Acts of Liturgy

Graduate Thesis Project
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MASTER OF ARCHITECTURE

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Abstract: This project is a Catholic church located in downtown Blacksburg, VA. Whereas many religious buildings seem to rely heavily on iconography in order to designate the building as sacred, this project explicitly seeks an architectural expression of the liturgy that exists independently, but not necessarily to the exclusion of, iconography. Also present in this investigation is the idea of distilling the architectural ideas from traditional things, and applying them in a modern context.
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Designing a Catholic church in the year 2004 makes an already arduous task even more difficult. The church's position on the design of its buildings seems to be in a state of limbo, oscillating between the “progressive” reforms stipulated by the Vatican II council and the desire to revert back to the traditional design ideas that have been present in Catholic churches for 2,000 years. Since 1965, cruciform-plans have been replaced by centralized plans, tabernacles have migrated out of the sanctuary into their own chapels, and the dark mysterious confessional has been remodeled into a bright reconciliation chapel, where penitents can face to face with the priest, in a simpler, more iconoclastic environment. The following thesis project takes its own stance on this issue. It reinterprets many of the classic elements of Catholic church architecture, attempting to distill these elements and articulate them in a manner that is not nostalgic or anachronistic. It is somewhat iconoclastic, assuming the position that good church architecture can and should be able to exist independently of iconography. In order to help establish guidelines for the design of this project, several accepted sources were consulted: *Built of Living Stones: Art, Architecture and Worship* (Guidelines set forth by the National Conference of Catholic Bishops), the *General Instruction of the Roman Missal*, and *Elements of Rite* (a text by Aidan Kavanagh). These documents were supplemented by ethnographic fieldwork, which involved visiting several different churches to witness the Mass, and countless unscripted interviews with Catholic priests, clergy, and laity.

Many religious structures, not merely Catholic churches, rely heavily on iconography in order to publicly signal the sacred nature of the building. Although icons/symbols are often perceived to be an important aspect of the liturgy of many churches, the role of architecture as a key player in supporting the liturgy is often overlooked. This is seen conspicuously in many storefront churches that occupy strip malls and downtown areas. Furthermore, this is evident anywhere icons, particularly large crosses (sometimes with fluorescent lights inside), are attached to structures that are otherwise architecturally ambivalent. In *Learning From Las Vegas*, Robert Venturi identified this type of building as the “decorated shed,” where the sign replaces the building as a signifier or explanation of the building. According to this position, all that is essential is the presence of icons (e.g. crosses and images) to validate a church building as sacred.

This project, a Catholic church in downtown Blacksburg VA, explicitly seeks an architectural expression of the liturgy (defined as any form of public worship) that exists independently, but not necessarily to the exclusion of, various forms of iconography. This is accomplished by allowing the architecture to respond to the requirements and ideas inherent in Catholic liturgy.
The priest addresses the gathered congregants:

"Today, as we think about what we are doing, about how on this site, where we have gathered to ask God’s blessing, a new church will rise, we also realize that here, on this ground, and this church that will be, God and man continue to meet, according to the plan given us by our Lord and Savior Jesus Christ. In this church that will be, our children will be baptized into new life, they will hear the Word of God as they grow, and we who nurture and protect them, will add to the substance of our own lives, as we share in the Eucharist, as we grow older, and as we depart this life, through the same portals where our children have entered."
The site for the project is located in downtown Blacksburg, VA. It is desirable that Catholic churches are oriented towards the East, which represents the direction of the Heavenly Jerusalem. This created an interesting situation when dealing with the urban grid of Blacksburg. Blacksburg’s grid is skewed off of the North-South axis, therefore the church’s orientation stands in sharp contrast to that of the other buildings in the town. The expression of the east-west axis is emphasized on the site as a way to mark the building and its site as different from the other things around it. If Blacksburg’s town grid conformed to the cardinal directions, then this gesture might have gone unnoticed. The larger site for the building, which is the old Blacksburg Middle School site, currently bisects Church St. In this proposal the two parts of Church St. are joined in an effort to shrink the site and pull the church off of Main St., which tends to be busy and noisy. The church is the largest building visible on the site plan; however, it is also sitting on the largest lot in the vicinity. Furthermore, the church building is comparable in size to the current Blacksburg Middle School, which does not seem too large for its context. The resultant lot on Main street would be developed later into a Catholic school, plaza, and parking. Also present on the site are the rectory, the bell tower (where the water originates from), and the outdoor wedding chapel where the water terminates and is recycled.
Section through site showing the relationship between the church building and the campanile.
Campanile

Priest:  Our help is in the name of the Lord.
Congregation: Who hath made heaven and earth.

Priest:  Let us pray: O Lord Jesus Christ, who camest to the aid of thy disciples in a storm, come now and always to our aid. When the sound of these bells flies through the skies, may thy Holy Spirit descend on all who hear them, may they increase in the knowledge of thy faith and love, may they be guarded by the heavenly host, and protected in body and soul. We dedicate this bell in honor of St. Kyneburgha--

Priest sprinkles bell with holy water

Priest: We dedicate this bell in honor of St. Kyneswitha--

Priest sprinkles bell with holy water

Priest:  In the name of the Father, the Son, and the Holy Spirit, Amen.
In the earliest Catholic churches, the bells that were used were small hand-bells. When bells began to be cast out of bronze and grew larger in size, bell towers were erected to house them. The bells function in a variety of ways: they are used to call people to prayer and they ring to announce funerals and weddings. In some churches the bells are even used to signal the elevation of the host and chalice during communion, to emphasize that a miracle is taking place. Since the 800s, the importance of bells to the church has been demonstrated by a dedication ceremony known as the “Baptism of the Bells.” In this rite, the bell is named, psalms are recited, the bell is washed with holy water and dried, anointed with Oil of the Sick in 7 places on the inside, and Chrism on the outside in four places. The bell tower on this site rises from the water at the highest point on the site and acts as a beacon to the town. It houses three large bells, which is traditional for a parish church, and has a central stair that allows one to walk all the way to the top, perhaps to enjoy a view of Blacksburg and the surrounding area from one hundred feet high. The campanile is constructed of site-cast concrete, board formed in the same rhythm as the service boxes on the church. Additionally, it is made from the same palate of materials as the church itself—concrete, metal, and wood.
The form of the campanile was derived from local air traffic control towers. The plan, which features four independent site-cast concrete walls tied together at various points, is extruded upward, changing to respond to the bells located at the top. The four walls continue past the roof and terminate themselves. This solution was necessary as it is very difficult to cap a tower shaped this way. The tower is open to the weather on the inside, with the wooden slats serving as light diffusers, enclosure protection, and as a way to help block rainwater.

Above: Campanile sitting in triangular pool of water. Concrete walls are board-formed in a 2:2:1 rhythm. Right: Plan and section of campanile, and plan at 95°
Inscription on a bell:

Laudo deum verum plebum voco congrego clerum; Defunctos ploro, nimbum fugo, festa decoro.

I praise the true God, I call the people, I assemble the clergy; I bewail the dead, I dispense storm clouds, I do honor to feasts.
General Responses to the Liturgy

The priest addresses the gathered congregants, at the dedication of the new church:

“And so, dear friends, we have gathered to bless our new church, and to begin an encounter with God that has its origins so long ago, in the desert, when Moses received the law, and enshrined it in the Ark—an encounter that was fulfilled, when Jesus Christ died on the cross, and enshrined His Sacrifice in the Mass, in His Body and Blood, which come to us now, and will remain with us, in this holy place.”
The diagram of the building, which proposes a symbiotic relationship between two containers, one nested inside the other, organizes and articulates the dual programmatic nature of the church. The inner container, constructed mainly of wood, houses the sacred aspects of the church. This inner box forms the heart of the church, which contains the nave, sanctuary, sacristy, support services directly related to the liturgy, and the library. I see the library as being intimately connected with the history of the church as a guardian and disseminator of scholarship. The library is found above the main sacristy on the upper level along with the organ, choir, and gallery seating. The larger, outer container, constructed mainly of concrete, metal, and glass houses the more pragmatic aspects of the church. It provides shelter and enclosure, contains offices, conference rooms, toilets, and a banquet hall. Below the church on the basement level is the crypt and spaces allocated for electrical and mechanical systems. The rigid order of the plan reflects the rigid order and structure of the liturgy.
Upper level: contains additional seating, choir area, organ, and library
1. Narthex
2. Nave
3. Sanctuary
4. Sacristy
5. Confessionals
6. Stations of the Cross
7. South Garden
8. Office Wing
9. Restrooms/Day Care
10. Main Entrance
11. Banquet Hall
Crypt Plan: Most Catholic churches in America do not have crypts below the church for burying the dead. There is usually a cemetery on the site or close by for this purpose. However, the crypt provides an opportunity to architecturally relate the burial of the dead to the requiem mass that takes place in the church.
Reflected ceiling plan: shows the placement of suspended light fixtures, and the wooden ceiling. The diagonals formed by the boards mirror the diagonal lines created by the stone floor, which point to the altar. The wooden boards are laid randomly, and range in width from 2-8". The boards are left rough to cast shadows on themselves.
Left: Cupola on roof of church. The structure is situated over the sanctuary platform. Above: Church building on site.
Left: South side of church. Structure projects from the concrete columns forming a lower enclosure. Dogwoods are planted at intervals between concrete planters. Above: Hallway on the other side of the south garden. The glass wall contains some blue infill glass as a counterpoint to the red glass used in the hallway on the other side of the building.
Rite of Baptism

Priest: Do you believe in God the Father Almighty, Creator of Heaven and Earth?
X: I do believe

Priest: Do you believe in Jesus Christ, His only Son and Lord, Who was born and Who suffered?
X: I do believe

Priest: Do you believe in the Holy Ghost, the Holy Catholic Church, the communion of Saints, the forgiveness of sins, the resurrection of the body and life everlasting?
X: I do believe

Priest: Will you be baptized?
X: I will
The rite of Baptism is an important ritual which signifies one's rebirth into the Catholic church. It wipes one clean of all sin and makes one fit to participate in receiving communion. The baptismal rite can take place during the mass or as a stand-alone ceremony. Infant baptism generally takes place during the mass, and a sponsor or godparent is expected to speak on that child's behalf. As a stand-alone ceremony, the rite of baptism has four parts, each part enacted in a different place in the church. It begins in the narthex with the question posed to the candidate, “What do you ask of the church of God?” What follows is a series of gestures, including the imposition of hands, making the sign of the cross over the candidate, placing salt in the candidate's mouth, exorcising demons, etc. When the candidate ends up at the font in part four of the ceremony, he/she is asked to make a profession of faith, and the priest pours water over the candidate's head three times “in the name of the father, the son, and the holy ghost.”
Above: Main entrance to church where baptism ceremony begins. Doors are chip-carved in a geometric diamond pattern. Many older church entrances have elaborate statuary and relief carvings marking their entrances. The density of detail and haptic qualities that have been important in the past are still present in this entrance in the absence of iconography. In this manner the church distills the important ideas of the past and presents them in new ways. Left: Section through gravity hinge. The hinge is sliced at an angle so that the heavy doors will slowly close themselves. Low-tech mechanisms such as this are better suited to buildings that have the potential to exist for hundreds of years.
Baptismal font: constructed of cast bronze, the four legs act both as support and as overflow for the water.
In the Sacramentary it is written "God our Father, your gift of water brings life and freshness to the earth; it washes away our sins and brings us eternal life." The notion of water is therefore an important aspect of the Catholic liturgy. The baptismal waters are seen as a link between human experience and the death and resurrection of Christ. Water provides a continual reminder of the idea of cleansing and renewal. The water that flows from the bell tower forms a channel that runs through the church. On the interior of the church, the water is selectively covered and uncovered, so that it does not interfere with the liturgy but always makes itself known. As the water approaches the sanctuary, it forms an island around it to emphasize its importance in the nave. The water is uncovered at the baptismal font, which is located in the rear of the nave. Its placement allows a large number of people to observe the baptism, even from the second level of the church. Through its proximity to the narthex, it allows a large crowd to gather around if necessary. The font itself is constructed of cast bronze, the legs functioning both to support the basin and to allow the water to overflow once the font is full, since it continually pulls water from the channel below. In proximity to the font are the sacred oils used to anoint the newly baptized and a place for the Paschal candle.
Sacrament of Penance

Penitent: Bless me Father for I have sinned. It is ____ since my last confession. I accuse myself of the following sins. For these and all the sins of my past life, I ask pardon of God, penance, and absolution from you, Father.

Priest: May our Lord Jesus Christ absolve you; and by His authority I absolve you from every bond of excommunication and interdict, so far as my power allows and your needs require.

Priest makes the sign of the cross

Thereupon, I absolve you of your sins in the name of the Father, and the Son, and the Holy Spirit. Amen.
Catholics are required to make a confession of their sins at least once a year or whenever they have committed a mortal sin, and it is desirable that they do so on a monthly or weekly basis. Like everything else in the Catholic liturgy, the sacrament of penance is highly structured and requires a number of steps. The first is an examination of conscience to determine what kinds of sins have been committed. The next step is contrition, or willful regret for one's sins. When confession occurs, the sinner enters the confessional and kneels, saying “Bless me Father for I have sinned. It has been ______ since my last confession. I accuse myself of the following sins.” The priest assesses the seriousness of the sins and then assigns a penance, which involves saying certain prayers and/or reading certain scriptures. Absolution from the sins is given by the priest under the condition that the penance is carried out afterwards.
Many newer churches do not have confessionals, but instead contain a reconciliation chapel. In this setting face to face confession can take place between the priest and the penitent. In order to facilitate some degree of flexibility in the space, this church has both confessionals and a reconciliation chapel. Many congregants still prefer the confessional, but the reconciliation chapel is also desirable to some people. This church contains four confessionals, located in such a manner as to promote privacy. There is one seat for the priest between each pair of confessionals. The penitent must go into the dark confessional, kneel and confess, while the priest sits in the light. This increases the chances of anonymity for the penitent. The screen between the priest and penitent is perforated copper, as are many of the other screens in the church at human scale. The angle created between the two people and the reflective quality of the copper also helps to create anonymity. The confessionals are relatively dark, with no electric light; they rely on borrowed light from the gallery above, and whatever light streams through the screen. The confessionals contain a thick cork insert in the floor for kneeling and acoustic paneling on the walls at the kneeling level. The acoustic paneling works for two purposes, it has a functional aspect to help contain sound, but it also has an ineffable transformative effect on the space that cannot be perceived visually.
The priest genuflects and adores the Sacred Host. He elevates the Body of Christ for the veneration of the faithful.

"My Lord and my God" (Dominus meus et Deus meus). If your senses betray you, pray "Lord, I believe, help Thou my unbelief!"

He places the Host on the corporal, genuflects, and adores Him again. He takes the chalice into both hands and says:

"For this is the chalice of my blood, of the new and eternal testament: the mystery of faith, which shall be shed for you and for many unto the remission of sins."
The sacrificial Mass is perhaps the central point in the liturgy, and what the church building is primarily designed to contain and support. The Mass is a complex series of readings, hymns, prayers, and ritual acts. There are several types of masses, the Novus Ordo (New Order) mass being the one most commonly held in parish churches today. This particular type of mass has received a lot of criticism from many traditional Catholics. However, you cannot design specifically for one type of mass since it could possibly change. There must be some degree of flexibility in the space to accommodate future modifications of the ceremony. The idea of procession, moving from one place to another, a kind of pilgrimage in microcosm, is an important idea in the Mass.
Front Elevation: As the entrance to the church is approached, two concrete service boxes project from the facade, and the two large concrete beams penetrate the skin of the building, which is clad with copper pans. The interior of this wall is also clad with copper pans. As the copper ages and develops a patina, the transition from inside to outside becomes more poignant. Much like many of the Frank Lloyd Wright houses, which are clad on the inside and outside with the same board and batten wood, the difference between the aged copper that is exposed to the weather and the interior copper which is protected has the potential to cause an acute awareness of the passage of time.
Inside of the narthex, the traditional gathering space and buffer zone between the outside and the nave, the diagram of the building becomes apparent, when the front of the wooden box is encountered. Upon entering the building, the organization of the building is fully present. From the narthex, one may enter the nave and sanctuary inside of the wood box, use either the left or right hallways to go to the rear of the building, walk the Stations of the Cross hallway on the left or visit the exterior gardens on the right.
The nave of the church accommodates various ritual actions—processions, singing, praying, the taking of communion, and wedding and funeral rites. At the core of the nave is the sanctuary, a special area that contains the altar, ambo, seating for the priest and clergy, and tabernacle. Below the nave is the crypt.
Longitudinal section through building. Cut reveals all the primary parts of the church: the narthex, nave, sanctuary, and crypt. Also visible in this drawing is the continuous articulation of the large concrete beams.
Longitudinal section: The large concrete beams are articulated as part of an effort to prevent the imperfections of the site-cast concrete (cracks, spalling, etc) from becoming the predominant lines visible on the surface. The articulation shows the large beams as a series of three smaller beams, spanning one hundred feet between columns. The outer edges are polished concrete that frames a rougher interior surface. Differentiating large surfaces can be accomplished by an act as simple as variable surface treatment. Along the bottom edge of the beam an orthogonal arch is mapped into the concrete, serving both as an expression of the condition of spanning and to help visually counteract any minor sagging that may occur. When building with wood, the grain of the wood can help emphasize the form of the object through its careful arrangement. Likewise, through differentiation and surface treatment, concrete can be given a “grain” that functions in the same way.
Narthex: Traditionally the narthex is the gathering space in a church. According to Built of Living Stones,

“The narthex is a place of welcome—a threshold space between the congregation’s space and the outside environment. The gathering space helps believers to make the transition from everyday life to the celebration of the liturgy, and after the liturgy, it helps them return to daily life to live out the mystery that has been celebrated. In the gathering space, people come together to move in procession and to prepare for the celebration of the liturgy. It is in the gathering space that many important liturgical moments occur: men and women participate in the Rite of Becoming a Catechumen as they move towards later, full initiation into the Church; parents, godparents, and infants are greeted for the celebration of baptism; and Christians are greeted for the last time as their mortal remains are received into the church building for the celebration of the funeral rites.”
The concrete structure of the church, with its two large beams (12 feet deep by three feet wide), echo the procession through their strong linear directionality. Furthermore, the beams assist in creating a hierarchy in the space through the way that they gather light. As one approaches the altar, possibly the most important fixture in the church, the amount of light that comes in over the beams increases.

Additionally, the two large screen walls that contain the nave also change to reveal a hierarchically structured space. The slat profile changes to permit more light as the altar is approached. The screen runs behind the columns, which face into the nave. To form a capital for these wooden columns, the screen wraps around the front of the column at the very top.
Screen wall elevation. Columns are spliced together with a scarf joint from two fifteen foot sections. The column is made like an I-beam.
The altar, where the last supper is reenacted, is set off center of the main axis of the church to balance out the prominence of the ambo. As a result, the stone pattern in the floor responds to its placement and radiates outward, growing increasingly larger. The ceiling responds as well, picking up on the diagonal lines created by the floor. The altar is constructed of concrete, allowing cast bronze elements to be cast into it. Although stone is a more traditional choice, the use of a highly refined concrete surface serves as a way to accommodate liturgical furnishings. The use of concrete also serves as a way to express the strength and stability of the altar in terms that are modern.

Plan and elevations of altar. Plan shows cast bronze inserts to hold candles, six for high mass and four for low mass. The bronze reliquary is in the center, helping to support the table.
The Mass begins with the entrance procession. This varies by Mass type and church, but is typically a server carrying the processional cross which is put in a prominent place in the sanctuary. Servers come in carrying candles, which wind up on the altar. The Deacon brings in the Book of the Gospels which is placed on the altar until it is needed. The priest comes in last and carries nothing. Cast bronze inserts in the surface of the altar hold both the candles and the processional cross. There is an effort to cluster things about the altar to the end of helping to keep the focus on the altar, as well as helping to keep the space quiet.

Axonometric showing the relationship of the processional cross to the altar. Cast bronze elements make a place for the cross to be inserted when brought to the sanctuary by a server. Facing page: view of sanctuary platform showing relationship of altar and ambo.
The central focus of the area in which the Word of God is proclaimed during the liturgy is the ambo. During the Mass, the priest will ascend the ambo at times to read from the Book of the Gospels. It is desirable that the ambo and the altar have a visual relationship, so as to emphasize the relationship between the Word and the Eucharist. The ambo is placed slightly off of the sanctuary on the right side as one looks at the altar. This is referred to as the Gospel side of the altar. Traditionally, this is viewed from the vantage point of Christ on the cross. At his right is the Gospel side represented by Mary, and to his left is the Epistle side represented by Joseph. The ambo shares in the same palate of materials as the altar, polished concrete and cast bronze, and is elevated eight feet off of the ground so as to be prominent enough to preach from and not get lost in a space with a high ceiling.
Front and side elevation of the ambo. According to Built of Living Stones:

"The design of the ambo and its prominent placement reflects the dignity and nobility of that saving word and draws the attention of those present to the proclamation of the word. Here the Christian community encounters the living Lord in the word of God and prepares itself for the 'breaking of the bread' and the mission to live the word that will be proclaimed."
The lamps that are suspended in the sanctuary are made from laser-cut acrylic, sand-blasted to diffuse the light. Newer technology such as laser-cutters and water jets makes customization such as this more feasible.

Left: View into the nave from the upper gallery.
There has been some controversy over what type of seating, or lack of seating for that matter, is most suited to the Mass. Some churches have pews, some have removable chairs, and in some churches people sit on the floor or stand throughout the Mass. Pews seem to have many advantages. From an anthropological standpoint, people are used to sitting through church services and are more comfortable, especially the elderly. On the other hand, pews can also be viewed as a knee-jerk reaction to seating when designing a church. They become another symbol on the drawing that attempts to describe the space as a church. But some of the advantages of pews is that they last a long time, (perhaps hundreds of years), hold more people in a given space, contain built in racks and kneelers, and are easier to fix and maintain. There are also movable chairs to make the space more flexible.

Elevations of pews and detail of kneeler attachment. The surface of the kneeler is covered with half-inch thick sheet cork.
The sacristy plays a central support role in the liturgy. It contains storage for vestments and holy items, a preparation room for the priest and a restroom. Situated above the sacristy is the library. In many modern Catholic churches the library is marginalized, its importance diminished by placing it in a small room that treats the space as an after-thought. However, the history of the library is intimately connected with the history of the church. In the Middle Ages, monasteries were guardians and disseminators of knowledge, building impressive libraries through borrowing and copying texts. Therefore, the library is grouped with the sacred functions of the church.

Above: Plan of sacristy, located directly behind the sanctuary. Right: Back wall and stair of sacristy. The stairs leads up to the library and gallery seating.
The Mass climaxes with the transubstantiation of bread and wine into the body and blood of Christ and the congregation receives communion. Whatever blood is left over must be consumed by the priest, and the body is placed in the tabernacle for veneration at any time by the congregation. In some parishes there is even a phenomenon known as perpetual adoration of the Host, where people sit in the presence of the tabernacle around the clock and pray or read scripture. In many contemporary Catholic churches, the tabernacle is removed from the sanctuary and placed in its own chapel. However, the Catholic church is once again experiencing a shift in its philosophy about where to best locate holy things within the church. Removing the tabernacle from the sanctuary was an idea contained in the Vatican II documents, much of which is now becoming unfashionable, and many parishes are reverting back to more traditional ideas about church design. Locating the tabernacle at the heart of the church, the sanctuary, does pose some problems, particularly that of competition with the altar. The tabernacle in this project is suspended in the sanctuary, which allows it to occupy a prominent position in the sanctuary without competing with the altar. Also near the tabernacle is the tabernacle lamp which glows continuously, representing the light of Christ.

Left: plan and elevation of the tabernacle. The tabernacle is conceived as a modest wooden box, revealing no expression of the corner joints, surrounded by a milled brass casing. The milled brass casing is differentiated by a spiral tool pattern that is a result of the processes of milling with a computerized end mill.
To access the suspended tabernacle, the priest ascends a small stair. The brass casing is designed to be held open, so that on certain occasions the monstrance can be observed directly.

Above: diagram showing the tabernacle in both the open and closed positions. Below: position of the tabernacle stair on the sanctuary platform. Right: Stair, tabernacle, and lamp.
As the grave and body are sprinkled with holy water, the priest says:

“O God, by your mercy rest is given to the souls of the faithful, be please to bless this grave. Appoint your holy angels to guard it and set free from all the chains of sin and the soul of him whose body is buried here, so that with all Thy saints he may rejoice in Thee forever.”

The priest makes the sign of the cross over the body:

“Eternal rest grant unto him, O Lord and let perpetual light shine upon him. May he rest in peace. Amen.”
The traditional Catholic funeral has three main parts: the Vigil, the Requiem Mass, and the Burial. The Vigil or wake occurs outside of the church. On the following day the body is taken to the church as the bell with the deepest voice—the tenor bell—tolls twice. The body is taken towards the altar, just outside of the sanctuary. The body is placed feet towards the altar for laypersons, head toward the altar for priests. The Requiem Mass is similar in structure to a normal mass, but with a slant towards death, dying, and the afterlife. The burial then takes place at either an approved cemetery or in a crypt.

Top right: Stair leading down into the crypt. Above the stair the underside of the water channel is exposed, allowing the light to filter in through the moving water. Lower right: excerpt from main plan showing relationship of catafalque (where the coffin is placed for viewing) to the altar. The place is marked by a darker piece of stone in the floor.
After the Mass, the body is taken down the stair behind the sacristy into the crypt. The crypt has four stairs and two main entrances. The first is the individual entrance, which has a smaller door, and the other is the processional entrance, which is larger in order to accommodate moving a coffin down the steps and through the sliding doors. The doors of the crypt are made of a welded steel frame with perforated copper attached. These doors act as barriers for containment and can be locked. However, they are porous so as not to make one feel trapped in the space.
Top left: diagram showing welded steel frame of door, composed primarily of steel angles and flat bar. Diagram showing perforated copper sheet and attachment points. Lower left: diagrams showing the connections between steel sections.

Facing page: crypt lamp plan, elevation, and axonometric. The lamps in the crypt bear a close relationship in material and form to the crypt doors. Perforated copper sheet is attached to a bolted stainless steel frame. On the underside of the lamp there is a sliding dovetail attachment to make it simple to change the bulb.
The crypt is a space flooded with columns. These columns support the weight of the nave above and serve to create a non-hierarchical space. The stone pattern in the floor radiates from the columns, which terminate into the earth. The smell of this earth adds another quality to the space beyond just its visual attributes. The bodies are placed into the wall, which is backlit to allow some electric light to leak in around the separate coffins, articulating each casket individually.
At the place of burial, the priest will intone the Canticle of Luke 1: 68-79, followed by John 11:25-26. The body is again sprinkled with holy water and the priest makes the sign of the cross over the body while saying, "Eternal rest grant unto him, O lord. And let perpetual light shine upon him. May he rest in peace. Amen. May his soul, and the souls of all the faithful departed, through the mercy of God rest in peace. Amen."
The priest announces the name of the station, and each congregant makes the sign of the cross.

Priest: “We adore Thee O Christ and we bless Thee”

Congregation: “Because by Thy Holy Cross Thou hast redeemed the world.”
During the time of the Crusades, it became popular for pilgrims to the Holy Land to walk in the footsteps of Jesus to Calvary. After the Muslims recaptured the holy land, this journey became too dangerous. A substitute pilgrimage, known as the Stations of the Cross, became a popular outdoor devotion in Europe throughout the Middle Ages. The individual stations represent critical events from scripture of Jesus’ journey to Calvary. The number of stations was fixed at fourteen in the 1700s by Pope Clement 7, and the stations were allowed inside of the church. Sometimes a fifteenth station is added, representing the resurrection. In the Catholic Liturgy, the stations are either experienced individually at any time that a person chooses to walk them, or they are walked as a group at special times during the year.

Right: Plan of stations of the cross. There are fourteen stations, and a placeholder for a fifteenth. Upper Right: View of exterior of Stations of the Cross. Lower Right: View of interior of Stations of the Cross. Red light spills in through the windows, transforming the space. Next Page, top to bottom: elevation and section of Stations, axonometric of steel beams and columns, connection between steel beams and concrete column.
The Stations of the Cross occupy the North hallway of the church, in a long linear progression. The stations can be viewed from either the main hallway or the raised platform, so an individual can walk either hallway to pray at the stations, or the priest can lead the congregation from the upper platform. The SOTC is an imaginative, meditative exercise. The traditional prayer said at every station is "We adore you, O Christ, and we bless you. Because by your holy cross you have redeemed the world." The images themselves would be large relief carvings in wood, separated by red glass windows. The red glass is used not as a debt owed to the tradition of stained glass in churches, but instead for its reliable transformative qualities in a space. The entire hallway acts together for the purposes of containment and rhythm. The columns and windows provide a rhythm for the stations, and the flooring, through the arrangement of the boards, helps to provide containment. A lamp was designed to help light the SOTC, which is discussed in the following section. This lamp hangs from the extended beams in the main hallway and is repeated down the hall, providing dim light at night, much like candle-light, for the purposes of viewing the stations.

1. Jesus is condemned to death
2. Jesus carries the cross
3. Jesus falls for the first time
4. Jesus meets his afflicted mother
5. Simon helps carry the cross
6. Veronica wipes the face of Jesus
7. Jesus falls for the second time
8. Jesus speaks to the weeping women
9. Jesus falls for the third time
10. Jesus is stripped of his garments
11. Jesus is nailed to the cross
12. Jesus dies on cross
13. Jesus is removed from cross
14. Jesus is laid in the tomb
15. Jesus is resurrected
Stair detail: This is a typical stair detail used in the Stations of the Cross, as well as many other places throughout the church.
Tangential Projects
In the first year of the M. Arch 3 program our studio had a philosophy of design that involved always having several projects in development simultaneously. I still think this is a valid idea, as the wisdom behind this philosophy is that all of the projects can inform and influence each other. The actual prototyping of the Stations of the Cross lamp was one of the projects. It is made by a process of laminating wood veneer to a plexiglass case to exploit the translucent properties of wood veneer. Since there are few precedents for this technique, and none that I could find, it became necessary to prototype the lamp simply in order to propose it. The ladder was designed for an ongoing remodeling project. It is made of red oak, with mortise and tenon construction with expansion wedges. Both of these projects propose a sort of design philosophy, that is, a merger between the new and the old, the low tech and the high tech. The lamp box features hand-cut dovetail joinery, a technique praised for both its strength and beauty, but is kept from being anachronistic by the addition of modern materials such as veneer and plastic, and modern methods of construction (new adhesives). The ladder is the same; the mortise and tenon joinery provides an element of strength and quality, while the precisely machined Delrin wheels and aluminum hubs, axles, and track update the ladder and keep it from becoming somehow nostalgic. Furthermore, I think it is important for architects to gain an understanding of the physical consequences of what is drawn on paper.

Facing Page: Construction drawings of Stations of the Cross lamp: plan, section, and elevation. The lamp is easily taken apart by the brass screws which project from the wood-veneered acrylic casing. These screws are knurled so that a screw-driver is not necessary.
Above: Acrylic joint machined from acrylic round-stock has a spiral tool-mark pattern left by a computerized milling machine. Right: Lamp as it appears unlighted. This prototype was made with solid birch wood and birch veneer, which has no finish applied. The wood grain on the two halves of the lamp is carelessly mismatched. Ideally, these two halves would be book-matched or very straight-grained. Facing page: Lamp as it appears lighted.
Left: Construction drawings of ladder. Successfully juxtaposing the delrin wheels with the traditional red oak ladder involved using a router to create a recess to accept the wheel. When the ladder sits perpendicular to the floor and is not in use, the wheels settle into a semi-circular "rut" in the floor. Facing page: Ladder mocked-up to test the mechanism. The aluminum track expresses its different parts through different surface treatments of the metal: sandblasted, milled, and hand-sanded. Subtle degrees of difference in architectural elements can be made through the treatment of surface.
In the library, this study table is repeated many times. The design was never prototyped or finalized, but it does share a common quality with the aforementioned ladder and lamp. The large table top features an articulated expansion joint, formed by closing the two halves of the table surface around a stainless steel section. In traditional table construction, the movement of the table surface is allowed by hidden expansion joints on the underside of the table. The larger the surface is, the more movement there is in the wood across the grain. The expression of a previously concealed “apologetic” mechanism applies more contemporary design ideas about a very traditional furnishing.

Above: detail of expansion joint. Left: Plan and elevations of library tables.
Conclusion
Although this project is a church, many of the raw ideas of architecture can be generalized to other projects of varying types. In this building there is an effort to create a dialogue across the three levels. The floor opens up around the large columns, the seating platform in the nave is elevated to create a window down into the crypt, in the crypt the water channel overhead is even transparent in two places, and there are several places in the building where all three levels can be experienced simultaneously. The idea of multi-functioning elements is present in the building as well. This occurs in using the structure not only in a functional way but also to create hierarchy in the space, or using acoustic paneling not just for noise containment but also for the transformative qualities it can have on a space which transcend the visual dimension. In this project there is also an emphasis on construction and the act of making. Everything from the way the concrete walls are board-formed in a rhythm to the way the floor and ceiling respond to the space contribute to this end. Finally, the idea of juxtaposing the old and the new can be applied on various fronts. Besides applying this idea to material and form, such as it is in the ladder and the lamp, this idea is also applied to light. In the Stations of the Cross hallway, the red glass windows distill the essential transformative qualities of traditional stained glass. The main entrance doors and rear sanctuary wall capture the haptic qualities that these elements have traditionally possessed, expressed in more modern terminology. In *Built of Living Stones: Art, Architecture and Worship*, it states that the nave “is not comparable to the audience’s space in a theater or public arena because in the liturgical assembly, there is no audience. Rather, the entire congregation acts.” Likewise, it was the goal of this project to have the entire building “act” to support the liturgy.
Bibliography


