1857-1957*. Ottawa: Advisory Committee of the Church for the Centenary Celebrations, 1957.

space. The original seating layout was amphitheater style with curved pews facing the west wall. The North façade of the church features a steeple and spire at the street intersection, a small steeple on the northwest corner, and large stained glass windows above the main entrance doors.

THE ANNEX

In 1914, likely before Canada became involved in World War I, the congregation expanded the church with the construction of an annex. The two-storey addition houses a kitchen, expanded educational facilities, three offices including the minister's, a choir room, a utility room, and new washrooms. The annex also allowed for the relocation of the choir behind the pulpit, rebuilding of the organ, and a new baptistery above the pulpit, accessed from the second floor. To merge the new addition space with the sanctuary, a large opening was cut into the masonry wall. Drawings or photographs of the west wall prior to the addition were not retained, however drawings of the annex and details in the church today are telling of past events. A 1914 plan of the church illustrates the original pulpit occupying two structural bays. The absence of a wall buttress below a main roof truss suggests the original presence of a stone arch. There may well have been a proper masonry arch in the original wall, but annex required an even larger two storey opening for the new organ chamber above the pulpit. On the surface it appears a masonry arch was reconstructed, but upon further examination a deflection in the ceiling brings into question the structure hidden behind lath and plaster. The lack of wall space

Figure 4.10
Cross Section of the First Baptist Church
 Drawn by Richards & Abra Architects 12 May 1914

between the arch and top of the wall indicates a masonry arch of this span is not structurally possible. Furthermore, unlike wood or steel, stone is not a material that tolerates tension. A cross section of this detail, drawn for construction of the annex, confirms the design of two cast iron beams spanning the opening. The load of a main roof truss and the adjoining flat roof of the annex also bear directly on the beams. Original masonry block between the two buttresses was dismantled and removed. The I-beams, evidently undersized, explain a sag in the interior ceiling. Architects chose cast iron beams for their strength and lightness, but masked them with a wood frame, and lathe and plaster finish to imitate a stone arch. Corresponding to the church, the annex is built of limestone, creating a near seamless pairing of tone and texture. Set back from the street, the annex serves as a backdrop, as to not take away from the Church's established physical presence. It appears the architect of the annex aimed to compliment the church using similar choices in form and material. Despite a visually modest and respectful connection to the church, significant changes were made to structure and material. Beneath the skin, building methods reflected a period of evolving social and industrial trends.

THE INTERIOR

The next major physical change to the church would occur in 1928 and on the eve of the great depression, it was an unwelcomed one. A leaking roof allowed water to penetrate the west wall and loosen the plaster near the pulpit section. The roof directly above this area was no longer the original sloped roof of the church,

Figure 4.11
Church Interior (First Baptist Church, 1914)

Figure 4.12
Church Interior (First Baptist Church, 13 October 2010).
 Photograph from author.

but a portion of the annex roof, which is flat. The time between the construction of the annex and the water leak indicates a technical flaw in the connection of new and old structures. The severity of the water damage caused major restoration work to the interior of the church. Architect A. J. Hazelgrove worked with the church congregation to take advantage of this state of restoration to perform other interior changes they desired. The seating plan changed from amphitheatre style to chancel style with two side aisles and a centre aisle. The pulpit moved from the west wall to the south wall. The former amphitheatre seating plan saw the floor sloped towards the pulpit in an east-west direction. The new layout meant restructuring the floor to slope north-south towards the new pulpit location. This layout change also relocated the organ console and choir to either sides of the pulpit. New doorways opened into the annex, and an entrance door on the southeast corner of the church was closed off. These major changes required skilled finishing work from patching scars in the plaster walls to new oak wainscoting. New stained glassed windows, pews, and lighting were provided by craftsmen from Toronto and Montreal. On its 50th anniversary, the First Baptist church reopened its doors to hold the first service in the renovated sanctuary on October 27, 1928. The fiftieth year is important to the success of a congregation but also an important marker in the life cycle of a building. From that point forward the only other major physical change to the interior occurred in 1966. A new organ and choir pit moved to the gallery space, which was extended in length by cantilevering over the sanctuary below. While the church underwent renovation, the congregation remained sensitive to maintaining the integrity of the space. This sentiment is expressed by former chair of the organ committee Robert H.

Price:

“Our church, a body of believers, is an established living institution housed in an edifice. The physical interior surroundings contribute to an atmosphere which is conducive to worship. Through worship, persons commit themselves to both personal and financial service. Our missions, both at home and abroad, derive their vitality from this service. Part of the witness of our church is through the physical building which is visible to all who pass by.”²

THE ROOF

Roof structures seem to be an architectural piece in flux, influenced by evolving style, construction methods and available materials. The Church’s roof, enveloped by shingles and finished carpentry, masks the skeletal frame that demonstrates an essential understanding of the structure. To see through its skin, clues are gathered from the interior, tracing finished components back to the bare bones. A virtual disassembly of parts uncovers the physical assembly. On the interior side of each wall buttress, timbers in the ceiling stretch down the plaster walls on either side, bearing on a ledger. This suggests timber frame trusses are the primary structure. The vaulted ceiling takes its shape from the bottom chords of a scissor truss design. Purlins running the length of the church tie each truss together and create a substructure for interior molding and rafters. Light weight rafters then attach to

2 Frith, Rowley. *First Baptist Church, Ottawa, 1857-1957*. Ottawa: Advisory Committee of the Church for the Centenary Celebrations, 1957.

purlins and provide a nailing surface for roof sheathing. Cohesive strength is achieved by each successive structural layer working perpendicular to the previous layer. This stacked structural system also distributes the entire roof load to each buttress, expanding their role as reinforcement for the walls. The original slate tile roof is now a less expensive asphalt shingle. The ceiling is finished with a grid of wood paneling, framed by structural members and capped with molding. Design details of the interior are an honest expression of the structure and process beneath the finished skin. The overall roof design speaks to an understanding of the possibilities and limitations of material. Large timbers are maximized for strength to transfer weight to specific points while bracing the masonry walls. The tensile strength of wood aids a weaker stone that works only in compression. Light weight framing is used to distribute loads across a large surface. Two dissimilar materials in stone and wood depend on collaboration. A stonemason's work structurally supports the carpenter's, while the roof protects and stabilizes the entire edifice. Finally, the roof covering protects all parts, ensuring no penetration of water occurs. Design and function equally capture the qualities of each material. A drawing of the roof system performs a disassembly by peeling back layers to identify component parts. Once the anatomy is communicated and understood, a virtual assembly recreates the original act of construction.

THE SPIRES

The featured ornament of the first Baptist Church is a spire situated above

Figure 4.13
Spire being changed (First Baptist Church,
 10 November 1955) Photograph taken by
 Cliff Buckman

Figure 4.14
Spire being raised (First Baptist Church,
 10 November 1955) Photograph taken by
 Cliff Buckman

Figure 4.15
Study of the Spire. Drawn by author

the intersection of Laurier Avenue and Elgin Street. The symbolic function of the spire dominates this prominent intersection, reaching forty-eight metres into the sky. Perching the large form on top of the stone tower requires strategic choice in material and framing methods. Once again, the concealed anatomy of the form and absence of original drawings requires research into other buildings of its kind. The spire on the Jarvis Street Baptist Church in Toronto, ON, built within a year of the First Baptist Church, is similar in scale and shape. A section of the spire reveals stacked octagonal platforms framed with timber. Wood studs sit on the vertices of each octagonal platform and taper up to a smaller diameter. The platforms create scaffolding for carpenters to work from. Between each stud diagonal braces assure lateral stability of the entire spire. Tapered studs eventually meet at the apex and secure to a central post to which a finial secures. The completed timber frame is clad with wood sheathing, followed by a metal sheet material. Copper shingles were installed on the spire in 1955. At that time the smaller spire on the North West corner of the building was replaced as well. Photographs from various decades of the church's life show very little change to the exterior, and that remains true today. However, the small spire is one piece of the church that has been altered at least three times. A photograph dated 1915, shows the original small spire. Another photograph from 1954, one year prior to the small spire being replaced, shows the second of three spires. The original is the tallest and most decorated of the two. The second spire is short and four sided, tapering slightly toward the top. The insignificant size and lack of detail suggest that it was a temporary replacement of the original. Wind may have brought down or damaged the spire in a time where funds were not available to replace it. The

third and present day spire replicates the large one, an octagonal cone that tapers to an apex. The cause for change in form to this architectural piece is speculative, but certain is its ability to accommodate change. Attached to the core of the building, the spire is a light weight and highly ornamental in function. Its connection to the church allows it to respond to external forces, welcomed or not. Photographs of the 1955 installation show the prefabricated piece being raised into place with a crane. The spire is understood as a part in flux, but always maintains an important relationship to the stone church.

CULTURAL ICON

One hundred and thirty four years has taken its toll on the church's exterior skin. Despite a declining population, currently hovering at seventy parishioners, financial barriers have yet to cripple the integrity of their cherished edifice. Recent fundraising has financed repointing the brick and window repair. Although the church building is protected by heritage designation, it remains vulnerable to environmental conditions. Replacing the roof is at the forefront of financial burden facing this congregation in the near future.

The city core surrounding the First Baptist Church has seen tides of change since construction. Relative to its urban context, it is among a class of buildings that has the freedom to evade forces of change, made possible by its independence

from the urban fabric. The church was constructed and maintained by a small group of people within the city. Its growth and evolution has always reflected that of the congregations. Therefore, the church as a building may be independent to the growth of the city, but the congregation is not. If not for establishing itself as an iconic image, forged in the psyche of 'heritage', this building would be in sync with urban transformation. Although the church is currently protected by heritage designation, several events discussed in this chapter detailed significant structural change. The thread that connects each alteration signifies a consciousness of parts. Elements such as the floor, spire, and archway were removed or reinvented, while appreciating their critical relationship to other, more permanent, parts. Each event is evidence that a building can evolve in parallel to the culture that recognizes its iconic value.

[5] THE PROJECT

BOOK TOWER
THRESHOLD
ROOF
THEATRE
OFFICES
DATA & MEDIA BUILDING

Figure 5.1

Project Site. First Baptist Church 140 Laurier Avenue West
Ottawa, Ontario.

Figure 5.2
Library Plan. Drawn by Author

FINDING THE PARTS

Leonardo da Vinci's faith in macro-microcosm relationships allowed him to compare human and plant anatomy, in search for the 'seat of the soul'. "The heart is to the 'tree of the vessels' as the seed is to the roots and branches of a vegetable tree".¹ Analogy between two comparable systems depended on his understanding of their internal parts. As discussed in previous chapters, Leonardo obtained knowledge through extensive studies that used three-dimensional drawing. His process, structured and diligent, left no joint, muscle, or tendon in question of its shape, movement, or purpose. However, the soul cannot be found in one particular drawing; its presence lies in the union of all parts. An understanding of the human soul may therefore only be understood in drawings intended to illustrate a synthesis of physiological systems. If analogy is my apparatus to define the soul of the First Baptist Church, its parts may be understood and revealed in the same manner. Information derived from Leonardo's individual studies migrates into a final drawing, using techniques such as 3-dimensional plasticity and transparency. Dissecting the church reveals parts of the structure containing significant knowledge. Strategizing which parts to detail begins by tapping into the 'sensory stimuli' of design imagination. Contrasting the head-to-toe diligence of Leonardo's anatomical studies, I will use my existing understanding of the structural system of the church, coupled with knowledge of its past to identify areas of the building worth dissecting. Particular elements of the structure trigger this process of exploration through their

¹ Kemp, Martin. "Dissection and Divinity in Leonardo's Late Anatomies". *Journal of the Warburg and Courtauld Institutes* 35 (1972): 202.

apparent qualities to the existing church, hidden anatomy that escapes understanding, and signs of structural intervention over the life span of the building. Architectural curiosity drives the study and resolves questions through detail. The purpose of exposing the church's essence is to sustain its permanence, beyond a relegated heritage building. Fragments of the church maintain historical presence and also form a conceptual basis as a model for evolving architecture. Similar to human anatomy, my proposed main branch for the Ottawa Public Library is made up of parts, each one imperative to a system of synthesis. The library design is guided by programmatic function to develop independent parts; critical is the relationship between them. I will discuss and display the anatomy of the library building, including the dissected church, by identifying each individual part. Ingrained in each, architectural details elucidate valuable knowledge.

THE BOOK TOWER

The central building, from which all other parts of library stem, assumes the most dominant presence on the site. Paralleling its formal attributes, the large steel tower also has a significant programmatic function. The library's entire collection of printed documents is shelved in the eight-storey structure. A steel skeleton, massed by a glass skin circulates users vertically, through a central void. Prior to reaching one of the eight floors, reference data is obtained at the ground level concourse. The foundation supporting the tower rises four metres above grade level where steel

Figure 5.3
Section Through Book Tower. Drawn by author.

columns attach. Elevating the tower well above ground level creates an intermediate space between the entrance concourse and first floor of the book tower. Linked by circulation, the entrance is physically disjointed from a more private library space. Furthermore, the threshold substantiates the tower as an adjoining piece, a structure connected for a distinct purpose to serve a greater system. An external perspective of the tower reveals an objective disposition, detailed by a conspicuous connection to the rest of the building. The joint of a steel column and concrete footing is visible in vertical transition between the reference concourse and first floor of the book tower. The tower is a vital piece, whose primary function is to store and distribute information through varying modes. As mentioned, printed documents referenced online or on the main level are then obtained and distributed to the reading room, media building, or checked-out. Function consciously dictates the central location of the tower, adjacent to each possible space users require library documents. Although formally independent as a distinct part, users experience its structural and functional dependence to other elements. Similar to Leonardo's drawings of synthesis, transitional spaces and details uncover the relationship of systematic parts.

THE THRESHOLD

The Church form, seemingly monolithic, masks the joint of an addition on the west wall. Although it meshes with the original edifice, in terms of scale and materiality, there are several clues dictating its construction came sometime after

Figure 5.4
Section Through Threshold. Drawn by author.

the original build. Evidence is found in varying floor heights, roof lines, window spacing, etc. From a structural and spatial perspective the interior threshold between new and existing spaces contains the most information. This space has repeatedly evolved through the church's lifespan and will continue to do so in this project. Although the use of this space has transformed from a pulpit to a baptistry, its role as a threshold has remained fixed. It is important to maintain, but reinvent this layered threshold. The new space, replacing the annex is a two-storey passage from the library concourse into the main reading room (former sanctuary space). Alternatively, users may enter the threshold via an elevated path from the original church entrance. At ground level, users descend down a set of stairs into the reading room. Above, the second storey projects into the church and branches off to either side, following the perimeter of the exterior walls. It is at the second storey threshold where the anatomy of this opening is peeled back. Hidden cast iron beams are partially revealed, by removing the lath and plaster on half the thickness of the wall. From the church interior, the plaster skin of the arch remains intact. Bare stone walls and original beams, spanning above, contrast the imitation plaster arch. A steel member attached to the new roof structure of the library cantilevers into the church space perpendicular to the cast iron beams and a few inches below the top of the arch. Sitting on top of this beam is a short steel column, sharing the load with cast iron beams. This detail exposes the anatomy of the arch to create a strong physical and conceptual connection between new and old structures. Introducing a reinforced detail acknowledges the sag in the ceiling, not just as a structural deflection, but evidence of a former dissection to the church. The spatial condition below the arch recalls layers of the building's

anatomy. Standing in the threshold, a floor to ceiling void in the new north gable wall reveals two elements of the church's front façade, the entrance doors and stained glass windows above. Once a focal point of the church interior, the only visual connection to these elements now is at the threshold space. Although the church is altered, the moment one enters the space, a link to the past is created.

THE ROOF

The Church's roof structure was the most concealed part of the structural anatomy, and naturally worth dissecting. It shelters the interior from exterior elements and frames a well crafted vaulted ceiling that defines a quality of space. Apparent in the ceiling are bays of structural members that reach down to walls below, suggesting a timber frame system. Such details act as clues in the process of architectural dissection. Religious buildings of approximately the same time period and geographical area provide analysis and information to aid a virtual dissection before the church is physically cut open. With found knowledge in mind I am able to draw and dissect the roof assembly. By physically removing layers of the ceiling, information I was forced to discover through research can be communicated to users through detail. Alike systems in the human body, the roof and ceiling are now understood as a system of parts. The roof trusses support a substructure that frames the finished ceiling, while the skin of the ceiling separates inside and outside air to form an attic space. Exposing this system communicates structural and spatial knowledge, allowing the church to become a truer expression of itself. Sections of

Figure 5.5
Roof Assembly Axonometric Drawn by author

the ceiling are removed, transitioning from a bare scissor truss to layers of rafters, purlins, and finally the finished tongue and groove wood ceiling. The portion of ceiling in the former church foyer, now an exterior space between new and old entrances, is completely removed and replaced with a metal roof. This roof sits atop the old church roof, covering sections where the ceiling has been removed, for the purpose of thermal insulation. Directly above the arched opening, skylights built into the new roof, provide light to the threshold space and reading room below. Steel beams supporting the new roof depend on the existing structural system by securing to timber purlins. The new piece is completely shaped by knowledge found in the fabric of the original building. Not only does the roof serve a functional purpose, it also signifies a change to the interior space from the street.

THE THEATRE

Creating a part that embodies the qualities of an entrance borrows from details exhibited in the church. As previously discussed, the church roof is dissected to uncover information pertinent to its role. This process ascertains structural and spatial qualities that migrate into a new roof structure covering the atrium and auditorium spaces. Anchored to an internal wall, roof trusses span in opposite directions covering both spaces. The slope of the roof is utilized to define a spatial condition. On the north side, roof trusses open up to the street, indicating a point of public entry. Similarly, the roof opens toward an atrium stage on the south side. Formal qualities reflect the

Figure 5.6
Section through theatre. Drawn by author

function of the space being served. The roof form is an open structure that links two unrestricted spaces within a regulated library. The trusses are a hybrid of wood-glue-laminated beams and steel rod. Exposed trusses promulgate a manufacturing process that uses craft to fuse two distinctive materials. Echoing the design of the church roof, component parts are exploited for their qualities. Parts congruently perform function and communicate knowledge. In the church, timber frame trusses designed to distribute roof loads are key elements to the church's finished interior. The triangulated design of the scissor truss frames a vaulted ceiling. Once exposed, the role of each truss is clearly understood. Dissecting a stagnant, concealed structure uncovers a methodology that is realized and reinvented in the form of a new architectural piece.

THE OFFICES

Adjacent to the atrium at the west end of the site sits a building containing a street level café and private offices above. The structure is encased by a concrete shell two stories high, exposing steel and glass at the third and fourth storey. Although relying on the base fabric to physically connect to the library, it visually remains a unique, separate component. This is reflective of a program that is independent of the public library. A main level café is accessible from the atrium or Laurier Avenue. Floors stacked above provide office space and meeting rooms for members of the library board. The relative instability of offices and commercial spaces, compared to a civic library, necessitates a demand for adaptation. Although an important piece to

Figure 5.7
Section Through Offices. Drawn by author

the library, the possibility for removal and alteration is achievable. Connecting each architectural piece to the core of the system is vital to a flux relationship. The light steel and glass structure is partially encased by the foundation to create a physical link to the library. Removing the piece would leave a void for interpretation, while the original outline would remain. Dissecting the church generates a methodology that acknowledges an evolutionary process for creating architecture. Reinvented forms and spaces in the church are templates for future adaptation of parts such as this.

THE DATA AND MEDIA BUILDING

The ongoing digitalization of information via online databases is contemporary evidence of a social trend pushing against architecture. Despite a shift towards the intangible, the new Ottawa Public Library provides access to various forms of information. The library model must transform functional responsibility to access both physical and virtual realms of publicized data. This part, classified as the Data and Media Building, accesses various types of physical and electronic data including maps, online data sources, videos, software, statistical information, etc. The four-storey structure runs parallel to the main library concourse and connects at the base of the book tower, through a circulation corridor. Separation from other parts creates an L-shaped courtyard, providing access from Gloucester Street. Corresponding to companion pieces, circulation is the binder of parts, acknowledging the individual function of each. Inside the guts of the structure, strategic views describe each part in unison. Analogous to Leonardo's ideal perspective in drawing, collective

Figure 5.8
Data and Media Building Plan Drawn by author

knowledge from each part manifests into a system of synthesis. Although spatial conditions visually link systematic parts, the knowledge of each is only generated from an active engagement with the architecture.

THE READING ROOM

During an interior renovation in 1928, the layout of the church was drastically changed. The congregation decided to move the pulpit, which meant altering the seating plan from amphitheatre style to chancel style. To accomplish this the floor was reconstructed to slope towards the back of the church. The floor, which in both cases has been customized to serve a specific layout, must evolve to suite its new purpose as a public reading room. Rather than construct a new level floor, it is completely removed, opening to the basement level. Utilizing the structure's entire height allows for a mezzanine level. Removing the floor does not imply it will be forgotten. Wainscoting that follows the slope of the old floor remains a telling layer of the church's past. Furthermore, the structural absence of the floor will be apparent through another reinforced detail. The floor of a building, at or close to grade level, typically has a structural role in resisting the external forces of soil, pushing inward on outside walls. It is necessary to brace the exterior walls. Steel columns spaced around the perimeter of the church support the new mezzanine structure and reinforce the stone walls. A gap between the columns and existing walls, and the connection of the two, demonstrates the dependence each has on one another. The mezzanine structure utilizes the lateral strength of the church, while the stone walls benefit

Figure 5.9
 Section Through Reading Room. Drawn by author

Figure 5.10
Mezzanine Detail. Drawn by author

from the tensile strength of the steel columns. A layer of woodwork between the two elements recalls the former floor. The height of the mezzanine now allows users to experience the space at a different level, affording views to the street and vice versa. Details in the original windows and ceiling are now experienced in close contact to the user. This detail is a microcosm of a space that has transformed structured views and circulation into a much more exploratory experience.

THE TRANSITION PIECE

The bulk of the annex structure is removed from the church in the dissection procedure to make way for the new library connection. The multitude of small spaces, once serving varying functions to the church, are no longer relevant to the new library program. Holding onto those spaces limited the potential for a large public connection to the former sanctuary space. Yet, rather than demolish the annex completely, the north (front) façade remains, because although it is simply one wall, this fragment contains information of what came before. Placed in a different context, juxtaposed to new materials, the wall is visually dissected for clues of its past. The chimney cavity frames openings of wood-burning fireplaces that served rooms at each floor. Window openings suggest a type of corresponding space, based on their size and position on the façade. Exterior steps lead to a recessed vaulted arch, clearly indicating a main entrance to the former annex. To support the now fragile façade and connect it to the new structure, beams stretch over the top of the wall and bear on columns placed on

Figure 5.11
Cross Section Through Transition Piece. Drawn by author.

Figure 5.12
Longitudinal Section Through Transition Piece.
 Drawn by author

the exterior side of the wall. These columns support a new roof, as well as vertically brace the stone wall, similar to the mezzanine detail. On the interior, the new second floor bares on the facade, while maintaining a gap of separation, allowing skylights to flood the entire wall with natural light.

THE CORE

The thick stone walls of the original church proved permanent in the church dissection. Despite being left untouched, the walls and buttresses contained the most valuable quality— a degree of permanence— essential in developing new architectural spaces. Like a human skeleton, stone walls assume the role of both shell and core. Bones are the structure of the human anatomy and serve two distinct, contrasting roles: to protect and be protected. The skull and rib cage are examples of bones that protect vital organs of the anatomy. Conversely, the spinal cord and pelvic bones are vulnerable, unless protected by muscle. Likewise in the church anatomy, walls act as a shell to frame interior spaces, or as a core to support external elements, such as the spire and roof structure. Inspired by this knowledge, a new structural element is designed to possess the same dual quality throughout. The core component, cast in concrete allows architectural pieces to be contained within or connected as external elements. A building that exemplifies both types of relationships prohibits a closed structural system, thus encouraging adaptation, addition, and subtraction of architectural pieces. This is necessary for the library to evolve with social needs and expectations. Details explored through dissection focus on visually separating

Figure 5.13
Model of the Core. Photograph from author

elements. Much like Leonardo's images, essence is discovered in the cognate relationship of parts, but more importantly in their visual unity. The core of the library recognizes the connection of architectural pieces. It is a device used to circulate users, support and house structures, and reveal connections that define a system of parts.

Figure 5.14
Longitudinal Section through the Library
 Drawn by author

[5] CONCLUSION

The conservation of heritage is not synonymous with the preservation of buildings. Rather, in this thesis, I have suggested that heritage conservation involves the uncovering of narratives, sometimes hidden in the body of architecture. Architecture should be a vehicle to carry the past into the future— a process of social responsibility—ever building a cultural narrative. Though the Ontario Heritage Act (1975), reduced risk to hundreds of sites and buildings — of agreed heritage value — a growing ethical tension concerns the present role of heritage buildings, especially in a dense city core. The collision between urban growth and the ethical responsibility to preserve heritage icons is the central contradiction. This thesis applies Leonardo da Vinci's theory of dissection to consider the topic of heritage, as it relates to a proposed public library on the site of the First Baptist Church.

Heritage conservation recognizes architecture as a catalyst for creating phenomenal links to the past. Although architectural fragments, photographs, and digital recreations have the ability to connect an object to its original condition, the most convincing evidence of a building's past is contained within its structural anatomy. Through this thesis, I argue that this anatomy is discoverable only through an architectural dissection. Unpacking an architectural anatomy borrows strategy found in Leonardo da Vinci's anatomical drawings of the human body. He develops structured drawing techniques that first identify each part and system before extracting essential knowledge. The ultimate way to express complete understanding is a synthesis of viewpoints and layers. Drawing techniques such as selective transparency and explosion allow him to illustrate a series of separate drawings in

one three-dimensional synthetic image. Leonardo's drawings simultaneously explore the scientific and spiritual nature of all anatomical parts. The same methodology and strategy is applied to a dissection of the First Baptist Church. Areas of the structure, explored through drawing and language, reveal hidden information as the source of cultural value, creating a contemporary expression of the past. Structural alterations, historic events, and a holistic understanding of the church's assembly, narrate the building's history. In doing so, this process not only reveals core qualities, it cracks the protective shell of heritage designation, allowing the First Baptist Church to have an essential role in urban growth.

The dissection uncovered critical details, telling of the structure's layered anatomy and history. Knowledge embedded in fragments and subsequent details transcends into new architecture through a fundamental understanding of the relationship of parts. Structural comprehension of the church is inconsequential in catalyzing the library project without recognizing the history of human response. Some parts repeatedly adapt, while others, like the corner spire, are accepted by the people as an untouchable object. The core walls, generally acknowledged as permanent, are continually reinvented and repurposed, serving as a protective shell or a foundation for parts in flux. Such elements have proven malleable, interchangeable and consequently responsible to promulgate cultural change.

Cultivated from this dissection is a methodology that creates a system of adaptable architecture, where heritage is the root of invention. Each part of the

library has a distinct purpose, reflecting a programmatic function or desired quality of space. The core element expands from the church, carving the site with definitive, permanent lines; a conceptual foundation for new architectural parts. As a form and space unto itself, the core mediates the past (church) and the future (library) by establishing a condition to invent architecture. Elements such as scale, solid versus void, closed versus open, are cast in form to initiate design of companion parts. The dissection of the church and necessary program and function of the library influences design of the core. The church dissection discovered that a core is not exclusive to one program, user, or time period; it is an object of evolving possibility. Parts of the library are methodically designed, connected, and integrated into a synthetic system, not to be permanently fixed, physically, or metaphorically. The erosion of parts is expected if not encouraged, allowing the core to catalyze new architecture without concealing the past. The relationship of parts lives in the core element that circulates users throughout the library. It is a permanent yet inscribable fabric that is never too comfortable with its surroundings.