Biography

As of the fall of 2019, Henry Savoie is a fifth year undergraduate student at Auburn University. He is completing his thesis studies, incorporating his research from Aydelott. Born and raised in Santa Rosa Beach, FL, he is the son of an architect and the oldest of eight siblings. From childhood, Henry possessed a passion for drawing and a love of learning. His experiences in public speaking, ceramics, painting, and drawing, his time talking to his father, and his excitement from engaging with moving design led to his decision to pursue architecture at Auburn University. While studying abroad in Europe during his third year at Auburn, he moved by the atmosphere in Antoni Gaudi’s Sagrada Familia. His experience there as well as his studio work kicked off his research into atmosphere in architecture. This path of research would lead to his application for the Aydelott Travel Award.

Beyond architecture, Henry is passionate about people, nature, photography, and giving back. The Aydelott travel grant has enabled him to access individuals, buildings, and places he only imagined seeing. It has given him an opportunity to explore, and he is excited to give back. As a College of Architecture, Design, and Construction Ambassador, he hopes to help incoming students discern their path forward. Whether in nature, relationships, or architecture, Henry is moved by atmosphere and the impact of intention.

Cover

Student:

Henry Savoie

Mentors:

Margaret Fletcher, Carla Keyvanian, Matthew Hall

Buildings:

1. Cologne Cathedral | Various | Cologne, Germany
2. Neviges Mariendom | Gottfried Böhm | Velbert-Neviges, Germany
3. Saint Peter of Klippan | Sigurd Lewerentz | Klippan, Sweden
4. Grundtvigs Church | P.V. Jensen-Klint | Copenhagen, Denmark

Institution:

Auburn University | School of Architecture, Planning, and Landscape Architecture

00 INTRODUCTION

THE ATMOSPHERE OF SACRED SPACES

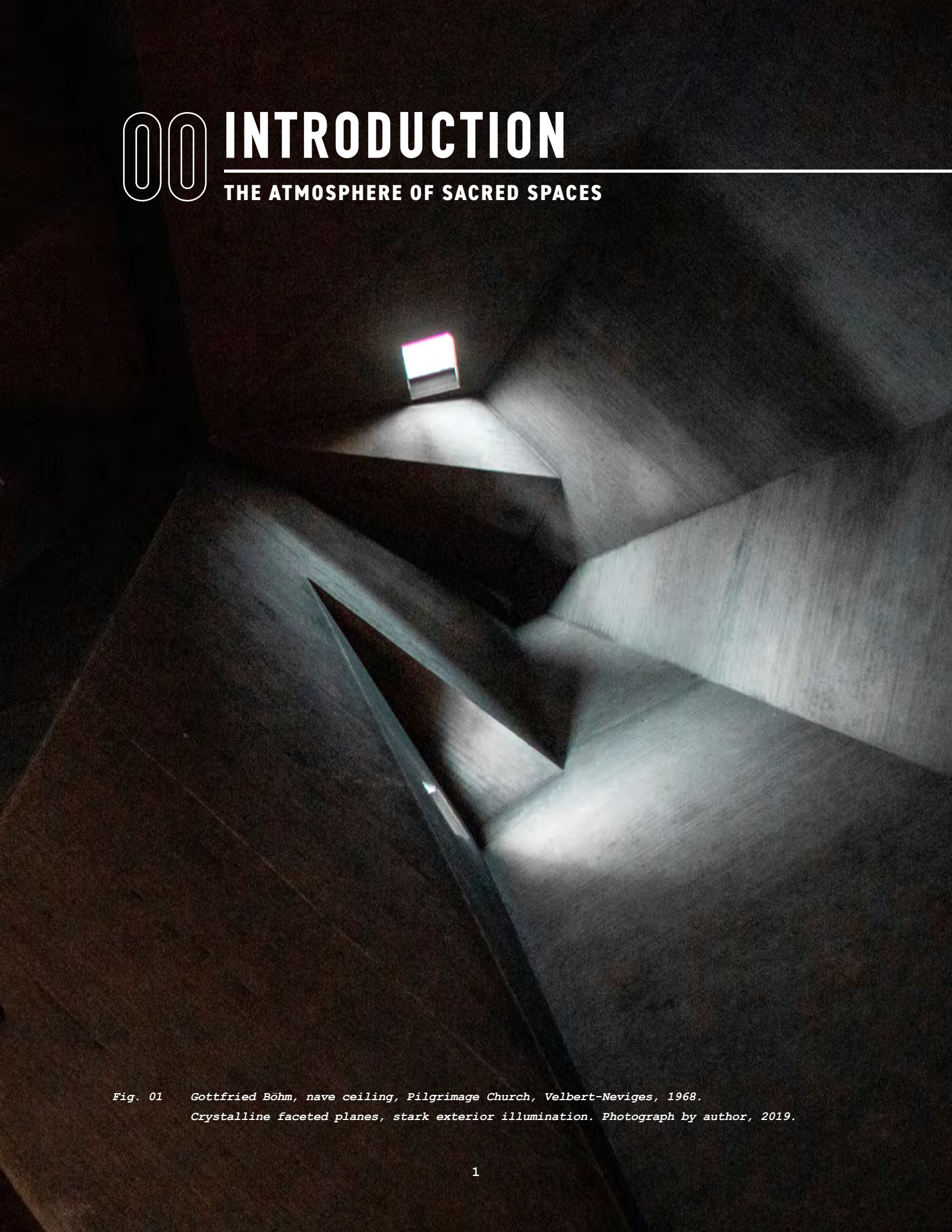
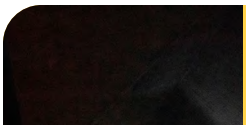


Fig. 01 *Gottfried Böhm, nave ceiling, Pilgrimage Church, Velbert-Neviges, 1968. Crystalline faceted planes, stark exterior illumination. Photograph by author, 2019.*



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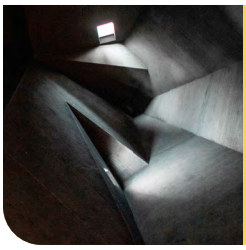

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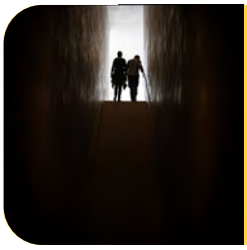

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New page numbering sequence for each essay.

Fig. 02 Table of contents, photographs and graphics by author, 2019.

00 | Introduction

Fig. 03 *P.V. Jensen Klint, nave arches from attic, Grundtvig's Church, Copenhagen, 1940. Soft stone arches. Photograph by author, 2019.*

The Atmosphere of Sacred Space

"[by] definition, [atmosphere] lacks definition"[1]

Atmosphere is why we visit architecture, why it is not enough to simply read about it, look at pictures of it, or draw it. There is precise terminology in architecture used to quantify function, scale, mathematical ratios, and time. There is a decidedly less specific vocabulary for softer qualities, such as color, tone and materiality, terms like hard and soft, cool and warm. Ultimately, what draws us to architecture is not the parts we can represent but the parts we cannot. The parts which lead us to tell others "you just had to have

been there." While a holistic definition of atmosphere as it relates to architecture does not exist, we need a point of reference. Starting with basic dictionary definitions, we can observe that atmosphere is tied to two primary ideas. The first considers atmosphere to be the whole mass of air surrounding the earth.[2] While this literal description is accurate and commonly accepted, it does not directly relate to our discussion. The more appropriate description of atmosphere in relation to architecture is:

> "the pervading sensation of a tone or ambiance in/of a place, space, or object."[3]

Sacred space is characterized by its atmosphere. Sacred is defined by Merriam Webster as "entitled to reverence and respect." Sacred space exists in the natural world, in groves of trees and on mountain peaks, as much as in the built environment (fig. 04-05). Sacred architecture is a designed form of sacred space. It attempts, through intentional,

Fig. 04-05 Left: dynamic light quality of atmosphere in nature, Höör, 2019
Right: dynamic light and shadow, Cologne Cathedral, 1880.
Photographs by the author, 2019.

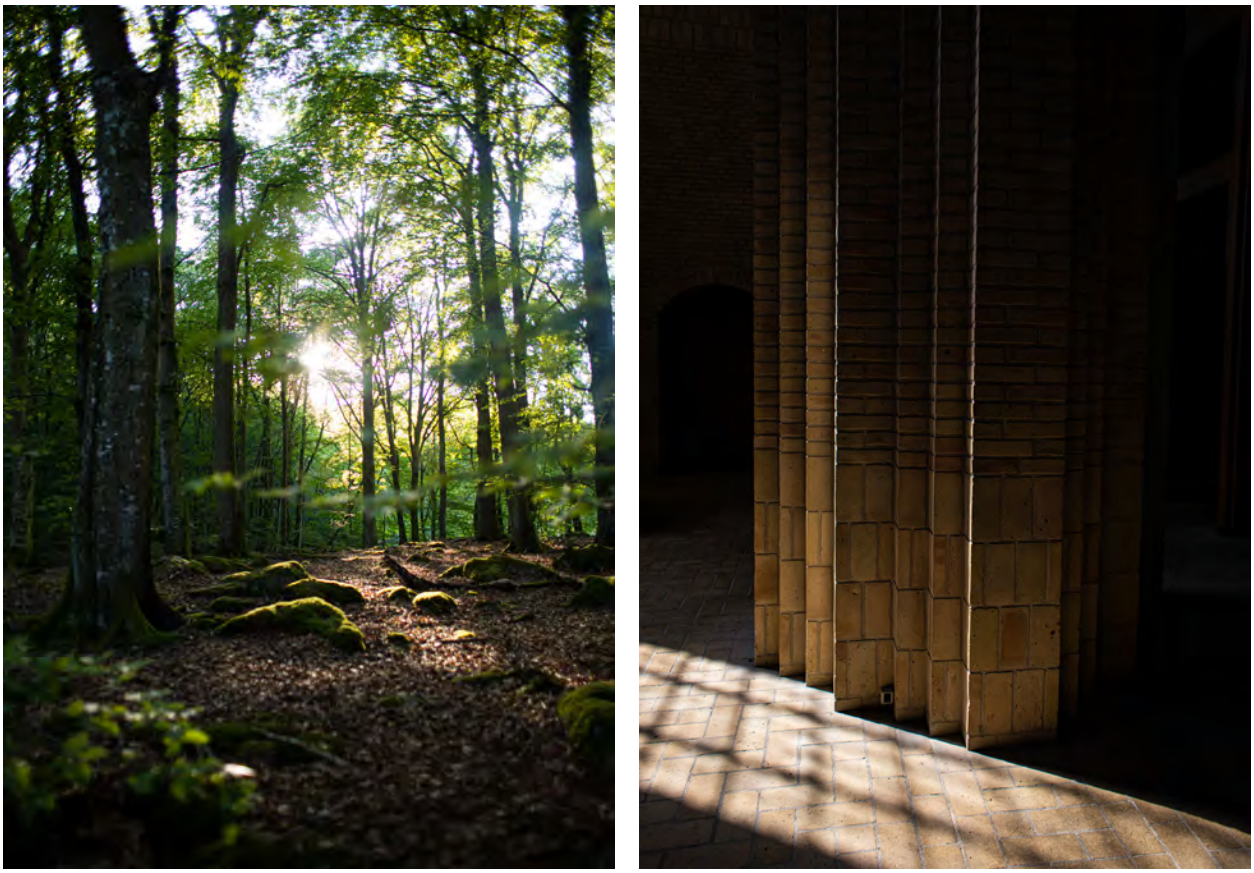

Fig. 06-07 Left: natural cathedral, Höör, 2019
Right: P.V. Jensen-Klint, interior column, Grundtvig's Church, 1940.
Photographs by the author, 2019.

designed conditions, to create an atmosphere which promotes reverence and respect. When I consider sacred architecture, archetypal images of soaring medieval Christian churches spring unbidden to my mind. The Gothic cathedral looms large in the education of the Western-trained architect. Historically, there has always been a primary purpose behind religious sacred architecture, to inspire visitors to worship and create an atmosphere which encourages a reverent attitude. This has led me to ask, what about the atmosphere of these places makes them such successful sacred spaces, and how can I design spaces of similar quality.

The in-depth analysis of the atmosphere of these sacred spaces has opened many doors. My Aydelott grant travel and study has influenced my thesis research, allowed me to discuss atmosphere with many designers, and enabled me to interview professionals including Thomas Bo Jensen, scholar on P.V. Jensen Klint, architect, and head of research at the Aarhus School of Architecture, Hansjörg Götritz, architect and professor at the University of Tennessee Knoxville, Conner Bryan, project designer at Trahan Architects, Anders Clausson, photographer and historian at Saint Peter of Klippan, Ann-Marie Nelson, priest at Saint Peter of Klippan, and many others.

In the following essays I will deconstruct four cases of atmosphere in sacred architecture. As Western-Christian sacred architecture has featured prominently in my personal education and experience, I chose to look at four buildings in that tradition. These are the the Cologne Cathedral, in Cologne, Germany; the Neviges-Mariendom in Velbert-Neviges, Germany; Sankt Petri in Klippan, Sweden; and Grundtvig's Church in Copenhagen, Denmark (fig. 06-09). These spaces differ drastically in their attitude towards the implementation of light, acoustics, space, and texture. They are however unified in their attempts to produce an atmosphere appropriate for sacred architecture. Atmosphere can be purposefully manipulated. These elements are used differently in each of the buildings studied. Yet all of these building create that "you just had to be there" sensation. My research aims to identify architectural components and themes in each building which contribute to the atmosphere of sacred space.

01 THE COLOGNE CATHEDRAL

ARCHITECT: VARIOUS
LOCATION: COLOGNE, GERMANY
YEAR: 1880

A Gothic cathedral constructed over eight centuries. Considered the most complete This church served as a touchstone when analyzing the other sacred spaces.

02 PILGRIMAGE CHURCH

ARCHITECT: GOTTFRIED BÖHM
LOCATION: VELBERT-NEVIGES, GERMANY
YEAR: 1968

A prismatic concrete church located on of the most revered pilgrimage sites in Germany. Designed by an architect from Cologne. Cavernous, shadowed, and dynamic.

03 SAINT PETER

ARCHITECT: SIGURD LEWERENTZ
LOCATION: KLIPPAN, SWEDEN
YEAR: 1966

A humble parish church designed by a Swedish master. A holistic and obsessive exercise in brick construction, craftsmanship, and intention.

04 GRUNDTVIG'S CHURCH

ARCHITECT: P. V. JENSEN-KLINT
LOCATION: COPENHAGEN, DENMARK
YEAR: 1940

A marriage of Gothic form and Scandinavian craftsmanship. A monument to one of Denmark's most beloved national heroes. Monolithic, monochromatic, and ethereal.

Fig. 08-11 from top: Cathedral towers at dusk, Cologne Cathedral, Cologne, 1880.
Gottfried Böhm, Via Sacra, Pilgrimage Church, Velbert-Neviges, 1968.
Sigurd Lewerentz, west facade and pond, Saint Peter, Klippan, 1966.
P.V. Jensen Klint, Bispebjerg view, Grundtvig's Church, Copenhagen, 1940.
Photographs and graphics by author, 2019.

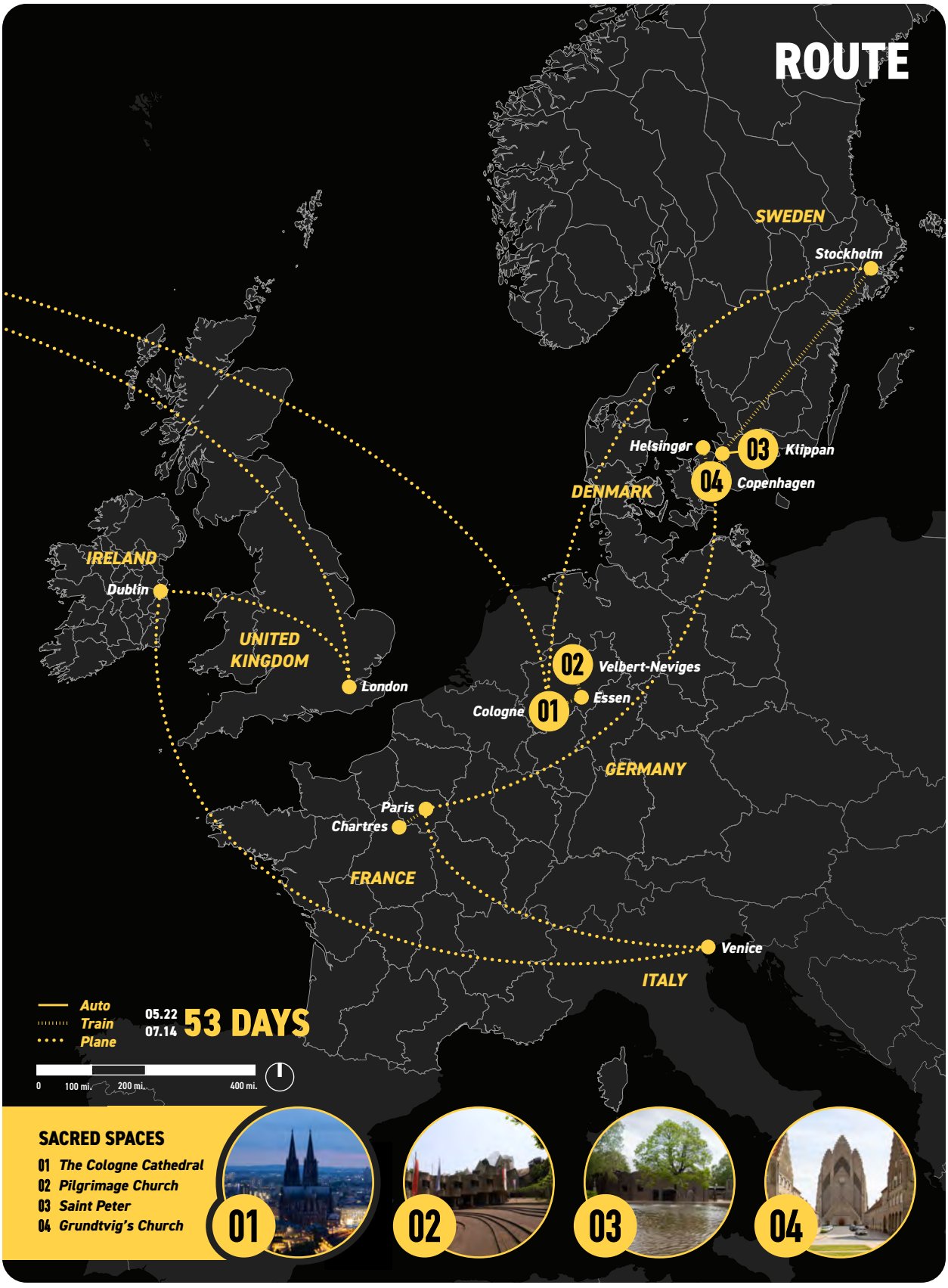

Fig. 12 Aydelott route, photographs and graphics by the author, 2019.

Fig. 13 Equipment used for documenting chosen buildings, graphics by the author, 2019.

Fig. 14-25 Selected sketches from Aydelott travels, drawings by author, 2019.

Fig. 26 Image from Aydelott and research into atmosphere presentation, December 6, 2019.

Presentation

I wanted to go deeper with the analysis and documentation I conducted during my travels. In an independent study course following my return, I sought to discover an effective method of communicating my experience. This project studied how we display images, and how, though the display of an image, we can convey and construct atmosphere.

In order to describe the spaces I had visited, I explored dissecting, exploding, and illuminating the images captured during my travels.

I built a frame, measuring 6 inches deep, 21 inches wide, and 30 inches tall, into which acrylic slides of the same size could be inserted. These were suspended proud of the rear of the frame by 1.25 inches. Three images were selected from my travels, based on their dynamic quality and the array of lighting conditions they displayed. Over the course of a semester, I explored layering each image, utilizing cutouts, filters, different mediums. I also studied methods of illuminating them, studying perception, depth of field, light temperature, and the boundary between illegibility and abstraction. Ultimately I settled on a method wherein one or two slides were inserted into the frame, each composed of the selected images printed on opaque paper and in one case semi-opaque paper, mounted on transparent acrylic. The apertures in each image were cut out of the slides, illuminated from behind with LEDs. Their shadows and color were projected onto them from matching slides inserted into a projector located 12 feet away. The frame was painted matte black to minimize reflection and refraction outside of the image, and the interior back was painted white to diffuse the LEDs. Once the frame

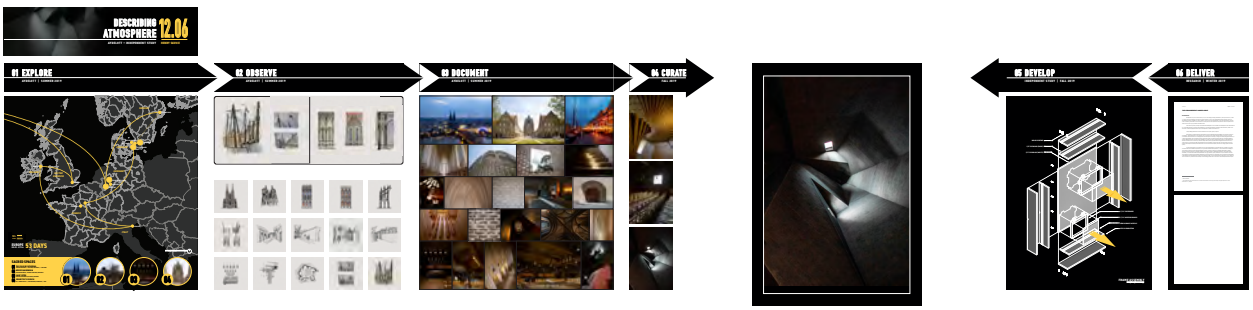

Fig. 27 Aydelott and research into atmosphere presentation, December 6, 2019.

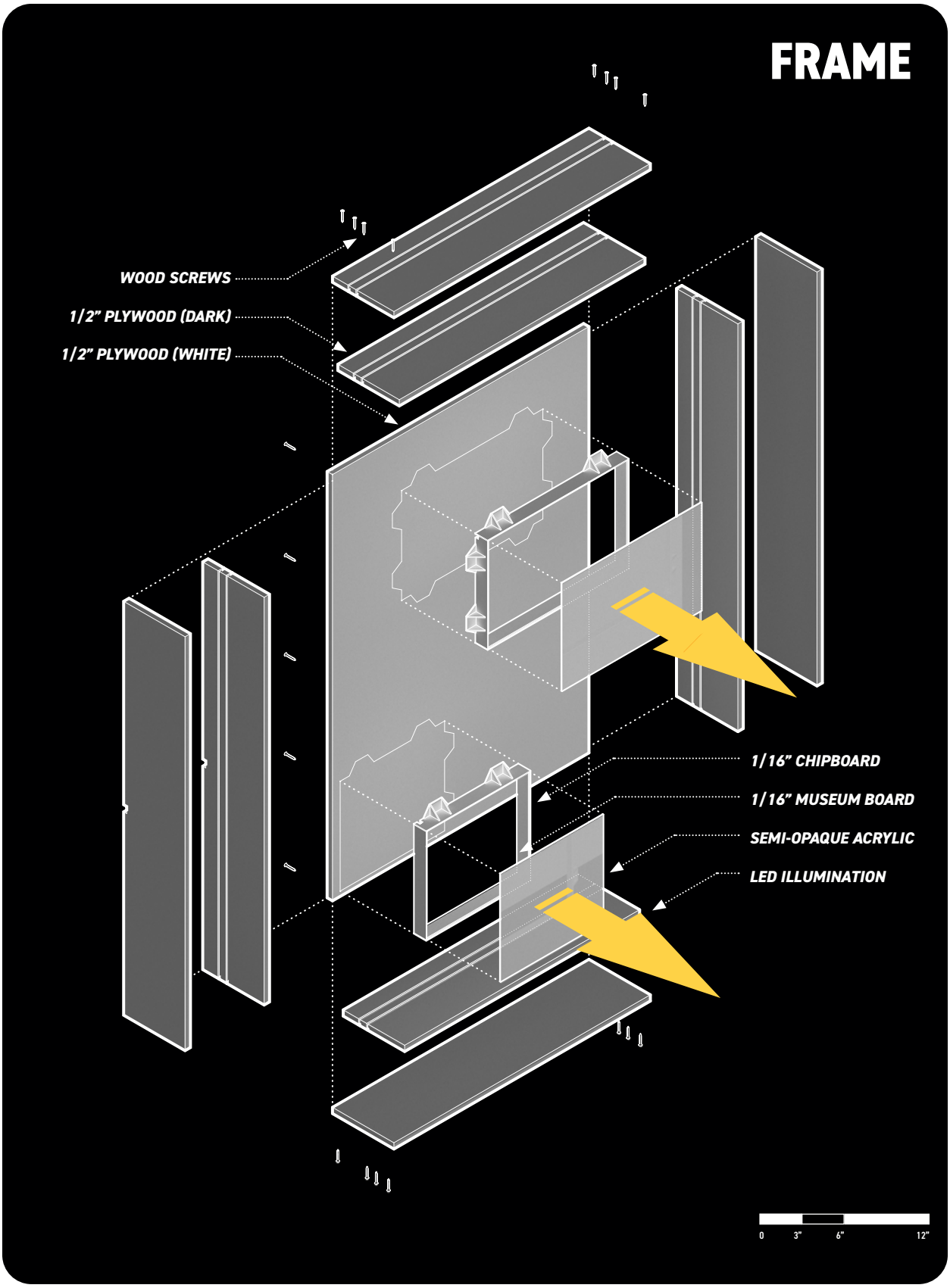

Fig. 28 Frame utilized in presentation, graphics by the author, 2019.

was mounted to the wall, a dimmer was soldered on to the LEDs so that the lighting for each aperture could be controlled individually.

The result was a glowing abstraction of the original photograph, which generated an atmosphere similar to but independent of the source building. It seemed fitting that describing unique condition requires the simulation of that condition. However, as they were reoriented and reconstructed, these images become their own inhabitable spaces. The final product of my independent study was an installation and presentation to the faculty of my school. It was composed of a presentation about my journey with Aydelott, and a built artifact which utilized the images I had taken and considered how we convey, describe, and construct atmosphere. If words or images alone were enough to describe these spaces, then this paper would have been the end of my study. To convey experience, I attempted to create a presentation which must be experienced. One essay, one project, two sketchbooks, seven countries, eight thousand photographs, and a full semester of study later, I find describing atmosphere to be as compelling, challenging, and delightfully elusive now as when I started.

Fig. 29 Image over projector from Aydelott and research into atmosphere presentation, December 6, 2019.

Fig. 30 Image from Aydelott and research into atmosphere presentation, December 6, 2019.

Notes

1. Mark Wrigley, "The Architecture of Atmosphere," *Daidalos* 68 (1998): 27.
2. Philip Babcock Gove, "atmosphere," In *Webster's Third New International Dictionary of the English Language, Unabridged*. (Cambrdige: G. & C. Merriam Co., 1968).
3. Bernard S. Cayne and Lexicon Publications, "atmosphere," *The New Lexicon Webster's Dictionary Of The English Language*. (New York: Lexicon Publications Inc.,1988).

01 THE COLOGNE CATHEDRAL

VARIOUS | COLOGNE, GERMANY | 1880

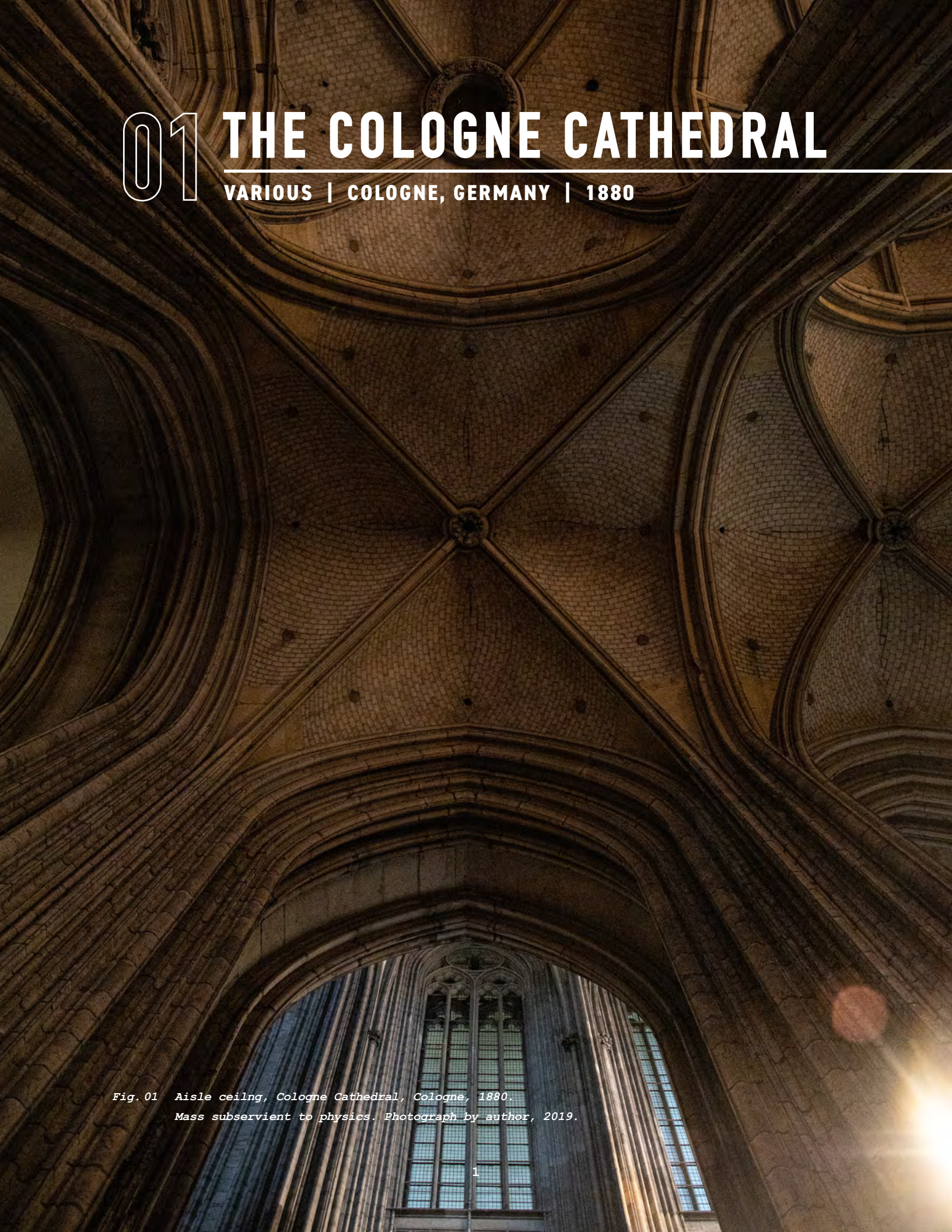

Fig. 01 Aisle ceilng, Cologne Cathedral, Cologne, 1880. Mass subservient to physics. Photograph by author, 2019.

The Cologne Cathedral

Fig. 02 *Monolith amongst the urban glitter, Cologne Cathedral, Cologne, 1880. Long exposure photograph by author, 2019.*

01 | Introduction

"No other cathedral is so perfectly conceived, no other is so uniformly and so uncompromisingly executed in all its parts, and no other is fully completed. Therefore, the Cologne Cathedral marks the zenith of cathedral architecture and simultaneously its culmination."[1] - UNESCO Board, 1995

During the Medieval period, church architecture defined beauty in western Europe. No other building types sought to generate atmosphere, or to inspire and uplift at the scale of cathedrals. The Gothic tradition established a new archetype of sacred space. The development

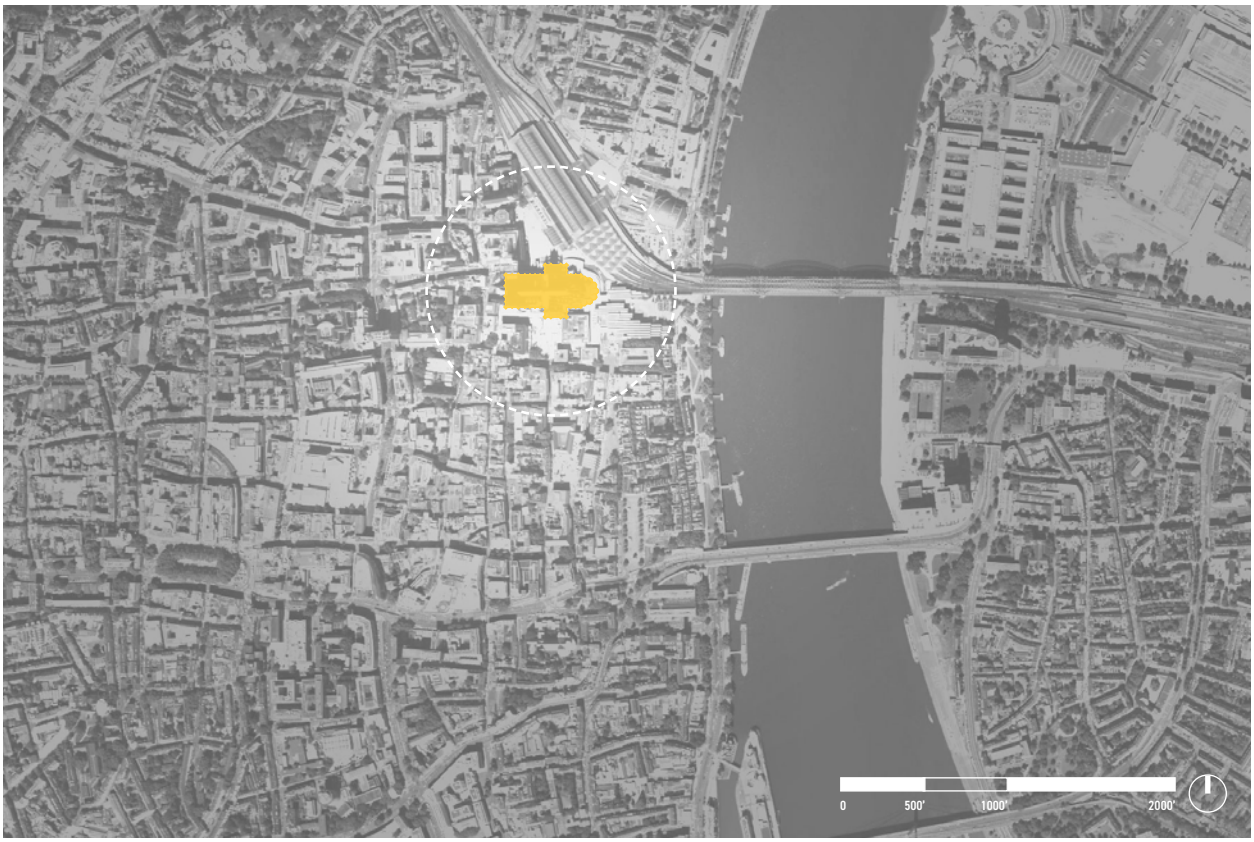

Fig. 03 *Site plan, Cologne Cathedral, Cologne, 1880. Diagram by author, 2019.*[2]

of flying buttresses and the resultant transparency of the cathedral walls enabled the intentional use of light to a degree hitherto impossible. The Cologne Cathedral represents the pinnacle of Gothic architecture. Organized architectural education in the West has taught us that the medieval cathedral is not only a type of sacred space, but a rubric for it. This understanding has influenced architects in their analysis of contemporary sacred space and infiltrated our common parlance. The use of phrases which reference our common understanding of cathedrals and the atmosphere which they evoke are prevalent in our speech. Likening the scale and atmosphere of an interior space to the nave of a church, or the rows of trees in a forest to the columns

of an aisle, or of rock formations to buttresses, reveals a link between our perception of sacred space and the built form of the Gothic Cathedral. The cathedral has had direct and indirect influences on the design of atmosphere. It is a touchstone for sacred space in the Western architectural tradition. The cultural and psychological impact of the current Cologne Cathedral on the citizens of Cologne and the world began nearly eight centuries ago. The cathedral has undergone three periods of construction, from 1248 to 1473, from 1842 to 1880, and from 1945 until the present.

Fig. 04 *Anchoring the Rhine, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

Fig. 05 *Main entrance on west facade, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

02 | History

2.1 A New Home

The legacy of the Archdiocese of Cologne predates the current Gothic cathedral by centuries. The first documented reference to a Bishop Maternus II of Cologne appeared in transcripts from the Council of Rome in 313, although the first record of a physical church on the site does not occur until the sixth century (fig. 06) Traces of an early medieval structure were confirmed by the discovery of a pre-medieval baptismal font, which is currently on display in the cathedral. Construction on the "Old" cathedral began during the ninth century. Despite being dwarfed by its successor, the scale of the first

cathedral on the site was substantial. The 312 foot long, three-aisled cathedral was consecrated in 873, and was eventually expanded to five aisles to meet the needs of the expanding population.

In 1164, the relics of the Magi, gifted to Archbishop Rainald von Dassel by Emperor Friedrich I, were sent to Cologne from the conquered city of Milan. Due to the significance of Magi in Christian tradition, Cologne quickly became one of the most-visited pilgrimage sites in Europe. Following their coronations in Aachen, German kings would regularly stop in Cologne to pay homage to the relics. The Old Cathedral was quickly deemed an inadequate home for such important

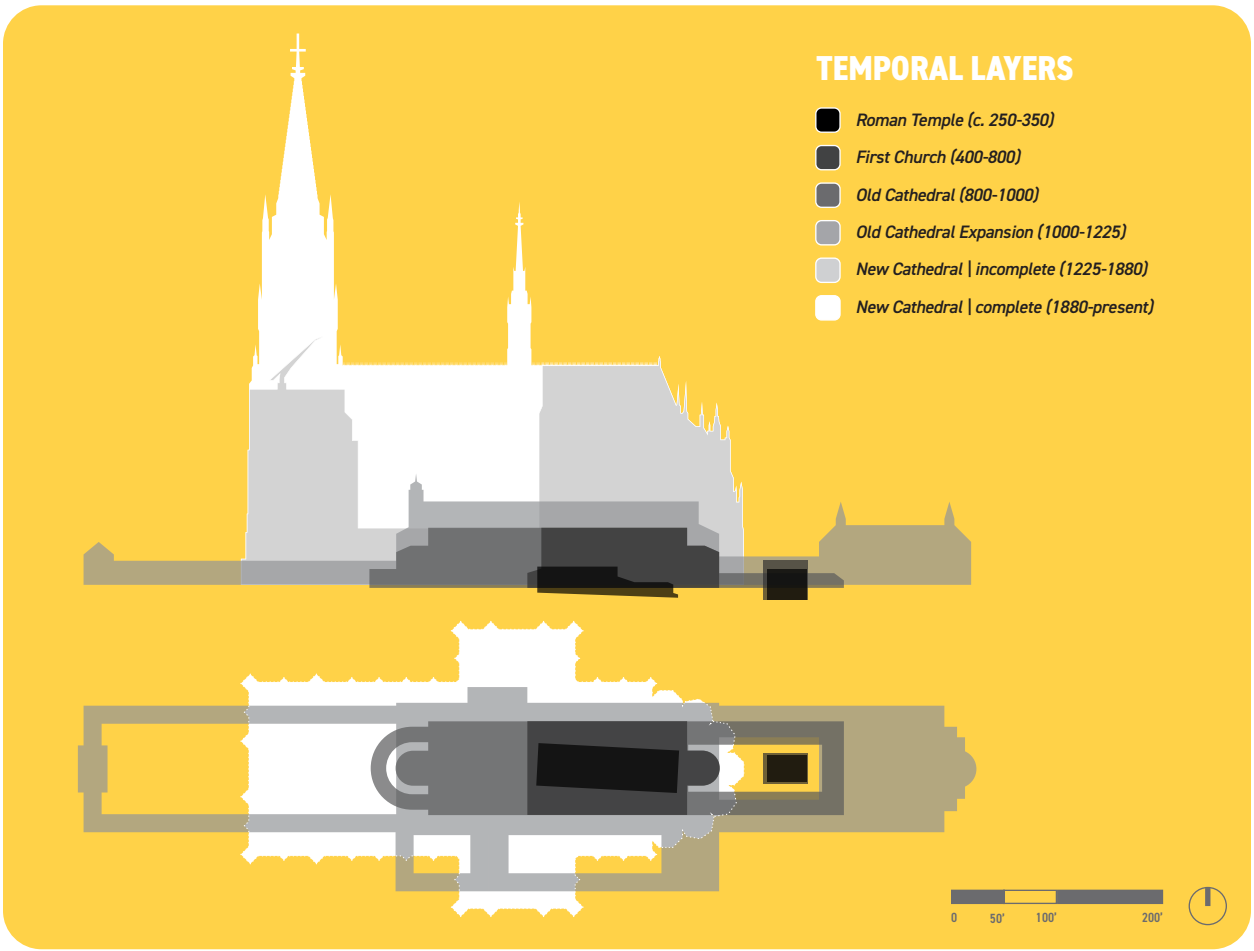

Fig. 06 *Temporal layers, Cologne Cathedral, Cologne, 1880.*
Diagram by author, based on data off Cologne Cathedral website, 2019.[3]

artifacts. By 1225, the eastern end of the Old Cathedral was demolished in anticipation of a new church. Plans were drawn for a massive High Gothic cathedral, which borrowed heavily from the French cathedrals, particularly Amiens and Sainte-Chapelle in Paris.[4] (fig. 05) Archbishop Konrad von Hochstaden laid the foundation stone of the current cathedral in 1248. Begun by a master builder and architect known only as "Master Gerhard," the cathedral would undergo three stages of construction and renovation, the last of which is still in progress. During its initial construction, the Cologne Cathedral drew master craftsman and artisans from Paris to design and assemble the intricate stonework of the choir. Work continued in earnest until 1473, finally stopping in 1530 due to lack of funds and interest. For three centuries, the finished choir and incomplete southern tower, capped by a tremendous wooden crane, would serves as the Archbishop's seat and define the skyline of Cologne (fig. 07).

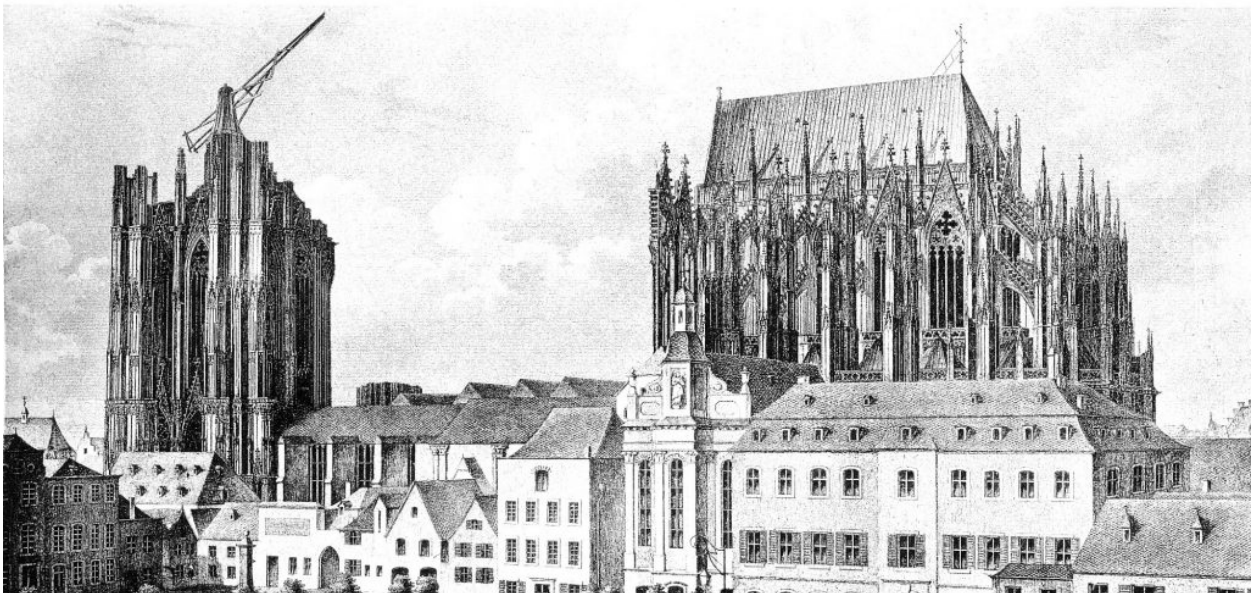

Fig. 07 *Choir and south tower in 1825, Cologne Cathedral, Cologne, 1880. Lithograph by Max Hosek, 1911.*[5]

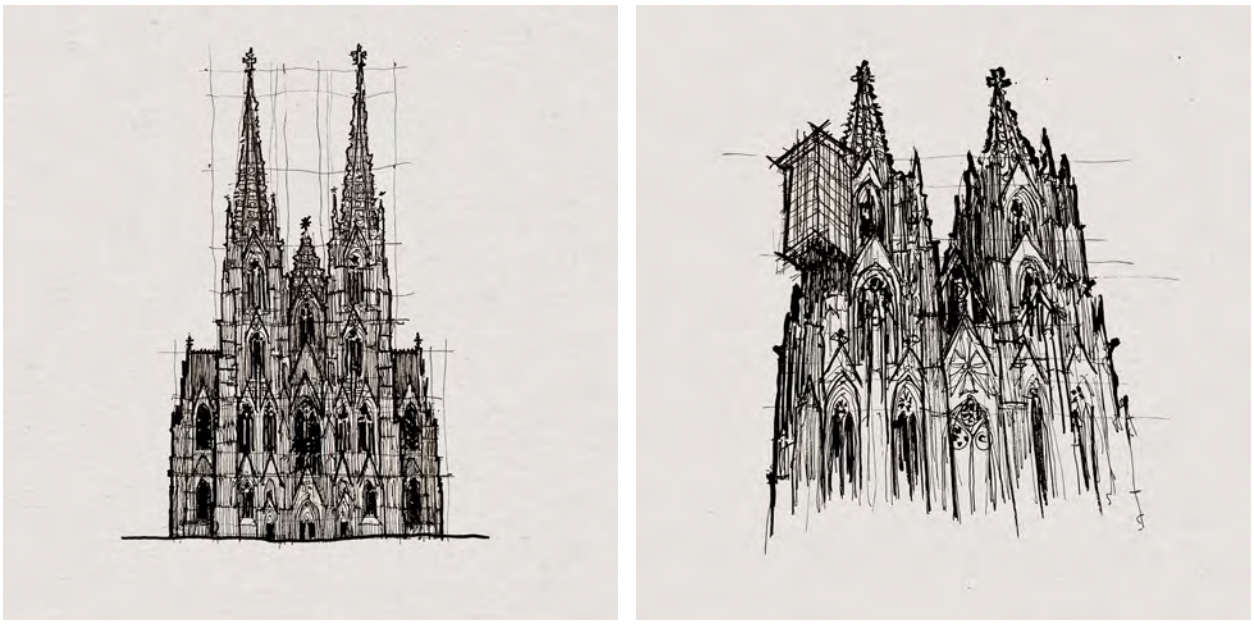

Fig. 08-09 West facade, Cologne Cathedral, Cologne, 1880.
Impressions of the facade. Sketches by author, 2019.

2.2 Perpetual Progress

The Archdiocese of Cologne was abolished during the French Revolution, and reestablished in 1821. During the intermediate years, pieces of the original facade plan, lost in the preceding centuries, were discovered scattered across France and Germany and reassembled (fig. 10). Spurred by this discovery, popular demand, and their reinstatement, the Archdiocese announced that construction would resume on the cathedral after three hundred years of silence. The cathedral workshop was reactivated in 1823. In 1842, King Friedrich Wilhelm IV pledged the support of the German government by laying a new foundation stone marking the continuation of building. That same year, the citizens of Cologne founded the Zentral-Dombau-Verein, or Cathedral Association, which raised 60% of the funding needed to complete the church.[6] The organization remains active today, and

Fig. 10 *Reassembled original facade drawing Cologne Cathedral, c. 1200. Photograph by Arnold Wolff, 1986.*[7]

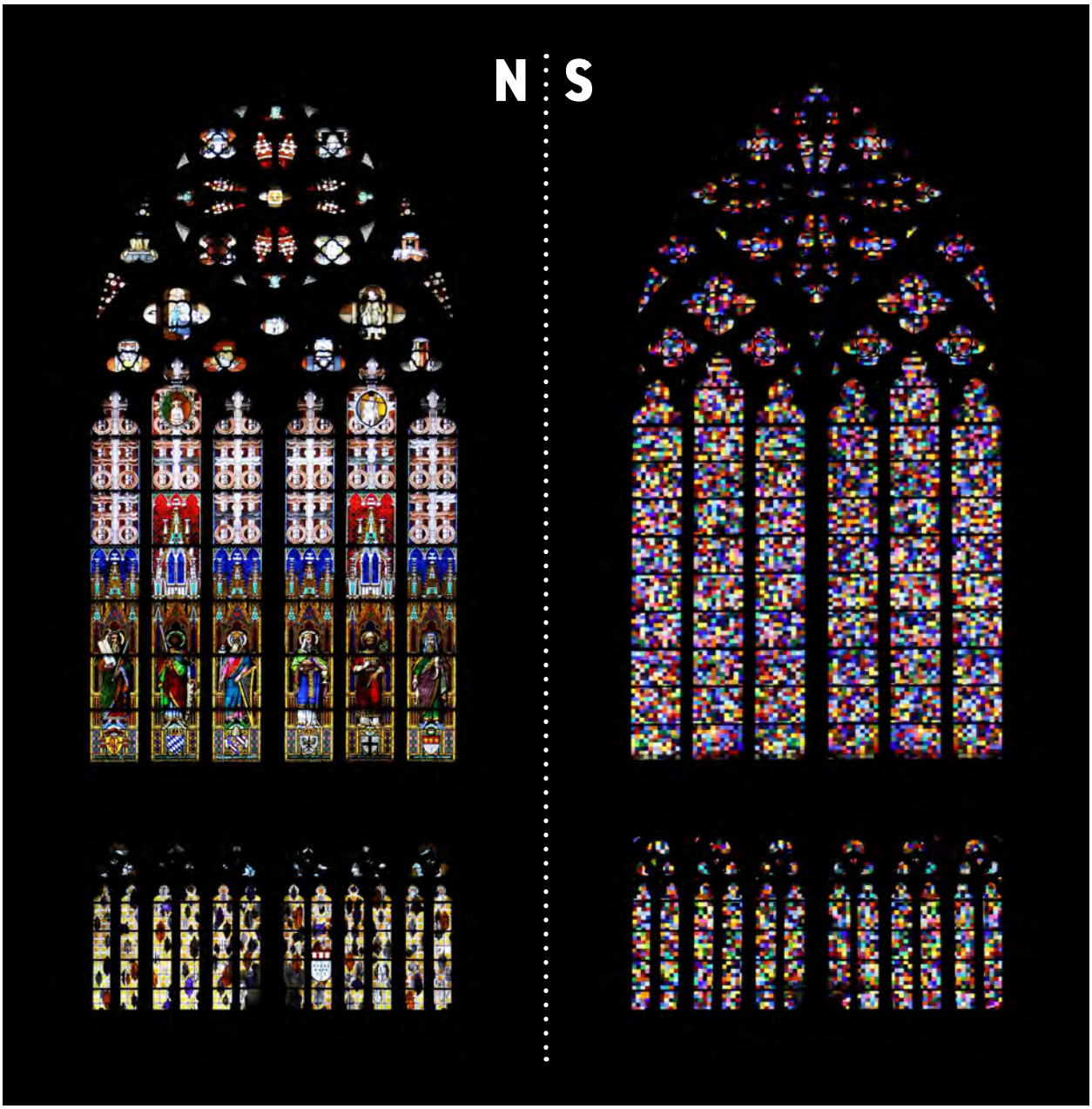

Fig. 11 *Left: medieval north transept window, Cologne Cathedral, Cologne, 1880. Right: Gerhard Richter, south transept window, 2007. Photographs by author, 2019.*

provides significant contributions to the constant maintenance and improvements. Thirty-eight years later, in 1880, the final stone was inserted into the South Steeple. Six hundred and thirty-two years after the first foundation stone was laid, the Cologne Cathedral was completed according to its original high medieval plan.[8]

Bombing during World War II severely damaged the cathedral, blowing holes in the walls, collapsing the vaults, and destroying much of the interior. Fortunately, the structure of the cathedral was largely unaffected (fig. 12), as were the medieval windows and artwork. Repairs began immediately following the war, and by 1956 the church was fully functional again. Today, the building is in constant cycle of repair, maintenance, and documentation. A permanent subterranean studio and workshop is located outside of the southeastern intersection between nave and transept walls. In 1996, the cathedral was declared a UNESCO World Heritage Site. Fearing the disruption of the cathedral's "visual integrity" due to impending but ultimately unrealized high rise projects, UNESCO declared the cathedral to be in danger. This resulted in a complete terrestrial laser scan in 2017, precisely documenting the as-built structure.[9] As a functioning church, the cathedral is constantly being modified and updated to suit its program. In 1960, a modern bronze altar was designed and installed by German sculptor Elmar Hillebrand. 2007 saw the addition of new stained glass windows designed by Gerhard Richter with a collective area of 1,076 square feet (fig. 11). These have sparked strong reactions in parishioners and visitors. Today, secondary programs such as the treasury museum and bell tours have supplemented the religious program.

Fig. 12 *Stone structure, Cologne Cathedral, Cologne, 1880. Photograph by author, 1986.*

Fig.13-17 Graphic models of the Cathedral scattered around city. Photographs by author, 2019.

03 | Experience

3.1 Accessible Icon

The Cologne Cathedral defines the vertical shape and horizontal layout of Cologne. There is a buffer zone surrounding the cathedral, in which no buildings which challenge the cathedral's height may be built. The twin towers of the cathedral are visible from nearly any point in the city. As an observer moves away, these appear to grow even as their surroundings shrink into the distance. This has the effect of relating any movement in the city to its proximity to the cathedral. Daily life in Cologne physically revolves around the cathedral. The silhouette of the cathedral used in marketing and artwork across the city. Kölsch, the distinctive local beer only brewed within a thirty mile radius of Cologne, is frequently marketed with illustrations of the facade. During my visit, I observed multiple models of the West facade, painted with the graphics of local businesses and institutions, outside of the Cologne Imhoff-Schokoladenmuseum, or Imhoff Chocolate Museum (fig. 13-17). Associating with the image of

Fig. 18 *Night view along Hohenzollern Bridge, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

the church is to express solidarity with the city, for the image of Cologne is tied to the cathedral. The plaza fronting the Cologne train station provides most visitors with their first glimpse of the intricate dark stone facade (fig. 18). The station lets out directly at its base, requiring passengers to crane their necks to catch a glimpse of the sky against the blackened monolith. The implication is that to enter the city you must first address the cathedral. Indeed, it is difficult to ignore the iconic towers when navigating the city streets. These anchor the largest church facade in the world. In complexity and scale, the Cologne cathedral dominates its Gothic predecessors and its immediate surroundings.

Another plaza, surrounded by tourism and regional governmental buildings, fronts the western facade. Visitors enter the cathedral from this space under the watchful eyes of dozens of saints. Finally entering the cathedral, filtering through the crowds of tourists, an appreciative visitor both exhales a sigh of relief and simultaneously catches their breadth at the sheer scale and color of the interior. A tremendous range of materials and textures, further distinguished by their patina and weathering, were employed to fine-tune the atmosphere of light within the nave and choir. These have the largest height to width ratio of any medieval church. Throngs of visitors wrap around the bases of the stone columns, pausing to snap photos or stand in the light cast from the stained glass windows. The structural lines are traced in stone rivers from the top of the nave down through the columns, placing further vertical emphasis on the nave (fig. 19). Today, the experience of the Cologne Cathedral is inseparable from both the celebration of mass and the crowds of awe-filled visitors.

Fig. 19 *Structural loads traced in stone, Cologne Cathedral, Cologne, 1880.*
Fig. 20 *Weathered walls, Cologne Cathedral, Cologne, 1880.*
Photographs by author, 2019.

Fig. 21 *Altar ringed by relics and apse, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

3.2 Hierarchy of Reverence

There is hierarchy within this already reverent space. It is reinforced through the Cologne Cathedral's ground floor layout. As they have for centuries, the Archdiocese' priceless relics shapes the route pilgrims and tourists take through the cathedral. The entire nave serves as a threshold to the altar and collection of relics which ring the apse (fig. 21). Traversing the Cologne Cathedral is a grand, ordered, and inevitable sequence. The stone columns frame the procession down the nave, and alternately shield and reveal alcoves. Dark recesses in the transept wings are populated with statues and venerable objects, and are occasionally punctured to permit access to

the subterranean program. Their relentless repetition serves a series of thresholds leading towards the altar and apse. As each threshold is crossed, the palpable aura of reverence increases. This sequence culminates in the choir at the foot of the gilded Shrine of the Three Kings, immediately behind the alter (fig. 22). The worn mosaic floors surrounding the shrine tell the story of the cathedral's construction, and bear the footfalls of millions. The shrine contains the relics for which Cologne become famous, and at 660 pounds, is largest reliquary in the Western World. The acquisition of the remains of the Magi enabled the collection of further relics. As the number of reliquaries and their contents increased, many of the lesser relics were removed to the treasury, and the most revered were arranged around the apse, framing the altar.

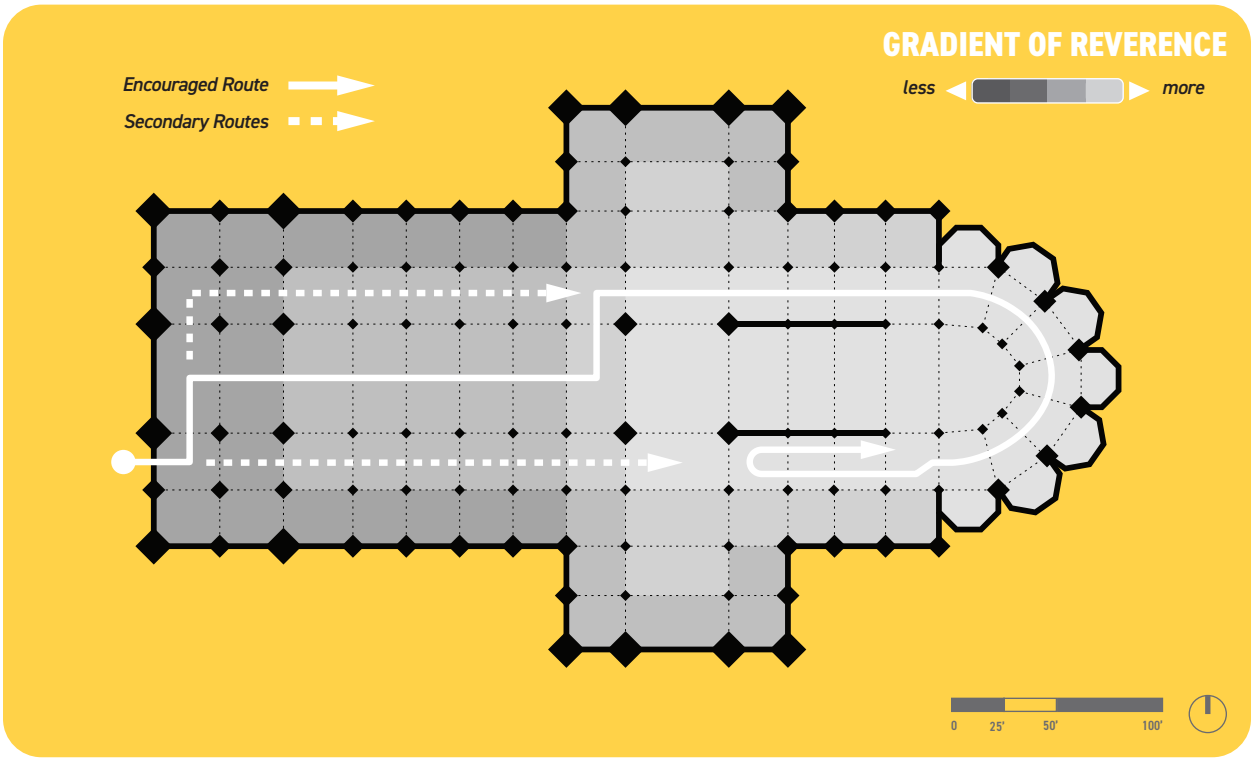

Fig. 22 *Reverent atmosphere increases at apse, Cologne Cathedral, Cologne, 1880. Diagram by author, 2019.*

Fig. 23 *Procession preceding mass, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

Fig. 24-26 Oiginal, transitional, replaced stone, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.

3.3 Texture and Patina

The character of the Cologne Cathedral is highly textured. While some of the churches we will discuss later are intentionally limited in the color palette and material selection, the Cologne Cathedral possesses a tremendous variety of colors, materials, and finishes. Though it attempts to be light and airy, the weight of the stone and sheer volume of the interior is tangible. In its size and material quality, the Cologne Cathedral reads as a mountain against the small medieval structures to its south. Colored light cast from the windows lightens the interior, yet the dark stone and column girth bely its scale. This distinctive dark patina is the result of two processes: a chemical reaction which occurs between the slightly acidic rain and the block, and constant exposure over years to pollutants in the air (fig. 24-26). False shadows created by this dark outer layer add greater depth and character to the ornate stepped facade. In response

to this perpetual weathering, the Cathedral is under constant repair and refurbishment. Constant attention requires a permanent maintenance team, which operates out of the sub-grade basement workshop.

To combat echoes and subdivide the interior tapestries displaying biblical sciences are hung between the nave and aisles. These introduce softer materials and a more permanent color into the church interior. As simple dividers, they imbue the aisles with a quiet, mediative feel while still permitting glimpses into the nave (fig. 27). In combination with the stained glass and floor mosaics, the tapestries imbue the Cologne cathedral with a finer grain of craft, color, and texture then many contemporary spaces possess.

Fig. 27 *Tapestries, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

Fig. 28 *Carven figures along interior, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

Fig. 29 *Scaffolding on the north tower, Cologne Cathedral, Cologne, 1880. Photograph by author, 2019.*

3.4 Temporal Identity

The atmosphere surrounding and infiltrating the Cologne Cathedral is ripe with age. A patina of permanence and history coats every surface. Additions and renovations, even in their attempts to accurately match the materiality of the original, stand out for the lack of weathering. There is a timeless quality bestowed by centuries which cannot be duplicated through design. Sacred spaces often possess a sense of timelessness, reinforced through careful craftsmanship (fig. 28), intentional material selection, and thoughtful use of light, shadow, and acoustics. Time tests timelessness. The Cologne Cathedral has been tested for the past six centuries. Though many the original surfaces and materials have been maintained, replaced, or renovated in the Cologne Cathedral, it has an identity which transcends its changing forms and temporal material nature.

Fig. 30 *Ivory crucifix, located in the Kolumba Museum by Peter Zumthor, Cologne, 1200. Photograph by author, 2019.*

The Cologne School

The legacy of the Cologne Cathedral and the Archdiocese of Cologne is still felt today in the Cologne School of architecture. Centuries of pilgrimage and the slow acquisition of financial wealth made Church in Cologne powerful, the one stable authority in the shifting political climate of the Rhineland. During the late nineteenth and up through the present day in particular, the Archdiocese would fund and encourage many cultural and religious projects throughout the area immediately surrounding Cologne. This practice provided many local and international architects, including Peter Zumthor (fig. 30) with employment, and allowed for the establishment of architectural dynasties. One of these is the Böhm family, which have been working in Cologne and with the Archdiocese for five generations and are still practicing today. Gottfried Böhm, a third generation architect and member of the family, would design a Pilgrimage Church in Neviges.

Notes

1. "Cologne Cathedral No. 292," *UNESCO World Heritage List* 1995, Accessed November 3, 2019. http://whc.unesco.org/en/list/292/documents/%23ABevaluation
2. Diagram by author, underlay from Google Earth.
3. Matthias Deml, "A Brief History of Cologne Cathedral," *Kölner-Dom.de*, accessed on November 12, 2019, https://www.koelner-dom.de/geschichte/a-brief-history-of-cologne-cathedral/?L=1
4. Deml, "A Brief History," *Kölner-Dom.de*.
5. Max Hasak, public domain lithograph in *Der Dom zu Köln* (Cologne: 1911).
6. Deml, "A Brief History," *Kölner-Dom.de*.
7. Arnold Wolff, *Der Gotische Dom in Köln* (Cologne: Vista Point, 1986).
8. Deml, "A Brief History," *Kölner-Dom.de*.\ Douglas Pritchard, J.
9. Sperner, S. Hoepner, and R. Tenschert, "Terrestrial Laser Scanning for Heritage Conservation: the Cologne Cathedral Documentation Project," *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 2, no. W2 (2017).

02 PILGRIMAGE CHURCH

GOTTFRIED BÖHM | VELBERT-NEVIGES, GERMANY | 1968

Fig. 01 *Gottfried Böhm, view of primary structural column, Pilgrimage Church, Velbert-Neviges, 1968. Tinted illumination, faceted interior monolith. Photograph by author, 2019.*

Pilgrimage Church

Fig. 02 Gottfried Böhm, warm and natural illumination, Pilgrimage Church, Velbert-Neviges, 1968. Photograph by author, 2019.

01 | Introduction

"Deep Shadows and darkness are essential, because they dim the sharpness of vision and invite unconscious peripheral vision and tactile fantasy."[1] - Juhanni Pallasmaa

Thirty miles north of Cologne sits a subterranean temple of shadow. Designed by Gottfried Böhm as part of a competition in the early 1960s and completed in 1968, the Brutalist Pilgrimage Church rises from the small town of Neviges like an extension of the rocky hill on which it sits. Referred to locally as the Mariendom, or Mary, Queen of Peace, The Church is the second largest in the Archbishopric

Fig. 03 *Gottfried Böhm, site plan, Pilgrimage Church, Velbert-Neviges, 1968. Photograph by author, 2019.*[2]

of Cologne, and at first glance appears to be the experiential inverse of its more famous neighbor. Where the Cologne Cathedral is the culmination of the airy, ornate, and symmetrical Gothic style, the Mariendom is prismatic, asymmetrical, and dark. The rough, faceted concrete in Neviges resembles a natural cave, sunken into the hill on which the church sits (fig. 02). Böhm turned many of the archetypal traits of Christian sacred space on their head. Through the contrast of light and shadow, considered echoes, heavy materials, and intentional but minimal apertures he crafted an insular and reverential atmosphere. In the Pilgrimage Church, the creation of a primitive and timeless sacred atmosphere transcends traditional archetypal form.

Fig. 04-05 Gottfried Böhm, Pillar of Mary containing Miraculous Image of Hardenberg, Pilgrimage Church Velbert-Neviges, 1968. Photograph by author, 2019.

02 | History

The story of the pilgrimage site began with the 1676 arrival of Franciscans in Neviges. In 1680, one Father Antonius Schirley claimed to hear the voice of Mary while praying before an image of the Immaculate Conception. Per the voice's request, he sent the image to Neviges. In 1681, local ruler Prince-Bishop Ferdinand von Fürstenberg of Paderborn and Münster was healed of a life-threatening illness, a miracle he attributed to the image (fig 04-05). He traveled to Neviges to give thanks, beginning centuries of pilgrimage. Following its completion, the monastery and a larger church built in 1728 served to mark the site for the ever increasing number of pilgrims. By the early

1900s, ten thousand pilgrims per day were normal. As waves of conflict swept through Europe during the twentieth century, the site hosted worship services for hundreds of thousands annually. In 1935, following the rise of the Nazi Party, over 340,000 concerned pilgrims visited the site.[3]

In response to the swelling numbers of faithful, the Franciscans tried three times to construct a larger church complex. The first two attempts were stymied by World Wars I and II. The third attempt took the form of a juried competition, announced by the Archbishop of Cologne, Cardinal Frings in 1959. The Cardinal called for "sculptured structure as an image and symbol of a pilgrim's church."[4] Gottfried Böhm was one of seventeen architects invited to participate. Like much of his competition, he was member of the exclusive Cologne School

Fig. 06 *Gottfried Böhm, Via Sacra approaching northern facade, Pilgrimage Church, 1968. Photograph by author, 2019.*

of architecture, an informal group of architects characterized by their ties to the legacy of the Archbishopric of Cologne. Böhm thus already had extensive experience designing expressive churches. His entry challenged the competition guidelines by shifting the proposed location of the church to the highest point on the site, organizing the entire pilgrimage complex along an ascending Via Sacra, or sacred way (fig. 06). This use of sacred way, refers to the triumphal processional route through ancient Rome. Archbishop Fring showed strong preference to Böhm's design throughout the competition and selection process, and encouraged the jury to that end.[5] Construction began in 1966, and was completed in 1968. Over the following decades, the building's presence and form would serve as a unifying icon for the town. Pilgrimage throughout Germany has generally declined since the mid twentieth century. Its crystalline silhouette rises above its surroundings, and appears in signage and local marketing. The church has come to define the identity of Neviges. Today, the complex's function as an object of architectural appreciation rivals its reputation as a pilgrimage site. This is a reflection of the architects innovative use of form, material and acoustics to generate atmosphere.

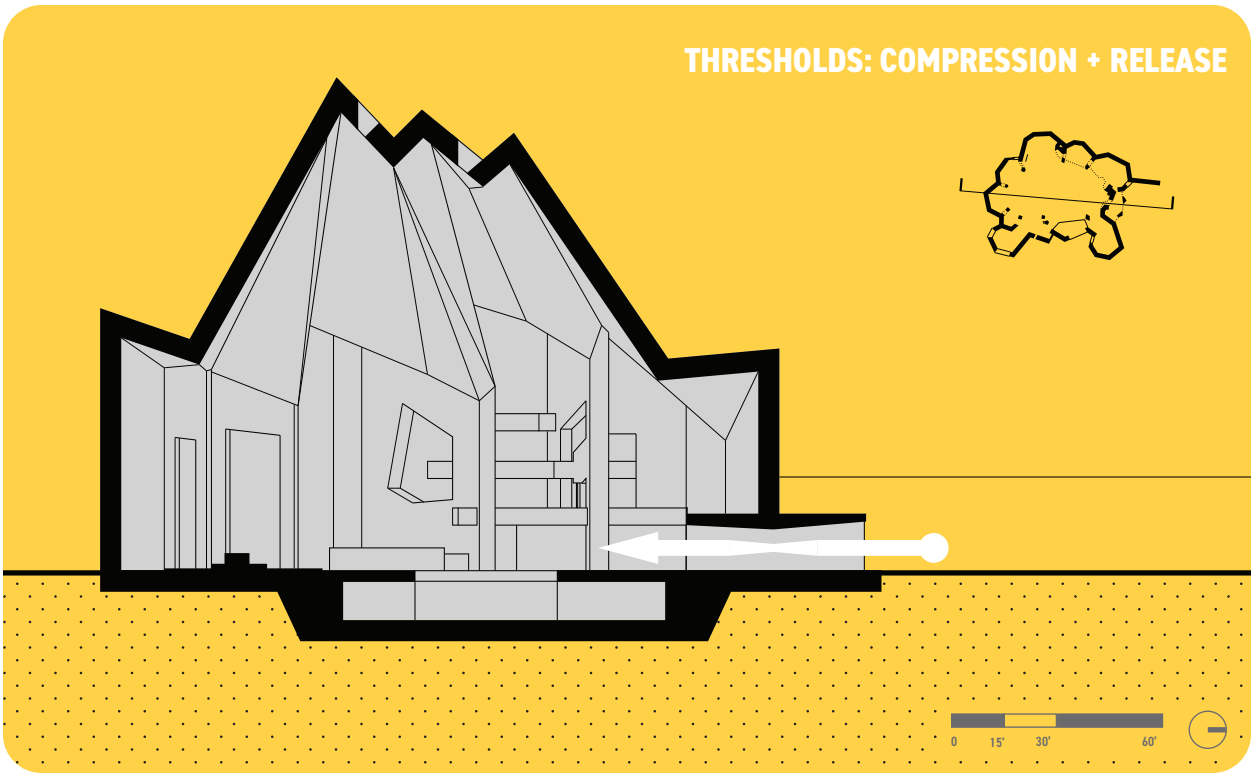

Fig. 07 *Gottfried Böhm, compression and release, Pilgrimage Church, 1968. Diagram by author, 2019.*

03 | Experience

3.1 Thresholds

The threshold of the Mariendom is an extension at the traditional footpath followed by pilgrims to the site. The Mariendom's jagged form rises high over the surrounding buildings in downtown Neviges. The distinctive silhouette of the roof paired with its inclusion in signage and local marketing keeps the church constantly in view. The surrounding monastery's complex structures frame a stepped plaza which rises from the street to the monolithic church. From the base of Via Sacra, the entry to the Mariendom is masked by the change in elevation. This reinforces a reading of the primary form as a rocky extension of the hill on which it sits. The ascension of the Via Sacra

is mirrored in the stepped concrete forms to the left and overgrown wall to our right, closing off views to the surrounding village and framing the monolith of the church. The climb releases and expands into a wide piazza fronting the main building, populated with low, identical trees. The jagged peaks of the structure are visible through above the branches, and below the foliage, a deep subtraction at the base of the Mariendom beckons like the entry of a cave.

The exterior plaza flows into this subtracted space, which compresses the volume of the plaza into a low narthex (fig. 07). Continuing the material of the plaza beneath the mass of the church signals that the space beyond remains in the public realm. This subtraction is the bridge between two volumes, one of light and one of shadow, each illegible from within the other. The intermediate space between ascent and descent. The depth of the threshold space prevents any exterior light from compromising the shadows within. Heavy, weathered steel doors shield the interior. Their mass and weight suggest the gravity of what lies beyond. The weight of the massive, solid form above presses down into the space, pushing the visitor along.

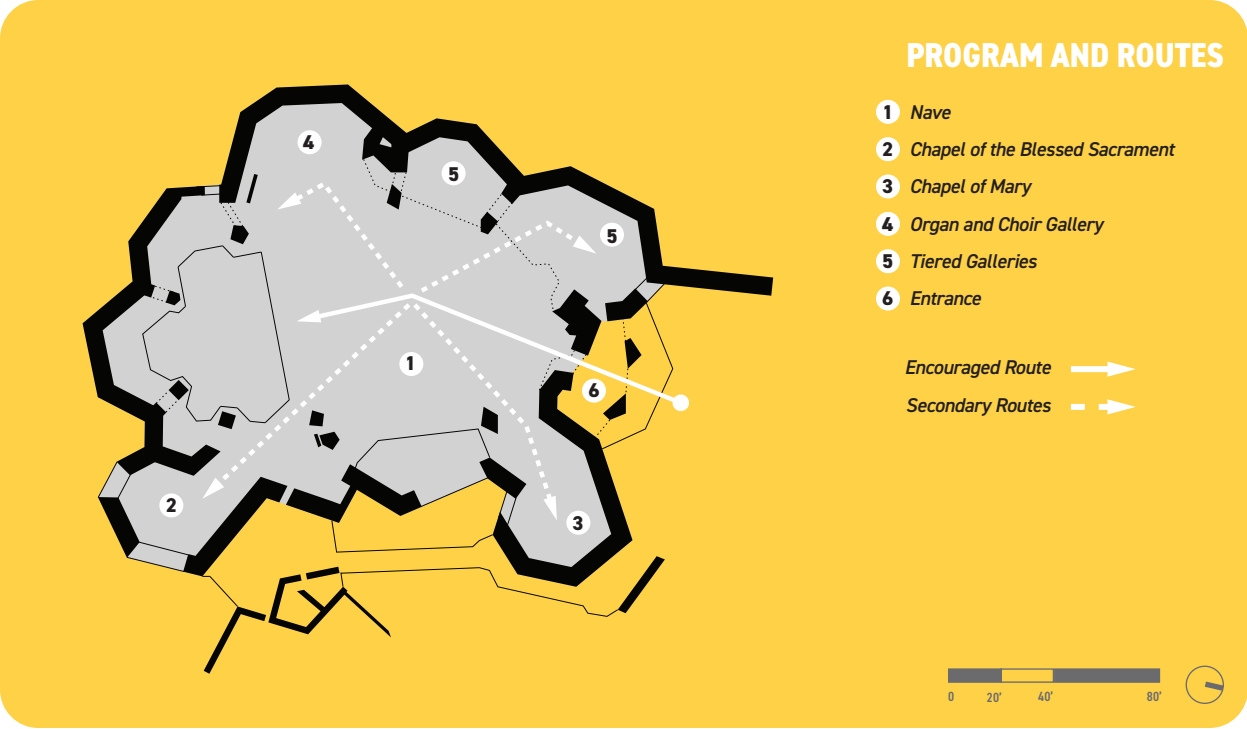

Fig. 08 *Gottfried Böhm, program and routes, Pilgrimage Church, 1968. Diagram by author, 2019.*

3.2 Perpetual Motion

Visiting the Mairendom is a nonlinear experience. The central void must be crossed multiple times to access all of the side chapels and subterranean spaces (fig. 08). Many thoughtful interior moments are not immediately visible. Some secondary spaces, such as the side chapel and the entrance to the galleries, are nestled back on either side of the entrance. These moments are only visible once you have entered the space and turned completely around. Similarly, the massive windows are generally recessed from the primary nave, and most are not immediately visible. Their location is discernible from the light they cast, prompting exploration around each corner. Böhm relies on the curiosity his unpredictable building inspires to generate constant circulation. He considers the church to be an "expression of the living church, always in

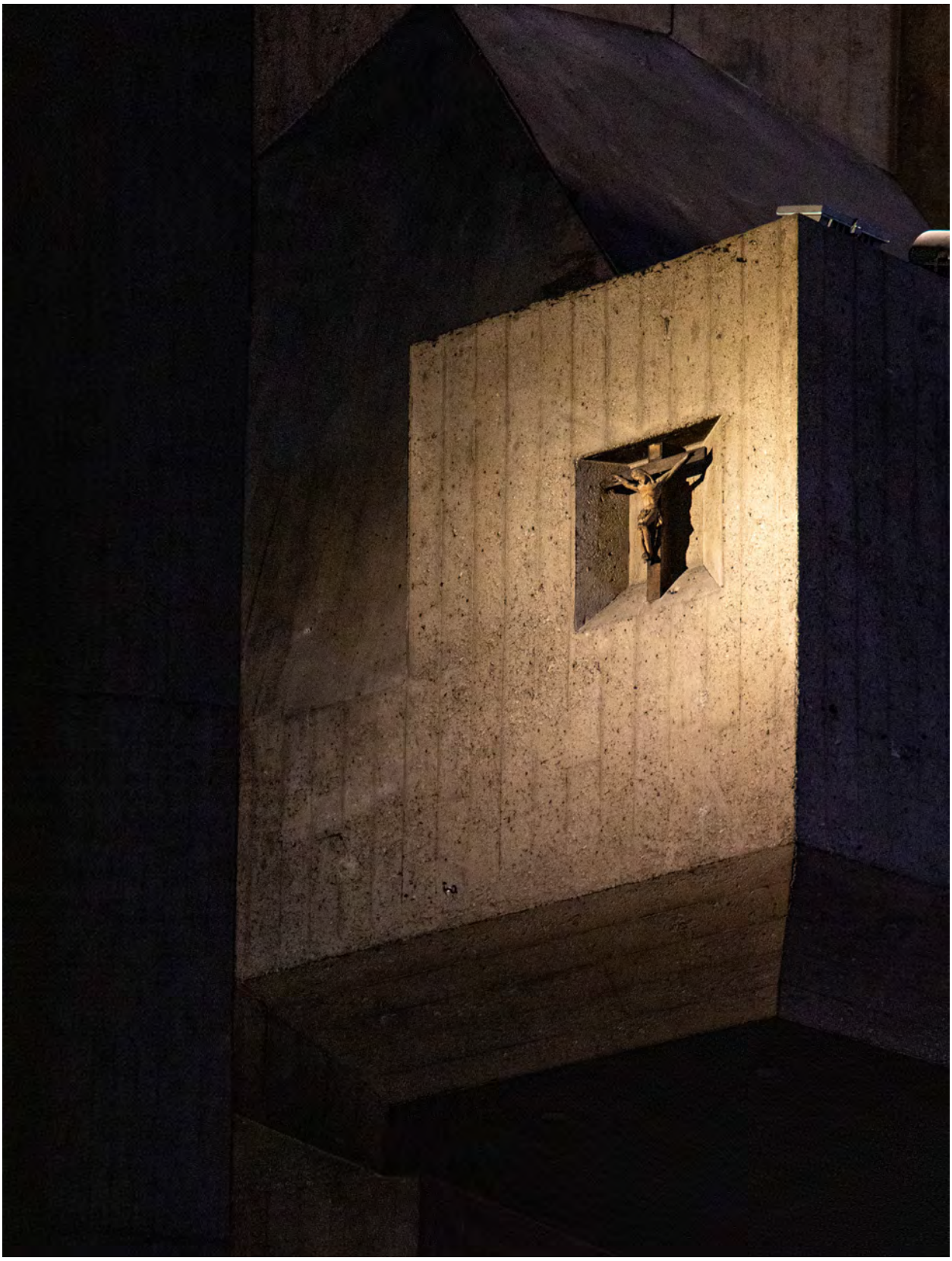

Fig. 09 Gottfried Böhm, Pilgrimage Church, intentional illumination, Velbert-Neviges, 1968. Photograph by author, 2019.

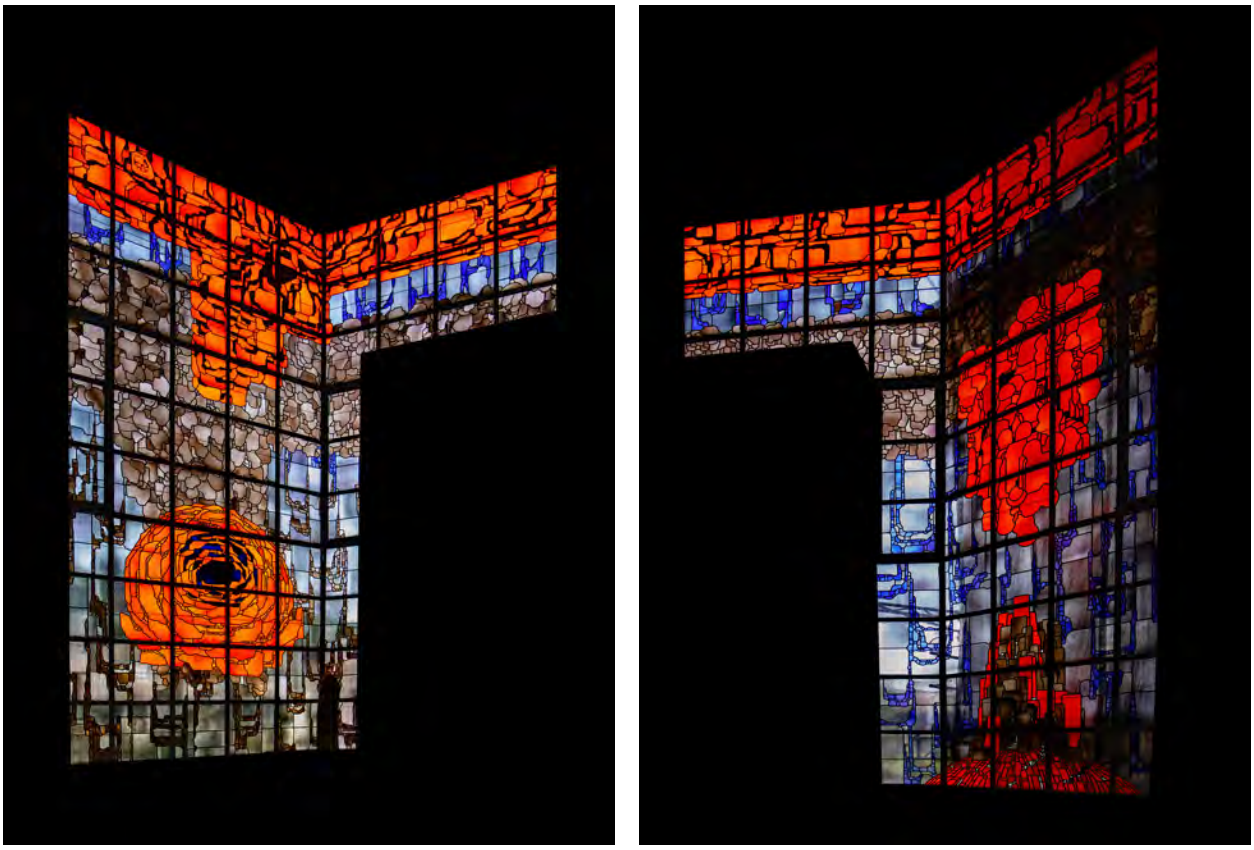

Fig. 10-11 Gottfried Böhm, Pilgrimage Church, Chapel of the Blessed Sacrament windows, Velbert-Neviges, 1968. Photograph by author, 2019.

3.3 Directional Shading

The Pilgrimage Church employs shadow as an art gallery employs light. Deep shadows fading into black suggests destinations within and beyond visitors field of view. While some of these destinations are physically occupiable spaces, others operate as mentally or visually accessible objects or zones (fig. 09). The initial shock of inky black gives way to layers of rose-colored shadows. The low, compact threshold releases into a void, sensed immediately through acoustic cues, and slowly revealed as your eyes adjust from the exterior daylight. It takes our eyes a moment to adjust to the sudden abundance of rich shadows, and every time they pass over an intermittent aperture they

must adjust again. The base canvas of shadow is broken via two primary methods: through a focal glow illuminating spaces (fig. 13), apertures, or artifacts of interest and through distant pinprick apertures which blur the perception of scale.

A focal glow may be emitted from physically inaccessible spaces, such as windows or recesses. Illumination within the Mariendom is sparse and intentional. Artificial light sources are subdued, their sources obscured. Most interior light and color emanates from the massive stained glass windows, which start at ground level and extend varying distances towards the ceiling (fig. 10-11). None permit exterior views. Rather, they encourage continued contemplation of the interior by illuminating key artifacts and surfaces. They are located in chapel

Fig. 12 *Gottfried Böhm, candles for pilgrims, Pilgrimage Church, Velbert-Neviges, 1968. Photograph by author, 2019.*

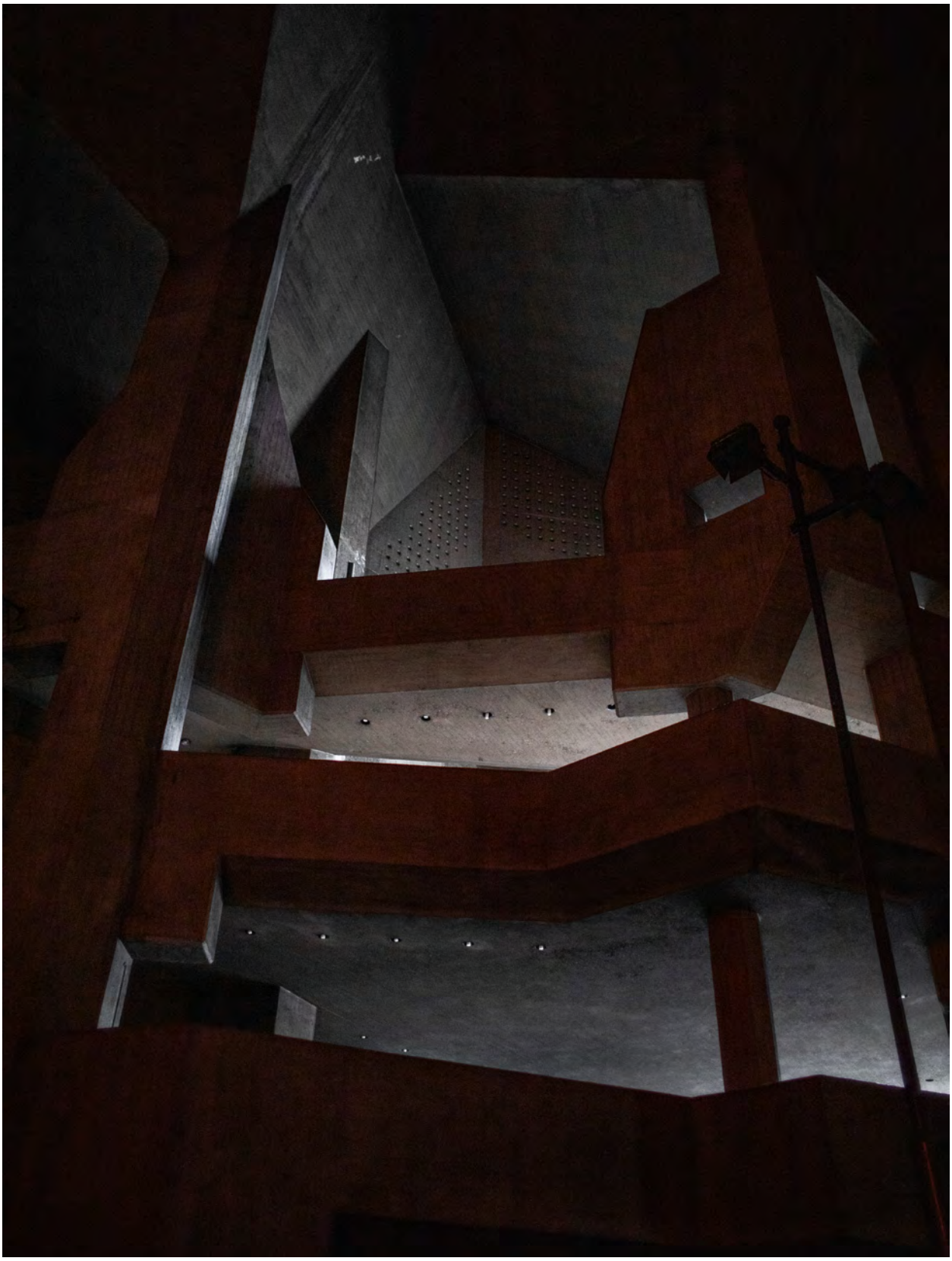

Fig. 13 *Gottfried Böhm, directional lighting highlights inaccessible space, Pilgrimage Church , Velbert-Neviges, 1968. Photograph by author, 2019.*

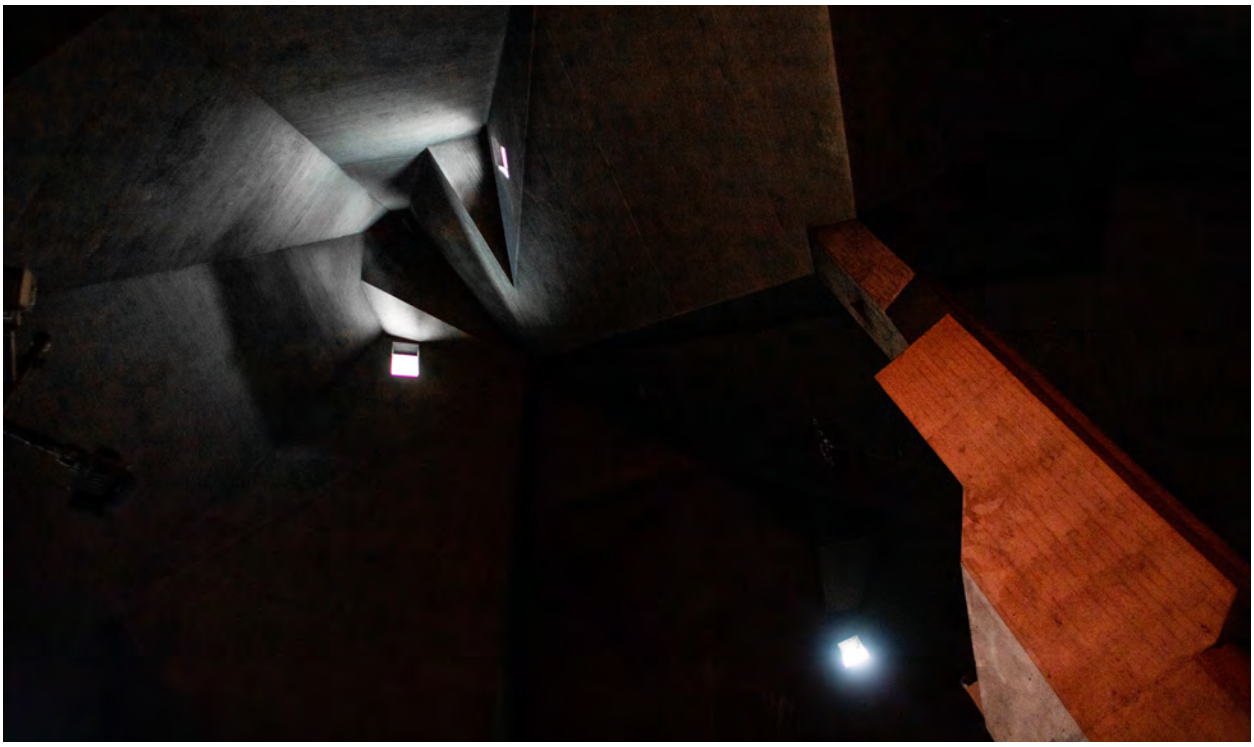

Fig. 14 *Gottfried Böhm, Pilgrimage Church, small and sharp apertures, Velbert-Neviges, 1968. Photograph by author, 2019.*

spaces and around programmatic elements. The proportions of each window are unique. Most possess a small quantity of red glazing which casts a disproportionately intense deep crimson hue across the monochrome concrete. This color grading, though pervasive, is relatively mild in person. However, its effect is inseparable from the atmosphere of the space, and is enhanced in most photographs, drawings, and verbal descriptions I have encountered.

The pervasive darkness draws attention to a minimal but purposeful set of apertures located in the ceiling (fig. 14). Their deliberately diminutive size obscures the Mariendom's substantial scale. These isolated windows sit like stars in the inky blackness of the ceiling, blindingly bright. Rather than illuminating the faceted ceiling, and clarifying the proportions of the space, they force the eyes to contract and disguise overhead surfaces. Their indiscernible scale creates an illusion of impossible distance.

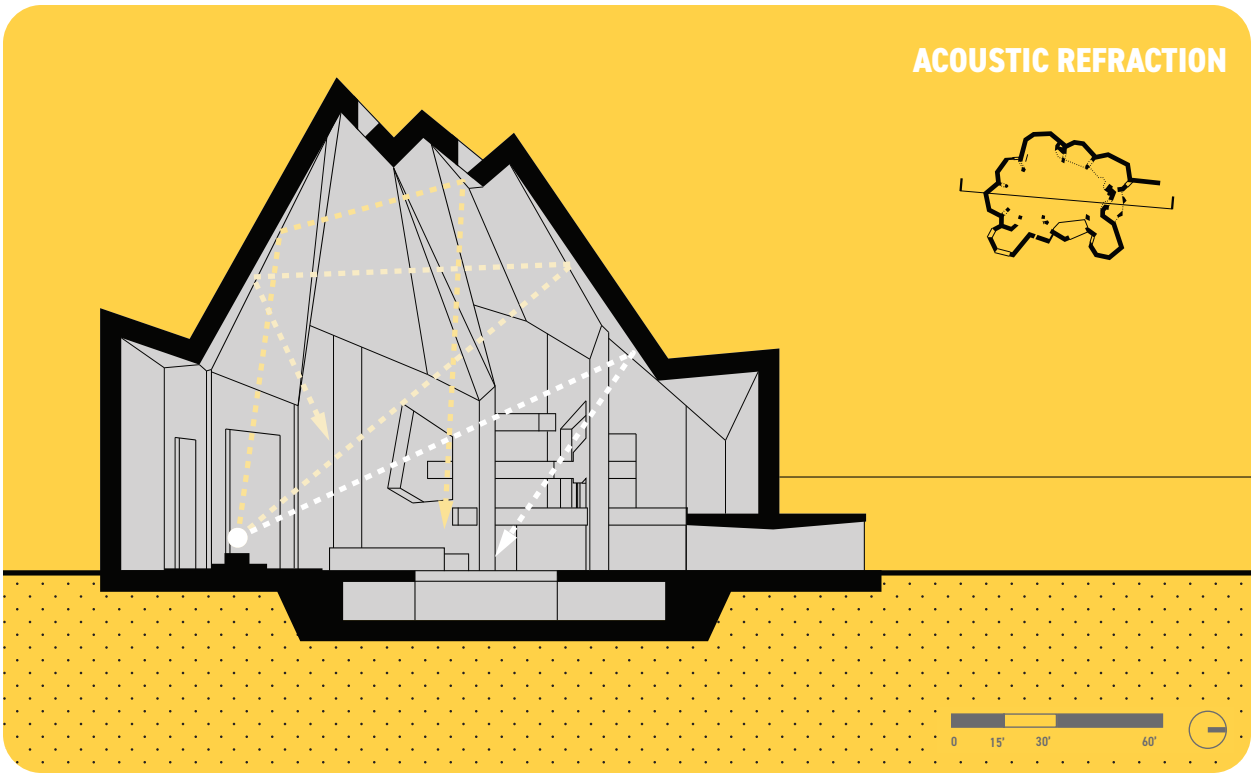

Fig. 15 *Gottfried Böhm, acoustic refraction, Pilgrimage Church, 1968. Diagram by author, 2019.*

3.4 Acoustic Extension

The snapping of fingers reverberates around the entire space, echoing through the choir and chapels before returning to the ears of an observer. Echoes are encouraged, mitigated occasionally through arrays of cylindrical subtractions in the concrete walls. (sketch of acoustic refraction). The refraction of sound waves off the angled surfaces disguises the source of most sounds (fig. 15). Voices and music are as loud in the side chapels is if you were in the main nave. From some imagined space above and beyond the balconies emanates the sound of monks singing. The chanting of the Franciscan brothers accentuates the echoes, reflecting off of the prismatic ceiling and filling the space with deep, pulsing verses. Their reverberating refrains overpower

Fig. 16-18 Gottfried Böhm, interior textures, Pilgrimage Church, 1968. Photographs by author, 2019.

and absorb the echoes of visitors voices. Sounds seem to emanate from imagined spaces beyond the building envelope. You think you hear voices projected from spaces which does not exist. This expands a visitor's perception of the interior, further exaggerating the scale of the church.

3.5 Enclosed Exterior

At the time of construction, the massive triangulated and unsupported span was unprecedented. The concrete facets distribute the load to the angled walls. Structure is incorporated rather than expressed. Lack of visible joints and distortion of vertical lines within the space make reading scale difficult. The result is a cave-like interior volume which seems to have been carved from a mountain. Irregular concrete stalagmites splinter, shrink, and disappear into the darkness overhead, further pushing the ceiling back (fig. 19). The largest of the support stalagmites is off center, disappearing against the monochrome of the concrete walls. Overhead, the tent-like facets seems distant, unsupported, and expansive. This span attempts to create a "piazza-like interior."[7] The side chapels and galleries are organized as surrounding buildings which front the public space.

Fig. 19 *Gottfried Böhm, structural stalagmites, Pilgrimage Church, Velbert-Neviges, 1968. Photograph by author, 2019.*

04 | Conclusions

Böhm’s cavernous Mariendom timeless, seemingly hewn from the rock it sits on. Although challenging, its cave-like interior is somehow comforting and familiar, in an almost primitive manner. Its atmospheric influence extends into the community which surrounds it, and it forms an internal experience which is both intimate and monumental.

Notes

1. Juhani Pallasmaa, "An Architecture of the Seven Senses," in *Questions of Perception: Phenomenology of Architecture*, 26-37 (New York: William Stout Publishers, 2006), 34.
2. Diagram by author, underlay from Google Earth.
3. Gerhard Haun, *The Mariendom Neviges*, 3rd ed., translated by Katherine Vanovitch (Lindenberg: Kunstverlag Josef Fink, 2017), 3.
4. Haun, *Mariendom*, 3.
5. Karl Kiem, "The Many-layered Concrete Rock: The Pilgrimage Church in Neviges," *DAM* (2006).
6. Haun, *Mariendom*, 14.

03 SAINT PETER

SIDGURD LEWERENTZ | KLIPPAN, SWEDEN | 1966

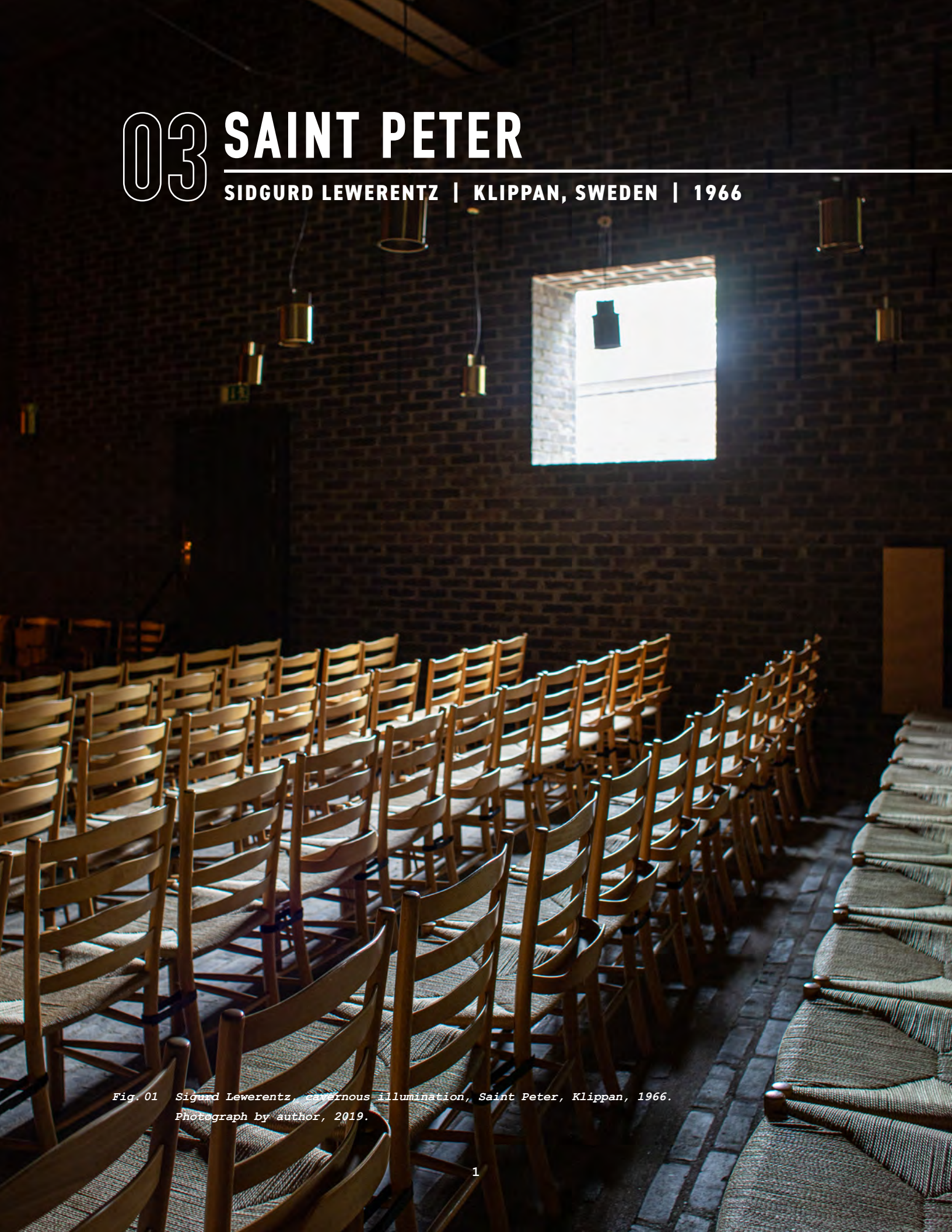

Fig. 01 Sigurd Lewerentz, cavernous illumination, Saint Peter, Klippan, 1966. Photograph by author, 2019.

Saint Peter

Fig. 02 *Sigurd Lewerentz, nave, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

01 | Introduction

"A renowned architect has with all his being built here a hallowed room of majestic weight" - Bishop Martin Lindström, at the consecration of Saint Peter, 1966.[1]

The final major work of Swedish master Sigurd Lewerentz, Saint Peter in Klippan, Sweden is a holistic, obsessive, and moving space. A disorienting journey through a thick and tranquil atmosphere, the church is intimate in scale and carefully detailed. Shadow dominates the interior of Saint Peter. Sources of illumination are sparse, focused, and purposeful, lending warmth and contrast to the space. The

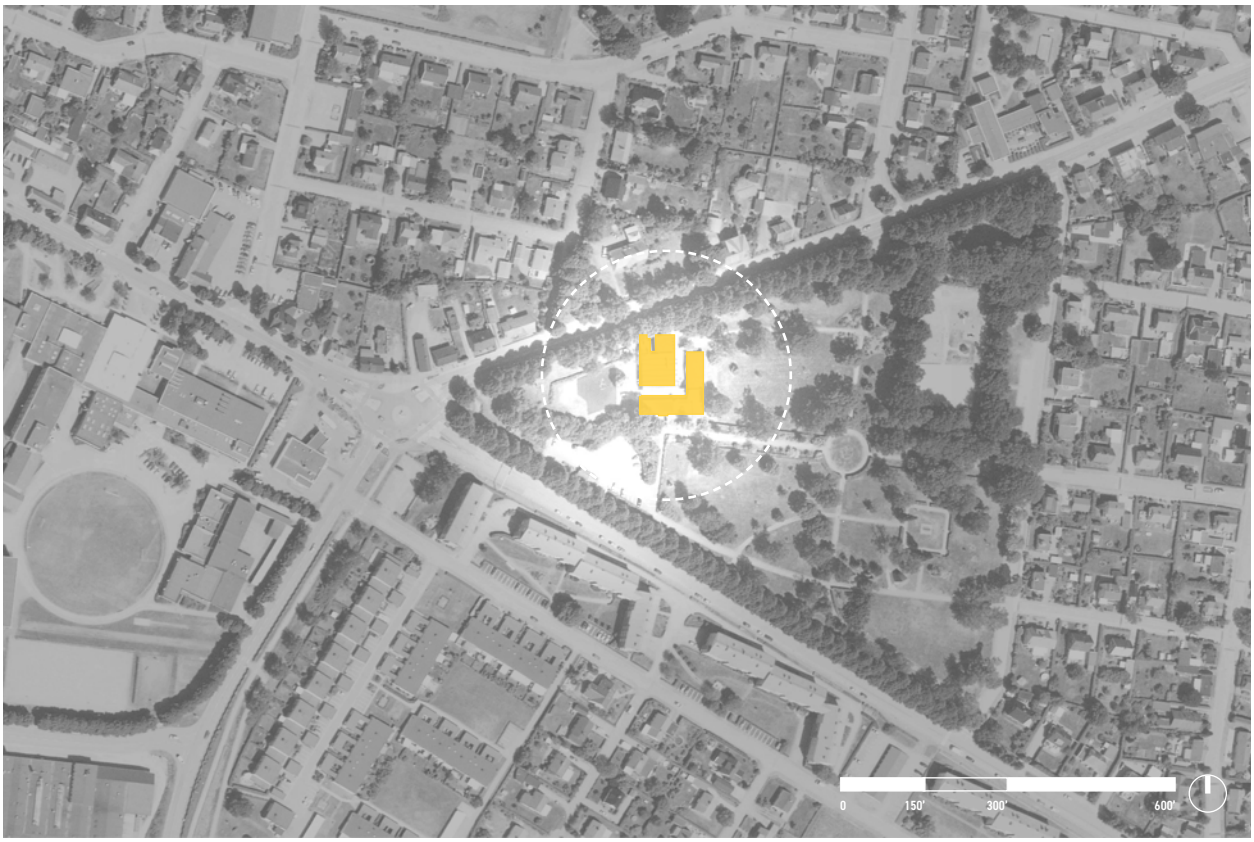

Fig. 03 *Sigurd Lewerentz, site plan, Saint Peter, Klippan, 1966. Diagram by author, 2019.*[2]

atmosphere of Saint Peter is inseparable from the treatment of the masonry. Lewerentz insisted on never cutting a brick to turn corners or make complex forms, and uses mortar with equal skill to craft careful moments. Saint Peter of Klippan is an intimate experience in which craft constructs atmosphere.

Fig. 04 *Sigurd Lewerentz, western facade, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

02 | History

2.1 Pilgrimage

The town of Klippan wanted a church since the 1890s, but did not have the resources to support one. Klippan lies along the Pilgrim's Way Skåne Blekinge, part of a medieval religious trial connecting shrines between Santiago de Compostela, Spain, Vadstena, Sweden, and Nidaros, Norway. In the 1940's, the Klippan's Church Foundation was formed, and with the aid of other local organizations collected funds to build a church. During this time, services were held in various civic buildings, including an assembly hall, abandoned in 1948 due to "serious cracks in its structure,"[3] the Klippan burial chapel, and the

local school hall. During a church inspection in 1960, the citizens mentioned their hopes for the parish. In December of that year, Church of Sweden Commissioners decided that a site set apart for a church in the 1915 town plan of Klippan would be gifted to the Parish. Architect Sigurd Lewerentz was employed in 1962, on the recommendation of the Church Commissioners out of Stockholm.

2.02 Lewerentz

The atmosphere of Saint Peter is tied to tangible craftsmanship and holistic design. The church and its architect share a unique bond, and a discussion of its atmosphere benefits from a brief analysis of Sigurd Lewerentz. Trained as both a mechanical engineer and later in

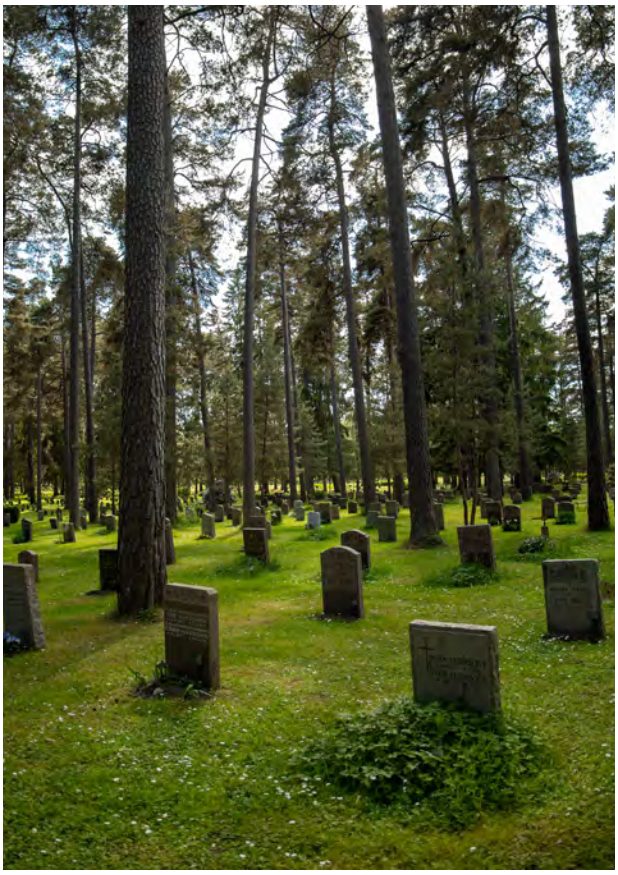

Fig. 05-06 left: Sigurd Lewerentz, Woodland Cemetery, Stockholm, 1966. Photograph by author, 2019. right: Sigurd Lewerentz, photograph by Karl-Erik Olsson-Snogeröd, public domain.

Germany as an architect, Lewerentz opened his practice in his hometown of Lund, Sweden in 1911. He frequently collaborated with his colleague Gunnar Asplund on projects including the Stockholm Woodland Cemetery and the Stockholm international exhibition (fig. 05). Their relationship grew increasingly rocky, and shortly after the completion of the Woodland cemetery Lewerentz stepped away from architecture for over a decade, focusing instead on the design and production of windows and other details. Lewerentz would return to architecture in his final years, and his time working with fittings would inform his most highly regarded work. His name has grown synonymous with intention and craft. Saint Peter in Klippan is one of the most apt examples of this association.

Begun when he was 78 years old, Saint Peter was to be his last major project. It is a direct evolution of techniques, materials, and moves which Lewerentz employed in his earlier Saint Mark’s church in Stockholm. Rather than relying on typical drawings, Lewerentz spent nearly every day on site dictating where bricks should be placed and toiling intimately with the workers on models and mockups. Aside from some models and drawings, the process was largely undocumented, and many of the records available today were generated in post by admirers, students, and other architects. Lewerentz’s intent and some of the moves he made are still open for interpretation. Today, the church of Saint Peter is the pride of Klippan. It is a site of pilgrimage for architects and believers alike.

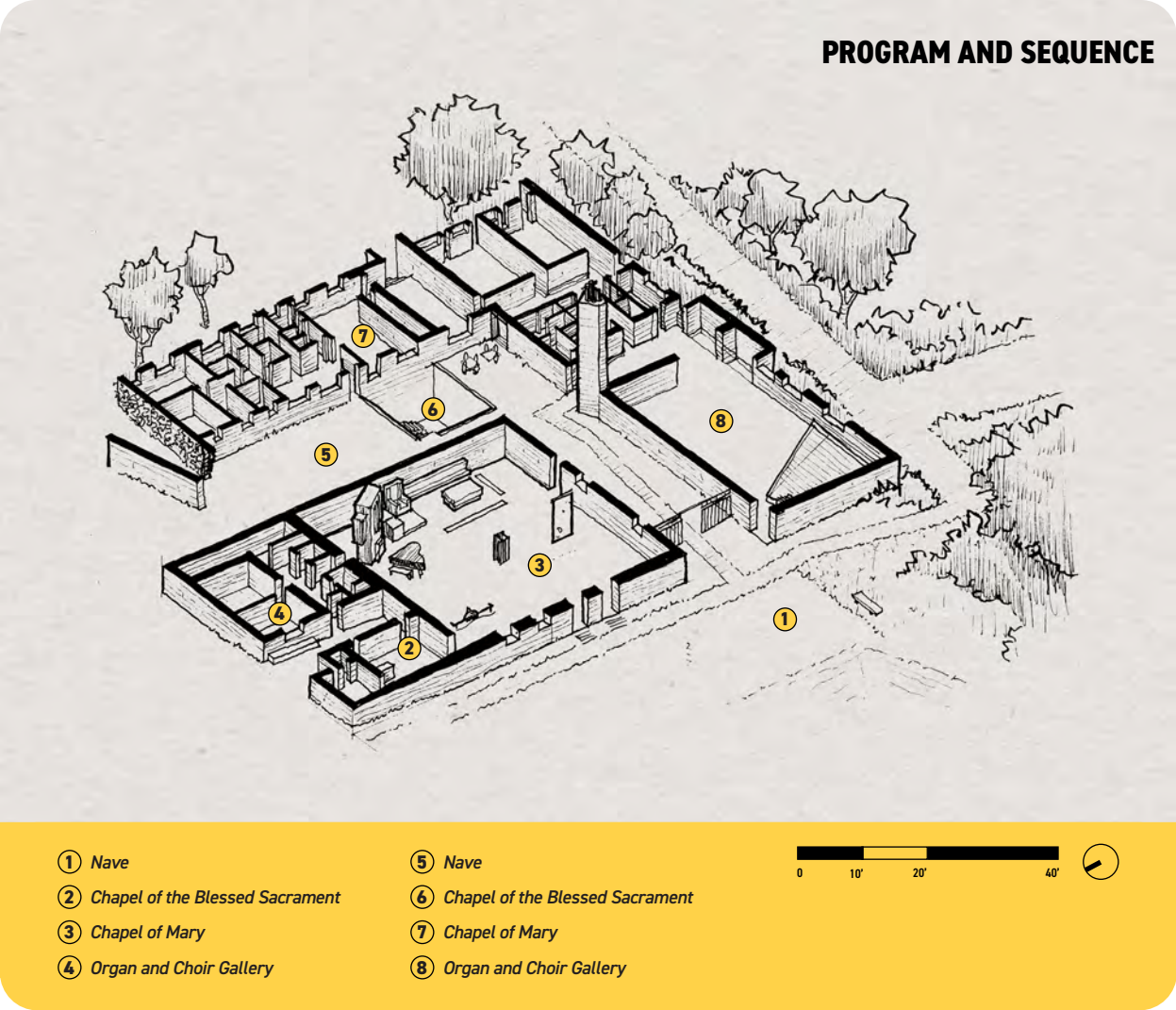

Fig. 07 *Sigurd Lewerentz, programmed axon, Saint Peter, Klippan, 1966. Diagram by author, 2019.*

03 | Experience

3.1 Thoughtful Sequence

Saint Peter is recessed from the street, concealed by a berm surrounding the car park to the south and trees and vegetation to the north. A variety of roof forms distinguish the church from its supporting structures, reinforcing the aggregated nature of the complex. The entrance must be sought to be found (fig. 08-10). The west facade appears at first to serve as the entry (fig. 04), as it opens onto

a plaza and is marked by an asymmetrical pair of ceremonial doors. However, these mostly remain closed. The actual entrance is located in the back corner of a courtyard between the vestibule and belfry. Each step towards the nave steps down in scale. This courtyard slopes down towards the only visible recessed aperture in the exterior envelope, which contains a small wooden door marked with a steel cross.

The dim wedding chapel preceding the primary space is warmed by the isolated light of upturned sconces, and receives little natural illumination (fig. 11-12). This intimate chamber encourages adjustment before entering the nave. The scale and complexity of illumination is softer than the outside world and simpler than the interior church. This is a space which reinforces intimacy through acoustics, texture, and illumination. The nave remains concealed until it is entered. It is reoriented to face along the traditional east-west axis, sloping downwards from the ceremonial doors to the altar. This gentle descent encourages the curious and the reluctant alike to approach the space's focal point. In Lewerentz's words, it is intended "to help the doubtful towards the communion table."[4] Every few minutes, a drop

Fig. 08-10 Sigurd Lewerentz, entry sequence vignettes, Saint Peter, Klippan, 1966. Drawings by author, 2019.

Fig. 11-12 Sigurd Lewerentz, marraige chapel, Saint Peter, Klippan, 1966. Photograph by author, 2019.

of water falls from the christening font into a crevice in the floor. The sound of rhythmic, subdued drops frames the silence. The shadowy overhead vaults bounce sound evenly and crisply around the church, with surprisingly little echo. Noise emitted from the direction of the altar sounds equally loud anywhere in the nave.

3.2 Focused Illumination

Saint Peter utilizes light sparingly and to great effect. The low and cavernous nave is filled primarily with shadow, reinforced through contrast with the purposeful light sources. The sources fall under three general categories: natural direct glow, indirect specific illumination,

illumination, and warm points of artificial illumination.

All artificial illumination in the primary volume exists below a height determined by the pendant lamps. Warm bulbs housed in dark metal fixtures float at a relatively consistent set height, glowing like a dim constellation against the dark brick ceiling (fig. 14). The only illumination which comes from above these is recessed in deep skylights, which are difficult to see from the interior. During services, the lamps and a row of candles must be lit in order to provide adequate illumination, as only four windows are visible within the nave (fig. 13). In contrast to the glittering light of candles and pendents, these windows brighten the nave with strong and volumetric washes of daylight. The bright natural light that they emit into the church illuminates

Fig. 13 *Sigurd Lewerentz, points of illumination, Saint Peter, Klippan, 1966. Anders Clausson lighting candles during tour. Photograph by author, 2019.*

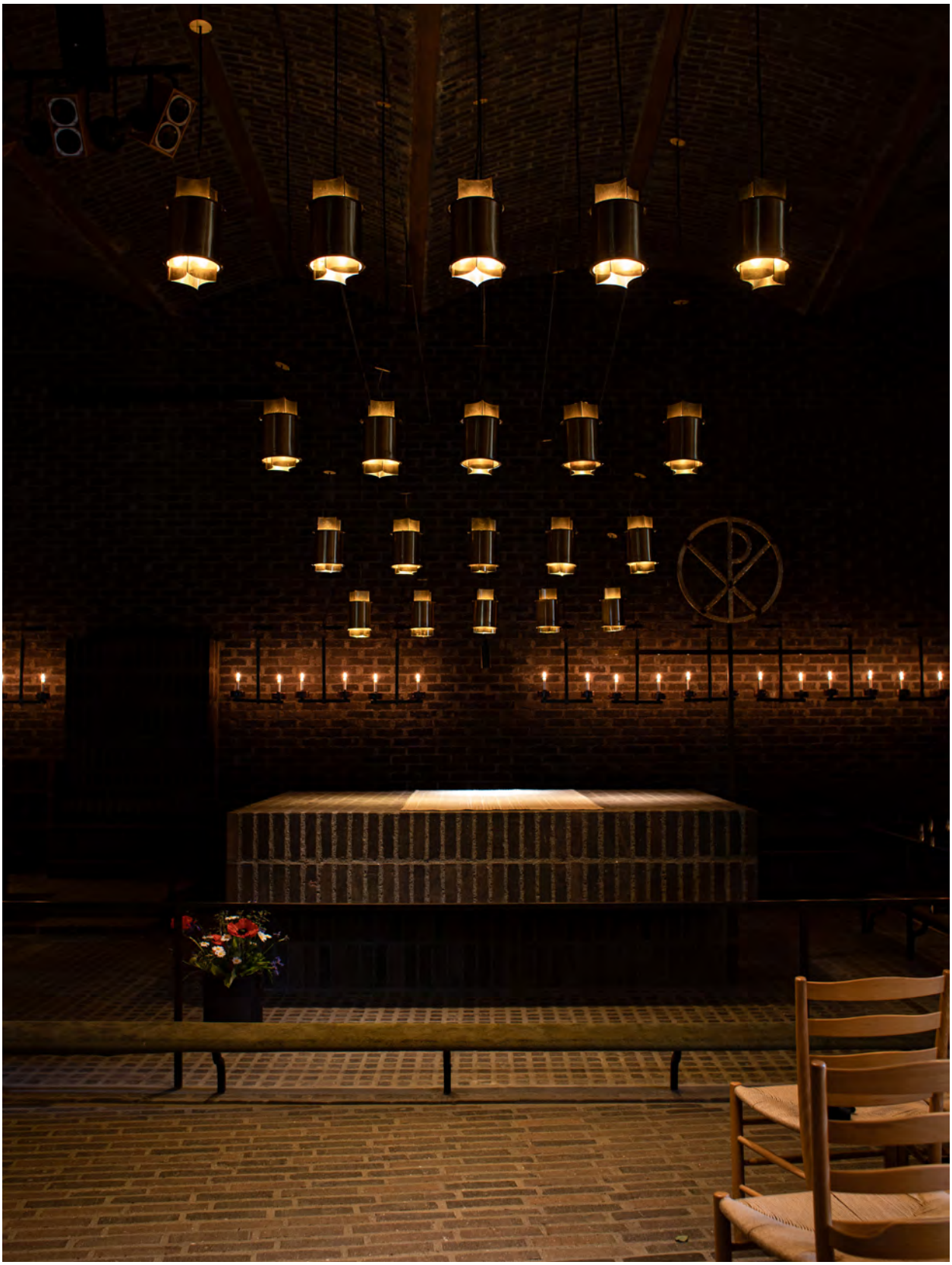

Fig. 14 *Sigurd Lewerentz, pendant lamp constellation, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

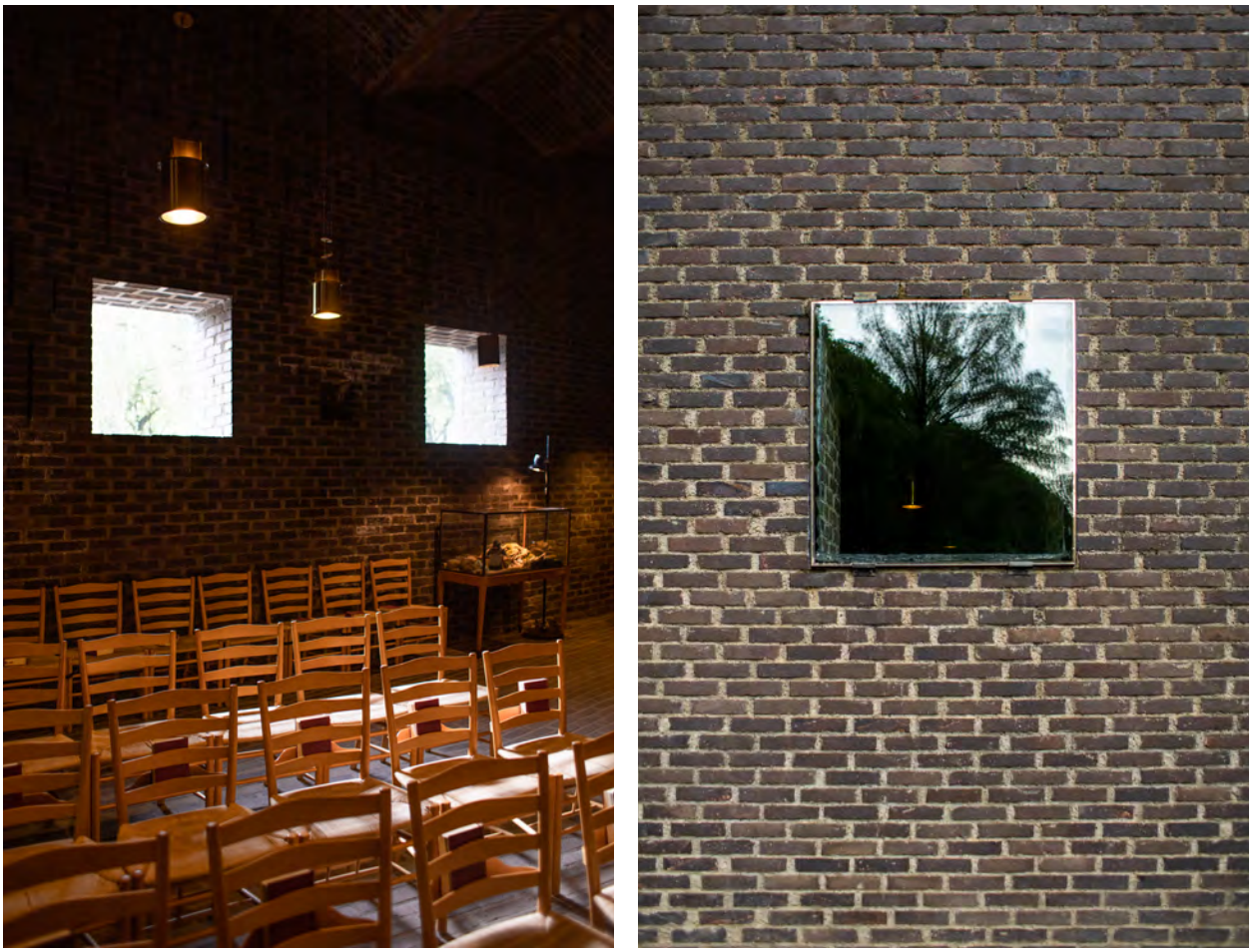

Fig. 15-16 Sigurd Lewerentz, primary apertures, Saint Peter, Klippan, 1966. Photograph by author, 2019.

the imperfection in the brick, highlights the finish on the chairs, and leaves the space beyond its edges in richly textured shadow. Located high in the walls, the windows permit views to the exterior which are directed skyward, just barely capturing the surrounding trees (fig 15). The apertures in the walls are read as deep punctures through the stereotonic mass of the wall. Unbroken panes of mirrored glass are fixed to the exterior brickwork, bypassing the opening edges and concealing the frame from the interior (fig. 16). Without any orienting frames or mullions, the view of the exterior appears completely unobstructed. The language changes only slightly along the L-shaped community and administration

Fig. 17 *Sigurd Lewerentz, exterior windows along the offices, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

building, which possess a larger number of horizontal windows closer to eye height (fig. 17).

The procession of the clergy from sacristy to the altar is illuminated by a set of deeply recessed skylights (fig. 18). This route travels parallel to the front of the congregation, following a path of light which begins at the sacristy door and terminates in front of the altar. While the wall apertures are objectified and observable, the skylights are implemented solely to illuminate a path. Here, natural illumination is being employed to highlight activity and key moments in the service, while its source is completely concealed. Lewerentz's deft, sparse, and intentional control of illumination would be reflected in his material selections.

Fig. 18 Sigurd Lewerentz, illuminated processional, Saint Peter, Klippan, 1966. Overhead skylights light the path of the priest. Photograph by author, 2019.

Fig. 19–20 Sigurd Lewerentz, brick details, Saint Peter, Klippan, 1966. Photograph by author, 2019.

3.3 Expressive Masonry

In Saint Peter, Lewerentz famously refused to break bricks, even to navigate corners. His insistence on using whole bricks drove many decisions about the form, and every change in plane reflects this. Brick production and construction has a proud history in Scandinavian design, and Lewerentz was showing his mastery of the material by challenging traditional construction methods (fig. 19). The entire structure is composed out of material rejected by the factories in nearby Helsingborg. The rough and banal masonry units are left whole, unbroken and uncut at corners and unique moments. Thick durable mortar, as expressive as the brick itself, fills the inevitable voids (fig. 20). Lewerentz purposefully used the roughest bricks he could acquire. The contrast in color between mortar and ragged stone reinforces that each brick is flawed but complete, a metaphor for the members of the church. These same materials are molded to create volumes and voids for the bishop's chair, altar, lectern,

Fig. 21 *Sigurd Lewerentz, Antonius Cross structure, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

and christening font. The careful craft and design of these elements is legible on close inspection, and reveals a mastery of masonry.

In addition to the walls and programmatic artifacts, purposeful brickwork composes the ground planes and ceiling form. Each room bears a different floor pattern, in contrast to the uniformity of the walls. The brick vaults are held up by a pair of transverse iron beams, themselves supported by a massive t-cross of the same material (fig. 21). All the structural iron pieces are left raw and rusting. Their patina brings them closer in coloration to the bricks they support. The vaults are slightly elevated above the pronounced structure by rods, creating the impression that they are floating.[5] The unified material palette evokes a primitive cave, and the patina on the steel and texture of the bricks craft a sense of timelessness in the space.

3.4 Considered Additions

The craft and intention on display in Saint Peter carries over into the furniture, hangings, and fixtures. Each artifact makes a specific contribution to the atmosphere of tranquility and reverence. Though unique in material, the fixtures are not additive. Many have physical ramifications on the space, such as the expressed piping, which weaves precisely across the front of the brick, and the integrated christening font, which causes the bricks in the floor (fig. 22). The lighting fixtures were designed by Klint, and they are unique to the rooms that they occupy. The most predominant are the cylindrical pendant lanterns which fill the nave. These are aggregated over significant programmatic elements including the altar and christening font, creating atmospheric hierarchy within the open room. Next to the altar sits an iron cross wrought by

Fig. 22 *Sigurd Lewerentz, christening font and bowed floor, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

Fig. 23 *Sigurd Lewerentz, iron cross wrought by Robert Nilsson, Saint Peter, Klippan, 1966. Photograph by author, 2019.*

Fig. 24-25 Sigurd Lewerentz, passion and resurrection tapestry, Saint Peter, Klippan, 1966. Designed by Sven Erixon, woven by by Barb Nilsson, Photograph by author, 2019.

Robert Nilsson. It is embedded with five red stones, which symbolize the five wounds of Christ (fig. 23). The most pervasive addition to the nave is the presence of woven chairs. These are one of the few pieces in Saint Peter not designed or commissioned by Lewerentz himself. Rather, they are the work of Danish architect Kaare Klint, slowly perfected over years of study and craft for use in his churches (fig. 26-29). Here, as in many of the churches of Klint, they stand as a bright, mobile, tectonic juxtaposition to the stoic masonry.

Above the chairs which sit to the right facing the altar is a large and colorful tapestry. Designed by Professor Sven Erixon and woven by

Fig. 26-29 Sigurd Lewerentz, the Church Chair by Kaare Klint, Saint Peter, Klippan, 1966. Photograph by author, 2019.

Fig. 30-32 Sigurd Lewerentz, selected artifacts, Saint Peter, Klippan, 1966. Photograph by author, 2019.

Barbro Nilsson, it possess a scarlet "passion" side and a blue-hued "resurrection" side (fig. 24-25). The soft, bright fabric offers a powerful contrast to the dark brick, and colors the light around it. Another tapestry woven by Barbro Nilsson hangs in the community hall, connecting it graphically to the nave fig. 30). The sacristy contains two artifacts which stand in stark contrast to the backdrop of humble brick. The first is an ivory crucifix from sculptor Christian Berg, which rests on a built-in preparatory altar. The second is a painting of Petrus by Swedish surrealist Erik Olsson, which sits directly across the room from the crucifix. (fig. 31-32) They are intentionally placed so at least one is always in view. In such a small space, they soften the texture of the room's interior.

4 | Conclusion

The composition of thoughtful sequence, focused illumination, expressive masonry and construction, and intentional additional fixtures generates an atmosphere which is hallowed yet welcoming. Saint Peter of Klippan is a carefully constrained exercise in pushing a few materials and details to their limits. The result is palpable craft and an aura of timelessness.

Notes

1. Anders Clausson, "Facts," *Sanktpetrikyrka.se*, 2007, Accessed November 3, 2019. www.sanktpetrikyrka.se/english.html.
2. Diagram by author, underlay from Google Earth.
3. Clausson, "Facts," *Sanktpetrikyrka.se.*
4. Clausson, "Facts," *Sanktpetrikyrka.se.*
5. Peter Blundell Jones, "Sigurd Lewerentz: Church of St Peter, Klippan, 1963–66," *arq: Architectural Research Quarterly* 6, no. 2 (2002): xx, https://doi.org/10.1017/S1359135502001628

04 GRUNDTVIG'S CHURCH

P. V. JENSEN-KLINT | COPENHAGEN, DENMARK | 1940

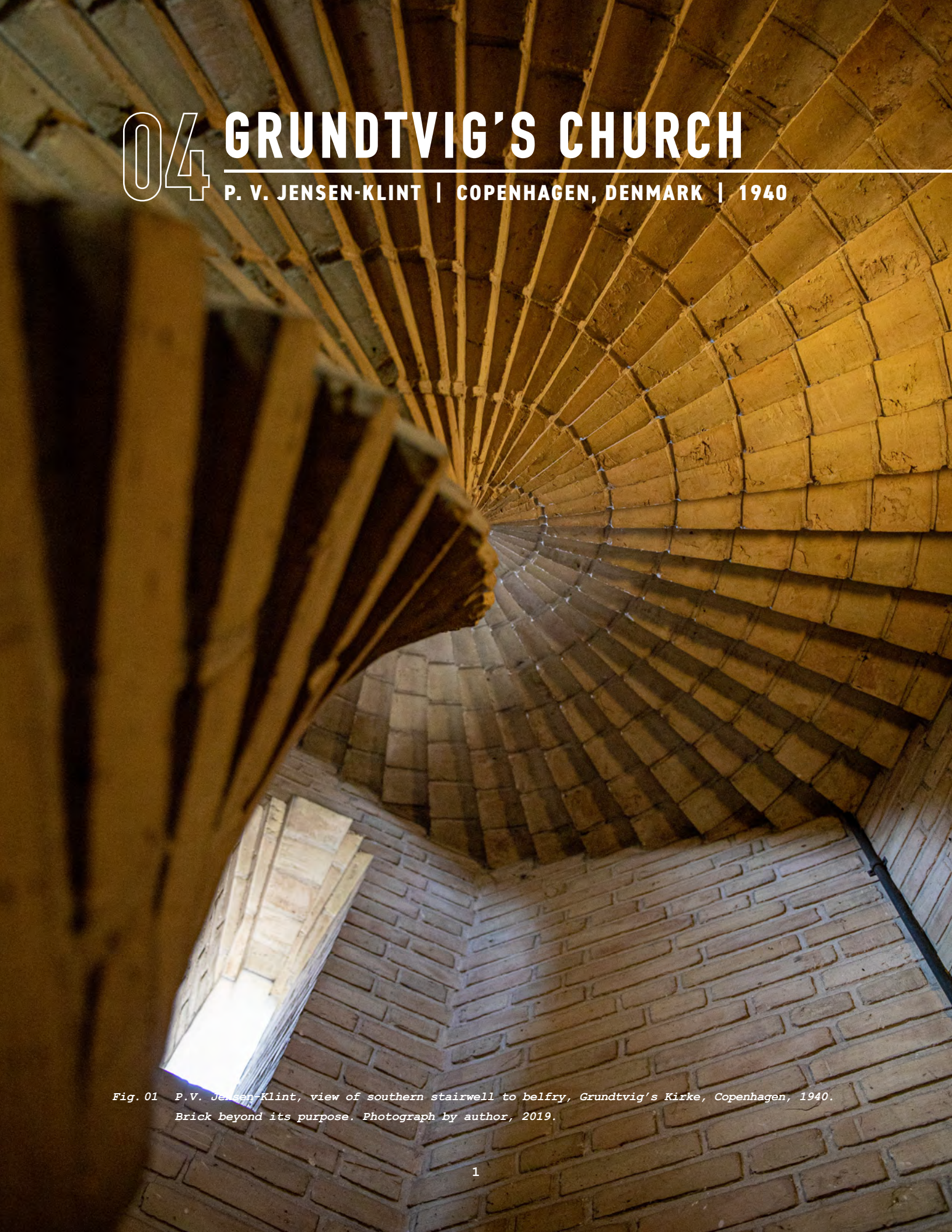

Fig. 01 P.V. Jensen-Klint, view of southern stairwell to belfry, Grundtvig's Kirke, Copenhagen, 1940. Brick beyond its purpose. Photograph by author, 2019.

Grundtvig's Church

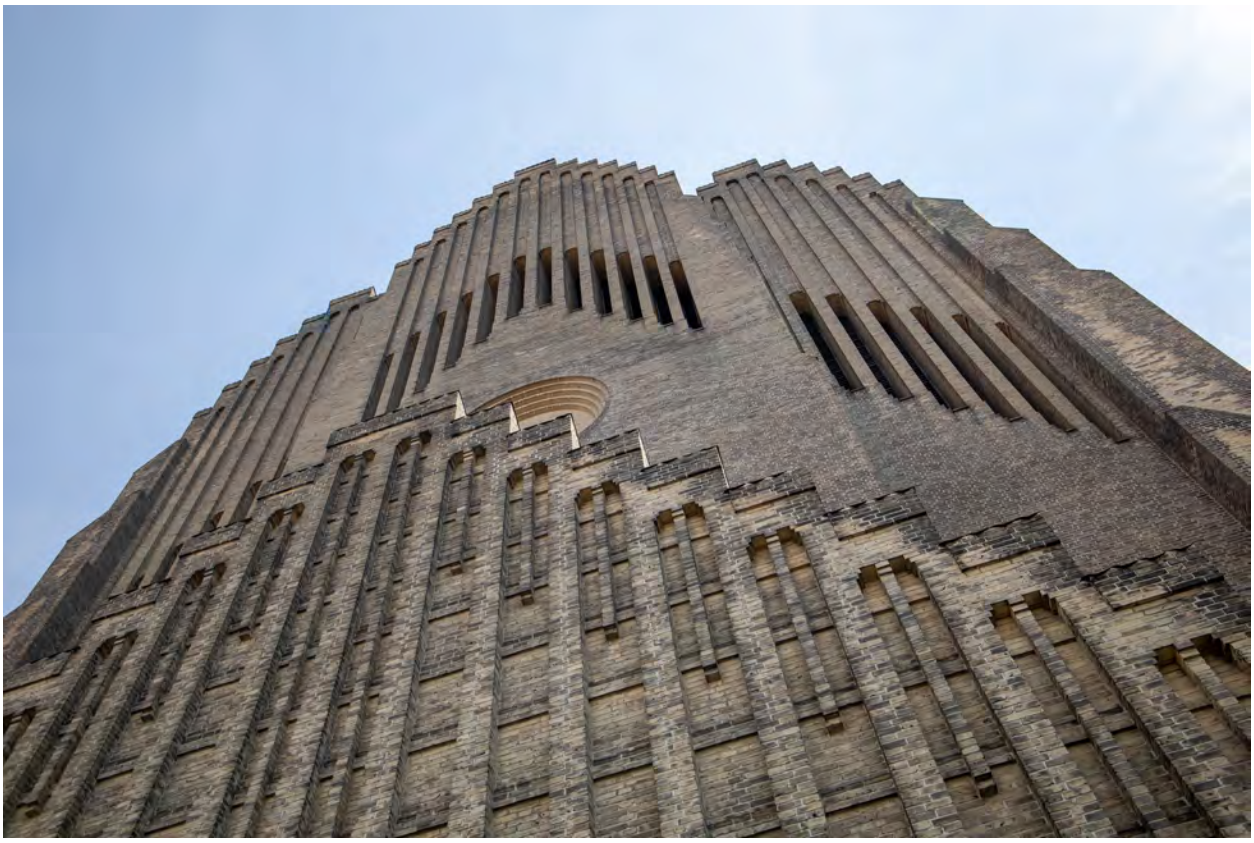

Fig. 02 *P.V. Jensen-Klint, the scaled up country church, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

01 | Introduction

> "Finally there is a work that is destined to stand for centuries, a poem in lime and brick that will touch hearts and attract admiring eyes to itself generation after generation." - Jeppe Aakjær[1]

Located just north of Copenhagen's city center looms a monument to Denmark's craftsmanship and to one of its most beloved historical figures. Completed in 1940 after sixteen years of construction, Grundtvig's church was designed in 1924 by Peder Vilhelm Jensen-Klint as a memorial to the author, historian, philosopher, pastor, poet,

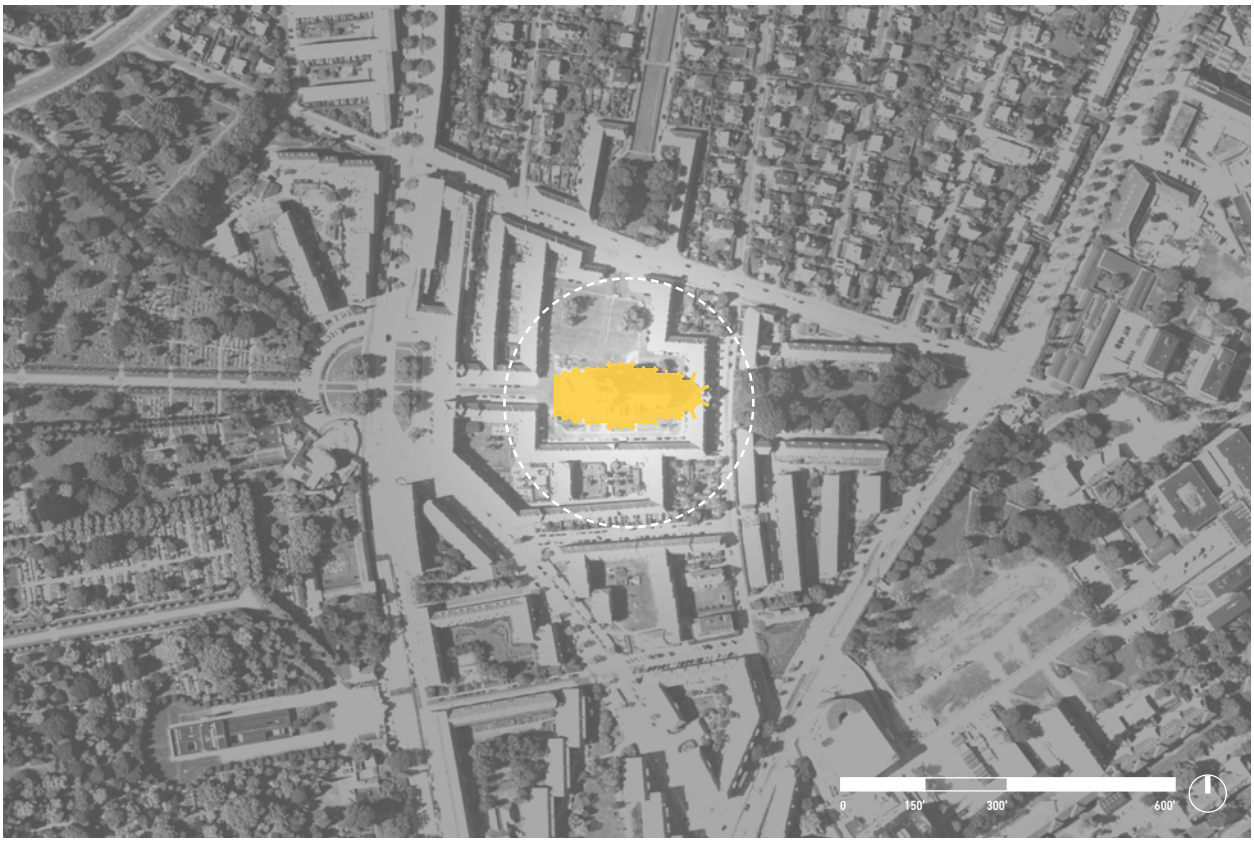

Fig. 03 *P.V. Jensen-Klint, site plan, Grundtvig's Church, Copenhagen, 1940. Diagram by author, 2019.*[2]

and teacher Nikolaj Frederik Severin Grundtvig (1783-1872).[3] In material and formal motifs, Klint referenced the country churches found in Grundtvig's home of Zealand (fig. 02). Klint's expressionist take on a Gothic cathedral translates the form and scale of the medieval church into the Scandinavian architectural language. Nearly six million identical hand-smoothed bricks and tiles aggregate to compose an ethereal space of worship and repose (fig. 04). The warm monochrome of its uniform brick materiality captivates and disorients, inspiring awe in its scale and precision. Gothic scale and Scandinavian minimalism merged to sculpt a space set apart from time.

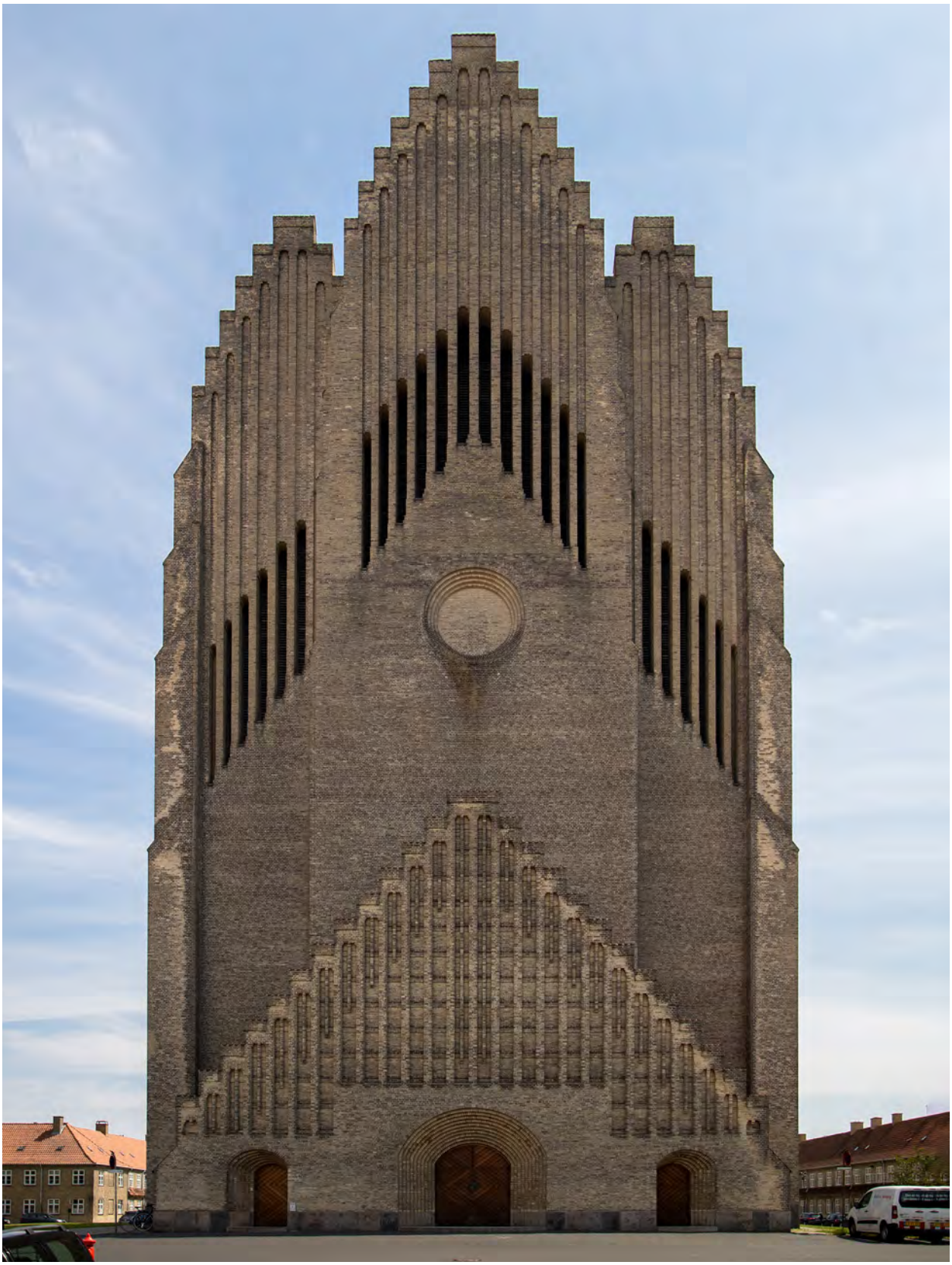

Fig. 04 *P.V. Jensen-Klint, six million bricks, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

Fig. 05 *P.V. Jensen-Klint, the crypt, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

02 | History

2.1 The Monument

Following the death of N. F. S. Grundtvig in 1972, the residents of Copenhagen called for the construction of a memorial. Danish sculptor Rasmus Bøgebjerg proposed a statue design in 1905, but in 1911 its humble scale was deemed insufficient to honor the national hero. In 1912 and 1913, a committee led by Sigurd Müller held competitions for a memorial to Grundtvig. Participants included sculptors Rudoph Tegner, Niels Skovgaard, Niels Hansen Jacobsen, Rasmus Harboe and historian Vilhelm Wanscher. Architects Peder Vilhelm Jensen-Klint and Ivar Bentsen also submitted a proposal for a memorial hall with

a statue of Grundtvig at Bispebjerg cemetery. Niels Hansen Jacobsen proposal for a statue won first place, and Klint and Bentsen's design was awarded second place. In addition to their joint proposal, Klint submitted a sketch for a massive church, which ignored competition guidelines of budget and scale.

After further discussion, the jury was so intrigued by the sketch that they elected to forego their original decision and awarded the project to P. V. Jensen Klint, trusting the inhabitants of Copenhagen and the government to provide continued support and financial aid. Their assumption was well founded, and the city of Copenhagen came

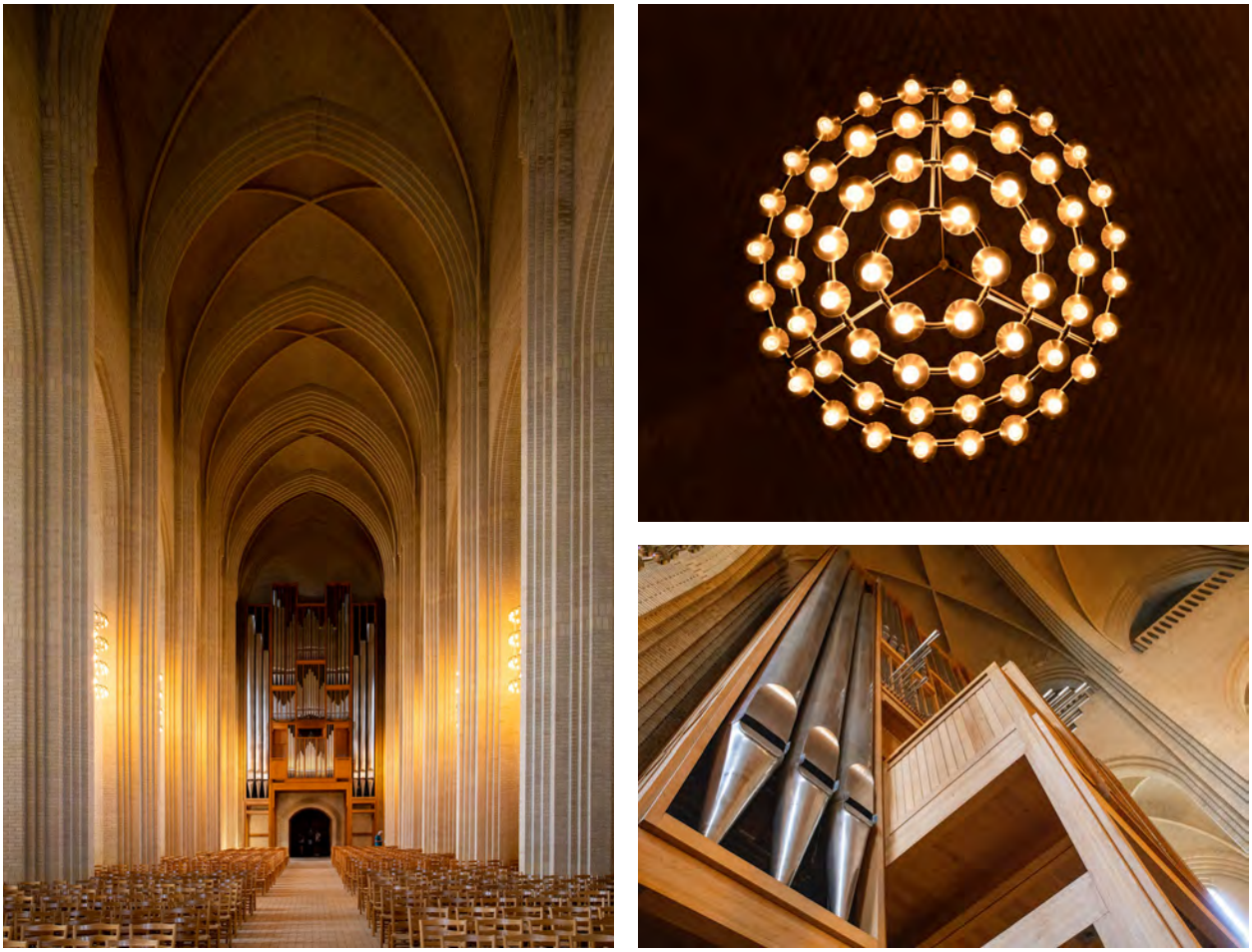

Fig. 06-08 P.V. Jensen-Klint, Esben Klint Marcussen & Søn Organ, Grundtvig's Church, Copenhagen, 1940. Fixtures and finishings. Photograph by author, 2019.

together in ready support of the massive church. In 1921, following World War I, the foundation was laid, and in 1924, construction began on the buildings immediately surrounding the site. These were masterplanned and designed by Klint as well. In 1926, the bell tower portion of the church was completed, and in 1927 it was inaugurated as a temporary parish church bearing the name Grundtvigs Minde-Kirke (Grundtvigs Memorial Church). This mirrored the lengthy construction and inauguration process of Gothic churches such as the Cologne Cathedral. Klint dedicated the remainder of his life to the project, and spent nearly every day on site. He was accompanied by a handful of master masons, who worked full-time preparing and laying bricks.

In 1930, Peder Vilhelm Jensen-Klint died. Work was carried on by his son Kaare Klint, who was by this time an established architect in his own right, with the help of Valdemar Jørgensen. The innermost buildings of the surrounding residential complex were completed in 1936, establishing the first of what would become several iconic vistas That same year, its name was shortened to Grundtvigs Kirke (Grundtvigs Church). In 1940, the church was completed, and Kaare Klint worked with Marcussen & Søn Organs to design and build an organ into northern side of nave. Fifteen years later, in 1965, Marcussen & Søn installed a larger organ at the western end of nave. The facade of this organ was drawn by Esben Klint, son of Kaare Klint. All told, three generations of the Klint family would contribute to the design, completion, and upkeep of Grundtvig's Church.

Fig. 09 *P.V. Jensen-Klint, Bispebjerg axis, Grundtvig's Church, Copenhagen, 1940. Diagram by author, 2019.*

2.2 On the Hill

Grundtvig's Church was ultimately sited in the then undeveloped Bispebjerg fields. This meant that the church could be oriented independently of the city fabric along a traditional east-west axis. The church was located on the second highest topographic point in Copenhagen. Any future building developments could be designed to harmonize with the building and preserve its view corridors (fig. 11). As construction on the church began, proposals were drawn for a primarily two-story, residential complex designed by P. V. Jensen-Klint with the help of Vilhelm Wittrup, Charles I. Schou and Georg Gøssel (fig. 10). The precision of these drawings paralleled the care

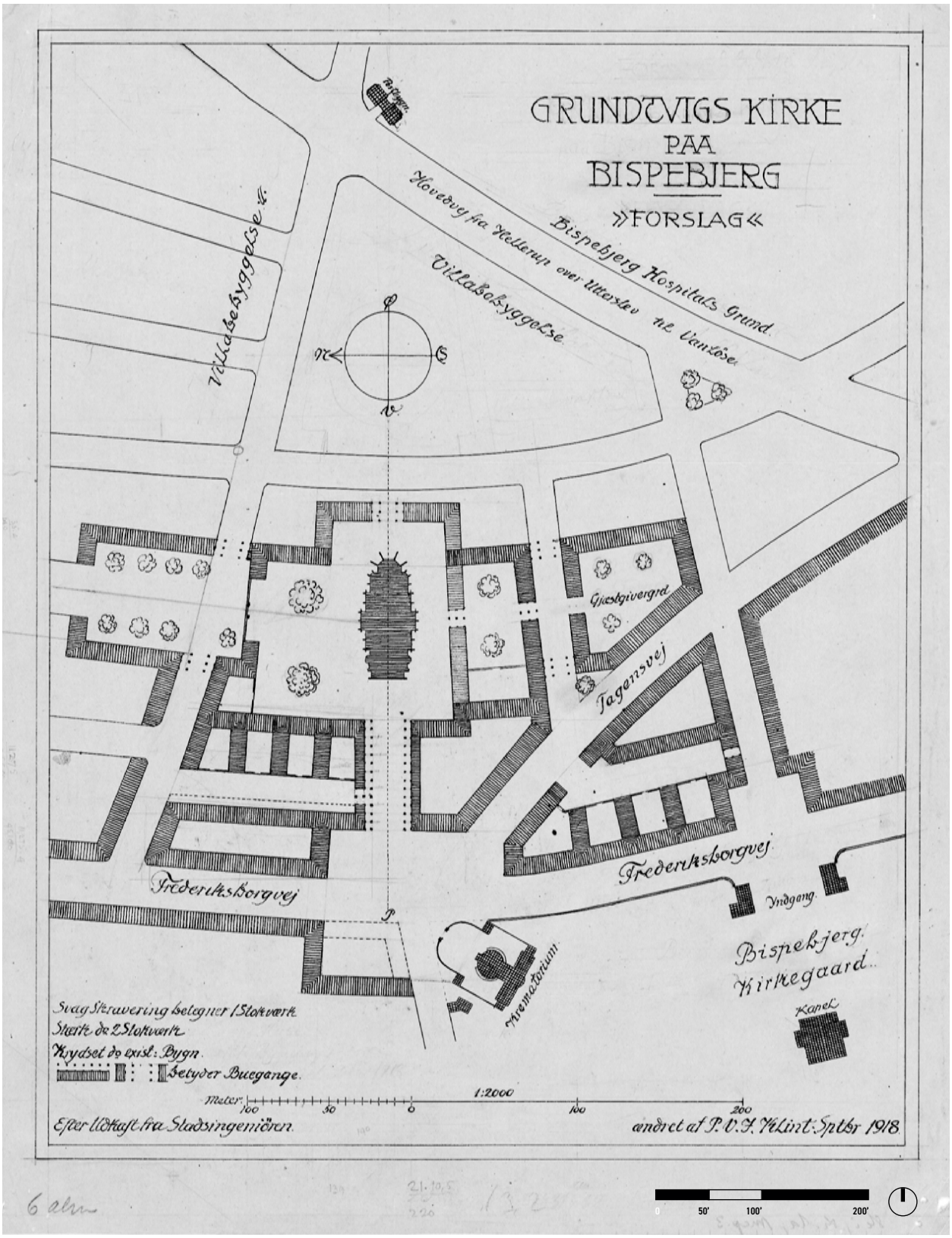

Fig. 10 *P.V. Jensen-Klint, plan of På Bjerget, Grundtvig's Church, Copenhagen, 1940. Drawing by Charles J. Schou, 1918.*[4]

taken in those for the church, considering even signage and street lighting. This community would surround the church in a manner reminiscent of a medieval town at the foot of a cathedral. From its conception, this area was known as På Bjerget, which translates to "On the Hill."

In its formal composition, siting, and impact, Grundtvig's Church revives the Gothic tradition of church as instigator and organizer of its surroundings. The symmetrical context creates a lengthy viewing axis, and is similar in layout to a Roman Templum plan.[5] As the buildings in På Bjerget approach the cathedral, they step down in scale. (fig. 09) This enhances the perceived scale of the church with relation to its surroundings. These and future expansions would all utilize the characteristic yellow brick employed in the church's construction. Klint was intrigued by and acutely aware of this revived condition. In a 1918 manuscript entitled Hvor *skal Grundtvigs Kirke ligge*, He remarked:

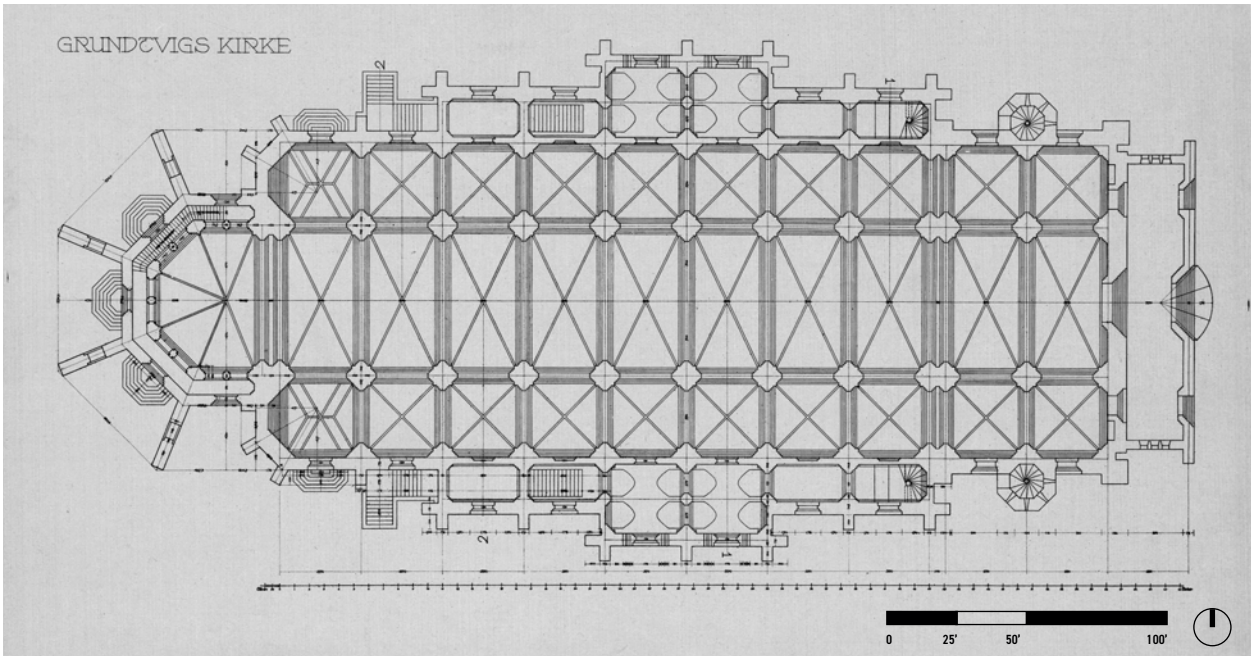

Fig. 11 *P.V. Jensen-Klint, plan of church, Grundtvig's Church, Copenhagen, 1940. Drawing by P.V. Jensen-Klint, 1918.*[6]

Fig. 12 *P.V. Jensen-Klint, entry sequence, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

"The Danish village church, as a mother of the Grundtvig Memorial Church, has its natural place on a hill from which one can see great distances…What is important is that the Grundtvig Memorial Church has finally found its monumental place on the highest site, in keeping with old traditions, with the tower on the west, the chancel on the east, and will itself help shape the surroundings, its city, just as churches and cloisters did in the old days."[7]

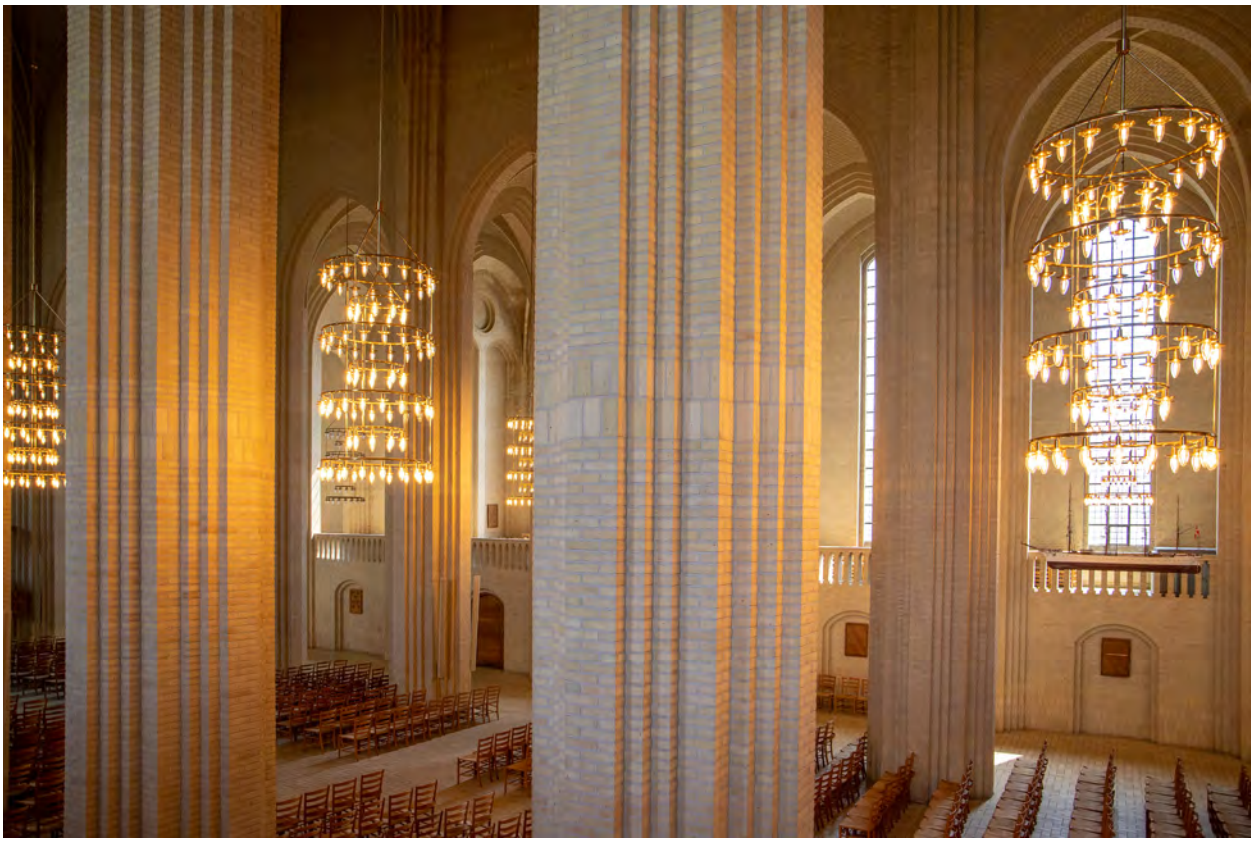

Fig. 13 *P.V. Jensen-Klint, inner radiance, Grundtvig's Church, Copenhagen, 1940. Diagram by author, 2019.*

03 | Experience

3.1 Symmetry and Sequence

The introduction to Grundtvig's Church begins at the far end of the Bispebjerg Cemetery. An axis which runs parallel to the church nave extends nearly a mile in front of the building, cutting through the cemetery. Its approach is bisected by a road which separates the cemetery from the neighborhood of På Bjerget, providing a moment's pause before transiting from vegetation to brick. Diminishing building scale around the church pushes the already impressive tower's profile further skyward. The effect is enhanced by the vertical recesses and striations in the uniform brick exterior. Often no deeper than a

a brick, these allow for just enough play of shadow to read the facade as a layered surface (fig. 12).

In contrast to the Mariendom and Saint Peter's, the sequence within Grundtvig's Church is relatively straightforward. Its traditional cruciform layout hearkens back to the Cologne Cathedral. This is a sequence constructed around one key moment, the initial view down the nave (fig. 14). Every step leading up to that moment is an extension or tributary feeding into that space. The side aisles are slanted, asymmetric versions of the nave, which are angled to feed you back in to the center. More than any other church discussed in these essays, Grundtvig's Church is a celebration of symmetry.

Fig. 14 *P.V. Jensen-Klint, nave along axis, Grundtvig's Church, Copenhagen, 1940. Diagram by author, 2019.*

Fig. 15 *P.V. Jensen-Klint, ethereal form, Grundtvig’s Church, Copenhagen, 1940. Photograph by author, 2019.*

Fig. 16 *P.V. Jensen-Klint, fixtures and shadows, Grundtvig's Church, Copenhagen, 1940. Diagram by author, 2019.*

3.2 Ethereal Form

> "(Klint's) work was moving toward a merging of his three life-long artistic goals: a crystalline regularity in the organism, a Classical simplicity in the composition, and a consistency of material in the whole - Antiquity and the Gothic united in the image of the crystal."[8]

Grundtvig's Church unties traditional cathedral form with brick expressionism (fig. 15). Gothic architecture stressed its structure and the negative space between columns and supports to make the interior feel light and airy. Klint's use of visually lighter and soft material, thicker walls, and narrower windows challenges this airy notion (fig. 17).

Exterior elevation *Interior elevation* *Section*

Exterior elevation *Interior elevation* *Section*

Fig. 17-18 Watercolor sketches juxtaposing Grundtvig's Church and the Cologne Cathedral. Drawings by author, 2019

Fig. 19-20 P.V. Jensen-Klint, side aisle and dissolving scale, Grundtvig's Church, Copenhagen, 1940. Photographs by author, 2019.

The nave and aisles fell like subtractions from a solid mass (fig. 19). Feelings of lightness and verticality are developed through the diminishing legibility of the individual bricks as they rise skyward (fig. 20). The surfaces are textured in a manner which is too minimal to be decorative and too layered to be minimalist. Klint omitted the transept observed in so many Gothic churches, opting for an unbroken march of columns in both the aisles and the nave.

Fig. 21 *P.V. Jensen-Klint, repetition, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

Fig. 22-26 P.V. Jensen-Klint, material palette, Grundtvig's Church, Copenhagen, 1940. From left: interior, exterior, neighboring structures, interior floor, exterior paving Photographs by author, 2019.

3.3 Texture and Tone

> "The finely smoothed bricks enabled a precision that has probably never before been achieved in brickwork, yet there is no hardness about the material; 'firm but soft' was an expression that my father favored." - Kaare Klint at Grundtvig's Church topping-off ceremony, 1933[9]

Grundtvig's Church epitomizes the intimate attention to detail typical of Scandinavian architecture. The omnipresence of the brick as a base unit of design is a cultural characteristic, but both Saint Peter and Grundtvig's Church push Danish brickwork to unprecedented places. Were Lewerentz intentionally worked with the humblest, roughest bricks he could find, Klint demanded uniformity, quality, and precision across a tremendous scale. The result is as impressive and overwhelming and Saint Peter is humble and haunting.

The burnt surfaces of the bricks were sanded by hand, to give the space softer acoustics. The surface of every brick was hand-polished to geometric perfection by a craftsman before it was placed. In contrast to Sigurd Lewerentz's masterwork Sankt Petri, the tooling of the mortar and the placement of the brick is as precise, smooth

and clean as possible. The polishing resulted in many tiny scratches which cover the surface of each brick. Klint wanted to "reveal the interior" of the material utilized in his church.[10] In the case of the bricks, this reveal was literal, as the bricklayers scratched off the exterior burnt layer of every brick. This increased the rate at which the exterior bricks gained their distinctive grey patina (fig. 22-26). The composition of millions of scratches prevents light from reflecting off of the bricks in the interior, resulting in the impression of light being absorbed. The brick surface appears deep and thick rather than a mere surface. This helps soften the reverberating echoes. (fig. 27) Grundtvig's Church employs humble material and hand craft on a tremendous scale. Exact drawings were produced showing the location of each brick (fig. 28).

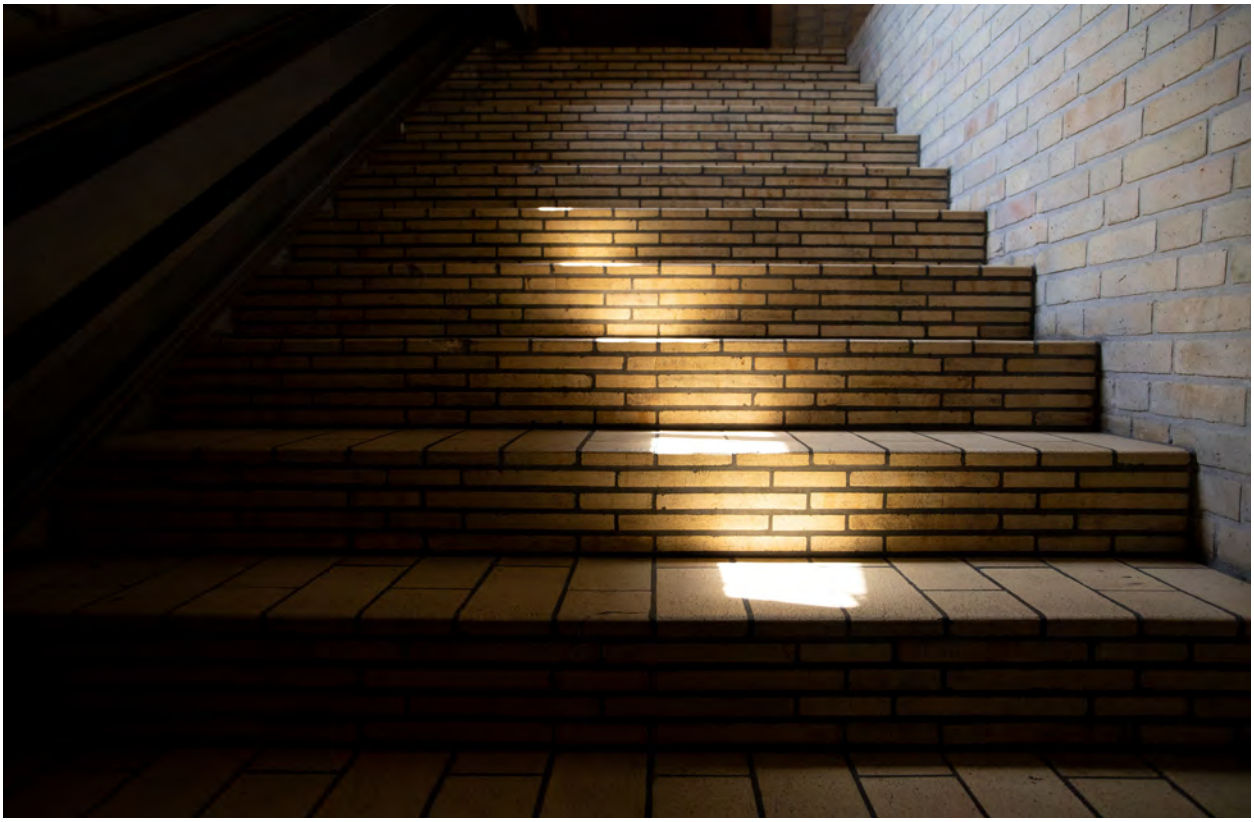

Fig. 27 *P.V. Jensen-Klint, brick absorbing light and sound, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

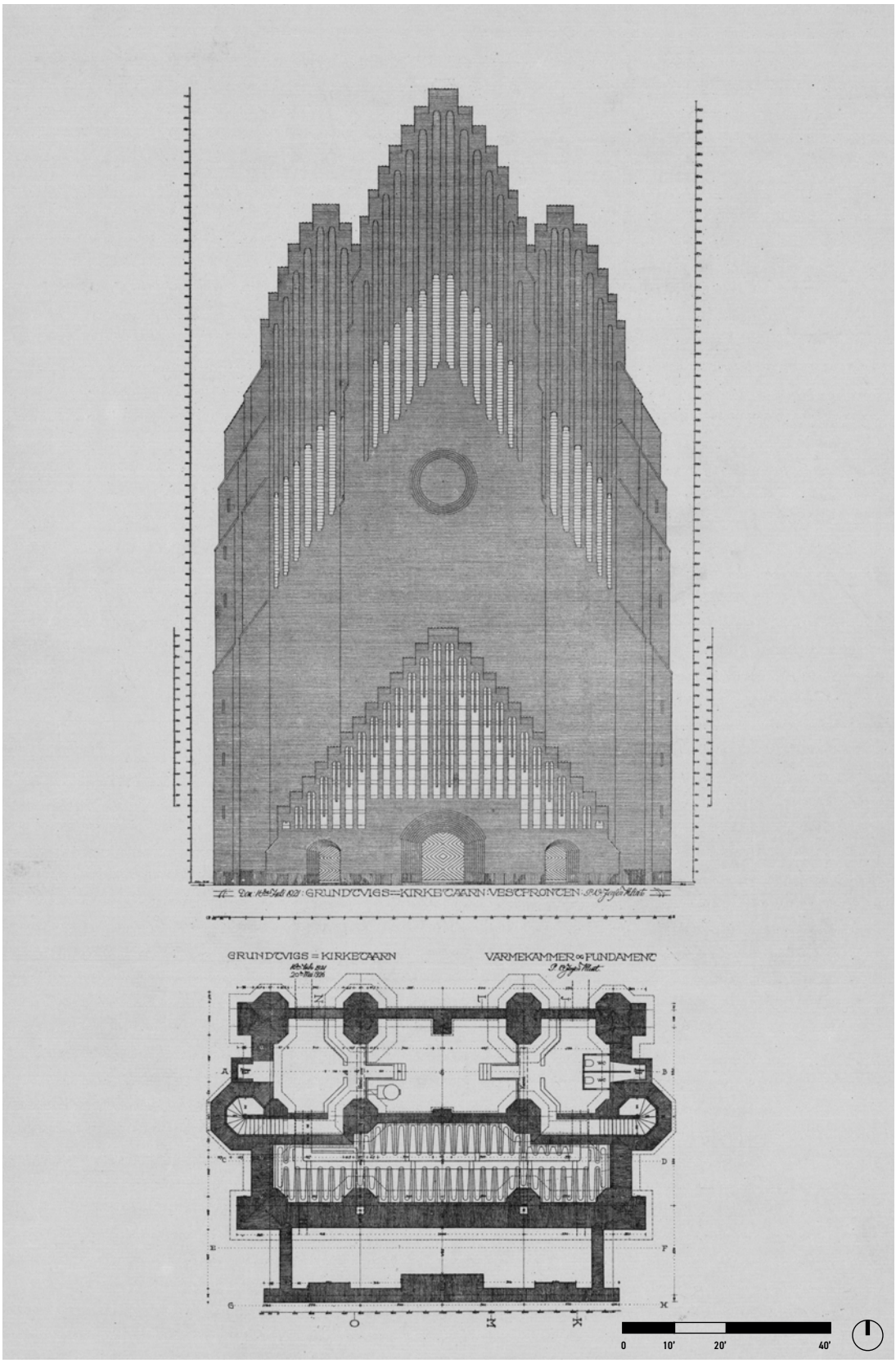

Fig. 28 *P.V. Jensen-Klint, plan and elevation, Grundtvig's Church, Copenhagen, 1940. Drawing by P.V. Jensen-Klint, shows every course on facade, 1921.*[11]

3.4 Acoustics

The echo of footfalls are muffled by the gently textured surfaces. The monotonous marching bricks absorb quiet sounds as effectively as they do sunlight. When I moved by myself through the interior, I felt as though I were observing a dream. My actions seemed to have a negligible impact on the tranquil space around me. However, this experience was preserved only so long as sounds remained relatively quiet. Grundtvig's Church sacrifices acoustic clarity for visual and formal impact. The acoustics are not the ideal for speech, as overlapping and refracting echoes can make loud voices difficult to understand. Klint did not like preaching, but he loved music. The nave was designed to sound best with choral music, which takes advantage of delayed echoes and relies on pulsing, returning rhythm. The placement of the organs is not driven by acoustics but by composition. On their own, they are effective, but the rate at which their music echoes around the nave conflicts, resulting in discordant overlapping sound when they are played at the same time. Klint drew inspiration from his research into catholic churches, although he never visited any of the Gothic cathedrals. When a choir accompanies the organ, they singers must stand as close to the organ as possible so their voices refract and reflect at the same rate.

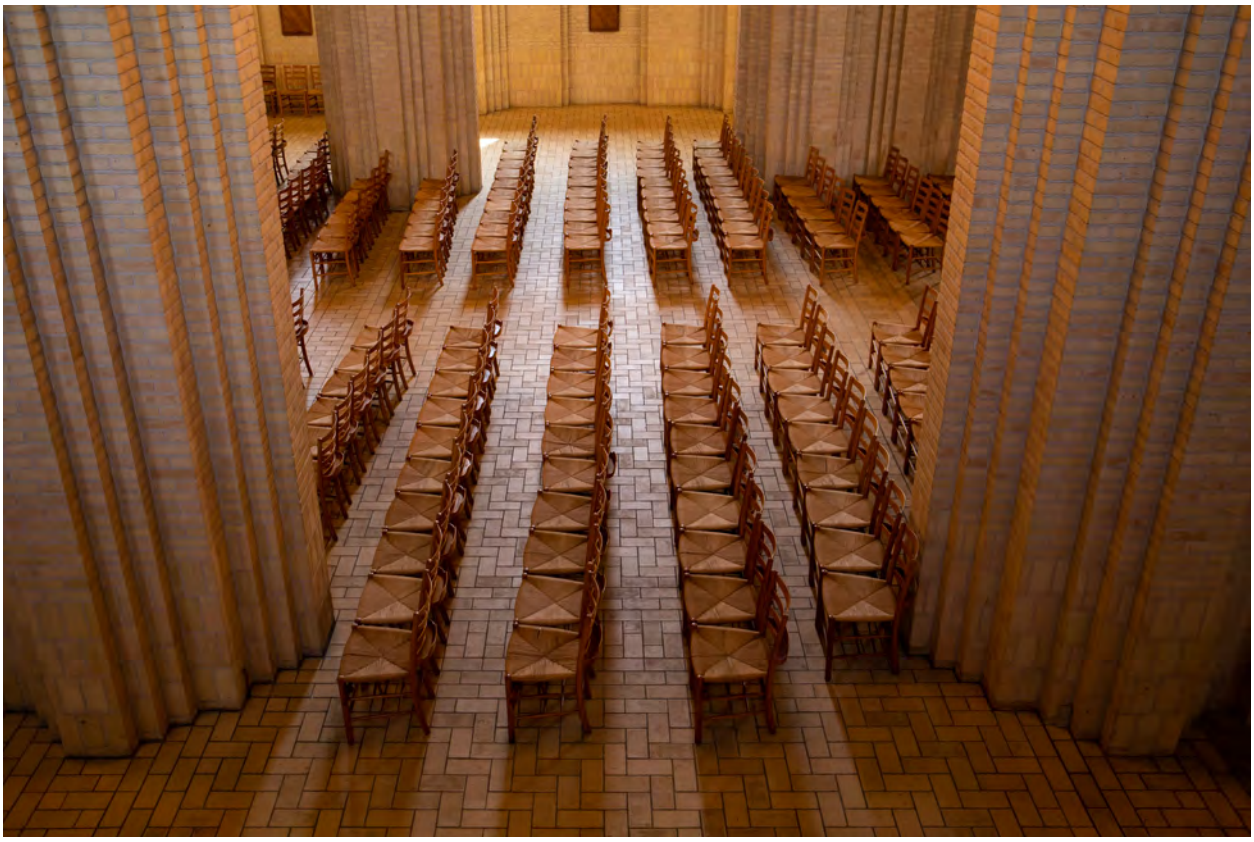

Fig. 29 *P.V. Jensen-Klint, marching uniformity in chairs, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

3.5 Intentional Interventions

Despite its massive scale, the minimal ornamentation in Grundvtig's Church lends it spatial clarity and depth. The moving power of Grundtvig's Church lies in its formal and material simplicity (fig. 29). Interventions take two primary forms: deft variations and patterns within the brick, and the sparse use of secondary materials and essential objects. The few standalone pieces include the baptismal font (fig. 32), which was also designed by P. V. Jensen-Klint, the organs, the roof, the geometrically patterned wooden doors (fig. 33-34), and various custom metal furnishings. The tremendous variation in the brick is dissolved in the monochrome sea of identical pieces.

Fig. 30 *P.V. Jensen-Klint, stair detail, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

Fig. 31-32 *P.V. Jensen-Klint, where arches meet and baptismal font, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*


Fig. 33-34 P.V. Jensen-Klint, intentional interventions, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.

after prolonged viewing do exceptions begin to reveal themselves. Unique moves are most visible in the spiral stairs, (fig. 30) the places where arches meet (fig. 31), and the pulpits.

What today would be considered humble furniture belies tremendous effort and study. Their inclusion in so austere and uniform a space lends the rows of chairs a somber significance. (fig. 35) The chairs which currently populate the nave and occasionally aisles were designed by Kaare Klint, and are staples in many of his churches. Their design may seem tame today, but they are the culmination of a year of study in Southern England and many iterations on the part of Kaare Klint. The design would become so inseparable from church architecture that Sigurd Lewerentz would utilize them in his meticulously curated and designed Saint Peter of Klippan. The light wicker chairs rest like delicate sticks in the nave. When visitors move them, they are immediately straightened by church employees. The result is an eerie museum quality.

Fig. 35 *P.V. Jensen-Klint, somber symmetry, Grundtvig's Church, Copenhagen, 1940. Photograph by author, 2019.*

04 | Conclusions

Grundtvig's church combines the formal strength of traditional Gothic Cathedral Architecture with the craftsmanship and humility of Danish design. The result is beautiful contradiction, a space both austere and welcoming, sparse in furnishings but rich in texture. Klint has craft an ethereal void...monumental, warm, reverent, and timeless.

Notes

1. Thomas Bo Jensen, *P. V. Jensen-Klint: The Headstrong Master Builder* (Copenhagen: The Royal Danish Academy of Fine Arts School of Architecture Publishers, 2009): 328.
2. Diagram by author, underlay from Google Earth.
3. Kaj Thaning and Per Kirkeby, *Grundtvigs Kirke 1990* (Copenhagen: Grundtvigs Kirkes Menighedsråd, 1990).
4. Jensen, *P. V. Jensen-Klint*: 297.
5. Jensen, Thomas Bo (Head of Research at the Aarhus School Architecture, Scholar on P. V. Jensen Klint), interviewed by Henry Savoie, Copenhagen, June 17, 2019.
6. Jensen, *P. V. Jensen-Klint*: 299.
7. Jensen, *P. V. Jensen-Klint*: 292.
8. Jensen, *P. V. Jensen-Klint*: 292.
9. Jensen, *P. V. Jensen-Klint*: 360.
10. Jensen, Interview, June 17, 2019.
11. Jensen, *P. V. Jensen-Klint*: 300.

05 BACK MATTER

CONCLUDING THOUGHTS + RESOURCES

Fig. 01 Peter Zumthor, Kolumba Museum, view of primary stairwell, Cologne, 2007. Ascending place. Photograph by author, 2019.

Concluding Thoughts

Most buildings today have a limited capacity to engage their occupants beyond their base program and function. Our expectations can shape our experience, particularly when they are defied. Buildings have the potential to stir emotion, heighten awareness, and become immersive experiences. What people contribute to these places big part of atmosphere. Atmosphere is also a funtion of factors beyond our control. I want to design architecture which moves its occupants. My experience through Aydelott has inspired me to continue to delve into how architecture can shape atmosphere.

Interviews

Bryan, Conner. (project designer at Trahan Architects), interviewed by Henry Savoie, New Orleans, October 7, 2019.

Clausson, Anders (photographer and scholar on Saint Peter in Klippan), interviewed by Henry Savoie, Klippan, June 10, 2019.

Göritz, Hansjörg (architect and professor at the University of Tennessee Knoxville, scholar on the Cologne School of Architecture), interviewed by Henry Savoie, Auburn, AL, October 20, 2019.

Hall, Matthew (professor at Auburn University, scholar on Sigurd Lewerentz), interviewed by Henry Savoie, Auburn, AL, October 12, 2019.

Jensen, Thomas Bo (Head of Research at the Aarhus School of Architecture, Scholar on P. V. Jensen Klint), interviewed by Henry Savoie, Copenhagen, June 17, 2019.

Kohnen, Jens (urban designer in Cologne), interviewed by Henry Savoie, Cologne, June 2, 2019.

Langel, Sandra (history guide in Cologne), interviewed by Henry Savoie, Cologne, June 3, 2019.

Nelson, Anne-Marie (priest at Saint Peter in Klippan), interviewed by Henry Savoie, Klippan, June 12, 2019.

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