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The Washington Memorial Chapel: Historic Structure Report and Condition Assessment

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Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of Master of Science Degree in Historic Preservation 2005.

Advisor: John Milner

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Abstract

The following report is a formal record of the history and current physical state of the Washington Memorial Chapel located within the Valley Forge National Historical Park in the Commonwealth of Pennsylvania. The report is divided into three sections: historical background, condition assessment, and recommendations for treatment of the decorative limestone. The historical description explores the story of the site, of the church founders, and of the building itself. The conditions assessment contains an analysis of selected exterior building materials and their current condition. The final section of the report presents a general conservation treatment plan for the long-term preservation of the severely deteriorated limestone tracery. This report is guided by the author's personal interpretation of the site as a place of both religious and national significance.

Disciplines

Historic Preservation and Conservation

Comments

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THE WASHINGTON MEMORIAL CHAPEL:
HISTORIC STRUCTURE REPORT AND CONDITION ASSESSMENT

Shelley Adair Perdue

A THESIS

In

Historic Preservation

Presented to the Faculties of the University of Pennsylvania in
Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE IN HISTORIC PRESERVATION

2005

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0.0 Abstract

The following report is a formal record of the history and current physical state of the Washington Memorial Chapel located within the Valley Forge National Historical Park in the Commonwealth of Pennsylvania. The report is divided into three sections: historical background, condition assessment, and recommendations for treatment of the decorative limestone. The historical description explores the story of the site, of the church founders, and of the building itself. The conditions assessment contains an analysis of selected exterior building materials and their current condition. The final section of the report presents a general conservation treatment plan for the long-term preservation of the severely deteriorated limestone tracery. This report is guided by the author's personal interpretation of the site as a place of both religious and national significance.

1.0 Introduction

The Episcopal chapel, located on private property within the Valley Forge National Historical Park, was created under the direction of Dr. Herbert Burk as a tribute to George Washington and the American Patriots of the Revolutionary War. Dr. Burk's vision for the chapel was given form by Philadelphia architect Milton Bennett Medary, Jr., who would later carry the project with him to the architectural firm of Zantzinger, Borie, and Medary. Construction on the chapel and its adjoining structures began in 1903 with the purpose of creating a complex of buildings which would both house an active church community and serve as a wayside chapel for visitors to the park. Eventually, Dr. Burk's vision of the memorial chapel developed to include plans for the Valley Forge Historical Society and Revolutionary War Museum, a national cathedral, and a memorial library, resulting in extended planning and building phases for the chapel throughout the 20th century.

Not only does the chapel represent a powerful mixture of the spiritual and nationalistic sentiment of its time, the building itself contains the work of some of the most talented craftsmen of its period. The gothic revival building contains intricate woodcarvings by Edward Maene of Belgium, elaborate stained glass windows created by Nicola D'Ascenzo in his Philadelphia studio, and wrought iron details forged by Samuel Yellin, making it an outstanding example of the building crafts of the early 20th century.

The chapel administration is currently consulting with John Milner Architects, an architectural preservation firm located in Chadds Ford, PA, in order to create a management and design plan for the building's continued use and conservation. Improvements to the chapel's contiguous building are being considered in order to more effectively meet the programmatic needs of the parish. This report is intended to both clarify the architect's original design plan for the site in order to inform future alterations or additions to the building and to identify the chapel's most pressing conservation concerns in order that its cherished artistry may remain intact.

2.0 Administrative Data

Name of Property, Location:

Washington Memorial Chapel, Lot #2 Port Kennedy Road, Upper Merion Township, PA

Management of Property:

The Rector, Church Wardens, and Vestrymen of Washington Memorial Chapel

Proposed Treatment:

The chapel will continue to be used in its current role as active church and wayside chapel for visitors to the Valley Forge National Historical Park. Alterations or additions made to the building should be sensitive to the original design and intentions for the building.

Real Estate Appraisal:

The 7.798 acres of land that the chapel sits upon was appraised in 2002 as open space without development at approximately \$50,000.¹ The building itself was appraised in 1995 at reproduction costs of \$10,437,697.²

¹ Real Estate Appraisal by Bearoff and Company, Inc., File # 215-014, Aug. 1, 2002.

² Building and Equipment Appraisal by Marshall and Stevens, Inc., File # 31-6328, May 31, 1995.

3.0 Building Description

Architect Milton Bennett Medary Jr. designed the Washington Memorial Chapel in the gothic revival style, a popular ecclesiastical form for which he became well known in the Philadelphia area.³ Specifically, the chapel may be described as ‘Perpendicular Gothic,’ a style that imitates English Gothic architecture of the fourteenth through sixteenth centuries and is characterized by intricate stonework and an overall linear effect.⁴ Both the complicated silhouette of the building complex, with its varied rooflines and heights and its sprawling asymmetrical plan, are exemplary of the picturesque Gothic aesthetic [Figure 1].

The chapel complex is primarily constructed of a reinforced concrete frame with Holmesburg⁵ granite block cladding that is laid with Portland cement mortar in a random ashlar pattern. The granite lends the building a heavy and somewhat unpolished appearance, which is counterbalanced by the finely detailed Indiana limestone tracery surrounding the bays of the cloister, porch, and chapel windows. The cloister to the west of the chapel is the only structure within the group that is built of purely stone masonry without inner reinforced concrete walls. The foundations of the cloister, chapel, and library are constructed of Conshohocken stone⁶ while the bell tower and its two-story

³ See Chapter 4.3 *History of the Architects*.

⁴ Lorette Treese, *Valley Forge: Making and Remaking a National Symbol*, (University Park, Pennsylvania: The Pennsylvania State University Press, 1995), p. 86.

⁵ Holmesburg granite was quarried from Holmesburg, PA within the county of Philadelphia. See the section dedicated to “Granite” in the *Condition Assessment* chapter for a full description on the stone.

⁶ “Conshohocken stone” is specified on drawing 263-161 from the Zantzinger, Borie and Medary collection at the Architectural Archives of the University of Pennsylvania; however, no geological description of the

addition rest on a modern foundation of concrete. The latest addition, extending north from the carillon, is constructed of load-bearing brick walls with stucco cladding. The original roofing over the chapel, cloister and Porch of the Allies is of grey slate, while the newer roof over the museum wing is a membrane system. The entire building complex contains 15,285 square feet above grade and 5,219 square feet below grade.⁷

3.1 The Chapel

The chapel was the first completed section of the building complex. It is a single storied room with approximately 30-foot ceiling height, oriented to the south with a view of the Triumphal Arch in the distance [Figure 2]. The entrance of the chapel is distinguished by a gated vestibule that leads directly into the sanctuary [Figure 3]. This vestibule is embellished with carved limestone panels inscribed with biblical texts. The entranceway is lit by four small gothic arched windows, two in each the east and west walls. The gate itself is of wrought iron and was designed and constructed by Samuel Yellin to depict the four Gospels. The gate is locked by a sliding latch bolt that is adorned with a small figure of a Revolutionary War soldier referred to as “the Minute Man”.⁸

The sanctuary itself is lit by 20 stained glass windows divided between the eastern and western walls depicting the lives of Revolutionary War soldiers as well as by two larger windows on the northern and southern walls depicting the life of Christ and the life of

stone could be found. It is assumed that this refers to local field stone that could have been conveniently collected for the construction of the foundation walls.

⁷ Building and Equipment Appraisal by Marshall and Stevens, Inc., File # 31-6328, May 31, 1995.

⁸ This figure was recently stolen from the gate and is being refabricated by Samuel Yellin Metalworkers, which is now under the direction of the original artist’s granddaughter, Clare Yellin.

George Washington, respectively [Figures 4,5]. The George Washington window was designed by Dr. Burk himself and contains thirty-six panels representing the life of the country's first president. The twenty windows flanking the sanctuary are arranged in vertical pairs. The upper window is embellished with trefoil-arched tips. These natural light sources are supplemented by twelve electrified iron and lead chandeliers created by Hollingsworth Pearce of Philadelphia.⁹

The floor of the chapel is laid in black and white marble in a checkered pattern while the ceiling is paneled in Indiana white oak. This ceiling, designated by Burk as the "Roof of the Republic," contains the state seals corresponding to the bronze plaques on the chapel floor. The walls of the chapel are clad in four inch thick veneer slabs of limestone with a tooled surface in a loosely hatched pattern. The sanctuary contains pews also built of quartered Indiana white oak and designed by the architect himself [Figure 6]. At the base of each pew is carved the insignia of a patriotic society, a family coat of arms, a state seal, or a colonial seal. The pew screen at the front of the sanctuary is embellished with the shields of the major generals and brigadier generals who served at Valley Forge.

The choir stalls, built into the east and west walls of the chapel, were carved by Edward Maene, a renowned Philadelphian woodcarver trained in Belgium. The stalls are constructed of the same white oak as the pews and contain wooden model soldiers representing the brigades who served at Valley Forge [Figures 7, 8]. The soldiers are

⁹ The Washington Chapel Chronicle, (1925), p. 28.

painted to reflect the regimental colors of their units from the 18th century.¹⁰ The chapel furnishings also consist of carved limestone elements such as the pulpit to the left of the altar, a font to the right of the entrance, and the clergy seats at the rear of the pulpit. Opposite the pulpit on the eastern wall of the chapel there is a stone niche containing a bronze sculpture of George Washington created by Franklin Simmons and donated by Burk in 1908.¹¹

3.2 Cloister of the Colonies

The Cloister of the Colonies, located to the west of the chapel, is accessed both through a door in the west wall of the sanctuary and by the north and south arches of the structure which form a port cochere to the chapel [Figure 9]. The cloister contains thirteen bays dedicated to the thirteen original colonies of the United States arranged in a square and containing a small open-air court. The western wall of the cloisters contains a small stone pulpit, sometimes referred to as the “Woodland Pulpit”, located in the central New York Bay. The pulpit continues to be used for outdoor ceremonies [Figures 10, 11, 12].¹²

The cloister floor is tiled with a pink tinged Knoxville marble inset with bronze medallions representing the seals of the colonies [Figure 13].¹³ The peaked ceiling of the each bay is constructed of tongue and groove white oak boards and supported by bevel edged trusses. The individual ceilings contain a central wooden plaque painted with the

¹⁰ Stacey A. Swigart, *Images of America: Valley Forge*, (Charleston, SC: Arcadia Publishing, 2002), p. 78.

¹¹ Swigart, p. 104.

¹² Swigart, p. 70.

¹³ The Washington Chapel Chronicle, Vol. IV, No. 9 (Dec. 15, 1911), p. 66.

shield of its colony, corresponding to the medallion directly below [Figure 14]. The bays are opened to the exterior by gothic arched openings which contain geometric tracery in Indiana limestone. Each tracery pattern is distinct from its neighbor but mirrored by its corresponding arch [Figure 15]. The interior court of the cloister, referred to as the ‘garth,’ holds a single statue entitled *Sacrifice and Devotion* and sculpted by Bela Pratt. The piece was donated by a parishioner in 1912 in honor of the mothers of the nation and as a memorial to his wife.¹⁴

3.3 Bishop White Library

The Bishop White library is located to the north of the chapel and is accessed through a glass enclosed vestibule situated between the cloister and the chapel [Figure 16]. The library interior, like the chapel, is also faced in limestone veneer tooled in a hatched pattern. The library contains eight window openings, four on the east wall, three to the west, and one to the north [Figure 17, 18, 19]. The east and west windows are paired, each containing three over six lights while the larger northern bay contains six gothic arched windows containing three over six lights and paired vertically. The room contains built-in glass-fronted book cabinets in a dark finish [Figure 20]. The room also includes a fireplace on the southern wall. The ceiling is finished in oak panels in a similar style to the cloister and chapel ceilings.

¹⁴ Swigart, p.72.

The main library entrance is located on the western wall to be reached by the path leading through the cloister. Just to the right of this door on the exterior wall is located a tall empty niche and blank stone plaque, yet to be designated [Figure 21]. An additional door was installed on the eastern wall during the 1990's and now leads into the rear courtyard flanked on the two other sides by Patriot's Hall and the new addition [Figure 22].

The library wing also includes the Sacristy, rector's office, girls' and boys' vesting rooms, music room, dining room and kitchen. The kitchen and dining room are located in the area between the library and the chapel. The dining room contains a bay window on the east wall with four central windows and two flanking windows [Figure 23]. The music room is located on the basement level while the remaining rooms are found on the second floor. The walls of these spaces are plastered and painted white while the floors are mostly carpeted [Figure 24].

3.4 Porch of the Allies

The Porch of the Allies and Patriots' Hall are located to the east of the chapel. The design of the Porch of the Allies is similar to that of the cloister with pointed arch arcades filled with geometric stone tracery, adding balance if not symmetry to the memorial complex. Each of the four bays of the porch is dedicated to a foreign general who aided America during the Revolutionary War – Johann DeKalb, Baron von Steuben, the Marquis de Lafayette, and the Count de Rochambeau. Instead of the oak paneled ceiling

of the cloister, the porch displays limestone groin vaulted ceilings within each of its bays. The floor of the porch is also of flagstone rather than marble.

3.5 Patriots' Hall

Patriot's Hall is entered from the Porch through a heavy, iron studded door, set within a gothic arched frame [Figure 25]. The reinforced concrete frame of this wing was completed with White Hall cement.¹⁵ The northern exterior wall of the museum is finished in brick rather than granite and is clad in stucco. Lupton steel windows, rather than wooden windows, were used in the museum hall to make the museum as fireproof as possible.¹⁶

Patriots' Hall is a two story structure with the lower level below grade from the south connecting to the basement floor of the chapel. The lower level has its own entrance from the rear courtyard in the north facing wall [Figure 26]. This basement floor was originally designated as living quarters for the church's sexton; however, it was quickly taken over by the museum as additional exhibit space.

With the intention of completing the third story of the wing at a later date, the architects left the masonry toothed at the edge of the library on the northern wall in order that the walls could be seamlessly tied together with later stonework. The stone buttresses

¹⁵ The Washington Chapel Chronicle, Vol. IX, No. 8 (April, 1924).

¹⁶ The Valley Forge Record, Vol. IX, No. 8, (April, 1924)

intended to support these future walls were also constructed at this time and now stand as a reminder that the chapel complex is yet unfinished [Figure 27].

3.6 Carillon

The carillon is located at the western end of the Porch of the Allies and is constructed of reinforced concrete with the same granite masonry cladding as the older buildings [Figure 28]. It reaches 102-feet and consists of some 75,000 stones. It is set on a polished pink granite base and holds patriotic statuary at the corners carved from limestone [Figure 29]. The interior of the carillon is also clad in limestone and carries brass plates stamped with the names of the Revolutionary War veterans [Figure 30]. In the center of the octagonal room sits the Justice Bell [Figure 31]. The carillon contains 58 bells: the lowest 28 cast by the Meneely Bell Foundry of Watervliet, New York and the upper 30 by the Paccard Bell Foundry of Annecy, France.

3.7 Museum Addition

The most recent wing is of brick construction with a gabled asphalt shingled roof and is of no distinguishable style [Figure 32]. The exterior walls are finished in cream stucco. The wing is two stories in height with one entrance on the western wall and two on the northern wall [Figure 33]. During this latest construction phase a small vestibule space was also created between the new wing and the carillon. A marble wall dedicated to hold the names of additional American veterans is located here.

4.0 Historical Data

4.1 Brief History of the Valley Forge National Historical Park

The Valley Forge National Historical Park commemorates the encampment of the Continental Army under the command of George Washington during the winter of 1777-1778. The site, to the west of Philadelphia along the Schuylkill River, was chosen for its defensible terrain with protective hills and enough elevation to spot an army approaching from Philadelphia [Figure 34]. The army also wished to protect the thriving farmland along the river and, at the same time, to take advantage of the local food supplies to support the troops throughout the winter. The winter long encampment devastated the countryside; fences and outbuildings were torn down to provide building material for the camps, fields were razed to make room for construction and maneuvers, and food supplies were exhausted. It took two years from the evacuation of the camp for local farmers to again manage a fruitful growing season.¹⁷

The history of the site as a formal place of memory and dedication began with the formation of the Valley Forge Centennial Association in 1877, a state sponsored private organization interested in celebrating and preserving the historical significance of the site. A year later the organization reorganized as the Valley Forge Centennial and Memorial Association (VFCMA) when it resolved to purchase and preserve the home that served as Washington's headquarters during the encampment. The task was achieved with the aid

¹⁷ Lorette Treese, *Valley Forge: Making and Remaking a National Symbol*, (University Park, Pennsylvania: The Pennsylvania State University Press, 1995), p. 3.

of the Patriotic Order Sons of America. This partnership marked the beginning of a long history of private donations to the park by patriotic organizations and individual patrons that have supplemented the governmental funding of the park. During this period the land was viewed as a memorial space upon which several monuments were erected, but relics such as the soldier's cabins and camp remnants located on the site were mostly left untouched and were not actively preserved.

This early preservationist fervor at Valley Forge was part of a larger movement within the nation now referred to as the Colonial Revival Movement sparked by the Centennial Celebration and World's Fair held in 1876. Although the colonial period was displayed at the Fair in order to emphasize by comparison the glorious modern conveniences of the modern age, it had the unexpected effect of instilling a sense of nostalgia for the past which expressed itself in revival architectural styles, a new interest in antique collections and house museums, and the creation of historical societies of all shapes and forms.¹⁸

In 1893, after lobbying by the VFCMA, Governor Robert E. Pattison signed a bill deeming the Valley Forge encampment site a state park and placing it under the control of the Valley Forge Park Commission. The task of this commission was to 'preserve the land forever in its original condition as a military camp.'¹⁹ Early on the Commission spent its meager resources simply acquiring land that had once held the camp. However, in 1904 a local man from Phoenixville, Samuel W. Pennypacker, was elected to the office

¹⁸ Ibid, p. 9.

¹⁹ Ibid, p. 40.

of Governor of Pennsylvania and he spent the next four years pouring resources into the park in order to ensure that the relics that had been acquired by the Park Commission would be properly cared for. During this time the holdings of the park were extended. Roads were built, an observation tower was erected, and markers were placed to indicate the campsites of the Continental Army brigades.²⁰

In the early part of the 20th century, the Park Commission followed a policy of ‘memorialization’ through the creation of various monuments that were technically additions to the park that altered the landscape. However, in 1936, this policy shifted to one of more strict preservation of the landscape as a memorial in itself to the soldiers that were sheltered there. Realizing that the presence of monuments was not consistent with this new desire to preserve the landscape as it appeared during the encampment, the Park Commission stated that no additional monuments would be erected in the park although the existing structures would be cared for and improved upon.

This decision marked a change in the park’s approach to preservation in which they would now focus their resources upon creating a “complete restoration.”²¹ This led to several generations of reconstructed soldier’s cabins as well as restorations of existing structures, which were “taken back” to their probable appearance at the time of the encampment period. This approach to historical preservation, which relies on physical interpretations of the past, continued at the park up through the latter quarter of the

²⁰ Ibid, p. 54.

²¹ Ibid, p.133.

century. On July 4, 1976, the nation's bicentennial, the Valley Forge encampment site was made a national park, placing it under the control of the National Park Service, U.S. Department of the Interior.

The Valley Forge site is now valued for both its cultural and natural attributes. Thirteen encampment period buildings remain in the park as well as historic monuments and markers. The park also houses the largest collection of American Revolution era military objects in the nation, although many of these have been inaccessible to the public until recently when plans for a museum building to house the collection became a reality. Additionally, over the years the natural landscape has come to be appreciated along with the historical significance of the site, and the park now serves as a nature reserve and recreation space for the local community. Today the park encompasses over 3,400 acres and serves over 1.35 million visitors a year.

4.2 History of the Church Founders

The Washington Memorial Chapel was brought into existence through the efforts and imagination of Reverend W. Herbert Burk. Herbert Burk was born in 1867 to Reverend Jesse Y. Burk and his wife, rector of Old Saint Peter's in Clarksboro, New Jersey.

Herbert attended the Philadelphia Divinity School of the Protestant Episcopal Church and received his Bachelor's degree in Divinity from the University of Pennsylvania. Burk was ordained in 1894 and soon after became rector of the Church of the Ascension in Gloucester City, New Jersey. Later he moved to Saint John's Church in Norristown, near

the Valley Forge encampment grounds, and eventually transferred to All Saint's Church in the same town. It was from his position at this church that Dr. Burk would launch his mission to commemorate the soldiers of the Revolution and their glorious leader, George Washington.

Before the history of Dr. Burk and the Washington Memorial Chapel can be told, however, there is an earlier story of the Washington *Monumental* Chapel at Valley Forge. Although this former memorial was never physically realized, the mixture of patriotic and religious zeal that almost brought it to fruition was the foundation from which the plans for the Washington Memorial Chapel grew. In the spring of 1886, Reverend James M. Guthrie of the Great Valley Baptist Church proclaimed that he would erect at Valley Forge a memorial church "to the glory of the Father of Man and the Father of Our Country".²² Local interest in the site had already grown due to the recent centennial celebration and the recent efforts to preserve Washington's headquarters. Guthrie's vision benefited from this patriotic fervor and he began fundraising for the building by asking for individual donations for stones and bricks, \$10 for the former, \$0.10 for the latter. The site for this memorial church was to be on an acre of land at the western edge of the encampment where an old Baptist meeting house, built in 1849, would be torn down.²³

²² Barbara Powell, *The Most Celebrated Encampment: Valley Forge in American Culture, 1777-1983*, (Cornell University Thesis, 1983), p. 120.

²³ Powell, p. 121.

The cornerstone for the Washington Monumental Chapel was laid on June 15, 1886 and work proceeded for the first few months so that the first floor was nearly completed by the fall. Unfortunately, further work on the building was stalled that winter and did not resume the following spring even though funds continued to be collected by Reverend Guthrie. Seeing no progress with the building, donors began to be suspicious of the use of their monies and asked Guthrie to give an account of his expenses. The reverend, however, dodged their requests and continued to take in donations for the memorial without making visible progress on the building. Finally, in 1890, the Board of Trustees of the Philadelphia Baptist Association passed an order restraining Guthrie from further activity on the building project and asked for an account of his finances. Still, Guthrie failed to respond with a report of his accounts. Soon after this final resolution, Guthrie left his congregation and was never seen again in the area.

Although Guthrie's attempts to merge American nationalism and the Protestant religion with a physical memorial were unsuccessful and even discouraging, this particular fusion of ideals continued to appeal to the late 19th century American society, especially to the community surrounding Valley Forge. Michael Kammen, author of *Mystic Chords of Memory*, speaks of a trend beginning in the late eighteenth century in which "nationalism and political ideology started to supplant, at least partially, a role that religion had customarily fulfilled in our culture."²⁴ People were increasingly turning to history rather than religion for inspiration, effectively blurring the line between the two institutions.

²⁴ Lorette Treese, *Valley Forge: Making and Remaking a National Symbol*, (University Park, Pennsylvania: The Pennsylvania State University Press, 1995), p. 83.

This is evidenced by the work and support of Reverend Herbert Burk who picked up the torch, so to speak, and managed to complete a religious memorial to the Revolutionary War soldiers and their general at Valley Forge.

The story of the Washington Memorial Chapel begins with Burk's experience on a winter hike through the Valley Forge state park with the choir boys from his church in Norristown. During this hike the reverend recounts being shamefully struck by the poor condition of the park and his own lack of knowledge concerning the events which had taken place there. Moreover, he was disturbed by the growing use of the park as a recreational space rather than a site of memorial. A desire to combat this misappropriation of the sacred land and to remind visitors of the significance of the place in American history urged the reverend to take immediate action.

The following Sunday, on February 22, 1903, Burk preached to his congregation at All Saints' Church about General Washington's worship at Valley Forge. Moreover, he made a proposal to build a chapel at the park to act as a shrine to the memory of Washington and the Revolutionary soldiers. Burk believed that Washington's greatness was the product of his religious nature and so this combination of religious faith and patriotism seemed a natural marriage.²⁵ He stated:

Would that we might rear a wayside chapel, fit memorial of the Church's most honored son, to be the Nation's Bethel for all days to come, where the American patriot might kneel in quest of that courage and that

²⁵ Treese, p.81.

*strength to make all honorable his citizenship here below, and prove his claim to that above.*²⁶

Burk began holding services at the park in May of 1903 in the POS of A meeting hall and then at Blackburn's Hall in Port Kennedy when the Patriot Order of Sons withdrew their invitation. By the spring, I. Heston Todd, a local landowner, had donated a tract of land just outside the boundaries of the Valley Forge Park and on June 19, 1903, the anniversary of the evacuation from Valley Forge, the cornerstone was laid for the new chapel. Church services would be held for the next year in a makeshift barnboard chapel located to the east of the building site until the chapel's stone walls stood high enough to be temporarily roofed over in between construction phases [Figure 35]. This temporary chapel was later dubbed Roosevelt Chapel, for it was from here that the president delivered a speech on June 18, 1904 in which he favorably compared the campsite to the Gettysburg battleground as it symbolized "constant effort" and not just a single heroic act.²⁷

It was not until after the cornerstone was laid that Reverend Burk formally prepared a proposal for his vision of the chapel which he then turned over to the University of Pennsylvania's Department of Architecture. The president of the architecture school at the time was Professor Warren P. Laird who also served as chairman of the church building commission of the Protestant Episcopal Diocese of Pennsylvania and was a member of the committee on church architecture of the General Council, Lutheran

²⁶ Powell, p. 124.

²⁷ Treese, p.88.

Churches of America.²⁸ The school sponsored a design competition in order to choose the building which would best articulate Burk's ideal. During this process the idea for a simple chapel expanded into plans for a large complex to include a museum of American history, a library and a bell tower [Figure 36]. Architect Milton B. Medary Jr. won the contract on April 13, 1915, and his design was described by Professor Laird in these words:²⁹

*Its ensemble expresses truthfully the theme of the competition; a memorial chapel with auxiliary structures. The chapel, while pure in historical character and fine in proportion, has an expression of dignity, repose, and strength, which it would be difficult to carry further toward harmony with the sentiment of Valley Forge. The other portions of the group are true in character and in proportion with the Chapel . . . in architectural quality it possesses real charm and distinction.*³⁰

The first sermon delivered within the walls of the new chapel took place on Washington's Birthday in 1904 underneath a temporary roof. The walls were only ten feet high at this time, raised to the level of the window sills [Figure 37]. This drawn out building process was made necessary by the lack of funds available to the Episcopal Church. The Washington Memorial Guild was created specifically to act as a fundraising committee for the building campaign as well as the church's many other missions. Money for the building project was raised through private donations and through some advertising fees collected from the publishing of the annual Washington Memorial Chapel Year Book and various souvenir books. Additionally, parishioners were expected to fill out weekly pledge cards and make regular contributions to the campaign. The church also organized

²⁸ Philadelphia Architects and Buildings Project, 2003.

²⁹ The Year Book of the Washington Memorial Chapel, Valley Forge and of the Valley Forge Historical Society, 1925.

³⁰ Powell, p. 125.

paid “colonial” suppers, opened a tea room for summer visitors, and printed “founder’s certificates” to encourage contributors.³¹

By 1910, Burk was still acting as the rector of All Saint’s Church, but his energies were noticeable focused on the mission at Valley Forge. At this time the congregation at Washington Memorial Chapel asked to become an independent parish with Reverend Burk as its new rector. Their request was granted and Burk moved into the porter’s lodge at Defender’s Gate, which was to serve as a temporary residence until a proper rectory could be constructed [Figure 38]. As an official rectory has yet to be built on the church grounds, the tradition of residing at the porter’s lodge continued through several generations of rectors.

Still, Dr. Burk and his congregation struggled to manage the fundraising with their energies scattered amongst the day-to-day workings of the church and the various projects associated with the collection of books and relics to fill their proposed library and museum. Finally, in 1913, when no further work had been completed on the chapel and donations were starting to dwindle due to the lack of confidence in the management of the project, the Episcopal Church hierarchy stepped in and created a committee of laymen under the direction of Bishop Garland to take over the building project. In order to expedite this work, the title for the chapel was taken from the church and put into the hands of three trustees: Bishop Garland, Bishop Philip M. Rhinelander, and Charles

³¹ Treese, p. 96.

Custis Harrison.³² The transfer occurred in 1915. The committee funneled new funds into the chapel itself rather than the various other building projects began by Hart.

Harrison would prove to play the most significant role in the completion of the chapel and its adjacent buildings. He managed to personally raise \$206,000 for the chapel in seven years while Burk had only raised \$15,000 over ten years. Harrison was a professional fundraiser, however, and had served as provost of the University of Pennsylvania where nineteen buildings were constructed during his term.³³ Despite all of his hard work, it is mentioned in Harrison's memoirs that he often felt snubbed by the chapel congregation and felt that his efforts were not appreciated. However, when Burk received the Philadelphia Award for outstanding achievement on February 9, 1928, the reverend is quoted as crediting Harrison in his acceptance speech for managing the task of completing the construction for the chapel.³⁴

Burk's last great push for the chapel was for the creation of a national cathedral for which he held a ground breaking ceremony on Washington's Birthday in 1928.³⁵ The cathedral was designed by J. C. Cornelius and patterned after York Cathedral in England [Figure 39]. It was to seat five thousand worshippers. The expected completion day was announced as 1932.

³² Treese, p. 97.

³³ Treese, p. 98.

³⁴ Public Ledger Philadelphia (Feb. 2, 1928).

³⁵ Treese, p. 120.

This ceremony, however, drew criticism from both the Diocese and the Park Commission. First, cathedrals are defined in the Episcopal faith as churches lead by bishops so that only a bishop is entitled to erect one. At this time the local bishop had selected a site in Roxborough for a cathedral as it was a more central location for local worshippers. Secondly, Israel Pennypacker of the park commission spoke out against the chapel and the proposed cathedral as the buildings were not historical from the perspective of the encampment period. He also maintained that the chapel did not serve the local community which was not Episcopalian for the most part, and that only the wealthy Main Line suburbs who could afford to donate to the extravagant building projects.³⁶ Construction on the cathedral, therefore, never began.

Burk died of a heart attack in 1933. At the time of Burk's death the chapel came under the direction of a series of temporary rectors until John Robbins Hart, PhD was elected to the permanent position in November of 1937.³⁷ Hart was a prominent Philadelphian and former chaplain of the University of Pennsylvania.³⁸ Under Hart's direction, the museum began to truly flourish, although the parishioners showed some dislike for Hart's manner of preaching which they considered too academic [Figure 40].³⁹ It was also during Hart's lead that the carillon for the chapel complex was finally built [Figure 41]. Within the carillon Hart placed an honor roll of parish men and women who had joined the armed forces, thereby extending the chapel's significance as a place of memorial for American

³⁶ Ibid, p.121.

³⁷ Daily Republican (Nov. 11, 1937).

³⁸ Treese, p. 187.

³⁹ Daily Republican (Aug. 15, 1939).

soldiers. Hart was succeeded by Reverend Sheldon Moody Smith in the 1960's but remained in residence at Defender's Gate and continued to run the Historical Society while Smith concentrated on the parish needs. Smith redirected the parish towards more orthodox practices and a more conservative liturgy.⁴⁰ Under his direction, the parish developed into one of the larger congregations in the Diocese. Reverend Smith was followed by Richard Lyon Stinson and R. James Larson, the current rector.

4.3 History of the Architects

Milton B. Medary, Jr. was born in Philadelphia on February 6, 1874. He graduated from Central High School and entered the University of Pennsylvania in 1890. The same year he began working in the office of architect Frank Miles Day where he decided to remain rather than return to school in the fall. In 1895, Medary left the Day firm to join a fellow University of Pennsylvania drop-out, Richard L. Field. Field died only ten years later, leaving Medary to work alone until he joined with Clarence C. Zantzinger and Charles L. Borie in 1910 where he remained until his death on August 7, 1929 at the age of 65. It was during his last years as Field & Medary that the architect was originally approached for the design of the Washington Memorial Chapel when he won the contract on April 13, 1915.⁴¹ Medary designed not only the chapel, but also the Porter's Lodge and Defender's Gate. The Washington Memorial project remained with Zantzinger and Borie and then Borie and Smith after Medary's death.

⁴⁰ Washington Memorial Chapel brochure, 2004.

⁴¹ Philadelphia Architects and Buildings Project, 2003.

Borie joined Zantzinger in 1902. Charles Louis Borie, Jr. was trained as an engineer at the University of Pennsylvania but acted primarily as the business mind within the firm. Zantzinger was also born in Philadelphia and received his BS in architecture from the University of Pennsylvania before studying for two years at the Ecole des Beaux-Arts in Paris. After Medary's death, the firm's design approach began to digress from their signature gothic designs in favor of a more modern style.

In 1918 Medary was appointed to chair of the U.S. Housing Corporation for the duration of World War I. He was responsible for the design and construction of workmen's villages in Bethlehem, PA and on Neville Island, Pittsburg, PA. He was later appointed to such organizations as the National Commission of Fine Arts, the National Capital Park and Planning Commission, and the Board of Architectural Consultants of the U.S. Treasury Department. He was a consulting architect to Cornell University, Mount Vernon, and the Roosevelt Memorial Association. Medary was also director of the Foundation for Architecture and Landscape Architecture, Lake Forest, Illinois; a member of the American Institute of Architects (president, 1926-28); Philadelphia Chapter of the American Institute of Architects (former president); T Square Club (former president); Architectural Alumni, University of Pennsylvania (former president); Fellowship of the Pennsylvania Academy of the Fine Arts; Pennsylvania Museum of Art; Fairmount Park Art Association; American Federation of Arts; honorary member of the American Society of Landscape Architects; honorary corresponding member of the Royal Institute of British Architects; and many other societies and clubs. In 1927 he was awarded a gold

medal by the Art Club in Philadelphia, and in April of 1929 he received the gold medal of the American Institute of Architects.⁴²

Medary's Project List:⁴³

Houston Hall, Philadelphia, PA
1894-96

Winner of design competition with William Charles Hayes working under the supervision of Frank Miles Day and Brothers Architects (1893-1911).

St. John Church, Bala Cynwyd, Lower Merion Township, Montgomery County, PA
1897-1903

Design by Field and Medary (1895-1906).

1919-1931

Design and alteration by Zantzinger, Borie, and Medary (1910-1929).

Washington Memorial Chapel & Bell Tower, Valley Forge, Schuylkill Township, Chester County, PA

1903-1929

Associated with Field and Medary (1895-1906) and Zantzinger, Borie, and Medary (1910-1929).

Solitude Farm, West Whiteland Township, Chester County, PA

1904

Independent design, association unknown.

First Baptist Church, Pittsburgh City, Allegheny County, PA

1909

Competitor in design competition.

Fischer Residence, Philadelphia, PA (Germantown)

1909

Independent design by Medary.

Synagogue Adath Jeshurun, Philadelphia, PA

1911-1912

Consultant and jury member for design competition.

⁴² Earle G. Shettleworth, Jr., *American Architects' Biographies*, (www.sah.org/aame/biom.html#40, February, 3 1997)

⁴³ This list contains only the completed projects of Medary and does not include the hundreds of additional projects for which he was commissioned.

Tampa City Hall, Hillsborough County, FL (Tampa)
1914

Consultant as Chairman of AIA Standing Committee on Competitions.

St. Mark Church, Philadelphia, PA
1922-23

Alterations by Zantzinger, Borie, and Medary (1910-1929).

Young Women's Christian Association of Plainfield, Plainfield, Union County, NJ
1923-24

Consultant and jury member for design competition.

Baltimore City College (High School), Baltimore, Baltimore, MD
1924

Consultant and jury member for design competition.

Masonic Temple and Scottish Rite Cathedral, Scranton City, Lackawanna County, PA
1925

Consultant and jury member for design competition.

Sesqui-Centennial International Exposition, Philadelphia, PA
1925

Consultant for planning study.

Rockland County Court House, Rockland County, NY (New City)
1926-27

Consultant.

Carillon Tower; Bok Singing Tower; Bok Mountain Lake Sanctuary and Singing Tower,
Polk County, FL

1927-1929

Firm Zantzinger, Borie, and Medary (1910-1929).

4.4 History of the Building Evolution

The Washington Memorial Chapel was planned to commemorate Washington the Churchman, to represent him as a product of those influences and forces which were manifested in the history of the Church of England of which he was a member, and in which . . . he had received such a large part of his education.

-Reverend Burk⁴⁴

Construction of the Washington Memorial Chapel began with the laying of the cornerstone on June 19, 1903, on the one hundred and twenty-fifth anniversary of the evacuation from the Valley Forge camp.⁴⁵ After this initial phase, the foundation lay untouched for nearly a year before the funds could be raised to continue upwards with the walls. Meanwhile, Burk arranged for a barnboard building to be erected on the eastern portion of the lot to serve the congregation until the chapel could be completed.⁴⁶ This temporary structure was necessarily demolished when construction began on the museum wing in 1908.

Construction began again in 1904, and by the end of the year the stone walls of the chapel had been raised to the height of ten feet, reaching the sill of the lower windows. With no funds to continue further, the building was temporarily roofed over with a wooden frame structure so that services could be held within the unfinished walls. At this point, the chapel began to be furnished by contributions from wealthy patrons with oak pews, a

⁴⁴ The Washington Chapel Chronicle, Vol. VII, No. 1 (April 15, 1915), p. 2.

⁴⁵ Montgomery County Historical Society Scrap Book No. 2, p. 133.

⁴⁶ The barnboard chapel sat approximately on the current foundation of Patriot's Hall.

stone lectern, and stone font, all of which had to be removed and reinstalled when the temporary plank floor was replaced with marble tiles in the 1920's [Figure 42].

One year after this first sermon, in 1906, the first bay of the Cloister of the Colonies was completed and dedicated as the Pennsylvania Bay. The cloister was completed in the same manner as the chapel, in phases over a period of twenty years:⁴⁷

- 1906 – Pennsylvania Bay
- 1907 – Virginia Bay
- 1908 – Maryland Bay
- 1909 – Massachusetts Bay
- 1912 – Delaware Bay
- 1915 – Connecticut Bay
- 1916 – New Hampshire Bay
- 191? New York
- 192? New Jersey
- 192? North Carolina

Reverend Burk's vision for the memorial also included a museum of American history to house relics from the Revolutionary War. This section of the building would also be dedicated to the meetings of patriotic and historical societies. Construction began on Patriot's Hall in 1908. The addition was attached to the eastern wall of the chapel to be accessed through the Porch of the Allies. The new building was a steel and concrete structure approximately 28 by 24 feet designed specifically to hold the museum cases [Figures 43-47]. The museum was officially dedicated in 1909 but, like the chapel, was only partially completed at the time. For a time the museum was covered by a wooden frame roof and shingles rather than the current slate roofing [Figure 40].

⁴⁷ All completion dates were announced in the *Washington Chapel Chronicle*.

Patriots' Hall was planned to eventually grow into a three story structure to house eight Halls of History:⁴⁸

Pocahontas Hall, The Aborigines
Raleigh Hall, The European Background
Franklin Hall, the Colonial Period
Washington Hall, the War of the Revolution
Jefferson Hall, the Period of National Development
Lincoln Hall, the Civil War
Roosevelt Hall, the Period of National Expansion
Victory Hall, the World War

These plans are yet to be completed; however, the stone masonry linking the north wall of the wing to the chapel masonry has been left keyed so that the building complex may be completed at a future date.

By the early 1910s, the congregation had organized sufficiently to support a choir, a Sunday school, a women's auxiliary, the Washington Memorial Chapel Guild, a Martha Washington Junior Guild, a boys' club and a baseball club. They had also grown enough to warrant a cemetery, which would also provide funds for the building project through the sale of lots. The land behind the chapel sloping down to the Schuylkill was purchased for this purpose, and Thomas Sears was contracted for the landscape design of the grounds.

⁴⁸ The Year Book of the WMC, Valley Forge, and of the VFHS (1925).

The addition of the cemetery inspired the construction of Defender's Gate beginning in the spring of 1911, which was to be a second complex of buildings at the entrance to the cemetery consisting of a porter's lodge and a waiting room connected by a gothic arch dedicated to Abraham Lincoln. The porter's lodge was completed within the year and the foundation stones for the arch were laid, however, it was never completed as the adjoining waiting room is yet to be completed.⁴⁹ The stones of the arch still lay in the woods to the east of the porter's lodge.

By 1913, the chapel was still without a proper roof and the cloister was only partially completed. The walls stood within 8-feet of their full height at the level of the sill of the top windows. By December 15, 1915 the chapel had been permanently roofed over and the capstone was set.⁵⁰ The cellar was also concreted at this time in preparation for the heating plant to be installed the same winter. In January of 1917, electricity was installed and a transformer room was created under the Porch.⁵¹ Over the next thirteen years the chapel interior was refined and, under the new management, the chapel was finally completed in 1928.

Although the museum wing was a multi-purpose building from the onset, as the museum collection began to demand more space, the Sunday school and tearoom were displaced. Therefore, in June of 1916 a log cabin was construction behind the chapel to house these

⁴⁹ The Washington Chapel Chronicle, Vol. IV, No. 1 (April 15, 1911).

⁵⁰ The Washington Chapel Chronicle, Vol. VII, No. 9 (Dec. 15, 1915), p. 65.

⁵¹ The Washington Chapel Chronicle, Vol. VIII, No. 2 (Jan. 19, 1917).

church functions [Figure 48].⁵² Meanwhile, Burk had made progress on his plans for the Valley Forge Historical Society, which was created in 1918, and focus shifted to completing the plans for Patriots' Hall [Figure 49]. In 1924, three additional rooms were planned for Patriot's Hall. At about the same time, the sexton moved out of his living quarters below the museum floor, opening up more space for the expanding collection.⁵³

By 1926, plans for a carillon had begun with an order of the first set of bells.⁵⁴ A temporary wooden and steel structure was constructed at this time to the west of the chapel to hold thirteen bells [Figure 50]. Construction of the permanent bell tower began in 1941; however, construction was halted during the war and would not begin again until 1949. The temporary structure was dismantled in 1958 when the bells were transferred to the permanent carillon.

In 1931, construction of the Bishop White Memorial Library began. It was completed in the November of 1937. The cost of the building was \$125,000 according to the dedication announcement in the *Daily Republican*.

The next building project would be the construction of the Porch of the Allies and the completion of Patriots Hall. By 1941, construction of the Pulaski Bay to the Porch of the Allies had begun. However, in 1956 the Porch was still not complete as design proposals

⁵² The Washington Chapel Chronicle, Vol. VII, No. 3 (June 15, 1911), p. 20.

⁵³ The Valley Forge Record, Vol. IX, No. 8 (April, 1924).

⁵⁴ Order for bells from the Meneely Bell Co. located in the Parish files at Defender's Gate.

by Borie and Smith show. Just the year prior in 1955, the plans for the completion of Patriot's Hall and an auditorium wing had begun again [Figure 51]. The drawings from this planning period show the last addition which leads north from the half-completed carillon.

By 1958 problems were already arising concerning the reinforcement of the chapel walls.⁵⁵ After such a prolonged construction effort, the earliest buildings were already beginning to show the wear and tear of their age. In 1962, problems with the stained glass windows began to arise and protective glazing was installed to shield the windows from UV degradation.⁵⁶ In the same year, the Townsend and Elfreth Company⁵⁷ was consulted to estimate the cost of installing new granite facing for the museum, construction of an addition to the lecture room, of a stair enclosure for the library, and of a 27,250 square foot auditorium.⁵⁸ None of this work was completed. In 1978, plans for the completion of Medary's design were revisited; however, although plans were drawn up for a new phase of construction, they were never realized. In 2004, the Church began discussions with John Milner Architects to address pressing issues of architectural conservation, maintenance, accessibility and potential future expansion. It is intended that the information generated by this thesis will contribute to that effort.

⁵⁵ January 13, 1958 letter from Borie and Smith to General Augustine S. Janeway.

⁵⁶ Two letters containing estimates for the installation of protective glazing were found in the Janeway papers dating from October 1962. The vying companies were Filipone Associates from 1912 S. Bancroft St. Philadelphia, PA and Willet Stained Glass Studios.

⁵⁷ The company was located at 31 Hampstead Circle Wynnewood, PA.

⁵⁸ The estimates are located in the Janeway papers in a letter dated July 10, 1962.

5.0 Condition Assessment of the Exterior Building Materials

The scope of this condition assessment is limited to selected exterior materials due to the time constraints for this project and the difficult accessibility of some areas. This does not indicate that the condition of the interior is more stable than the exterior, only that the outer envelope was of more pressing concern for this initial investigation. It should be noted that the interior limestone panels are exhibiting advanced deterioration, especially in the hallway linking the chapel and library [Figure 52]. This stone displays salt efflorescence, disaggregation, and orange staining possibly due to the deterioration of iron rebar within the reinforced concrete walls. Each of these conditions is linked to the migration of water that appears to be evaporating from the interior surface of the walls. This process may be due to the lower permeability of the exterior granite which forces water to migrate towards the heated and more porous interior surface. It is possible that improved drainage around the perimeter of the buildings will help to stem this action. The installation of a more precise climate control system may also alleviate the problem. It is also recommended that an assessment be made of the interior finishes and stained glass windows as soon as possible.

5.1 Granite

The predominate building stone used in the construction of the chapel is a granite gneiss quarried from Holmesburg, PA.⁵⁹ As a building stone, granite is a compact, crystalline rock with a generally uniform structure. Gneiss has the same mineral composition as granite, however, the minerals have a more or less well-developed parallel arrangement so that the dark minerals make noticeable black bands.⁶⁰ The stone at the chapel loosely exhibits this parallel structure. The granite-gneiss exhibits a range of colors, is hardwearing, and is capable of taking a high polish. It has a low porosity and permeability and is valued for its high resistance to weathering and corrosion unless it is highly jointed, micro-fractured, or foliated. The crushing strength of Holmesburg granite is 24, 034 pounds when the rock is on edge and 26, 254 pounds on the bed.⁶¹

Granite is an igneous rock that has been primarily crystallized from fiery fluid silicate melt. In the eastern United States, granite is found along the eastern edge of the Appalachian Mountains. True granites consist of alkali feldspars and quartz (appearing grey to pale purple when in the mass of rock) with varying amounts of other minerals, such as micas (appearing dark brown) and hornblendes. These elements are composed with an interlocking and granular texture within which all of the constituents are visible. Feldspars make up the majority of minerals found in granites, therefore, determining the

⁵⁹ Holmesburg granite was quarried in Philadelphia County at the intersection of Welsh Road and Crispen Streets. The quarry was developed by Holmesburg Granite Company and was then bought by Holmesburg Concrete Company.

⁶⁰ Ralph W. Stone, *Building Stones of Pennsylvania*, (Harrisburg, PA: Department of Internal Affairs: Topographic and Geologic Survey, 1932), p. 4.

⁶¹ *Ibid*, p. 250.

overall color of the stone (colors range from white to grey to pink, with some instances of red, yellow, and brown). The color of the chapel granite ranges from light brown to bluish gray.

Because the type of granite usually used for buildings have such low porosities, they are not as susceptible to frost attack. However, granite may become more brittle in colder temperatures, which increases the risk for cracking. In addition, some loss of material may be caused by natural erosion through wind and rain.

The condition of the granite at Washington Memorial Chapel is generally good. It shows minimal biogrowth. Algae are found mostly in areas of shade, such as under the trees on the east wall of the chapel, or near deep cracks or seams in the stone where water is more likely to collect. The most severely affected area is the open keyed wall leading into the rear wall of the museum. The shade and damp here has allowed for moss and ivy to cover nearly a third of the surface area of the stone [Figure 53].

The stone is also minimally affected by soiling and staining. Soiling is found mostly in protected areas that are not washed by rain. Staining has occurred mainly where the copper gutters and downspouts have failed and begun to leak rainwater, spreading a greenish copper stain. Overall, however, the granite appears to resist the copper staining more effectively than the Indiana limestone. There is also superficial rust staining beneath the air conditioning unit on the west wall of the library [Figure 54]

The granite appears otherwise sound, exhibiting no cracking, sugaring, or delamination that might suggest salt damage or moisture problems.

5.2 Limestone

The decorative stone located around the windows, bays, cornice, and statuary is Indiana limestone. Limestone is a sedimentary stone composed mostly of calcium carbonate with less than 5% clay impurities.⁶² The material is subject to large variations in color and composition, however, Indiana limestone is generally pale grey to buff in color and fine-grained. It is considered a strong a durable building stone.

Indiana Limestone began to be quarried for commercial use in 1827 in southern Indiana near Stinesville. The stone won merits for quality at the Philadelphia Centennial celebration in 1876. By the time the chapel was built, the stone had gained a reputation for its superior weather resistance, ease of shaping, consistent quality, boundless supply, and broad architectural acceptance.⁶³

Although limestone is a relatively durable building material, all carbonate rocks are subject to dissolution by rainwater, especially in areas where acid rain is common.

Sulfates carried by the polluted water can interact with the stone to form gypsum, a soft,

⁶² Winkler, *Stone in Architecture*.

⁶³ Indiana Limestone website.

water-soluble material that weathers quickly. For this reason, waterproofing agents are very helpful in preserving limestone.

The limestone tracery at the chapel is in overall poor condition, especially within the Cloister where it has previously been repaired with an apparently incompatible mortar mixture.⁶⁴ The efflorescence now visible on the surface of the stone indicates that salts are present in the stone [Figure 55]. The cycle of salt dissolution and recrystallization will continue to cause delamination of the stone surface if not treated. Delamination occurs when layers of stone are forced apart, often through the action of salt or water crystallization. The same process of crystallization is causing cracking in some areas [Figure 56].

Where the cement patches are separating from the stone, original fabric is also being lost as the surface layer of limestone remains adhered to the cement patch and pulls away from the body of the stone [Figure 57]. This behavior of the patch implies that the mortar mixture chosen for this repair was too strong and dense as it is sacrificing the original material during failure rather than the replacement material.

The limestone surface is also exhibiting sugaring of the surface layer. This may be caused by the dissolution of the stone's calcium binder due to interaction with acid rain.

⁶⁴ No record of this repair was found, therefore, the date of the intervention is unknown.

This condition exists mostly in areas which are continuously exposed to flowing rainwater that enters through the failing roof [Figure 58].

The limestone surfaces show many areas of biogrowth. The higher presence of vegetation on the limestone rather than the granite may be due in part to the higher porosity of the limestone which allows it to support plant growth. The higher porosity also allows for greater water absorption, creating a more agreeable environment for the vegetation.

The stone is also affected in several areas by staining. It is susceptible to green copper staining from the gutters and downspouts [Figure 59]. It also exhibits some blackening in areas which are not washed by the rain [Figure 60]. These particular areas should be monitored for the development of gypsum crusts which can develop through the interaction of the stone with sulfites in the sooty film.

5.3 Marble

The exterior floors of the Cloister of the Colonies are laid with Knoxville marble.⁶⁵

Marble is a compact limestone; a variety of calcite, capable of being polished and used for architectural and ornamental purposes. Geologically, marble is a metamorphic rock formed from limestone or dolomite under high heat and pressure. The color varies from

⁶⁵ The stone is specified in the Zatzinger, Borie, and Medary drawings; however, no geological description could be found.

white to black, being sometimes yellow, red, and green, and frequently beautifully veined or clouded. The Knoxville marble is a pink and cream color with distinct veining.

Deterioration of marble is caused by three main factors: dissolution from acids found in the air and rain such as sulphur dioxide produced by the burning of coal, the effects of frost or the freeze/thaw cycle, and the effects of salts.

The condition of marble at the chapel appears to be very good. It is exhibiting only some wear on the surface due to the friction of foot traffic.

5.4 Wood

The wood used for the ceilings of the Cloister and Chapel, the doors, and the chapel furniture is Indiana white oak.⁶⁶ White oak is a hardwood of medium density with a distinct ring structure that gives it a pronounced graining making it a preferred wood for furniture and decorative paneling. Because of its relative hardness and density, white oak tends to be a very durable material.

The oak ceilings in the cloister are overall in good condition. The areas of damage are limited to the areas where water has seeped through the roofing material, specifically in the southern corridor of the cloisters. In these areas the wood appears swelled and darkened, suggesting that wood may be becoming rotten. In these areas there is also a

⁶⁶ The wood type is specified in the Zatzinger, Borie, and Medary drawings.

whitening of the surface [Figure 61]. Although not closely inspected, this discoloring may be due either to salt efflorescence or the deterioration of the finish layer.

5.5 Wrought Iron

The wrought iron found at the chapel was forged by Samuel Yellin in Philadelphia. Wrought iron is used throughout the building for door latches, gates, and decorative applications. The material is tough and fibrous, equally strong in compression and tension and can be worked by hammering, rolling and forming. Wrought iron is very pure, containing less than 1% of carbon, which makes it very resistant to corrosion.

The condition of the wrought iron at Washington Memorial Chapel is good to fair. In places where the iron has been left unpainted, such as the door latches, the condition is very good, showing only wear from friction through use. However, in places where the iron has been painted over, such as the front gates of the chapel, water has been trapped against the surface of the iron and begun to cause rusting. The paint layers also obscure the fine detailing of the pieces.⁶⁷

5.6 Lead Gutters and Downspouts⁶⁸

The downspouts and gutters used for the chapel and library are formed of lead metal [Figure 62]; however, elsewhere in the complex, copper and an unidentified modern metal

⁶⁷ It is unknown whether the wrought iron was originally painted.

⁶⁸ All information in this section was gathered from the condition assessment performed by Eileen Murdock.

have been utilized for the drainage system. This assessment will focus solely on the lead fittings as they exist in the majority.

Lead is resistant to penetration by moisture and is considered to be one of the best waterproofing materials available. This resistance to moisture, along with its overall corrosion-resistant nature makes lead well suited to function as a downspout. Lead's insoluble salt corrosion products create a protective, impervious film that protects the metal from further attack. These protective films are responsible for the high resistance of lead corrosion by sulfuric acid, chromic acid, and phosphoric acid. In most environments, the amount of lead corrosion is insignificant.

Overall, the downspouts are in good condition. The joints toward the base of each downspout are consistently an area of weakness. The damage appears to have been caused by poor joinery during re-fitting for the installation of the iron underground storm water drains. The new joints are separating and exhibiting heavy corrosion [Figure 63]. The upper portion of the downspout at the south end of the west façade has been replaced with a different metal. From the ground, the exact type of metal used could not be determined. The remaining portion of the lead downspout does not appear to have any structural damage.

Most corrosion is present at the joints and attachment plates. White corrosion drips appear to have been caused by the repair materials used on the lower joint of the

downspout at the south end of the west façade [Figure 64]. The two downspouts on the north façade have an overall higher level of corrosion than the downspouts on the east and west facades.

In rainwater pipes, a good flow of air is necessary to create the wetting-and-drying cycle required to provide the conditions for the protective patina to be formed. The areas of increased corrosion may not dry out enough for the protective film to form. The attachment plates and joints likely trap water, and the north façade downspouts are not exposed to direct sunlight; therefore, these elements are not able to consistently dry after a rainfall or snow event, which causes the increased level of corrosion.

It was noted that the iron attachments have all rusted. This probably occurred because lead is a more noble metal than iron. When the metals are in contact, the lead is cathodic to iron, which accelerates the corrosion (rusting) of the iron.

On the whole, the downspouts are in good working condition. Only the joints appear to need structural and cosmetic intervention. At this time, the benefits of intervention are uncertain.

6.0 Recommendations

6.1 Recommended Treatments

As the decorative limestone at the chapel exhibits the largest number of weathering problems, the following chapter will propose several treatments that may help moderate the stone's aging process. The limestone was also chosen for its rare and delicate artistry which makes it one of the more valuable features of the chapel complex.

Before describing the individual processes that can be employed to stem the stone's deterioration, the overall structure must be examined. The Cloister is an open-air structure, which means that each of the building materials is exposed to environmental extremes [Figure 65]. Excessive temperatures, water penetration, and wind are constant factors in the performance of these building materials. Stability of the building relies on the durability of the chosen materials.

While the granite masonry with cement mortar is extremely hard and durable, the decorative limestone is a more porous and soft material that is less capable of withstanding such temperature and moisture fluctuations. Not only is the limestone inherently a weaker material, it is also used in a manner which adds stress to its performance. Rather than having one face exposed as is the bedded granite, the carved stone is often exposed on four out of six planes. Also, the jointing used for the limestone is fine and slightly recessed unlike the bulky weather joints used for the block cladding.

Lastly, although the limestone exhibits a more uniform pore structure than the granite, it also has a bedding plane which is not always set at advantage when carved. All of these factors have led to the relatively quick deterioration of the limestone tracery. The following sections will delineate how to best protect the more fragile stone from further decay.

6.1.1 Cleaning

Cleaning is an effective way of prolonging the age and durability of stone. The process can remove harmful pollutants and bio-growth that speed its deterioration through both chemical and mechanical means. However, cleaning treatments can potentially cause irreparable damage if not properly designed and executed. Also, cleaning can dramatically affect the appearance of a building by removing its patina - the visible testament of age and, thus, value.

6.1.1.1 Abrasive Methods

Pressurized air combined with an aggregate, pressurized water with or without an aggregate, and steam cleaning can all be used for the mechanical cleaning of limestone. Although an aggregate is often used in conjunction with pressure cleaning, especially when it is necessary to keep the stone dry, this method would be too abrasive for the delicate surface of the chapel's limestone. Aggressive abrasive cleaning can easily remove healthy surface layers. This may increase the porosity of the stone by removing the hardened outer layers that have become naturally consolidated over time by the

migration of minerals to the exterior face during the process of evaporation. This heightened porosity will result in higher water absorption. Excessive pressure during cleaning can also disturb already fragile or damaged areas and/or obscure the lines of delicately carved detail. Due to its fragile state and the relatively clean surface of the chapel's stone, gentle water cleaning at very low pressure would be recommended. This may be combined with gentle brushing in areas of resistance soiling. The introduction of water to the stone is of minor concern due to its relative thinness which will allow for complete evaporation.

6.1.1.2 Chemical Methods

Detergents and chelating agents are both recommended for the chemical cleaning of limestone whose calcite binder would be attacked by acidic cleaners. A mild detergent will help to loosen dirt and hardened crusts while dilute ammonia will remove lichens, algae, moss, and fungi as well as the copper staining from the leaking gutters. If used carelessly, chemical treatments can introduce potentially damaging salts, cause staining, bleaching, etching, or chemical residue. Therefore, it is advisable to choose the most conservative and gentle treatment available when using chemical agents. Chemical cleaning should only be employed in areas of staining for the chapel limestone as the soiling elsewhere is light and not visually disturbing.

6.1.1.3 Desalination Methods

While complete removal of salts is impractical, significant reduction can be affected by essentially rinsing the stone with pure water. This process involves saturating the stone with clean water and then applying clay poultices which will absorb the salts as they are drawn toward the surface in the evaporation process. The poultices can be left on the stone for up to a month, but the process will mostly likely need to be repeated several times before a significant improvement is observed. Sacrificial renders can also be used in place of clay poultices, especially for stone with an open pore system that may make removal of the clay difficult. The render is left in place until it weathers and disintegrates naturally.⁶⁹ This process will both improve the appearance of the stone and its integrity. Obviously, it is advisable to remove from the environment any potential sources of salts such as incompatible mortar patches or pointing, fertilizers, or de-icing salts.

6.1.2 Consolidation

Because of the highly weathered state of the limestone tracery and the large amount of loss due to a loss of its cohesive properties, a consolidant treatment would be highly advisable. Consolidation has the added benefit of increasing the stone's resistance to water penetration. Consolidation methods may also be used to address the cracking that has begun to occur in severely damaged areas.

⁶⁹ Young, p.48.

Consolidants are deeply penetrating materials which have the ability to re-establish the cohesion between particles of deteriorated porous building materials. This can be achieved both by chemically bonding the existing particles to one another and by creating a new matrix within the stone particle structure, which then stabilizes the original material. Consolidation is aimed at improving the cohesion and adhesion among the mineral constituents of the stone and also between the deteriorated parts and the sound core of the stone. This process increases the stone's resistance to mechanical stress applied to both the exterior and the interior of the pore structure.⁷⁰ This process should improve the mechanical properties of the material and make it less susceptible to abrasion, thermal expansion, freeze/thaw cycles, and water penetration.

In order to be successful, a consolidant must reattach the weathered, friable outer material to the sound material beneath. Therefore, liquid consolidants must have high enough viscosity to be able to penetrate deeply. If a strong bond is not achieved with the stable material below, the consolidated surface will simply delaminate as it weathers. For this reason, poultices are often used in the application of consolidants in order to increase the absorption time and to decrease evaporation when a solvent is used. The evaporation of solvents will cause the consolidant to be drawn back towards the surface of the material even once it has achieved good penetration, leaving a thin layer of sound material over unconsolidated material.

⁷⁰ Marisa Tabasso, "Acrylic Polymers for the Conservation of Stone: Advantages and Drawbacks." APT Bulletin, v.26, n. 4 (1995), p.18.

In addition to strengthening the material, consolidants can also encapsulate and immobilize impurities within the material such as salts so that they will not continue to cause damage to the original fabric.⁷¹ Although resins such as acrylics and epoxies work well for this purpose, it has been shown that ethyl silicate treatments will continue to allow salt migration and precipitation.⁷² This ability to allow for the movement of salts, however, may be seen as beneficial since the consolidating material is less likely to create a barrier behind which salts in the untreated material may build up as they migrate towards the surface. This concentration of salts below the treated surface may eventually cause the outer layer to be pushed away from the unconsolidated material.

Because consolidants work to strengthen a material partially by filling voids caused by weathering, they will lower porosity. This, in turn, helps to raise the water repellency of the material. However, the porosity of the material should not be lowered to a point at which water vapor transmission becomes impaired and causes further damage to the material.

Consolidants must be colorless and stable in the presence of oxygen and UV in order to maintain the material's original appearance. Likewise the consolidating material should not be more susceptible to soiling than the untreated material so as not to cause an inconsistent appearance over time.

⁷¹ James Hewitt, "Approaches to the Conservation of Salt Deteriorated Brick." MS Thesis of Historic Preservation, UPenn (1996), p.44.

⁷² Both Rodrigues' experiments with ethyl silicates and acrylics in "Surface and Structural Stability for the Conservation of Historic Buildings" and the observations of ethyl silicate treatments recorded at Mount Vernon support the statement that ethyl silicates allow for salt migration in consolidated materials.

The thermal expansion of the consolidant material must be similar to the coefficient of thermal expansion for the original material so that stresses are not created within the bonded materials during temperature fluctuations.

Finally, ideally any conservation treatment should allow re-treatment. Chemical consolidation, for all practical purposes, is not reversible. This is both because of the nature of the chemicals used, which often cannot be made completely soluble again once polymerization has taken place, and because of the nature of the problem being addressed. If a highly friable material is consolidated with a material that is later deemed inappropriate, it is unlikely that the delicate material will survive the removal process even if it is chemically possible. For this reason, a consolidation treatment should only be performed when the loss of material is imminent and/or unacceptable as is the case at the Washington Memorial Chapel.

6.1.2.1 Limewater

Lime watering involves the much repeated application of very dilute calcium hydroxide in solution to friable limestone masonry. The objective is to consolidate the material through carbon dioxide absorption and re-conversion to calcium carbonate, the cementing material of limestone.⁷³ Lime watering is often combined with the application of a

⁷³ A similar consolidation treatment involves replacing the calcite in limestone with fluorite or barium compounds which form a protective mineral crust on the surface of the stone. Although somewhat effective, these treatments can alter the appearance of the stone.

shelter or sacrificial coat of a thin lime mortar which protects the original surface of the stone.⁷⁴

Although lime washes have been used for centuries as a sacrificial layer for stone masonry, lime watering was first attempted in 1950 at Wells Cathedral in England. The process has been promoted as conservationists become frustrated by the incompatibility of modern consolidants and search for simpler, more traditional methods. In the past fifty years, many conservators have become convinced of the beneficial effects of this system. However, in the few laboratory tests that have been conducted on the subject, no evidence has been found to prove that limewater has any more consolidating effect on the stone than plain tap water. Because of the inconclusive prognosis on the effectiveness of lime watering and the advanced deterioration of limestone to be treated, it would be recommended to use a more aggressive consolidation method. Limewater treatments also require consistent and frequent re-treatment which leads to high labor costs and an increased risk of human error.⁷⁵

6.1.2.2 Epoxies

Epoxies consist of epoxy resins and a polymerization agent. They are the strongest consolidating materials available, however, their strength is often a deterrent as it can cause damage to the weaker original material when stresses are applied. Epoxies are also

⁷⁴ Fidler, p. 19.

⁷⁵ Recent developments within calcite treatments have introduced bacteria to the system that induce and mediate mineralization; however, further testing must be performed before this innovation may be prescribed for standard use.

irreversible as they cross-link during polymerization and cannot be re-dissolved in solvents, making them less desirable as conservation materials. They can also change the appearance of the material by causing a darkening effect. Furthermore, they are not as UV stable as acrylics and will chalk when exposed to sunlight.

The exposed position of the chapel makes an epoxy consolidation treatment risky for the limestone. However, it may be used in another capacity. Because of their strength, epoxies are often used to reattach delaminating stone layers. This may be accompanied by pinning in cases where large portions of stone are being treated.

6.1.2.3 Acrylics

Many acrylics are thermoplastic resins that exhibit transparency, good adhesion, and stability against oxygen and UV radiation, making them ideal consolidants under certain conditions. The acrylic polymers used for consolidation come from two families of monomers, the acrylates and the methacrylates derived from acrylic and methacrylic acids. Acrylics can be dissolved in solvents such as aromatic hydrocarbons, halogenated hydrocarbons, acetone, and methyl ethyl ketone. The higher the molecular weight of the acrylic, the harder it will be to dissolve the resin. Acrylics are affected greatly by their glass transition temperature, the temperature at which the material transforms from a rubbery to glassy state. A higher the molar mass will translate to a higher glass transition temperature which means the material will exhibit greater rigidity.

Acrylic polymers may be employed as consolidants in two ways. The first is to dissolve an acrylic *polymer* in solvent and then to deposit the solution into the porous material. The second is to put an acrylic *monomer* into solution and allow it to form polymers within the matrix of the material. The advantage of the latter process is the higher viscosity of the monomers which allows them to penetrate more deeply before polymerization takes place.⁷⁶

The most common commercially available acrylic is Acryloid B72 (known as Paraloid B72 in Europe) produced by Rohm and Haas. It has good solubility in ketones and chlorinated hydrocarbons, is transparent, has good adhesive properties, and has a glass transition temperature of 40°C which means it has low rigidity at room temperature. Acryloid B72, however, has poor penetration power and is less water repellent than silicone polymers. Many acrylic-silane and acrylic-polysiloxane mixtures have been developed over the years to make up for this lack of water repellency; however, it has been found that the resulting compounds are not adequately bonded to one another and can result in unstable composite materials. Acryloid B72 has limitations as a consolidant due to solvent retention, the latter acting as a plasticizer, which allows the material to remain tacky and, therefore, soil more quickly. Overall, acrylics are a good choice for the consolidation of the limestone due to their good adhesive properties and relative UV stability.

⁷⁶ John Warren, *Conservation of Brick*, Oxford: Butterworth and Heinemann, 1999, p. 209.

6.1.2.4 Ethyl Silicate combined with HCT

Ethyl silicate is one of the most popular organic consolidants; however, its compatibility with calcareous stones is questionable due to the stone's relatively low silica content.

Therefore, until very recently, ethyl silicate has mainly been used for the consolidation of sandstones. Beginning in the late 1990's, Monument Conservation Collaborative Materials (MCCM) began developing a water-borne pre-consolidant for calcareous stones to be used in conjunction with ethyl silicate.⁷⁷ The material is manufactured and distributed by ProSoCo under the name Conservare HCT (Hydroxylating Conversion Treatment).

The treatment is a heavily buffered tartaric acid that converts the limestone surface to be chemically sensitized to silane-based consolidants.⁷⁸ The material cures within 48 hours, is water repellent and relatively insensitive to acidity. It is odorless, contains no organic solvents or polymers, and is harmless to the environment, making it a relatively safe material.⁷⁹ The product literature also claims that HCT can increase resistance to acid rain by 40%, resistance to abrasion by more than 100%, and resistance to freeze/thaw cycles by up to 40%. Although the HCT has not been in use long enough for satisfactory field testing, the benefits of the product warrant testing the material on a portion of the limestone tracery at the Chapel in order to monitor its possibly beneficial affects.

⁷⁷ BSA Historic Resources Committee, meeting notes for January 2002, report by Norman Weiss, Senior Scientist at ICR and partner of Monument Conservation Collaborative Material.

⁷⁸ John Fidler, "Stone Consolidants: Inorganic treatments," *Conservation Bulletin*, Issue 45 (Spring 2004), p 34.

⁷⁹ ProSoCo, Technical Bulletin 1102-HCT.

6.1.3 Waterproofing

A waterproofing treatment is meant to decrease the permeability of the stone's surface. This may be achieved through either a surface sealant, such as a paint layer, or a penetrating consolidant that increases the stone's density and decreases its permeability. Sealants are generally a poor choice for waterproofing stone as they do not allow for water vapor transmission. The barrier traps water behind its surface, causing a build up of pressure that can cause spalling, sugaring, cracking, or blistering of the stone's outer layers. Waterproofing through consolidation of the outer layers of stone can be more effective as it creates a permeable shield that allows for the movement and release of water from the stone. Waterproofing the stonework at the chapel would mitigate several of specific threats to the stone. Waterproofing deters biogrowth as the stone dries and become a less desirable host to plant life. It will stem staining by blocking the dissolved metals from penetrating the stone. It will also slow the transfer of salts through the stone, lessening efflorescence on the surface. Protecting the stone from the absorption of water also diminishes the occurrence of cracking and delamination caused by the action of the freeze/thaw cycle.

6.1.4 Plastic Repairs

A plastic mortar repair uses mortar to replace damaged or lost stone. Plastic repairs should be made to cleaned stone so that a correct color match can be made. The success of a mortar repair depends both upon the compatibility of the mortar mixture and the quality of the workmanship which determines greatly its aesthetic compatibility.

For the repair to be successful the decayed stone must be removed back to the sound material and the surface must be keyed to ensure a strong bond with the replacement material. The finish edging of the patch is also vital to the longevity of the repair. A feathered edge will weather quickly as it is thin and brittle, causing the outline of the patch to be highly visible and allowing for water entry that will speed the deterioration of the bond. It is recommended to carry the patch to an existing joint or to create a faux joint so that it may be finished with a blunt edge.

Ideally, a replacement mortar should match in color and texture. It should also have a higher permeability than the original stone, which will allow water vapor to be transferred through the patch rather than become trapped behind, creating pressure that will eventually break the bond of the two materials. Furthermore, the cohesive strength of the mortar should be less than that of the original stone. This ensures that under pressure, a fracture will occur in the mortar body rather than within that of the stone.

6.2 Recommended Further Study

The scope of this thesis did not allow for a full exploration of the several conservation concerns at the chapel. Of the second most importance after the care of the stone should be a full survey of the chapel's stained glass windows. The windows underwent protective treatment in the 1960's. This system should be reviewed for its effectiveness

and appropriate measures should be taken to improve upon or replace the system if it is found lacking.

Also of importance is the roof and water shedding system which was not surveyed in this conditions assessment. It is obvious from the damage to the cloister ceilings and the copper staining on the granite and limestone that the gutter system is also failing. As water infiltration is often the most damaging factor in building deterioration, it is highly recommended that the drainage system be assessed soon.

Further study should involve testing of the salts which are precipitating on the stone. Identification of the salts will help to pinpoint their source so that it may be removed or mitigated. If it is determined that the salts have been introduced by the mortar patching, then this may have to be removed wholly and replaced with a compatible material.

7.0 Conclusion

The Valley Forge encampment site was designated as a National Historic Landmark in 1962 in recognition of the site's great significance within the story of our nation's inception. This honor may be largely ceremonial due to the park's long established status as a symbol of American courage and strength; however, this award has helped to protect the land for future generations. The benefits of such a nomination could likewise aid the Washington Memorial Chapel's caretakers to better protect and maintain their own historic property to ensure its continued participation in the Valley Forge story.

Without a doubt, the Washington Memorial Chapel is an integral part of the park's history. It stands as a monument to the patriotic fervor that is responsible for the park's existence today. It also represents one of the many interpretive perspectives that have been used to define and shape the landscape. Moreover, the chapel is part of a larger narrative in American history about the complicated relationship between church and state in this highly religious environment.

The chapel's significance is not limited to its association with its setting. It is also valuable as an example of exquisite architectural craft. The building represents the work of the finest Philadelphian craftsmen of its period as well as the design of one of the area's foremost ecclesiastical architects. Furthermore, that chapel remains a testament to

the unique and great passion of Reverend W. Herbert Burk and as a permanent reminder of his noble accomplishments.

The Washington Memorial Chapel is reaching an age at which preventative care becomes crucial to its longevity. At this juncture, the repairs needed to extend the building's life are minimal; however, another twenty-five years without intervention may cause critical damage to some of the chapel's finest features. Intervention at this time will maximize the church's limited resources while preventing critical loss. It is hoped that this work will aid in the recognition, protection, and care of this unique place of worship and memorial.

Appendix A

Images



Figure 1. South elevation of the Washington Memorial Chapel.



Figure 2. View from the Chapel entrance of memorial statuary.



Figure 3. The chapel entrance with solid oak door.



Figure 4. Stained glass windows viewed from the interior depicting the lives of the Revolutionary War soldiers.



Figure 5. Chapel interior, facing large stained glass window on north wall depicting the life of Christ.



Figure 6. Quartered oak pews designed by the architect.



Figure 7. Carved soldier located in choir stall.



Figure 8. Kneeling soldier, carved and painted by Edward Maene, located in choir stall.



Figure 9. South elevation of the Cloister of the Colonies.



Figure 10. West elevation of the Cloister of the Colonies containing the "Woodland Pulpit."

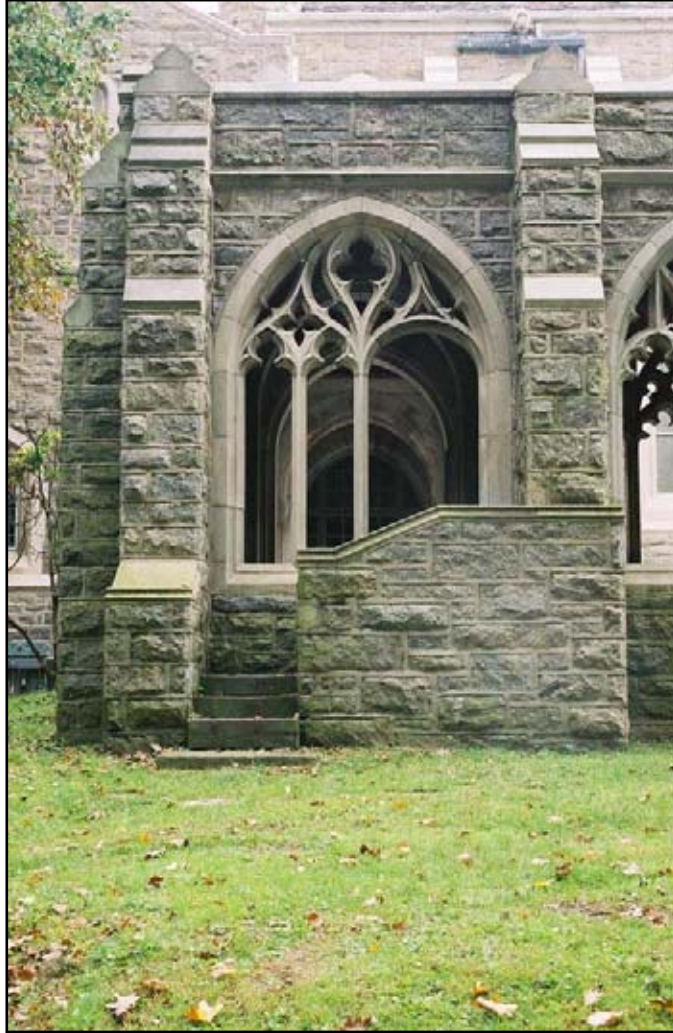


Figure 11. Western entrance to the Cloister.

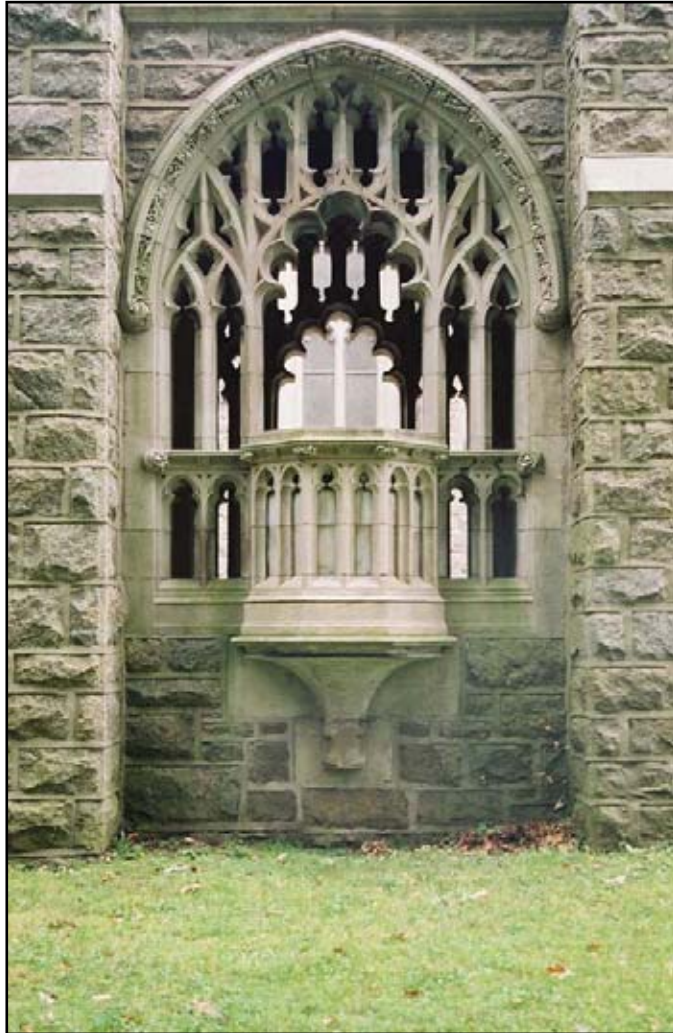


Figure 12. Woodland pulpit located in western wall.

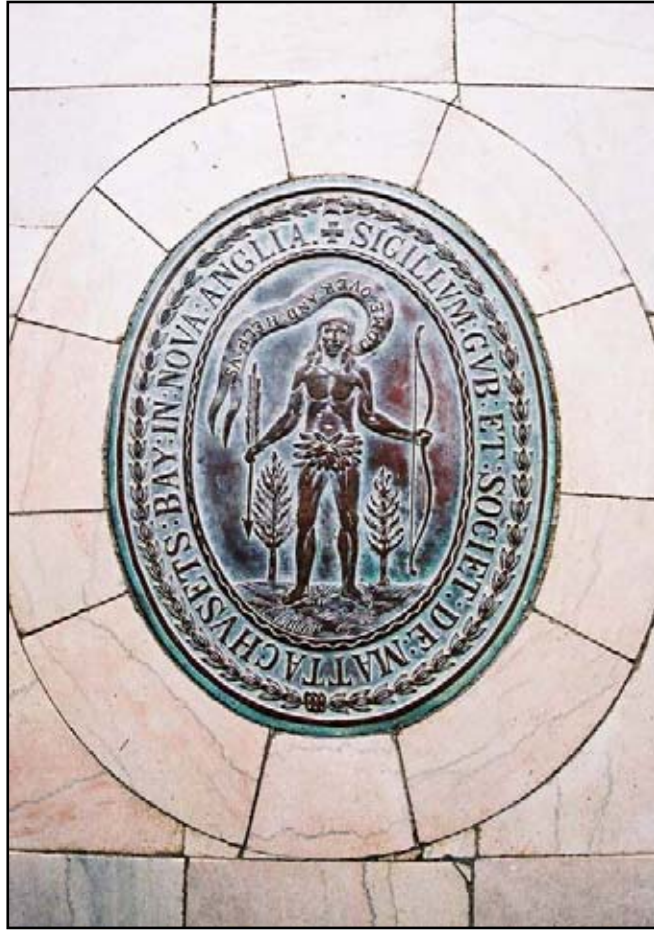


Figure 13. Knoxville marble stone flooring located in the Cloister of the Colonies. Each bay contains an inset bronze medallion depicting its state.



Figure 14. The cloister roof is constructed of Indiana white oak in a tongue and groove pattern and supported by bevel edged trusses.



Figure 15. The design of each adjacent bay is distinct from its neighbor.



Figure 16. Oak door leading from glassed in vestibule into the Bishop White Library.



Figure 17. East façade of the Bishop White Library.



Figure 18. West façade of the Bishop White Library.



Figure 19. North façade of the Bishop White Library.



Figure 20. Interior of the Bishop White Library.

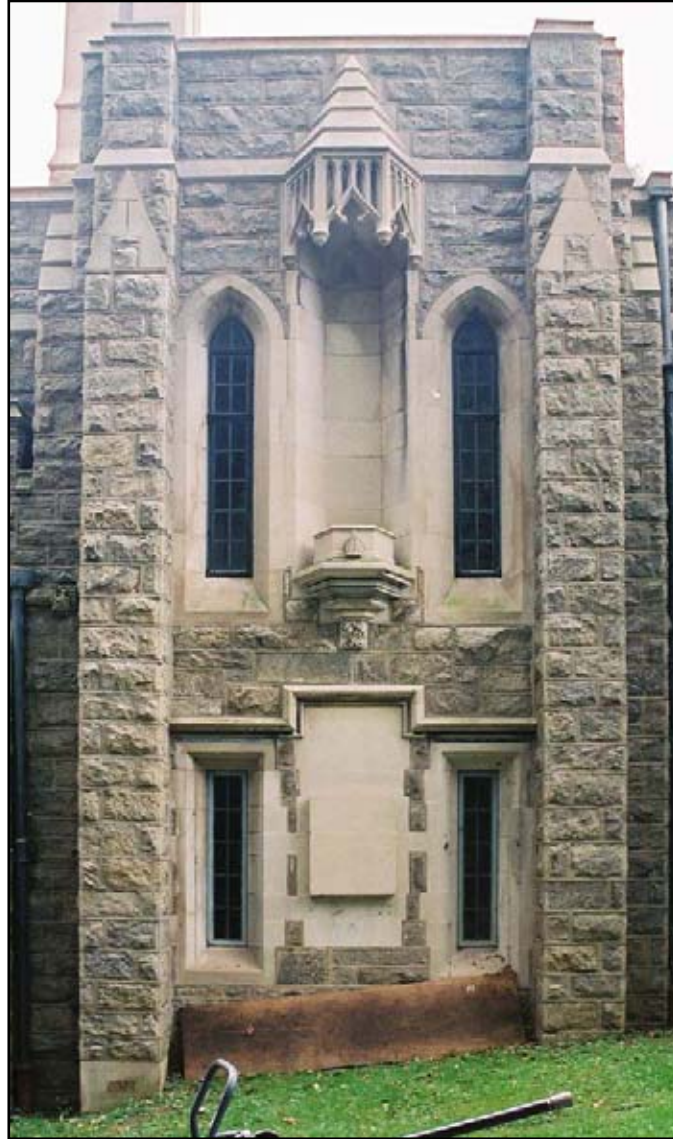


Figure 21. Empty niche and blank stone plaque to the right of the western entrance.

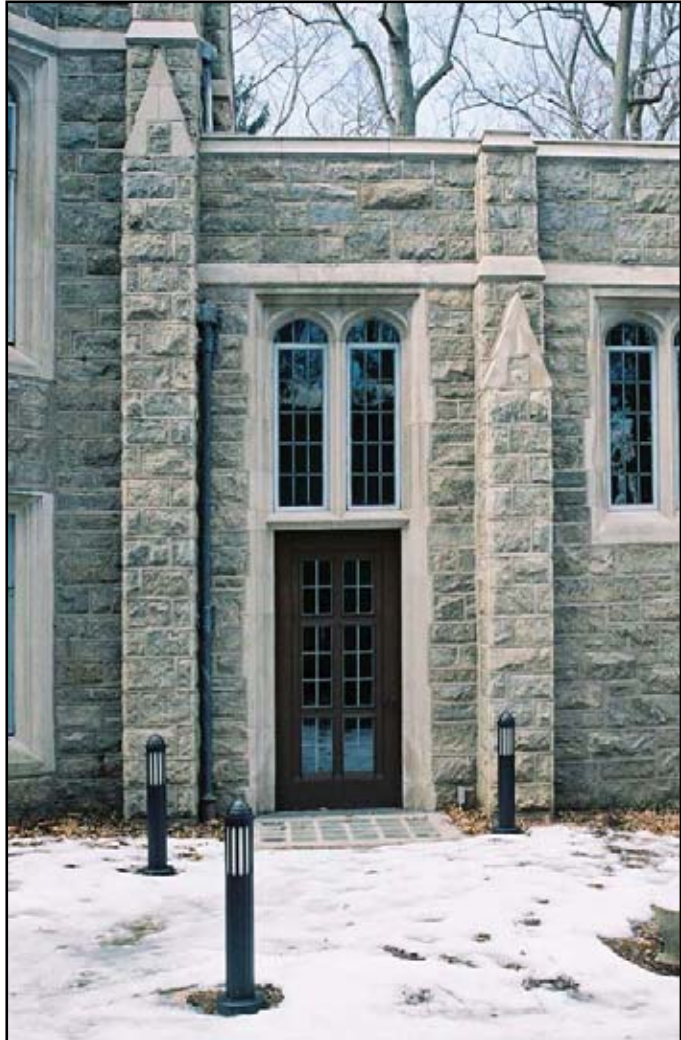


Figure 22. Recently installed door on the east façade of the library.



Figure 23. Bay window of the dining room.



Figure 24. Interior plastered hallway in the library wing with stairs in the background leading to offices on the second floor.



Figure 25. Patriot's Hall entrance.



Figure 26. North façade of Patriot's Hall with stucco finish over brick, containing basement entrance.



Figure 27. Toothed granite masonry intended to be extended upon the completion of Patriot's Hall.



Figure 28. The south façade of the Carillon.



Figure 29. Limestone statuary located on the southwest corner of the tower.



Figure 30. Interior of the carillon with brass plaques containing the names of American patriots.



Figure 31. The Justice Bell.



Figure 32. The museum addition extending north from the carillon.



Figure 33. North façade of the addition.

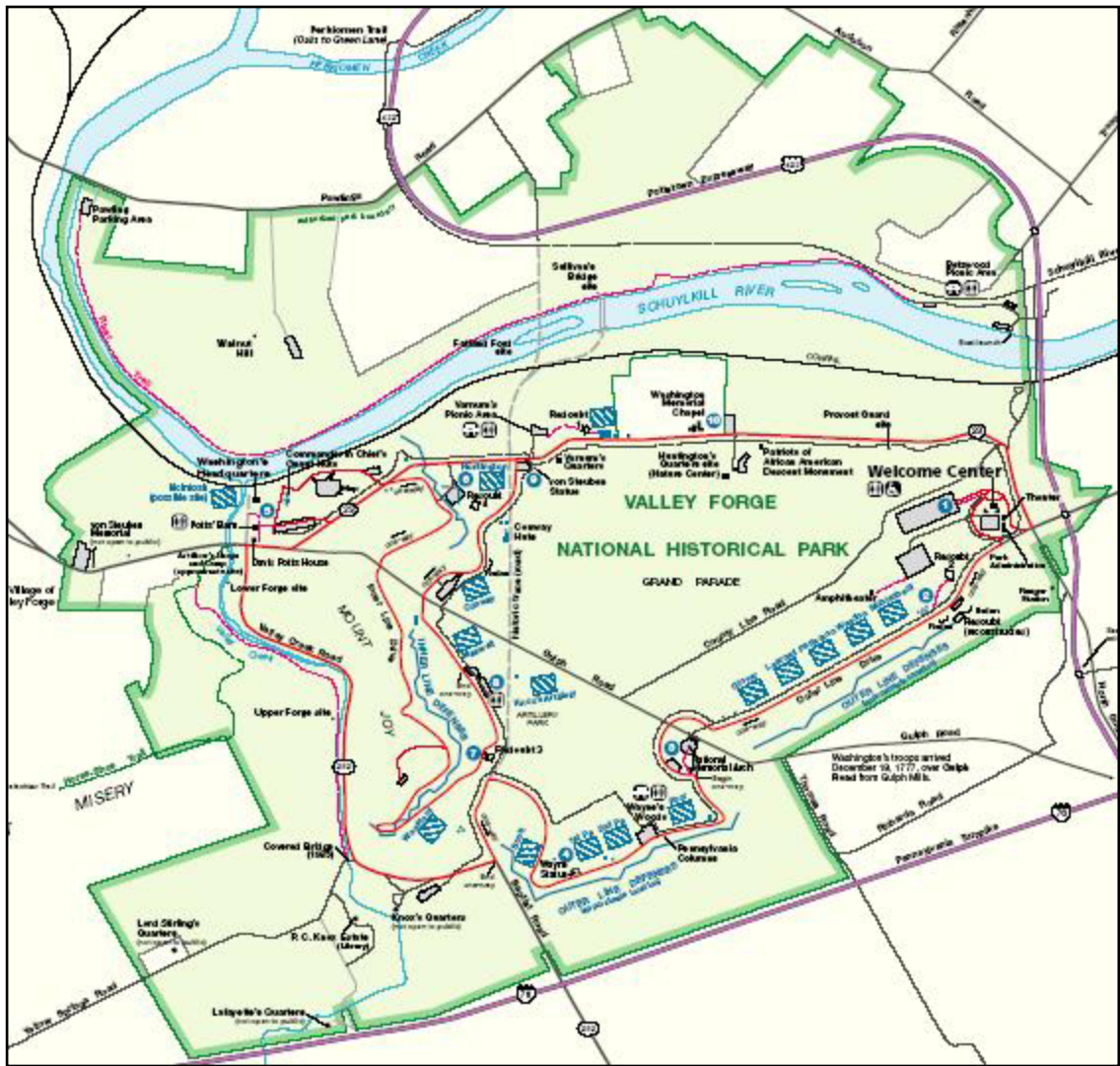


Figure 34. Map of the Valley Forge National Historical Park (www.nps.gov/vafo, 2004).

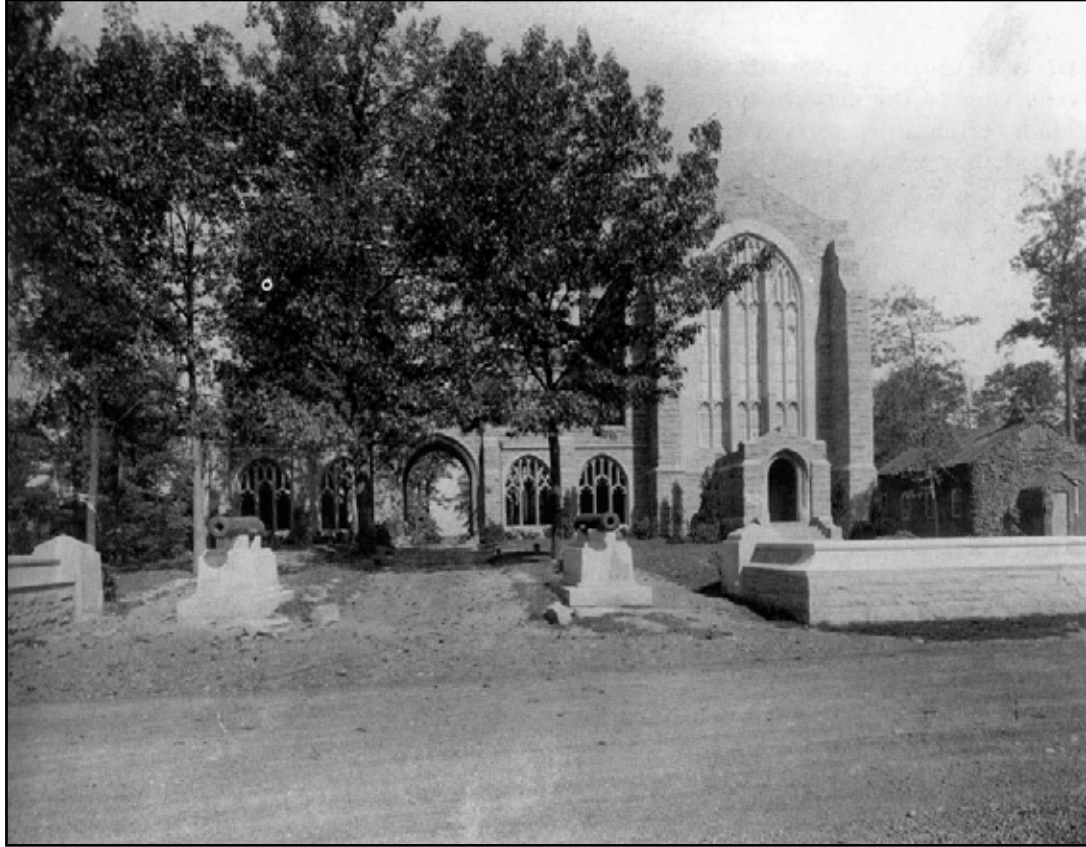


Figure 35. Undated historical photograph with original barnboard chapel to the left of the current chapel (Swiggart, 59).



Figure 36. An early image of the Washington Memorial Chapel proposal which appeared on the cover of the *Chronical* in 1912.



Figure 37. An early image of the chapel with only two completed bays of the Cloister and a temporary wooden roof (Swiggart, 67).

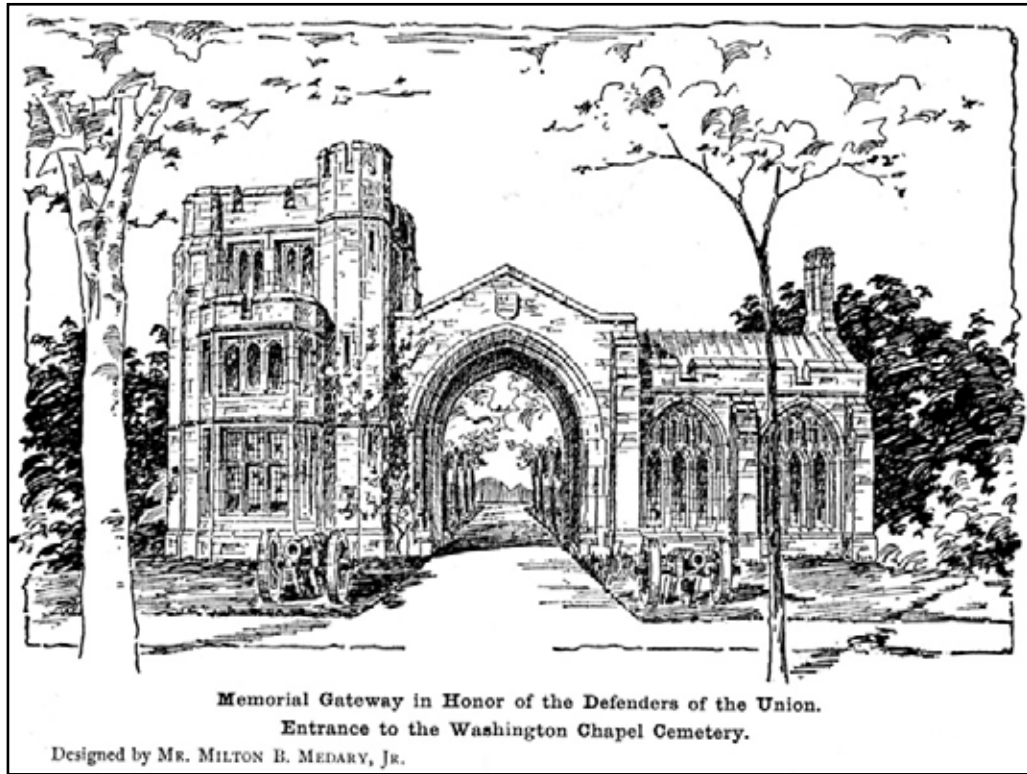


Figure 38. The design proposal for Defender's Gate by Medary, published in the *Chronicle* in 1909.

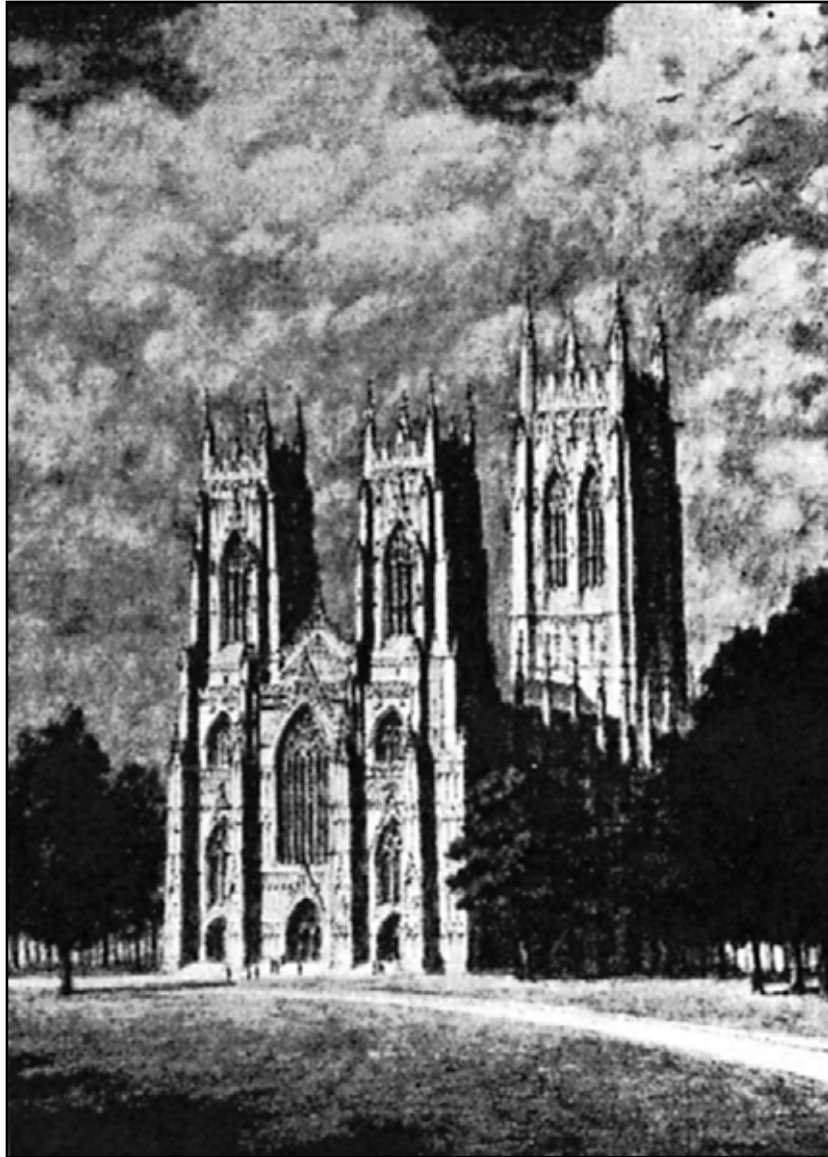


Figure 39. A design proposal for the cathedral published in the *Chronicle* in 1931.



Figure 40. This undated photograph shows the building complex at about the period of Hart's arrival with the Porch of the Allies completed but the carillon yet to be built (Swiggart, 110).

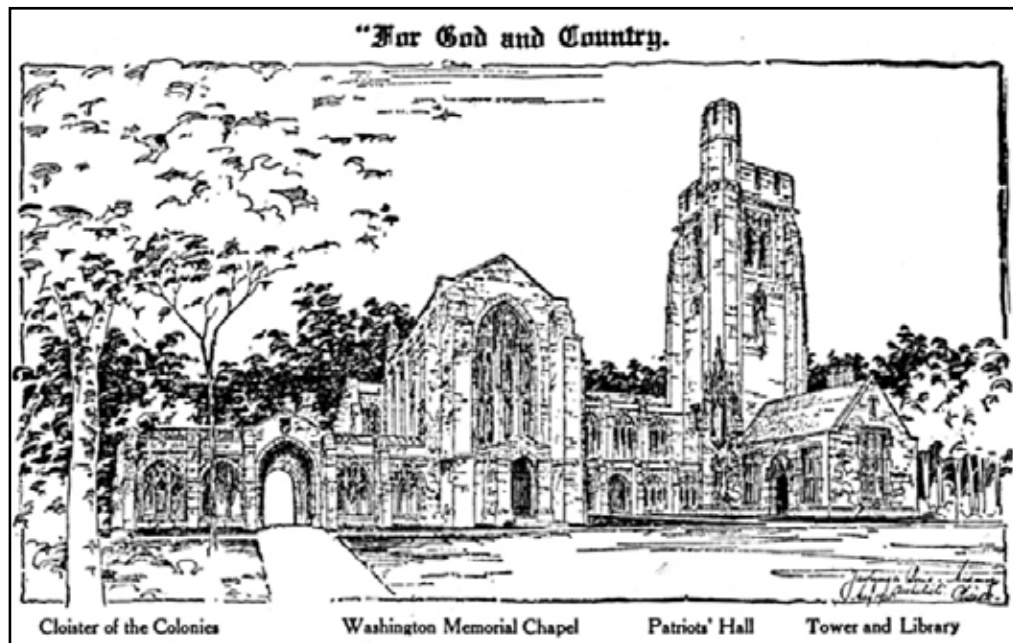


Figure 41. The cover image for the *Chronicle* after 1915 shows the new design for the carillon, closely matching the existing structure.

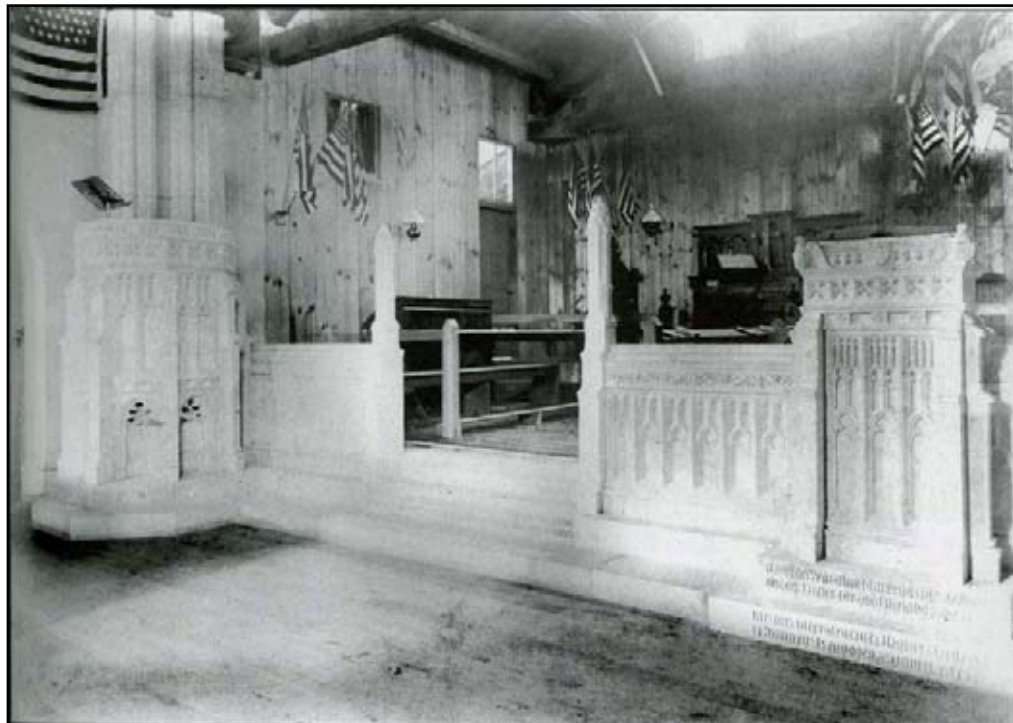


Figure 42. The unfinished interior of the chapel with temporary wood plank floors and walls (Swiggart, 61).



Figure 43. Museum interior (Swiggart, 112).



Figure 44. Museum interior (Swiggart, 112).

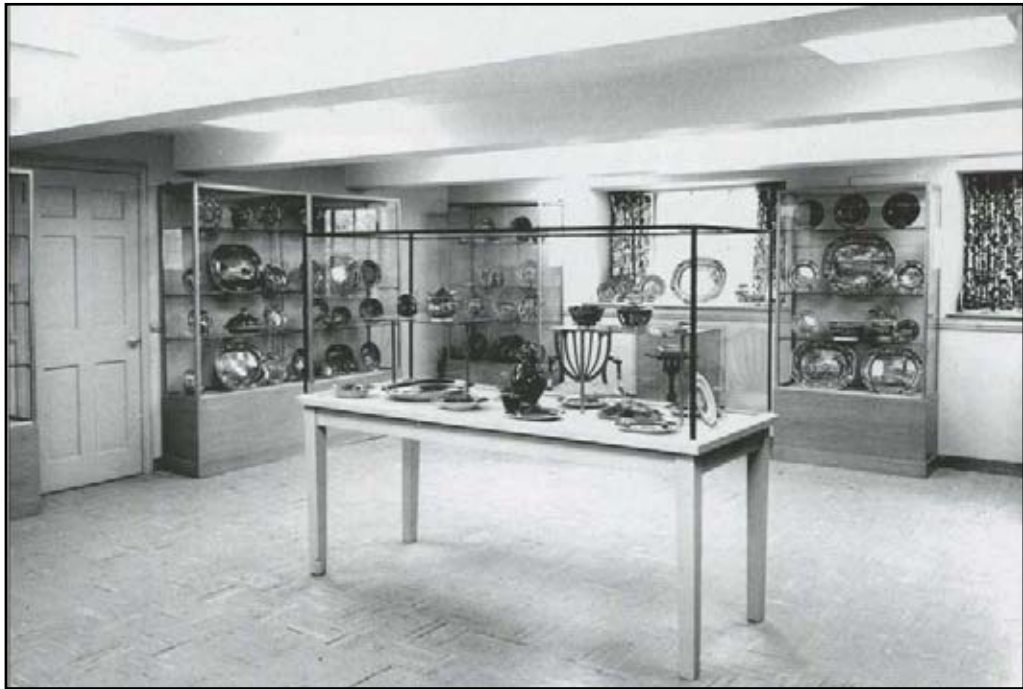


Figure 45. Museum interior (Swiggart, 113).



Figure 46. Museum interior (Swiggart, 113).



Figure 47. Museum interior (Swiggart, 97).



Figure 48. Log cabin constructed to house the Sunday School (Swiggart, 86).

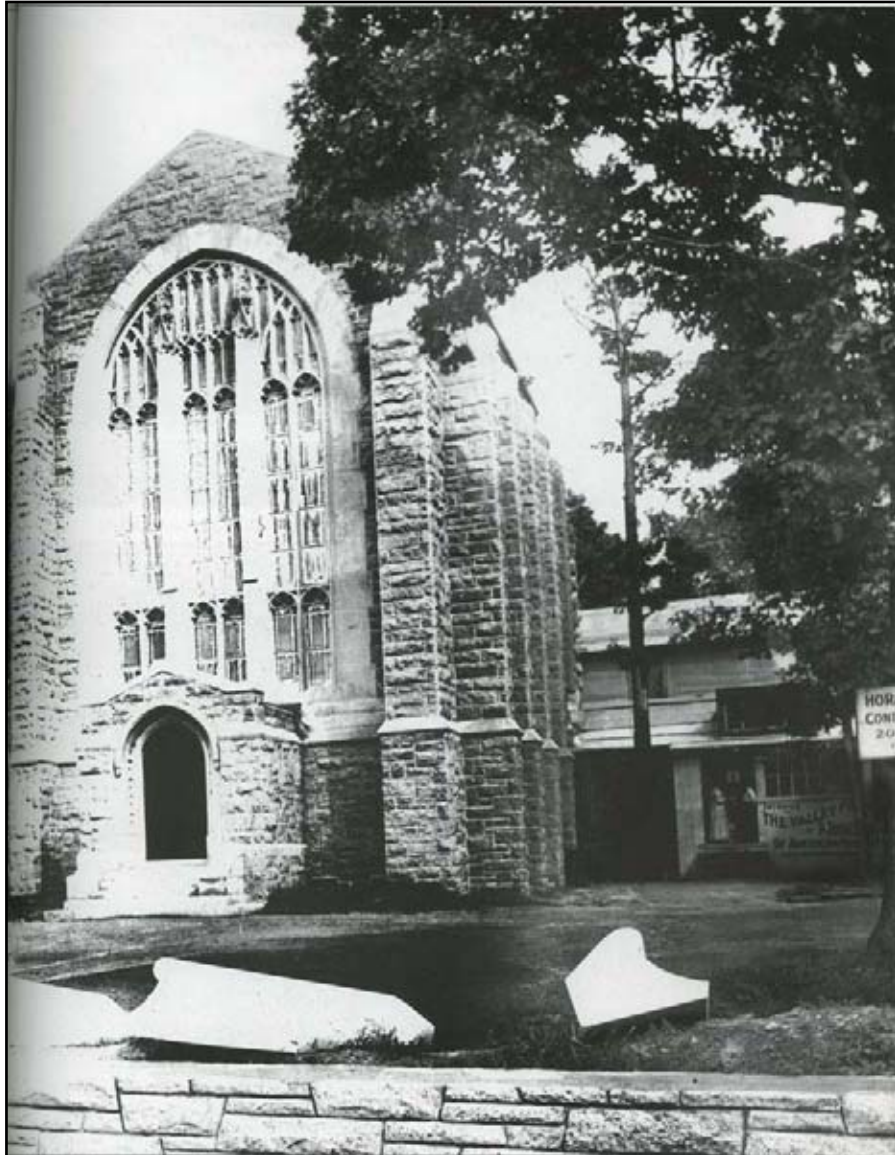


Figure 49. The building is still covered by a temporary wooden roof and the Porch of the Allies is yet to be built (Swiggart, 63).



Figure 50. The temporary bell tower located to the west of the chapel (Swiggart, 84).



Figure 51. Model from the 1950's completion study (Swiggart, 57).



Figure 52. Limestone panels located to the north of the library entrance.



Figure 53. Biogrowth attacking the damp stone and stucco on the north wall of Patriot's Hall.

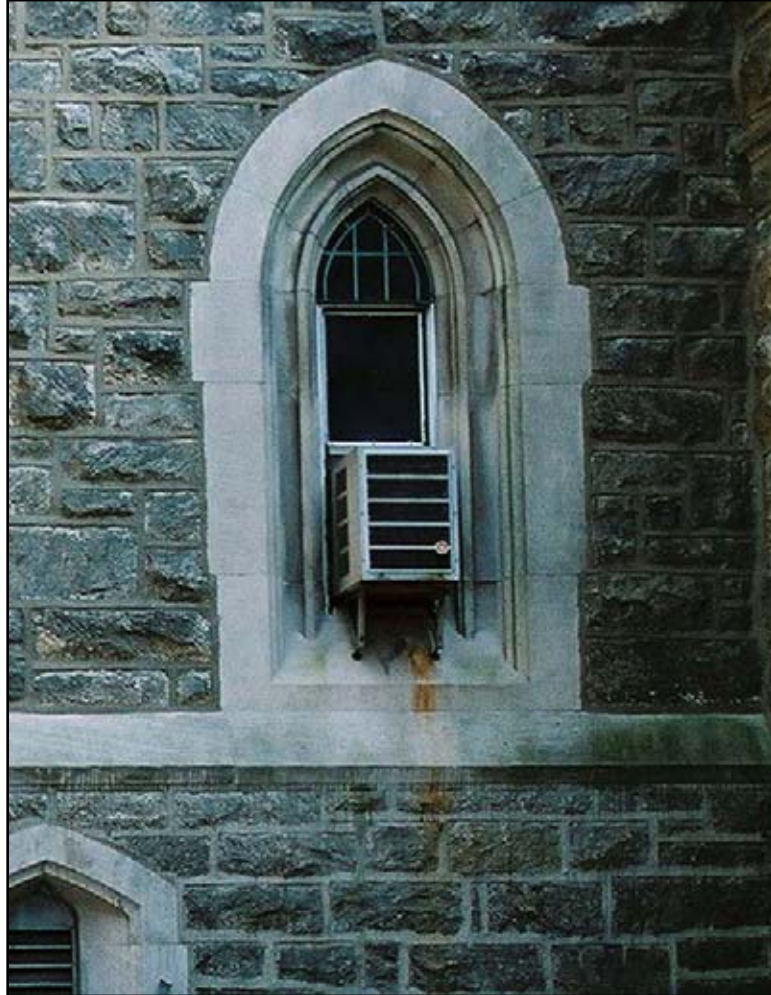


Figure 54. Rust staining resulting from leaking air conditioning unit.



Figure 55. Salt efflorescence in the Cloister of the Colonies.



Figure 56. Delamination of the stone presumably caused by salt crystallization.



Figure 57. Cement patching separating from the limestone body.



Figure 58. Area below a leak in the Cloister roof, which is allowing rainwater to erode the stone's surface.



Figure 59. Copper staining from the Cloister gutters is spreading below a leak in the roof.



Figure 60. Black staining is found in areas that are not washed by rainwater.



Figure 61. The oak ceiling is exhibiting water damage in small areas due to the leaking roof.



Figure 62. Example of the lead downspouts found within the Cloister.



Figure 63. Joint repair & corrosion on downspout located on west façade, south end.



Figure 64. White corrosion drips on downspout on west façade of the Cloister, southern end.

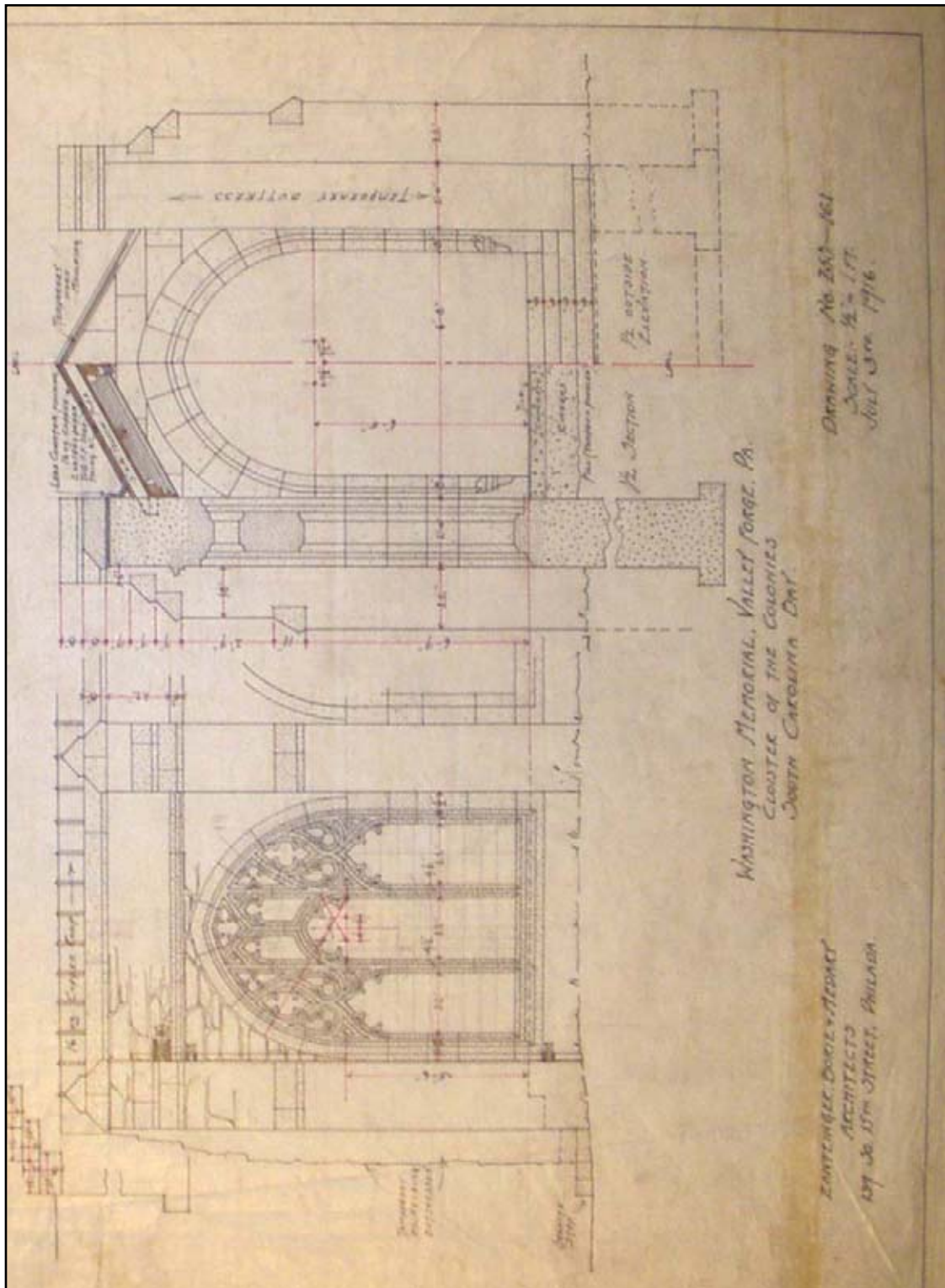


Figure 65. Drawings 160-161 from Zantzinger, Borie, and Medary Architects detailing the Cloister construction.

Appendix B

Chain of Title

(All deeds recorded at Norristown, PA)

Dec. 23, 1895

Deed Book No. 409, p. 189

J. Heston Todd and Anna P. to Sarah Zulich

Note: Deed concerns the transfer of tract 3.

April 3, 1905

Deed Book No. 578, p. 209

J. Heston Todd to Herbert J. Cook, et al

Given in trust for WMC as tract 1.

April 26, 1905

Deed Book No. 578, p.216

William M. Stephens and Martha J. to Rev. Herbert J. Cook

Given in trust to WMC as tract 2.

March 5, 1911

Misc. Book No. 9, p. 227

Charter for the incorporation of the Rector, Church Wardens, and Vestrymen of WMC by Rev. Herbert Burk

April 25, 1911

Deed Book No. ?, p. 202

Rev. Herbert J. Cook, et al to The Rector, Church Wardens, and Vestrymen of WMC

Note: "Until WMC is incorporated the trustees will be elected by the vestrymen of All Saints Protestant Episcopal Church of Norristown." Deed concerns transfer of tracts 1 and 2.

March 27, 1915

Deed Book No. 728, p. 304

The Rector, Church Wardens, and Vestrymen of WMC to Philip M. Rhineland, D.D.,
Thomas J. Garland, D.D., and Charles C. Harrison, Trustees

Deed concerns transfer of tracts 1 and 2.

June 20, 1917

Deed Book No. 754, p. 455

Sarah S. Zulich to Winifred Zulich and Amy

Deed concerns the transfer of tract 3.

March 25, 1927

Deed Book No. 505

Philip M. Rhineland, D.D., Thomas J. Garland, D.D., and Charles C. Harrison, Trustees
to The Trustees of the Protestant Episcopal Church in the Diocese of Pennsylvania

Deed concerns transfer of tracts 1 and 2. Sold for \$1.

June 7, 1927

Deed Book No. 1018, p. 316

Winifred and Amy Zulich to WMC

Deed concerns the transfer of tract 3. Sold for \$15, 180.

Appendix C

Timeline

06-19-1903	From MCHS Scrap Book Cornerstone laid.
09-14-1904	Medary Drawings- cloister details
10-02-1905	Medary Drawings- cloister details
00-00-1906	VF Record Vol. X, No. 8 Pennsylvania Bay completed.
04-30-1906	Medary Drawings- cloister elevations
12-21-1906	Medary Drawings- detail of pews
00-00-1907	VF Record Vol. X, No. 8 Virginia Bay completed.
00-00-1908	VF Record Vol. X, No. 8 Maryland Bay completed.
05-08-1908	Medary Drawings- pulpit and lectern
11-19-1908	DLN (11-19-1908) Pulpit placed.
00-00-1909	WCC cited Massachusetts Bay completed
10-04-1910	ZB&M Drawings- tower plans with elevator
04-15-1911	Washington Chapel Chronicle cited Completion of Defender's Gate cellar for lodge
06-01-1911	ZB&M

	Drawings- North elevation Main floor plan Decorative stone work
06-15-1911	WCC cited Defender's Gate completed
06-19-1912	WCC cited Delaware Bay completed
02-08-1915	ZB&M Drawings- stained glass window plans
02-18-1915	ZB&M Drawings- basement plan, heating and ventilation
03-15-1915	WCC cited Chapel completion announced. Connecticut Bay completed. Design for complex reconfigured.
08-15-1915	WCC cited Chapel built to within 8 feet of final height. Cellar concreted for heating plant.
12-15-1915	WCC cited Capstone set for Chapel.
00-00-1916	ZB&M Drawings- heraldry designs by Medary
06-15-1916	WCC cited Log cabin completed for Sunday school and tea room use. New Hampshire Bay begun.
00-00-1916	Janeway letter refers to repairs to cloister roof.
07-03-1916	ZB&M Drawings- cloister details
01-19-1917	WCC cited Electricity installed. Transformer room created under Porch of the Allies.

00-00-1918 VFHS established with plans for museum (Patriot's/Victory Hall)

04-00-1924 WCC cited
 Money received for Stueben Bay on Porch.
 Three additional rooms planned for Patriots Hall

00-00-1926 Carillon plans began with orders for bells, temporary wooden
 and steel structure built to west of chapel to hold 13 bells
 (destroyed in 1958 when permanent carillon completed)

02-23-1928 Public Ledger Philadelphia
 Burk broke ground for proposed National Washington Memorial
 Church, expected completion 1932.

00-00-1929 Chapel completed

07-03-1929 Letter to Herbert Mauck stating shortage of funds, Medary
 working on revision of plans (library to rear of chapel?)

01-27-1930 Drawings- window details by Z&B

00-00-1931 Memorial Library constructed (cited in 01-13-1933 letter)

00-00-1933 Death of Rev. Burk

00-00-1937 Rev. Hart becomes rector

00-00-1937 Z&B
 Drawings- misc.

11-01-1937 Daily Republican
 \$125,000 Bishop White Memorial dedicated.

02-15-1940 Z&B
 Drawings- elevation looking north
 elevation looking south
 W section and elevation
 Basement plan
 1st floor plan
 2nd floor plan
 Group of Buildings
 Plot Plan
 *Model constructed

06-16-1941 Janeway papers contain specifications for the addition of the
 Pulaski Bay to the Porch of Allies, construction of the foundation

and temporary steel structure for the bell tower, of construction of the footings and rebuilding of portion of museum wall

12-30-1950 Z&B
Drawings- Study for Complete Group Main Floor by Z&B
section E/W looking north
section N/S thru Court
museum upper floor
Patriots Hall leading to stage @ rear
Fully enclosed courtyard

00-00-1951 Carillon photo showing 2/3rds completion.

00-00-1953 Carillon completed

08-25-1955 Drawings- (located in Janeway papers) B&S drawings for museum
facing, window, roof, and sections
*revised 03-19-1956; 03-20-1959; 05-18-59; and 06-04-1959

01-18-1956 B&S
Drawings- Porch of the Allies drawings

03-07-1957 B&S
Drawings- 1st floor plan

01-13-1958 Letter from B&S concerning reinforcement of Chapel wall

07-10-1962 Letter from Townsend & Elfreth Co. (Building Construction
Appraisals and Engineering reports) to Janeway - estimate for
facing, addition to lecture room, stair enclosure, detached
auditorium of 27,250 sq. ft.

10-11-1962 Letter from Filipone Assoc. to Janeway – stained glass protection
estimate

10-29-1962 Willet Stained Glass Studios estimate

02-17-1978 Completion Study by Atlantic Engineers and Constructors,
Kimberton, PA
(610)933-1148

Appendix C

List of Chapel Artisans:

Samuel Yellin - wrought iron worker
5520 Arch Street, Philadelphia, PA
and
41 East 42nd Street, New York, NY

D'Ascenzo Studios - stained glass
1604 Summer Street, Philadelphia, PA

Hooper and Null Company - painters
1609 Ranstead Street, Philadelphia, PA

Jacoby and Sons Company - marble work
2025 Market Street, Philadelphia, PA

Edward Maene - sculptor of wood, stone, and plaster
919 Locust Street, Philadelphia, PA

Hollingsworth Pearce - metals sculptor (composed chapel chandeliers)
34 S. 16th Street, Philadelphia, PA

List of Chapel Builders:¹

B. Ridgway & Son, William M. Sullivan – cut stone
Boyer and Evans, Joseph Mandes – masonry
Thomas V. Smith – concrete and steel floor
G. Gerald Evans – pews, NJ state panel, Roof of the Republic, cabinetry
John Williams, Inc. – bronze tablets
Franklin Simmons – bronze status “Valley Forge”
Thomas Sears – landscape architect
John M. Doyle – pew tablets
Horace H. Burrell – contractor
J. Frank Boyer Heating Co. – heating and plumbing
Lloyd Garret Co., Lewis S. Kates – electricians
McFarland-Meade Co., John Nacey, Alexander-Johns Roofing & Mfg. Co. – roofing
Musta Appleton and Co. – hardware
David E. Kennedy Co, Inc. – corktile
Hungerford Brass & Copper Co. – brasswork

¹ The Washington Chapel Chronicle (1925), p. 29.

Grater-Bodey Co. – millwork
Ellis L. Fox - painter
Builders Iron Work Co., Morris Wheeler & Co., Garlin & Co. – ironwork
Gillingham Co. – lumber
John Williams, Inc. – bronzework

List of Bishop White Memorial Builders:²

Horace H. Burrell & Sons – contractors and builders
B. Ridgeway & Son – cut stone workers
C. A. Lobb & Sons – lumber
Kramer Woodworking Co. – cabinet and stair work
Philadelphia Ornamental Glass Works – leaded glass
Colonial Shop – painters
Zenitherm Co. of Pennsylvania – art floors
Hart & Hutchinson Co.
Wayne Plumbing and Heating Co.
Stine & Wall – electricians
Joseph H. Bass – modeling and carving
Jacob Schmidt – wrought iron worker
Felix Cantono & Brothers – stone masons
Crater-Bodey Co. – millwork
F. M. Venzie, Inc. – plasterers
Y. Eisenberger – rigger and house mover

² The Washington Chapel Chronicle (1931), p. 54.

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