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Student:

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Mentor:

Jeff Shannon

Buildings:

1. Trenton Bath House by Louis Kahn in Ewing Township, NJ.
2. First Unitarian Church of Rochester by Louis Kahn in Rochester, NY.
3. Salk Institute for Biological Studies by Louis Kahn in La Jolla, CA.
4. Library at Exeter Academy by Louis Kahn in Exeter, NH.

Institution:

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Pragmatics and ephemerality in architecture

In defending a claim of superior architecture, one must first differentiate between mere construction and architecture. Building, banal construction, exists only to provide shelter and accommodate the contents of a given program, often in the most economical- and consequently least elegant- manner. Most of the constructed environment can only be described as "building," and nothing more. It serves its purpose efficiently until it deteriorates, only to be replaced by equally banal construction.

Architecture, however, concerns itself with both the tangible and intangible. It owes its existence to the realities of construction, but it surpasses the mundanity of providing shelter and transferring loads. Good architecture acknowledges the pragmatics of building- that structure demands a certain degree of permanence against the natural environment, or that materials must come together in a particular fashion to create an enclosure, or that light is essential to the utility of a space. It not only fulfills practical needs, but also uses them as a medium of philosophical and artistic expression.

The permanence of a building includes its perceived and actual immutability as an object in the natural world. A structure that bears visual weight will remain in the memory as it does on the earth. Subsequently, materiality and formal expression impact both conceptual and physical realities of durability and longevity of the built environment.

Through detailing, architecture mediates the relationships, thresholds, and joints within the built environment. For example, the articulation of built form's interaction with its urban context, the sky, and the ground determines the relationship between site and built form. The dialogue between the interior and exterior, as evidenced through plan and section, reveals a stance on the relationship between built form and space to be occupied. Thresholds, joints, furniture, and hardware contrast the scale of the human against that of a constructed space.

Gestalt describes a condition in which the final composition, or "whole," is greater than the sum of its constituent parts. It surpasses the basic needs of shelter and construction in order to elevate the mundane to a state of ephemerality. Lighting, through its interaction with built form and building materials, is a key element in producing such an experience.

Louis I. Kahn approached architecture with a uniquely spiritual mindset, seeking to reveal a notion of pre-existing order and to reach such a level of resolution and unity within each project that there could be no other building. He excelled in the manipulation of light, designing spaces of profoundly spiritual quality that, after decades of use, still function according to their original intentions. The projects in which this is most evident are the **Trenton Bath House**, **First Unitarian Church of Rochester**, **the Salk Institute**, and **Exeter Library**.

Trenton Bath House

Louis I. Kahn's bath house in Ewing Township, New Jersey may seem to many an odd choice for the title of World's Greatest Building. A small building of humble materials and program, the project has none of the grandeur one might associate with greatness. However, the beauty of this project lies in the interaction of its simplicity and order with natural light. Kahn himself considered this to be the true origin of his path as an architect, stating, "If the world discovered me after I designed the Richards tower building, I discovered myself after designing that little concrete-block bath house in Trenton."¹



Figure 1: Louis I. Kahn. Approaching bath house entry. Trenton Bath House, Ewing Township, NJ, 1954-59.

The bath house embodies the design approach that Kahn took with the most successful of his works. Philosophically, he drew from Thomas Aquinas' definition of beauty, which demanded integrity,

perfection, symmetry and proportion, and clarity. In short, each element of the design had to be essential to the composition as a whole, while also maintaining its own identity and legibility. In this project, and in others that followed, geometric purity, as promoted by fellow architect Anne Tyng, became a vehicle of order upon which the composition relied.

He also worked with respect for his selected materials, understanding and working within the limitations and strengths of each element, while also celebrating the presence of each individually. Another crucial aspect of Kahn's design philosophy is his treatment of each space as an individual module, defined and linked by so-called servant spaces. The use of natural light is the final factor prominent in this building as well as the larger body of his work.²

From a conceptual standpoint, this building falls within Kahn's definition of the public forum. In a text on the human institution, he described the role of the public square or forum as a place where the attainment of aspiration is aided by reliance on community.³ Though his discussion addresses architecture at the urban scale, the Trenton Bath House, can be seen as a building-scaled forum that meets the physical needs of the individual- for example, providing a sheltered space in which to change one's clothes- while also promoting interaction and dialogue between members of an intimate, close-knit community.

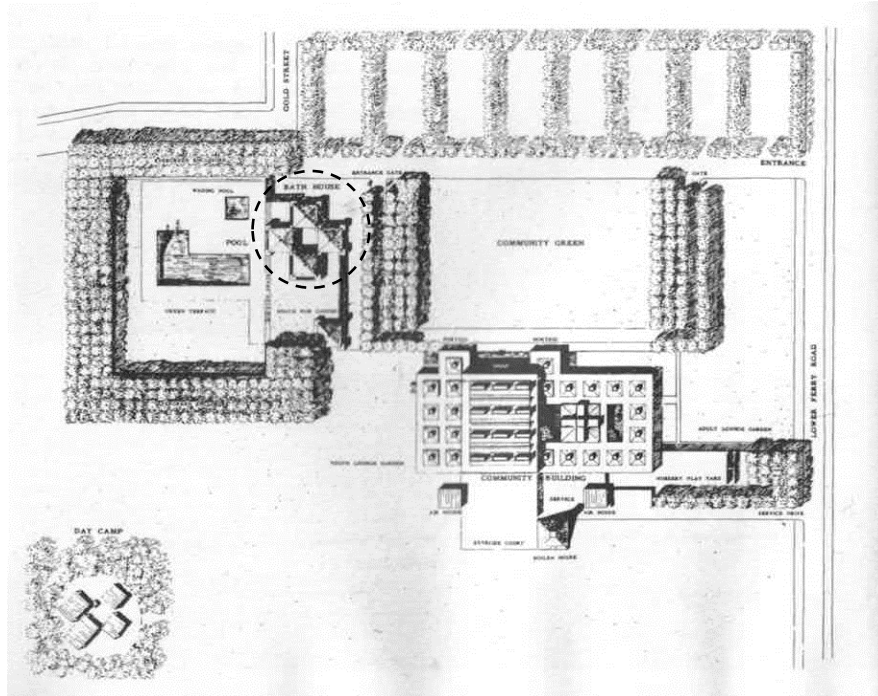


Figure 2: Louis I. Kahn. Full proposal for the Trenton Jewish Community Center, of which only the bath house (circled) was completed. Trenton Bath House, Ewing Township, NJ, 1954-59.

Initially intended as a small portion of the much larger plan for the Trenton Jewish Community Center, the small structure that stands today is the only realized element of the project. It is still in use according to the original design of the architects, having joined the National Historic Registry in 1984 and undergone preservation measures in the early 2000's.⁴

The plan of the bath house adheres to a square grid, the final product being a symmetrical cruciform arrangement. The pavilion features an open central courtyard, flanked by two changing rooms mirrored to the north and south. A cabana encloses the eastern edge of the courtyard, while a short staircase defines the western side and provides access to

the pool deck.

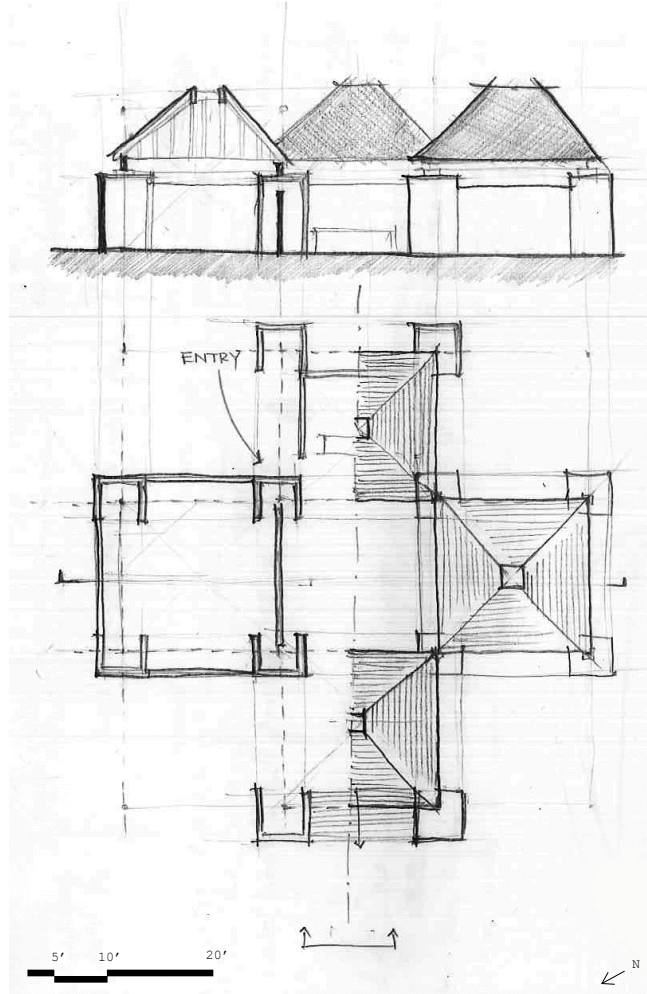


Figure 3: Louis I. Kahn. Plan and roof plan of the Trenton Bath House. Trenton Bath House, Ewing Township, NJ, 1954-59.

Hollow rectangular prisms, roughly ten-foot squares in plan, occupy the intersections of the larger grid, providing either entrances into the changing areas or storage spaces. Atop these structural elements rest four pyramidal roofs, three of which cover the cabana and changing spaces while the fourth shades and frames the approach to the pool deck. The roofs, each with an oculus at the peak of the pyramid, meet at the center of each of the square extrusions. As a result, there remains a five-foot gap between the roof's edge and the perimeter walls of the

cabana and changing rooms. The walls of the former stand beneath the roof, which shelters the storage space from the elements; the enclosures of the latter are offset five feet outside of the roof perimeters, affording natural ventilation and lighting in the changing rooms.

The materials used in the project include wood and concrete block. Though humble in appearance, these low-cost materials reinforce the simplicity of the formal design idea of the architects. The two materials are used according to their natural structural properties: the visually and physically heavy concrete masonry units become load bearing walls; the wooden framework serves as a lightweight counterpart to span the distance of each space and to provide a visual contrast with the heaviness of the supporting walls. The materials are left in an unfinished state, the only applied decoration being a mural that indicates the entrance to the pool house.

In visiting the building, one first enters the site in a sequence very similar to that intended by Kahn, despite the fact that only a fragment of his proposal saw completion. After winding through a suburban, residential area characterized by an abundance of single-family housing and local government buildings, one turns abruptly onto a drive that protrudes meekly from behind a thicket of trees. The driveway curves gently, bringing the visitor away from the street and allowing the trees to shield from sight the building that rests deeper within the property.

Continuing through a parking lot dominated by a tree-lined area of grass- perhaps a contemporary evocation of Kahn's original "Community Green"- one notices a senior center to the left- a more recently constructed complex which



Figure 4: Louis I. Kahn. Northeast corner of the Trenton Bath House with view towards entrance mural. Trenton Bath House, Ewing Township, NJ, 1954-59.

occupies a large portion of the site designated for the unbuilt majority of the Jewish Community Center. At the westernmost back edge of the lot, the visitor leaves his or her vehicle and continues on foot, following a short pathway that leads beyond a double row of trees, through he can glimpse the heavy concrete walls of the bath house.

In passing under the tree canopy, one finally encounters the bath house. The visual weight of the concrete block and the nearly cubic form is contrasted by the seemingly floating roof of the cabana. The perimeter of the building undulates as one circumnavigates the exterior, an effect resulting from the varied alignments of the enclosures of the cabana and changing rooms. Despite

the geometric regularity and symmetry of the plan, the project is dynamic in the way it occupies space, and it further intrigues the viewer with the play of light and shadow across the offset forms of the exterior.

Proceeding towards the mural, the visitor finds the entrance to the building. The slight overhang of the roof canopy compresses the visitor vertically, drawing him or her through a gap between the perimeter wall of the cabana and alongside the exterior of the men's changing room on which the geometric pattern is painted. Several steps later, he enters the courtyard- a space open to the sky and wholly unexpected from outside the project. A glance westward reveals a framed view of the pool deck.



Figure 5: Louis I. Kahn. Central Courtyard of the Trenton Bath House with view of pool, storage volume, and changing room entry. Trenton Bath House, Ewing Township, NJ, 1954-59.

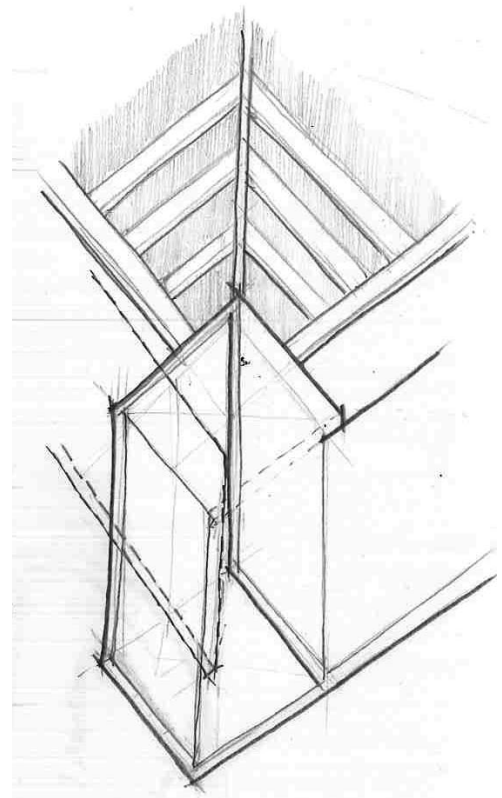


Figure 6: Louis I. Kahn. Worm's eye axonometric of changing room entry. Trenton Bath House, Ewing Township, NJ, 1954-59.

Movement to the north or south brings the visitor to his or her respective changing room, which is entered through the "hollow columns" that support the roof. Once again, the visitor is compressed and reoriented, entering parallel to the wall of the changing room, rather than approaching it frontally. One progresses from the sunny courtyard into the darkened entrance, making a 180 degree turn in order to enter the changing room, where the ceiling surface suddenly soars overhead. The lofty roofs of the changing rooms, though they are entirely unnecessary from a practical standpoint, are the soul of the project. Despite the straightforwardness of the pyramidal timber structures, or the humility of the buildings they shelter, they evoke memories of the Pantheon- a temple of ancient grandeur that is decidedly opposite the bath house in every other facet of its existence.



Figure 7: Louis I. Kahn. Oculus and light joint seen inside the changing room. Trenton Bath House, Ewing Township, NJ, 1954-59.

Kahn, in a discussion on the ancient Baths of Caracalla, also justifies the use of such a powerful move at Trenton, asserting, "We know that we can bathe just as well under an eight-foot ceiling just as well as we can under a 150-foot ceiling, but I believe there's something about a 150-foot ceiling that makes a man a different kind of man."⁵

The validity of the Trenton Bath House as great architecture rests on three factors. First, the clarity of the plan- perhaps indebted to the program's simplicity- reveals an approach both logical and formal in the creation of space: the use of the necessary servant spaces (in this case storage spaces and changing rooms) to define space (the central courtyard and procession to the pool). The second praiseworthy factor of this project is the geometric interdependence of many independently legible elements, such that the final work appears as a unified whole. Thirdly, the building takes a utilitarian, banal project brief- to hide pool equipment and people changing in and out of their swimwear- and elevates it to an ephemeral experience beyond what is expected.

Endnotes:

- 1 Quoted in Robert McCarter, *Louis I. Kahn*, (London: Phaidon Press, 2005), 122.
- 2 Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 155-160.
- 3 Ibid., 95-96.
- 4 "Home - The Bath House." Home - The Bath House. Accessed June 01, 2018. <http://kahntrentonbathhouse.org/>.
- 5 Alessandra Latour, *Louis I. Kahn: Writings, Lectures, Interviews*, (New York: Rizzoli, 1991), 111.

Images:

- 1 Morris, Anna. *Trenton: ext 1*. June 19, 2018.
- 2 *Site plan*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 98.
- 3 Morris, Anna. *Trenton: sketch 1*. June 2018.
- 4 Morris, Anna. *Trenton: ext 2*. June 19, 2018.
- 5 Morris, Anna. *Trenton: int 1*. June 19, 2018.
- 6 Morris, Anna. *Trenton: sketch 2*. June 2018.
- 7 Morris, Anna. *Trenton: skylight*. June 19, 2018.

First Unitarian Church of Rochester

Of the many religious structures designed by Louis Kahn, the First Unitarian Church of Rochester is the only project to be realized. It seems surprising that an architect renowned for the ephemeral quality and spirituality of his secular spaces only saw the construction of one of his many proposals for houses of worship. However, a majority of these proposals- among which were several synagogues- fell victim to conflict with or within the congregations seeking architectural services, a bleak reality that prompted Kahn, a man of Jewish descent, to remark "I'm too religious to be religious."¹

A more accurate description of the architect's philosophy comes from Bangladeshi architect Shamsul Wares with whom Kahn was acquainted during his work in Dacca. He observed:

"Spirituality has nothing to do with religion. Religion is a set pattern of rituals; religion is caught between rituals. Kahn was a man of the mind: he explored mind. Mind wants to know the truth. Religion never provides the truth- it's a belief. Kahn was a spiritual man. He was trying to understand the truth in terms of how things happen."²

Perhaps one factor in the success of the First Unitarian projects was the mission of the Unitarian Universalist denomination, which seeks to avoid the dogmatic and ritualistic aspects of worship often found in other religious circles. Rather, in a fashion much more in tune with Kahn's notion of spirituality, the church's mission statement urges its members, "Through spiritual connection in

community," to "Listen deeply to others and ourselves, open to wonder and transformation, and serve together with love and humility."³

Regardless of the reason for so many failures in the category of religious architecture, the successful endeavors at First Unitarian reveal several items of great importance in the understanding of the architecture of Louis Kahn. Programmatically speaking, the building emphasizes the importance of a clear organizing *parti*. It also employs natural light as a measure both practical and artistic, allowing its interaction with form to become the defining characteristic of the composition.



Figure 1: Louis I. Kahn. View from the northeast front lawn. First Unitarian of Rochester, Rochester, Ny, 1959-67.

The site, located along a thoroughfare dotted with a handful of religious institutions in the residential suburbs of the city, provided an ideal location for the building. Situated atop a gentle slope, the church maintains the street edge to the west. North of the

building is a parking lot bordered by a neighborhood of single-family homes; to the southeast a grove of trees adorns the hill and acts as a buffer between the building and its residential suburban fabric.

The program for the project required a single large space for congregational worship as well as additional classroom spaces for the church school. When first commissioning the building, the congregation of First Unitarian specified that there would be no need to accommodate for future additions to the structure. However, less than

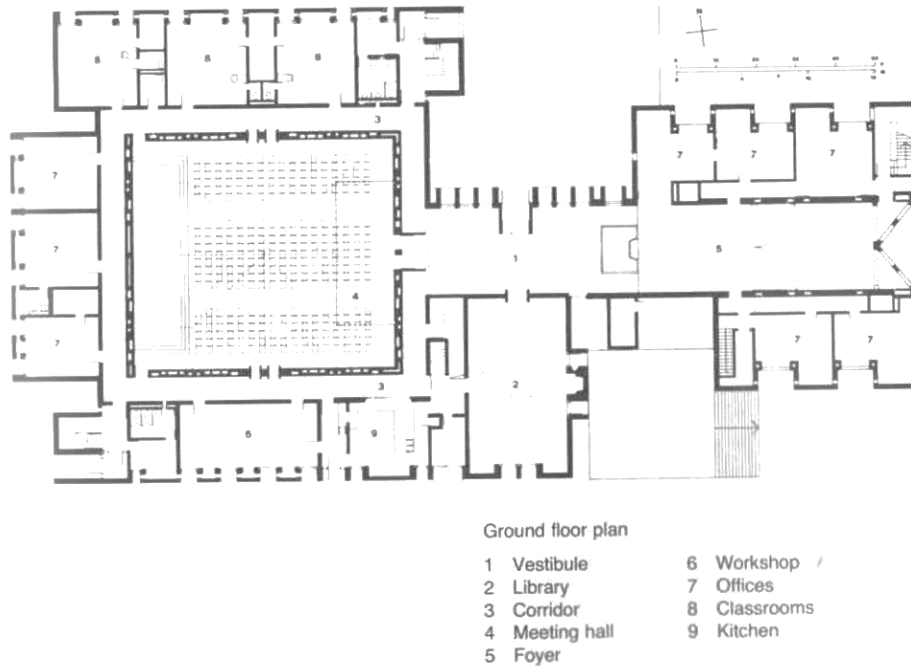


Figure 2: Louis I. Kahn. Ground floor plan, with original building to the west and later expansion to the east. First Unitarian of Rochester, Rochester, Ny, 1959-67.

a decade after initially enlisting Kahn, they returned to the architect with the request that he extend the building to house a growing congregation.

The nearly square plan of the western volume features a centrally located sanctuary enclosed by classrooms, smaller gathering spaces, and other service elements including restrooms, egress staircases, and

a kitchen. Over the course of designing the church, Kahn maintained the strength of his original conceptual plan: a dominant, figural hall of worship encircled by smaller servant spaces. The main entrance and lobby- previously the northeastern corner of the building- now acts as a courtyard between the two wings of the church. The eastern wing, separated from the lobby by a hearth, contains offices, a gallery, and a recreational area for the church school. With the addition of the eastern wing, a predominantly central plan becomes linear, creating a central axis from east to west.

Protruding frames around recessed apertures punctuate the north, south, and west faces of the building, allowing indirect natural light into the spaces. On the eastern façade, the building edge pulls back at the center point, introducing a triangular element at which the central axis of the plan terminates.

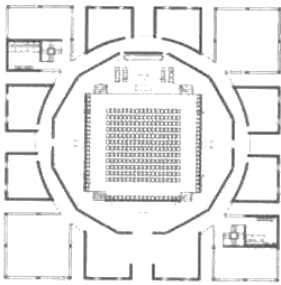


Figure 3: Louis I. Kahn. Early plan for the church. First Unitarian of Rochester, Rochester, Ny, 1959-67.

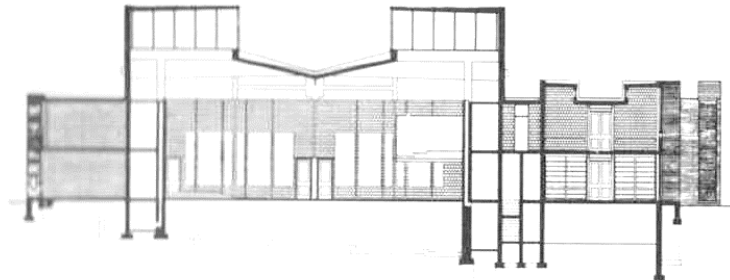


Figure 4: Louis I. Kahn. Section through the sanctuary and lobby of the west wing. First Unitarian of Rochester, Rochester, Ny, 1959-67.

In section, the sanctuary rises to nearly twice the height of the servant spaces that occupy its perimeter. Clerestory monitors at the four corners of the sanctuary light the space, while a massive

cruciform element defines the elevation of the ceiling and reinforces the centrality of the space.

At the First Unitarian Church of Rochester, Louis Kahn limits his material palette to brick and concrete block, with wooden elements at the scale of the detail. From the exterior, only the red brick is visible, providing enclosure and an abstract kind of decoration. For example, the protruding frame-like boxes on the elevations of the west wing, which owe their visual impact and weight to the standard dimensions of the brick units, extend the height of the building to border the apertures of the classroom spaces. The verticality of these elements creates a rhythm of shadow and light across the elevation, celebrating the volumetric qualities of the three-dimensional form and avoiding a smooth, surface condition lacking dynamic.

With the eastern wing of the church, Kahn takes a similar conceptual approach- a façade articulated by light and shadow- but in a different way. Instead of frames that project from the surface of a geometric form, he works in a subtractive manner perhaps more natural to the volumetric material properties of brick. The surface of this wing is interrupted by voids that recess into the larger form to house and shade windows into the primary spaces.

The church's interior consists of the familiar concrete block also found at the Trenton Bath House, left unfinished. The concrete units provide a utilitarian solution to the structural needs of the building. True to the natural inclination of a load bearing material, the block walls define fixed, enclosed spaces. There are no apertures

from one room to another, nor is there fluidity or the ability to alter the relationships between programmatic elements of the plan. Each classroom, office, and space of worship is a self-contained unit within the larger scheme of the building. Despite the humility of the concrete block, Kahn elevates the material and the spaces it defines in the way he allows the light to touch it. The depth of the façade prevents direct light from entering the spaces, instead diffusing the sunlight and allowing it to graze gently over the texture and imperfections of the concrete masonry units.



Figure 5: Louis I. Kahn. West elevation. First Unitarian of Rochester, Rochester, Ny, 1959-67.



Figure 6: Louis I. Kahn. Wall detail found in sanctuary, wooden chair rail on CMU with shadow joint. First Unitarian of Rochester, Rochester, Ny, 1959-67.

The third and detail-driven material of the project is wood, used sparingly within the project as a mediator between interior and exterior, human and building. The wooden window frames, invisible to the eye from the outside of the project, negotiate the connection of glass to masonry. From within the building, the warm tones of the wood contrast with the cool gray of the concrete. Everything at the scale

of the human being- doors, railings, and built-in furnishings for example- is made from wood, as if to encourage contact and provide relief from the potential austerity of the interior surfaces.



Figure 7: Louis I. Kahn. Courtyard with north-facing entry. First Unitarian of Rochester, Rochester, Ny, 1959-67.

When one visits the First Unitarian Church, s/he approaches from the interstate, exiting onto the main thoroughfare that runs parallel to the site. Continuing along the tree-lined road, the visitor travels through the quiet suburban neighborhood, passing a number of small single-family residences and various places of worship with a scale similar to that of Kahn's church. The peripheral wall of foliage along

the street suddenly gives way, revealing a clearing dominated by a brick mass, which sits fortress-like atop a gentle slope.

Proceeding towards the building, the visitor becomes aware of the dynamic quality of the façade created by the protruding elements that rise from ground to roofline. The shadows that fall across the form enhance the volumetric quality of the mass, altering its appearance as the solar angle changes throughout the day and year. Above, one sees the four massive monitors that form the building's core. The viewer understands immediately the importance and dominance of such elements but cannot determine the nature of their interaction with the larger scheme of the building.

Turning onto the drive and into the parking lot, the churchgoer sees in greater detail the façade articulation, eyes following the undulation of the perimeter towards a protected courtyard. The entrance to the building, set back from the street between the heavy masses of the east and west wings, bears a similar articulation to the facades of the west wing. However, as the entrance faces north, it is always in shadow cast by one of the two wings. This prevents the reflective glare of sunlight on the glass of the windows and allows the viewer a glimpse of the anticipated interior of the building.

In order to enter the Church, the visitor must pass through the deep brick wall of the courtyard's elevation, feeling compressed as s/he passes from the openness of the outside environment, through a comparatively narrow doorway, and into the low-ceilinged lobby space. Here, three options confront the guest: proceed forward into the

library, to the east wing which houses various offices and gathering spaces, or to the west, where reside the classrooms and sanctuary.

Straight ahead is the library, both a destination and a passage through to the back side of the church. Upon entering the room, a large fireplace centered on the eastern wall reorients the guest to an axis perpendicular to his path of entry. Doors to either side of the hearth allow access to a patio, from which the guest can descent the sloping landscape and proceed to the meditation paths that wind through the grove of trees occupying the southern border of the site.



Figure 8: Louis I. Kahn. Southern façade viewed from the woodland area behind the church. First Unitarian of Rochester, Rochester, Ny, 1959-67.

If the guest turns instead to the left, s/he will encounter the eastern wing of the building, the 1967 addition. First, a monumental hearth rises from the center of the joint between lobby and gallery (originally described by Kahn as the foyer), preventing occupants from moving along the east-west axis of the building and instead decentralizing their role in the space. Physically, it separates the

two spaces, providing a sense of intimate privacy for the gallery and shielding it from the noise associated with the transitional, waiting area. Pragmatically, it heats the wing in the winter months. Structurally, it bears the weight of the floors above. Beyond the gallery, a larger meeting space opens, lit naturally from a single element on the easternmost wall. Office spaces determine the north and south borders of the space. The second floor of this wing is a single large space that serves as a recreational area for the younger members of the congregation. The hearth again defines the western edge of the wing, rising through the ceiling to become a lightwell.

Returning to the lobby, the final option remains- the west wing. In the oldest part of the project, one can choose to go into the sanctuary or to classrooms that wrap around it. If one circumnavigates the central void, a dark, narrow corridor leads to the classrooms. The corridor again compresses the visitor, as the light that pours in from the corner staircases beckons him to quicken his step. From this path, one must either enter a classroom- a source of temporary release from the tight corridor- or continue back to the main doors of the sanctuary. The visitor passes once more beneath the low ceiling produced by a mezzanine for the choir and organist, to enter the most singular space of the First Unitarian Church.

The open, double-height space contrasts starkly with the compact, low-ceilinged remainder of the project. Nearly square in plan with a figural cruciform ceiling, the worship space is predominantly centric in nature. A stage on the western wall of the room indicates a

suggested orientation for assembly, but the reconfigurable seating suggests versatility and fluidity in worship. From the corners the four clerestory monitors so prominent on the roofscape illuminate the room, unseen from below. The lighting technique lends itself easily to a sense of mysticism and spirituality, as observed by Shamsul Wares,

“He found something in the light; you feel that you are washed clean. The light has some existence. It is not totally abstract. It is also visible, it is also feelable. Light is sensoriality. This sensoriality is somehow connected to spirituality.. We get the idea of spirituality through the senses. His architecture is sensorial, not just formal.”⁴

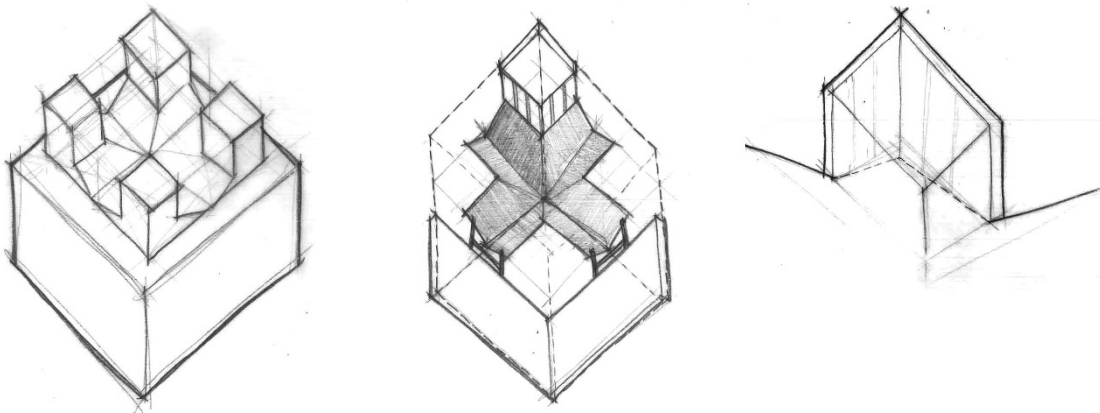


Figure 9: Louis I. Kahn. Diagrams illustrating the form and structure of the skylights. First Unitarian of Rochester, Rochester, Ny, 1959-67.

In conclusion, several key elements qualify the First Unitarian Church of Rochester as one of the greatest buildings in the world. First, the clear *parti* in conjunction with thoughtful material choices yield themselves to a largely unaltered project that still functions properly after sixty years of life. Additionally, there is a carefully



Figure 10: Louis I. Kahn. Sanctuary, northwest corner. First Unitarian of Rochester, Rochester, Ny, 1959-67.

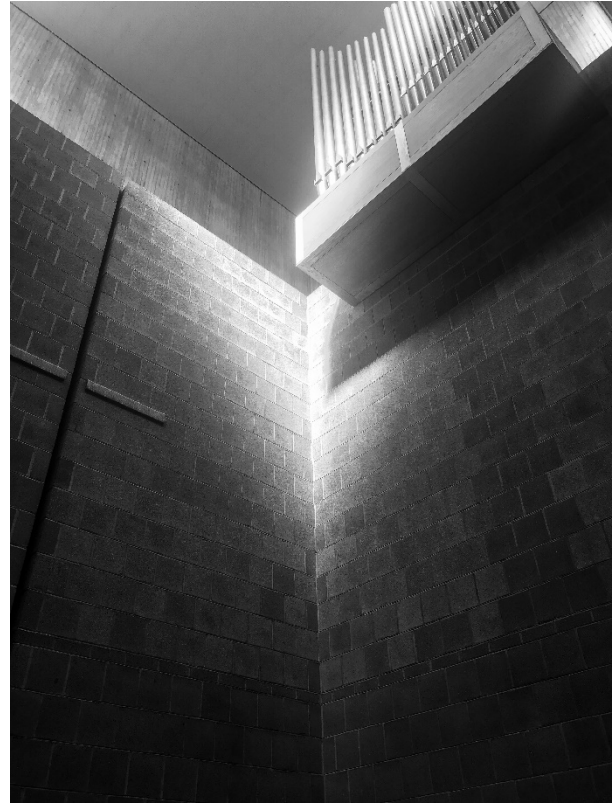


Figure 11: Louis I. Kahn. Sanctuary, northeast corner. First Unitarian of Rochester, Rochester, Ny, 1959-67.

considered unity between the concrete aspects of the building's *parti* and the abstract beliefs of the church's congregation. For example, equality and symmetry are dominant within the plans each of the two wings, but as one progresses through the spaces, s/he is constantly confronted with a choice between right and left, up and down. In parallel with the Unitarian Universalist belief of "universal salvation for all human beings,"⁵ the choices one makes in navigating the building- as in life- all lead to the same end: a space animated by an unseen source of light- a metaphor for the spirituality and

enlightenment achieved through worship in the Unitarian Universalist faith.



Figure 12: Louis I. Kahn. Sanctuary, facing southeast. First Unitarian of Rochester, Rochester, Ny, 1959-67.

Endnotes:

- 1 Wendy Lesser, *You Say to Brick: The Life of Louis Kahn*, (New York: Farrar, Straus and Giroux, 2018), 4.
- 2 Ibid, 227.
- 3 "UU Beliefs and History." First Unitarian Church. Accessed June 01, 2018. <http://rochesterunitarian.org/>.
- 4 Lesser, *You Say to Brick*, 227.
- 5 "UU Beliefs and History." First Unitarian Church.

Images:

- 1 Morris, Anna. *Rochester: ext 1*. June 25, 2018.
- 2 *Ground floor plan*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 37.
- 3 *Initial Parti*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, 37.
- 4 *Section*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, 37.
- 5 Morris, Anna. *Rochester: ext 2*. June 25, 2018.
- 6 Morris, Anna. *Rochester: detail*. June 25, 2018.
- 7 Morris, Anna. *Rochester: ext 3*. June 25, 2018.
- 8 Morris, Anna. *Rochester: ext 4*. June 25, 2018.
- 9 Morris, Anna. *Rochester: sketch 1*. June 2018.
- 10 Morris, Anna. *Rochester: int 1*. June 25, 2018.
- 11 Morris, Anna. *Rochester: int 2*. June 25, 2018.
- 12 Morris, Anna. *Rochester: int 3*. June 25, 2018.

Salk Institute for Biological Studies

The Salk Institute was founded in 1959 by Dr. Jonas Salk, discoverer and developer of the polio vaccine. Having toured the state-of-the-art laboratories of the Richards research facility in Philadelphia's Richards Laboratory, the biologist and researcher sought out the Louis Kahn to design a new facility for scientific research in the then-undeveloped La Jolla, California. The complex, whose construction was aided by a \$20 million grant from the National Science Foundation and the March of Dimes, was to be located on a twenty-seven-acre plot of land along the Pacific Coast. When discussing his intentions for the facility with Kahn, he stated that it ought to be "worthy of a visit from Picasso,"¹ expressing a desire for the institute to harbor a spirit of collaboration and



Figure 1: Louis I. Kahn. View east from above the plaza. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

interaction between the arts and sciences.²

In Salk, Louis Kahn found a kindred spirit with whom he shared his philosophical musings on the nature of the relationship between order and art. Their rich friendship lasted until the time of Kahn's death, after which Salk spoke at the University of Pennsylvania's Memorial Convocation for the architect. He read an original poem, praising Kahn's singular ability to create by first uncovering and satiating the needs and desires of the project- treating the work itself as a quasi-sentient being and pursuing its natural state of being.

What he caused to appear
Out of the invisible and the intangible
Allows us to see and to touch
The fruits of creation that continues without end
As if without beginning."³

This stanza not only reveals the lasting impact on the architectural community of the philosophical and spiritual lens through which Kahn viewed design, but the final line also implies the inspiration of an authority superior to and beyond his contemporaries' reach. In a composition of his own titled *Order is...*, he states:

"Art is a form making life in order-
psychic order is intangible:
it is a creative consciousness
forever becoming higher in level."⁴

His appeal to "order," an entity above the existence of mankind, was evident his work, often yielding works- as in the case of the Salk

Institute- that possessed an ancient quality, seemingly wise beyond their years. For instance, the plaza's frame of concrete and travertine, in which rests an unobstructed view of the Pacific Ocean, seems to defy its modern historical context and the technology that produced it- rather, it holds steadfast, immutable against the line of the horizon.

Such a description suits not only the aesthetic but also the practical intentions of the institute, which were to make a building to withstand the test of time- be it environmental, structural, technological, or otherwise. With this charge, Kahn and his structural engineer August Komendant devised a scheme that met the needs of the unstable seismic conditions of California, and also housed laboratory spaces that could be retrofitted for equipment without disturbing research activity in addition to being free of any interrupting structural elements.

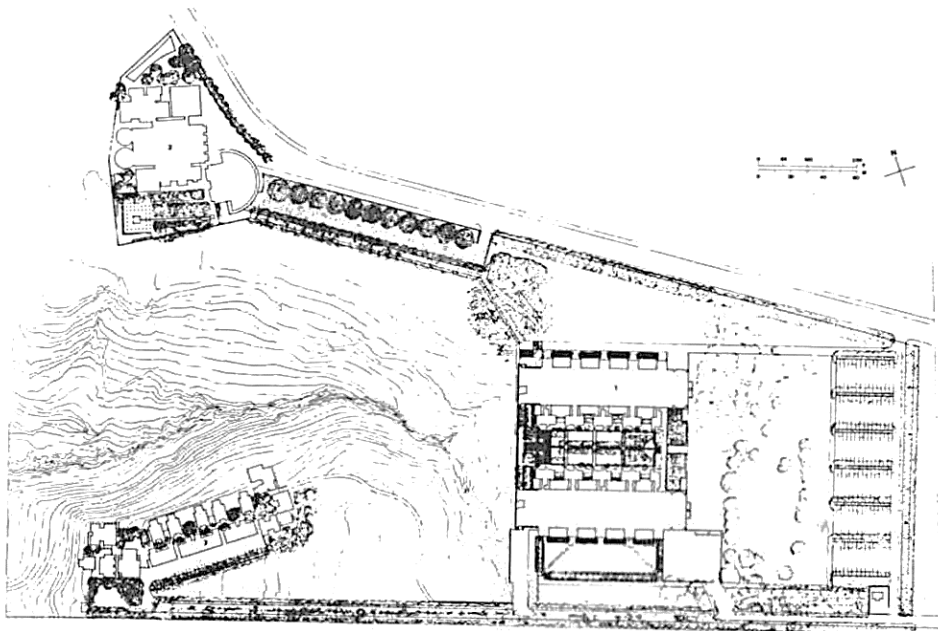


Figure 2: Louis I. Kahn. Proposed site plan. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

The program for the facilities originally included laboratory spaces, private offices for the scientists conducting research, and several meeting halls. Of this, only the labs and offices were realized. According to Kahn's original proposal, employees and visitors were to arrive by car to the northwest of the site, from which they would proceed southeast along an allée of eucalyptus trees and emerge in a tree-filled courtyard between the primary laboratory buildings. A conversation between Salk, Kahn, and Mexican architect Luis Barragán led to the removal of the trees, thus creating the now-iconic plaza.⁵ The processional allée of trees also did not survive, drastically altering the contemporary approach to the facility.

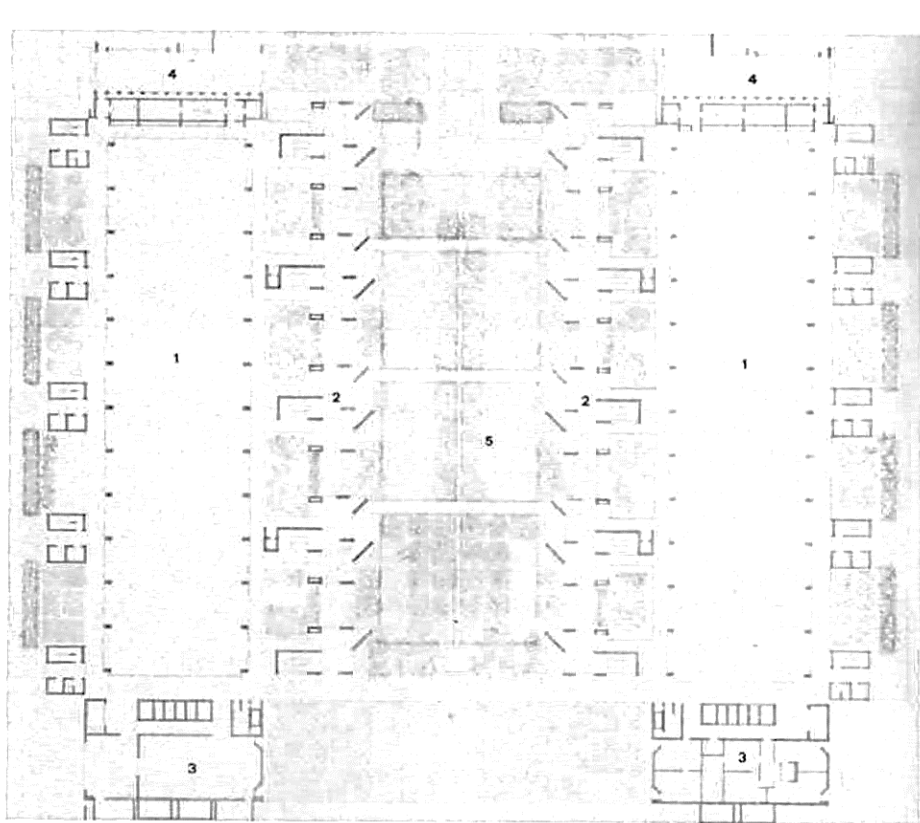
In present day, one arrives at a parking lot on the western perimeter of the site. S/he advances towards the front gates and directly into a travertine plaza- a product of the 21st century addition that includes auditorium spaces and administrative offices. The new buildings match the Kahn-designed portion of the campus in width, material, and color. However, the central axis across which the two buildings are mirrored is mis-aligned with that of its older counterpart, thus creating a distinction between the old and new as well as paying respect to the forgotten non-axial arrival sequence proposed by Kahn. A few steps up from the western addition to the complex, the visitor passes through a thin screen of eucalyptus trees- another homage to the past design.

As s/he exits, the Salk Institute plaza finally appears, a level below his or her feet. The desire to enter axially into the plaza is circumvented by the staircase that runs perpendicular to the main

axis, diverting the visitor one last time as s/he descends to the elevation of the travertine-clad courtyard.

The axis of the complex runs from east to west, angled according to the seasonal movements of the sun, so that the channel, which ordinarily flows into the horizon, terminates visually at the setting sun of the solar equinox.

Symmetry defines and adorns the space, from the laboratory buildings mirrored the north and south of the channel to the meticulous placement of the form-ties and scoring on the in-situ concrete planes of the structure.



Plan of the laboratory building

- 1 Laboratory
- 2 Balcony
- 3 Office
- 4 Library
- 5 Internal garden

Figure 3: Louis I. Kahn. Plan. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

The plan of the laboratory buildings includes four key spaces: private offices to the west, a library to the east, an open loggia (at ground level) or balcony (at the upper level) that runs the length of the building, and a single continuous laboratory space that also extends the full length. The balcony, in addition to offering a higher vantage point from which to view the ocean, houses an outdoor classroom of sorts, with chalkboards mounted to the structure. The laboratories are wrapped in glass, with columns restricted to the perimeter. This leaves the space free of any obstructive vertical elements, and therefore affording the laboratories a plan of infinite flexibility- to be reconfigured and subdivided according to the needs of the researchers. Equipment can also be moved freely without the hindrance of intervening structural elements or narrow doorways, as the glass walls are simply removed during the installation process.

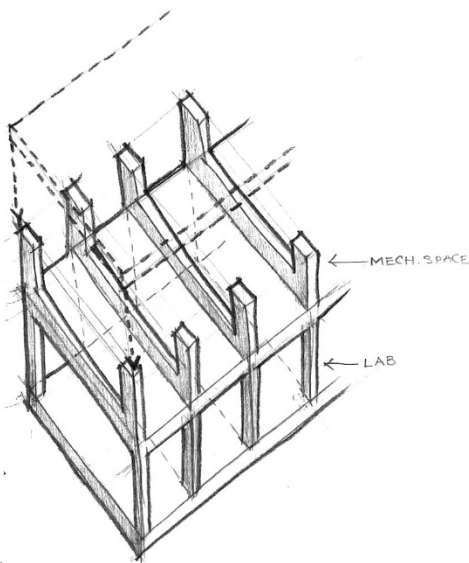


Figure 4: Louis I. Kahn. Structural diagram. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

Figure 5: Louis I. Kahn. Intermediary floors. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

The section further reveals the reasons for such flexibility of the laboratory. Between the main floors are shorter intermediary floors that provide the structural capacity to have such long clear spans on the main floors. These interstitial spaces behave as Vierendeel trusses, in addition to housing all of the electrical, mechanical, and plumbing systems for the laboratories. Such forward-thinking in structural planning has enabled the complete remodel of the laboratory spaces with the various technological developments and code changes of the last fifty years. In fact, extensive maintenance and building systems updates have occurred- and will continue to take place- without disturbing the work of the scientists.

Concrete, travertine, and teak complete the material palette of the complex. The unique mix of pozzolanic in-situ concrete, dubbed "Salk-crete," appears pink in direct sunlight and is smooth to the touch. It performs structurally in addition to acting as the façade to the plaza. The structure is unadorned, but for the meticulously placed holes left by form-ties and scored lines that speak of the construction process and indicate a scale nearer to that of the human. Carefully selected travertine paves the plaza and matches the same pale shade of the concrete.

Teak panels articulate the facades of the libraries and private offices, their warm color contrasting with the cool tones of the other two materials. A gap- a single inch- separates them from the concrete, allowing them to expand and contract without causing any damage. This gap, pragmatic in nature, is what Kahn called a shadow joint, a gap of great importance, for "the joint is the beginning of ornament."⁶

All three of these materials were chosen for their durability, as well as their aesthetic qualities. Over the life of the building, only the teak has deteriorated to warrant replacement, for the sole reason that Jonas Salk insisted on treating the panels instead of allowing them to age at the instruction of the architect.

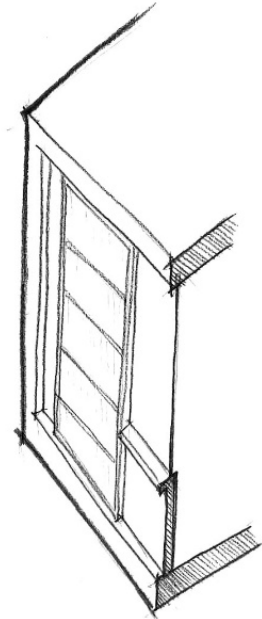


Figure 6: Louis I. Kahn. Photo of façade along the plaza. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

Figure 7: Louis I. Kahn. Sketch of private office facade. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

That the Salk Institute for Biological studies is among the best architecture in the world is evidenced by the unity of the project's utility with its unlikely spirituality. The project fulfilled the basic needs of the program- laboratory space, offices, and libraries- but it did so in a way that was structurally innovative, materially distinct, and elegantly articulated. Order permeates every facet of the complex- visible in the symmetry of the plaza, and the precision of the formwork, and the pristine materiality. Every aspect of the

building proclaims to the visitor of mankind's struggle and victory against the chaos of the natural environment, a monument to the mission statement of the organization it serves.



Figure 7: Louis I. Kahn. Within the sawtooth elevation. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.



Figure 8: Louis I. Kahn. Elevation of southern building. Salk Institute for Biological Studies, La Jolla, CA, 1959-65.

Endnotes:

- 1 "History of Salk." Salk Institute for Biological Studies.
Accessed June 01, 2018. <https://www.salk.edu/about/history-of-salk/>.
- 2 Wendy Lesser, *You Say to Brick: The Life of Louis Kahn*, (New York: Farrar, Straus and Giroux, 2018), 242.
- 3 Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 10.
- 4 *Ibid.*, 11.
- 5 Lesser, *You Say to Brick*, 244.
- 6 *Ibid.*, 124.

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- 1 Morris, Anna. *Rochester: ext 1*. June 27, 2018.
- 2 *Proposed site plan*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 59.
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Library at Phillips Exeter Academy

In the early fifties, Exeter Academy, a prestigious boarding school in New Hampshire, set out to build a new library in the that would accomodate the Academy's needs for the next quarter of a century and complement the Georgian buildings that defined the architecture of the campus.¹ A long and arduous process ensued, during which two architects were hired and then fired. An open call for recommendations and submissions put the search committee of the Library of 1945 in touch with Louis Kahn, who was eventually hired to design the building.²

Of particular interest to the architect search committee was Kahn's personal belief on the nature of a library's function.

"The quality of a library, by inspiring a superior faculty and attracting superior students, determines the effectiveness of a school. No longer a mere depository of books and magazines, the modern library becomes a laboratory for research and experimentation, a quiet retreat for study, reading and reflection, the intellectual center of the community.. Fulfilling needs of a school expected eventually to number one thousand students, unpretentious, though in a handsome, inviting contemporary style, such a library would affirm the regard at the Academy for the work of the mind and the hands of man."³

Another assertion of his was that:

"the emphasis should not be on housing books but on housing readers using books. It is therefore desirable to

seek an environment that would encourage and insure the pleasure of reading and study."⁴

Such a strong humanistic belief directed the course of the library's design, as it appealed to the universality of the pursuit of knowledge while also dealing elegantly with the practical aspects of introducing a new structure to the fabric of the historic campus.



Figure 1: Louis I. Kahn. Northern elevation viewed from the lawn. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

The building sits south of the main street that cuts through the campus, standing at a distance and partially obscured by the trees that populate the lawn. Undoubtedly the more successful of the two buildings Kahn designed for the campus- the failure being a dining

room- the nearly eighty-foot-tall library rises high above the roofs of the colonial style buildings that dominate its context.

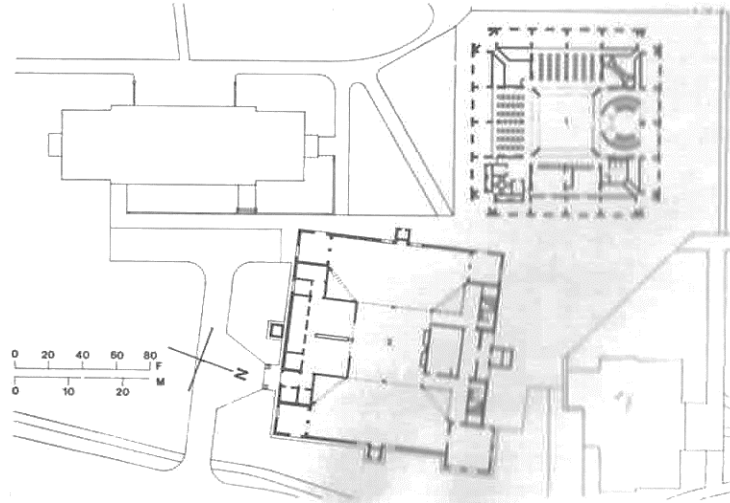


Figure 2: Louis I. Kahn. Plan of the dining room (left) and Library (right) both designed by Kahn. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

The building is square in plan, with chamfered corners that soften the brutality of placing a massive cube at the previously unoccupied center of the educational complex. One encounters the library from the northern façade, first entering a covered exterior space that wraps the full perimeter of the square. A vestibule protrudes into this covered walkway of the northern facade, announcing its presence as the only means of entering the massive and otherwise impenetrable cube. Upon entering, the visitor is greeted by an imposing monumental circular staircase of travertine that demands s/he climb to the next level.

The ascent to the atrium confirms the simplicity of the building's diagram: a series of concentric squares, with the open atrium at the center, compact stacks and servant spaces in the intermediate ring, and open but intimate reading spaces and study

carrels along the perimeter of the plan. The stacks and servant spaces- staircases and restrooms located at the corners of the square- cater to the featured elements of the plan. They define the perimeter of the atrium to enhance its volumetric quality, while isolating the study spaces to encourage a more intimate atmosphere suitable for studying.

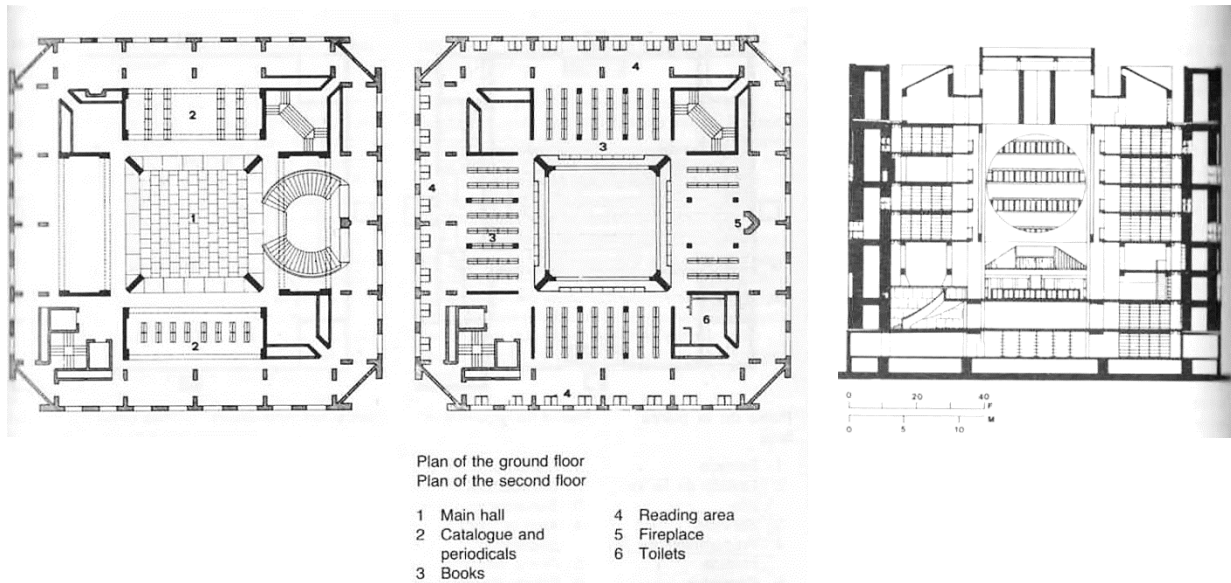


Figure 3: Louis I. Kahn. First floor plan, second floor plan, and section. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

In section, the atrium rises seventy feet, topped by a giant "x" that is two stories deep. Around it, anyone on the floor levels that house the book stacks and study carrels can see straight into the voided core of the building. Of the four levels above, two pull away from the envelope of the building, allowing the façade to maintain the double-height apertures appropriate to the scale of the facade.

The project uses four main materials. Unfinished teak and brick clad the exterior, while reinforced cast-in-place concrete and white oak act as their interior counterparts. Required by the school's self-enforced material palette to encourage cohesion with other buildings

on campus, the exterior brickwork was sourced from a local brick mason. Teak, unfinished and left to age in the elements, fills the lower portion of the building's double height apertures, indicating the location of the of the study carrels within and humanizing the scale of the otherwise massive windows.⁵



Figure 4: Louis I. Kahn. Covered exterior walkway. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.



Figure 5: Louis I. Kahn. Double-height apertures, teak exterior correlates with the placement of study carrels within the building. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

Inside, the structure consists entirely of reinforced concrete. Around the atrium, a large circle punctures each of the four interior facades, thereby permitting guests on the upper floors unrestricted views of the whole project. The deep cross beams atop the atrium provide structural stability as well as diffusing the light that

enters from the clerestory above. Everything of a smaller scale- everything intended to come in contact with the human body- is milled from white oak: the study carrels, chairs, atrium railings, and book displays. The material, warmer in color than the austere gray of the concrete structure, is more sympathetic to the touch, more comfortable to rest against, and more comparable to the scale of the human hand than is the smooth, monolithic concrete.



Figure 6: Louis I. Kahn. Concrete structure. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.



Figure 7: Louis I. Kahn. Study carrels. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

According to Kahn, a successful library not only meets the needs of its visitors by providing educational materials and an environment conducive to learning; it also fosters a desire to learn in their hearts and minds. A library ought to encourage

the acquisition of knowledge.

At Exeter, Kahn investigates the relationship between the rational mind and the inescapable effect of the sensational. Embedded within the very core of Exeter library are several rational ideas of humanistic origin. The plan, for instance, is a square, the most basic and human geometric element according to Vitruvius, who determined that "Four is the number of man, because the width of a man with his arms outstretched corresponds to his height, thus forming the base and height of an ideal square."⁶ Other elements evocative of the Vitruvian man are the crossbeams overhanging the atrium and the circular apertures in the atrium's concrete structure, which suggest the motion of the proportionally perfect human being. The central atrium of the plan is also a square, and the ratio of its width to the height of the atrium is the mathematically perfect golden section.⁷

An anthropological justification for the perfect geometry of the composition refers to the ancient tradition of depicting Knowledge seated on a square, and therefore steadfast and unchanging, throne,⁸ while the chamfered corners of the building's envelope recall the Chinese proverb that, "The infinite is a square, without corners."⁹ The rational geometric shapes of the composition could allude to any number of historical or mathematical ideas of formal purity or knowledge

in an attempt to bring meaning into the built environment.

However, while the end result of the form is a balanced and symmetrical and pure, the project only truly comes to life with the introduction of light into the space. The rational mind can dissect the origin and meaning of each element of the design, but without the ephemeral, ineffable glance of light across the surface of the concrete, it understands nothing of the Exeter Library. Kahn's understood this power of form plus light, recognizing the importance of the role of the incidental and inspirational and applying it to the built environment in order to ignite aspirations in the minds of the students to extend their reach beyond that which is already known.

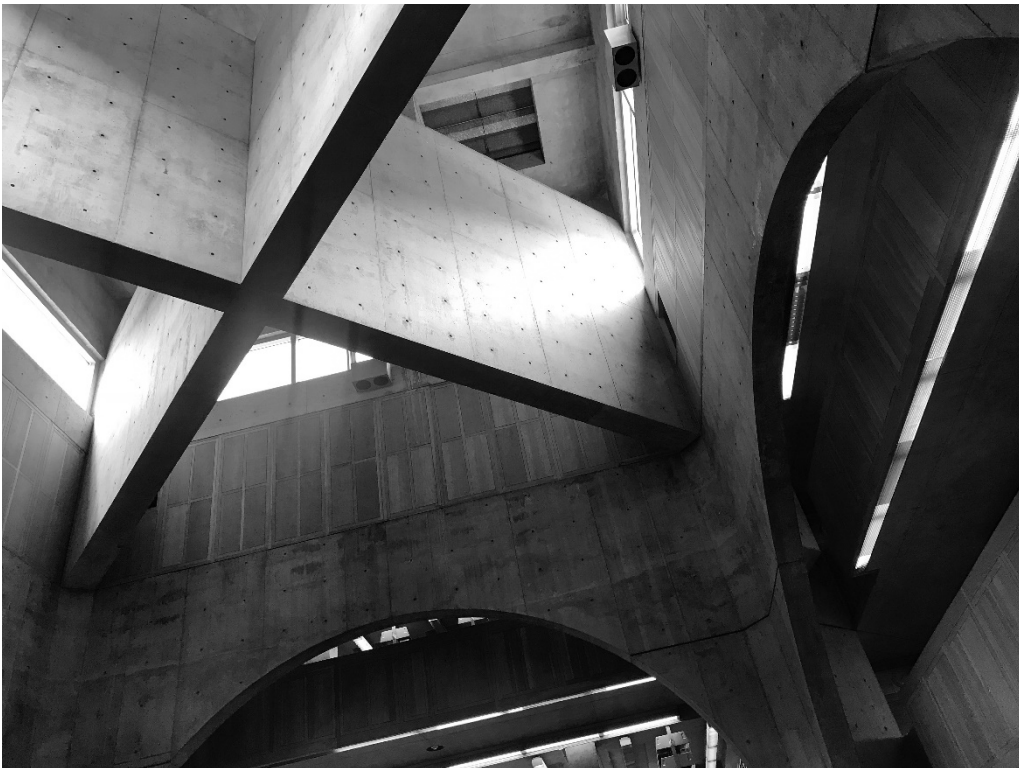


Figure 8: Louis I. Kahn. Atrium, looking up. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.



Figure 9: Louis I. Kahn. Atrium. Library at Phillips Exeter Academy, Exeter, NH, 1967-72.

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- 1 Rodney Armstrong, "Lou Who?" *The Phillips Exeter Bulletin* Spring 2004: 26.A
- 2 "Design of the Library." Phillips Exeter Academy. Accessed June 01, 2019. <https://www.exeter.edu/academics/library/about/design-library>.
- 3 Rodney Armstrong, Elliot G. Fish, and Albert C. Ganley, *Proposals for The Library at The Phillips Exeter Academy* (Exeter, NH: Phillips Exeter Academy, 1966), 1.
- 4 *Ibid.*, 6.
- 5 "Construction and materials." Phillips Exeter Academy. Accessed June 01, 2019. <https://www.exeter.edu/academics/library/about/design-library>.
- 6 Bruno Munari, *Square*, (New York: Princeton Architectural Press), 44.
- 7 Wendy Lesser, *You Say to Brick: The Life of Louis Kahn*, (New York: Farrar, Straus and Giroux, 2018), 184.
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- 9 *Ibid.*, 47.

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- 1 Morris, Anna. *Exeter: ext 1*. June 21, 2018.
- 2 *Site plan*. From: Romaldo Giurgola, *Louis I. Kahn: Works and Projects*, (Barcelona: Gustava Gili, GG, 1996), 79.
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