

1959-67 Salk Institute
La Jolla, California

Louis I Kahn

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Kahn's Salk Institute: Measuring the Immeasurable

The Salk Institute is perhaps the most famous project of architect Louis Kahn. It is an attempt by Kahn and his client, Jonas Salk, to connect the disciplines of art and science as a synthesis of intuition and reason. Along with a number of other projects, including the Kimbell Art Museum, Exeter Library, and the Indian Institute of Management, the Salk is a product of the rigorous exploration of several recurring themes: the play of light and shadow upon form, the concept of monumentality, the importance of historic precedence, and the tension between the effable and ineffable.

The heart of the Salk Institute is an open-ended courtyard that divides two parallel wings, each lined along the inside face by five freestanding towers. The wings house laboratories while the towers, arcaded at the base, house private studies. A narrow ribbon of water divides the courtyard and directs the viewer to a sublime view of the distant ocean. This courtyard is undoubtedly the most photographed and well-known portion of the institute, depicted as a stark open space where scale is immediately thrown into question. This starkness is not coincidental: by allowing the iconic courtyard space to become one of sublime contemplation and silence, Kahn created a sharp contrast to the hospitable and functional elements of the institute and effectively transferred transcendental ideas found in earlier stages of development to the final design.

History | Context

Before leaping into an analysis of the institute itself an introduction to the key players involved is crucial as the final product was directly informed by their (in many cases parallel) personal backgrounds and ideologies. The client, Jonas Salk, was a medical researcher and virologist best known for his discovery and development of the first effective vaccine for Polio. Salk was raised in the relative poverty of East Harlem born to Russian-Jewish immigrant parents in 1914.ⁱ Upon graduating from New York University Medical School, he eventually accepted an appointment to the University of Pittsburgh School of Medicine in 1947. There he undertook a project funded by the National Foundation for Infantile Paralysis to determine an accurate number of Polio virus types.ⁱⁱ This project was further extended over seven years under the head of Father Basil O'Connor, resulting in the public announcement of a successful vaccine in 1955. In their discussions regarding the Salk Institute's establishment, Salk and Basil O'Connor laid out four primary principles to guide its planning.ⁱⁱⁱ Though each of these ideas may be found to have influenced the design of the institute, one in particular stands out:

That in order to assure the maximum contribution to human welfare, the scientist must be concerned with men not only as biophysical organisms, but as unique individuals and as social beings.^{iv}

Louis I. Kahn was an architect and professor of architecture at both the Yale School of Architecture and the University of Pennsylvania. Like Salk he was born to Jewish parents, on the Baltic island of Saaremaa in Estonia.^v He received a Beaux Arts-

style education from the University of Pennsylvania, from which he drew no small amount of influence from his professor Paul Philippe Cret a graduate of the Ecole des Beaux Arts in Paris.^{vi} He would later, upon graduating and touring the architecture of Europe, work for Cret in Philadelphia. As was evident in his later professional practice, these experiences informed an interest if not reverence for historic precedence in architecture, the idea of monumentality, and a desire to clearly express the nature of his buildings' structure and materials. Salk became aware of Kahn through the referral of a friend, regarding a lecture Kahn had given at CIT in Pittsburgh. The topic was "Order in Science and Art," and featured his recently completed Richards Medical Research Building. In 1959 he visited Kahn at his office in Philadelphia, as well as the Richards Medical Research Building.



Figure 1: Courtyard at San Francesco d'Assisi

Additionally, he discussed with Kahn the potential requirements of the institute as well as the more philosophical goals of the project- the desire to bridge science and the humanities, articulating the distinction between the measurable and immeasurable work of the scientist.^{vi} Author Thomas Leslie describes an immediate bond between the architect and client following this encounter: "They shared a common background: both came from Jewish immigrant families; had grown up in working class, urban neighborhoods; and had been encouraged by their parents to transcend their origins."^{vii} This notion of transcendence, as well as the duality of the measurable and immeasurable discussed at their first meeting, would arguably serve as the most important guiding factor for the Salk Institute's design.

The initial design for the Salk Institute was not based upon specific program requirements, but rather discussions the Salk and Kahn had in regard to the project. From these discussions, Kahn drew forth certain architectural precedents, notably the monastery at Assisi, which Salk had visited in 1954 and spoke of frequently as an architectural image suitable to his ideas of the institute's social and intellectual organization.^{viii} Upon actually visiting the site, a parcel of coastal cliff property in La Jolla near the University of California in San Diego, Kahn executed a number of sketches outlining three building groups: a meeting house, laboratories, and housing. Though the institute remained essentially a laboratory complex, the meetinghouse represented an important desire, derived from his discussions with Salk, for a greater philosophical element of discussion. In this scheme the laboratory spaces were organized as two clusters of towers, connected via a several pulley-like circulation paths. This plan, referred to by Salk as an "early fantasy," was soon fleshed out, becoming more pragmatic in its attention to space requirements and by 1962, the final contract between Salk and Kahn was signed.^{ix}

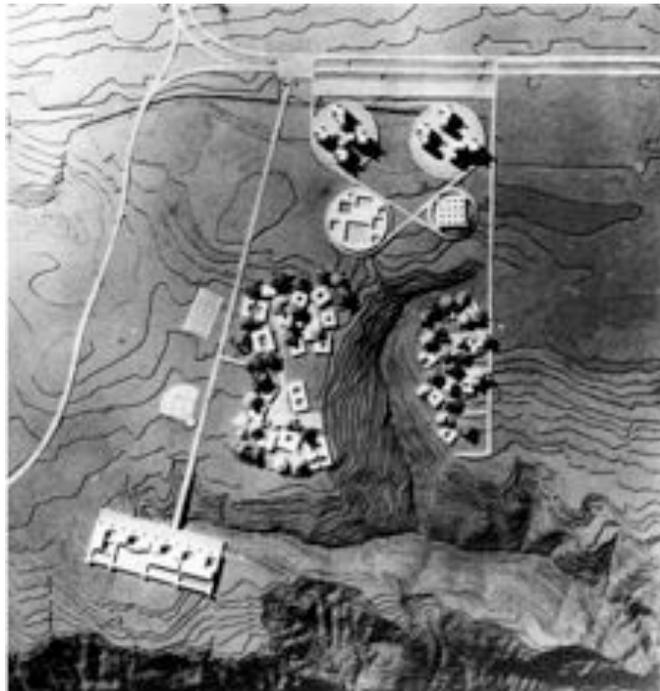


Figure 2: Model of master plan ca. 1960

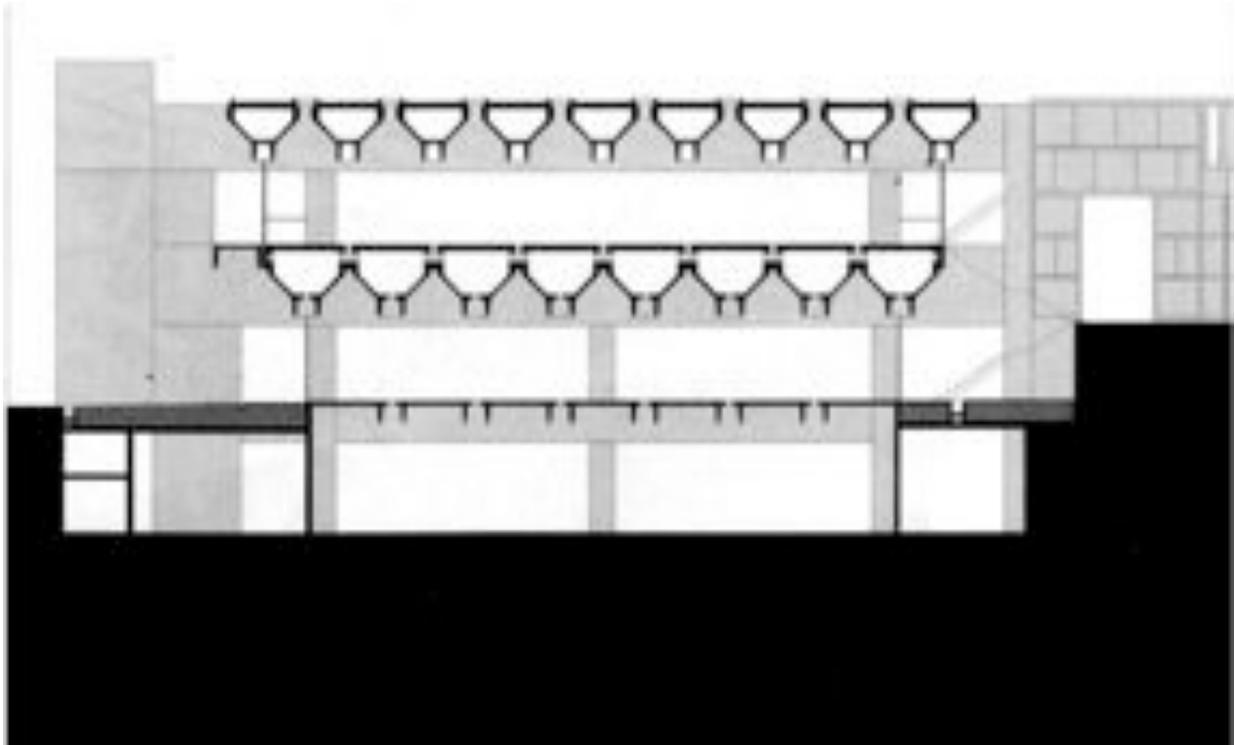


Figure 3: Initial folded plate laboratory design

In its second iteration, the institute retained the same core elements, altered in terms of their arrangement. The residences were located to the west of the labs along a gently curving access road overlooking the southern gorge. Opposite of these, Kahn placed the meetinghouse complex, which had become an amalgamation of auditorium, library, dining, and gymnasium spaces. The design of the laboratories served as a kind of middle ground between the meetinghouse and residences, consisting of four identical two-story concrete buildings arranged symmetrically as reflexive pairs around two courtyards.^x Study towers flanked each concrete laboratory, their bases left open to serve as an arcade for the courtyard plan. The laboratory spaces themselves featured folded plate ceilings, freeing the plans from load-bearing columns. Above these were story-high mechanical spaces, held aloft by the plates. Salk referred to these spaces as "mesenchyme spaces," with "one serving the body, while the other is the body itself."^{xi} In April of 1962, upon seeing Kahn's second design, Salk called for changes, having been "too preoccupied with financial matters during the development of the scheme to be critical of the emerging design."^{xii} He found the grid of the laboratory spaces required by the folded plate ductwork systems too large for realistic equipment setups and was worried that unhealthy competition might arise between the paired laboratories.^{xiii} In June of 1962 Kahn presented Salk with the third design for the institute. All essential elements of the second design scheme were carried over, in particular the notions of an Alhambraesque courtyard presence and the tri-partite arrangement of residences, laboratories, and the meetinghouse.

The number of laboratory buildings was reduced from four two-story buildings to

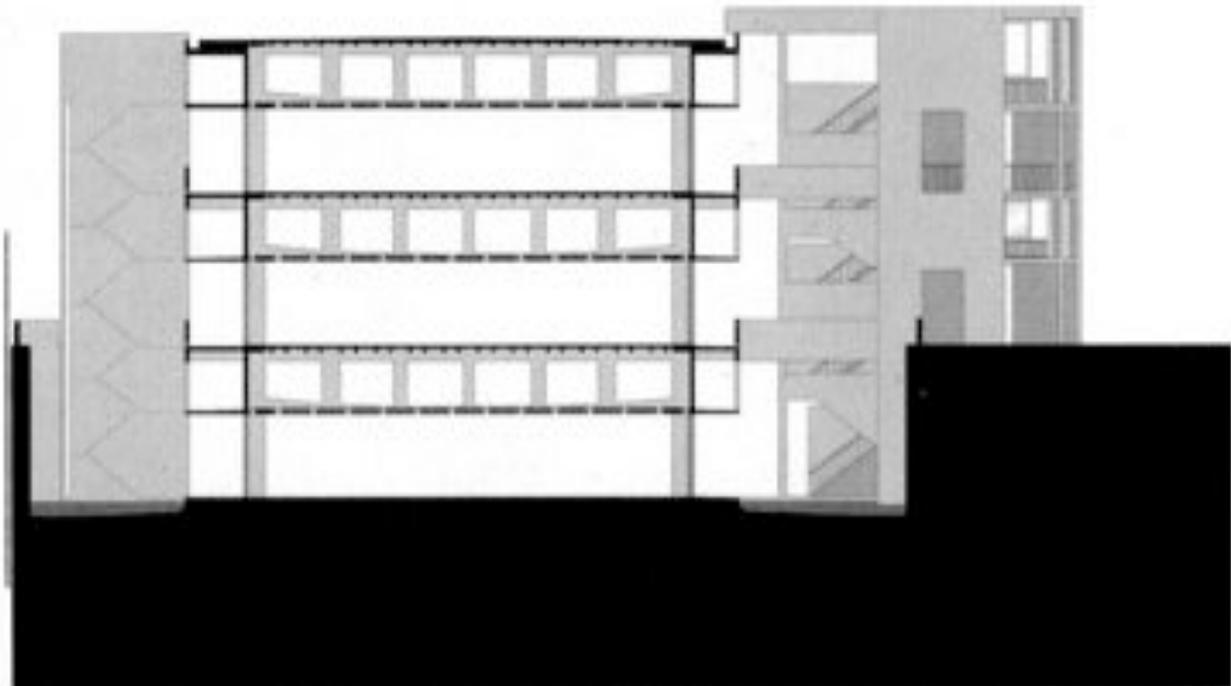


Figure 4: Revised, trussed laboratory design

two six-story buildings, each sunken one story into the earth. The folded plate structure of the labs was replaced with poured-in-place concrete trusses, embedded still with the served and servant space logic of the previous scheme. Stair towers provided a bridge between what Kahn called the “oak table and rug” environment of the study towers and the “stainless steel realm” of the laboratory spaces.^{xiv} They were further removed by their alignment with the servant spaces *above* the labs, rather than the workspaces themselves. These studies, serving the need for individual reflection, featured the use of teak wood, a material that provided an intimate, warm contrast to the impersonal and perhaps lifeless concrete used in the institute’s other spaces. Open-air porticoes, at the level of the uppermost laboratories, were placed as informal meeting spaces, equipped with slate blackboards.

In addition to these alterations, Kahn also began moving forward with plans for the other parts of his tri-partite plan, with a large amount of attention paid to the meetinghouse. Multi-functional in nature, the meeting house was to Kahn “every bit as big as the laboratory. It was... the place of arts and letters. It was the place where one had his meal, because I don’t know of any greater seminar than the dining room.”^{xv} The arrangement of the complex was that of a square courtyard, framed by separate “rooms,” each a juxtaposition of a circle upon a square. These rooms were conceptualized by Kahn as ruins, which Kahn wrapped around glass-enclosed appendages to control glare. On August 29, 1963 an amendment to the original contract was signed between Kahn and Jonas Salk, halting work on the meeting house and residences indefinitely, “pending further investigation of the design premises.” Financial limitations, although not mentioned as a reason for the

postponement, were most likely an influential factor.^{xvi} By 1965, the project, consisting of only the laboratory buildings, studies, and courtyard, was nearly complete. The courtyard, however, remained unfinished. Unsure of how to approach its completion, Kahn invited architect Luis Barrigan to visit the site. Kahn had seen Barrigan's work exhibited at MoMA the previous year. Upon his arrival at the site, Barrigan recalls having suggested to Kahn, "Don't put one leaf nor plant, nor one flower, nor dirt. Absolutely nothing. A plaza...will unite the two buildings and at the end, you will see a line to the sea."^{xvii} Despite the submission of two designs for the courtyard following Barrigan's visit, both of which displayed no small amount of uncertainty in regard to use of vegetation, Kahn wrote a three-page letter to Salk, whole-heartedly endorsing the plan suggested by Luis Barrigan. The

final plan, a mortarless stone plaza divided by a continuously flowing canal of water, was documented for construction in the summer of 1967.

The final design for the plaza, bold and harsh in its complete lack of vegetation, represents the end result of Kahn's struggle to balance the stilted remainder of his original three-part plan for the institute. The plethora of ideas that emerged from Kahn and Salks earlier discussions were in large part embodied in his design of the meeting house.

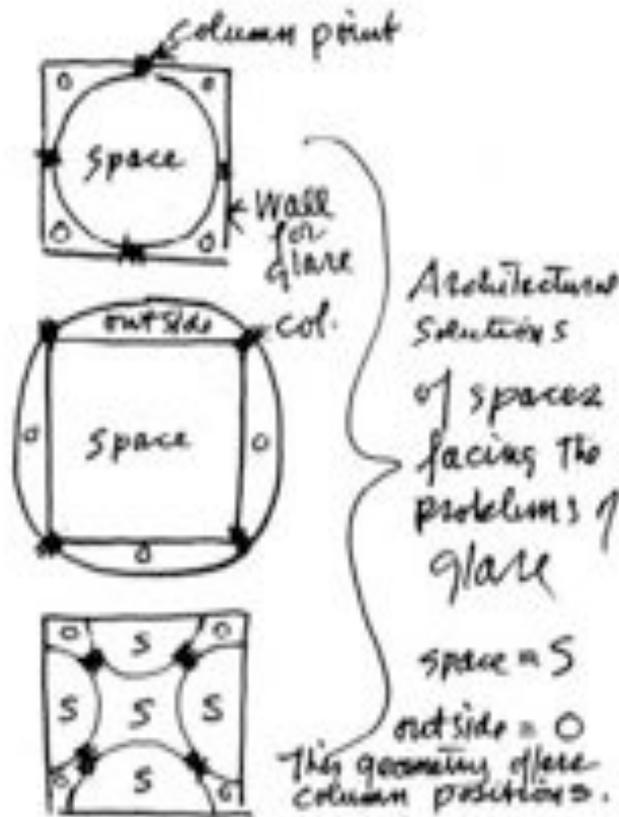


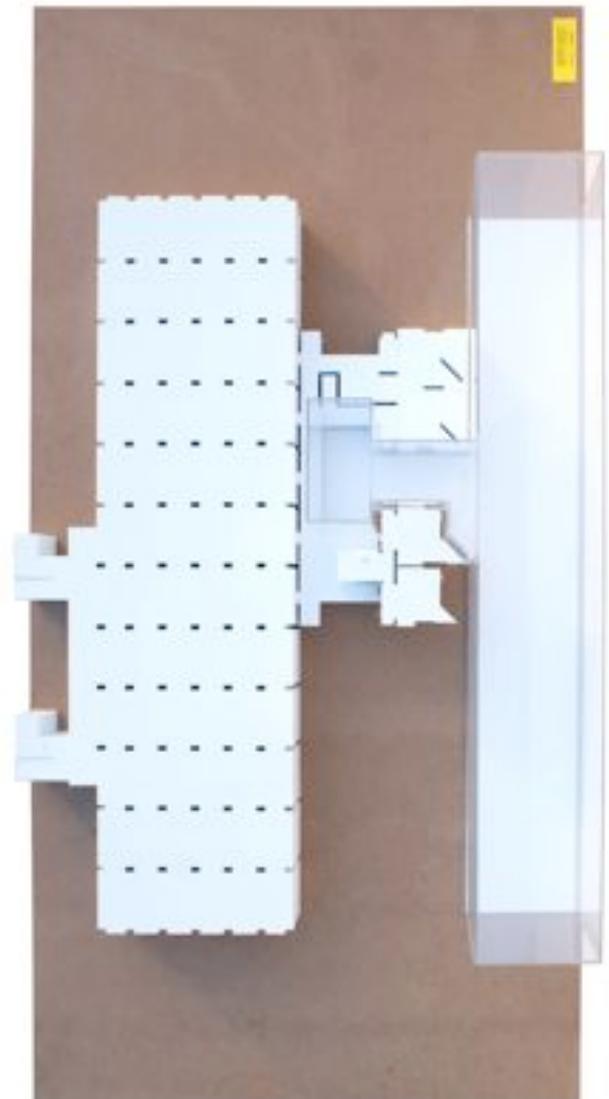
Figure 5: Sketches of "wrapped" meeting house rooms

Interpretation

Whether fully intentional or the recognition of good circumstance,, it would seem that Kahn began to make connections between his earlier decisions regarding its layout and the suggestion of Luis Barragan. Kahn's earlier decision to consolidate two courtyards into one is of no small importance, as he noted that "two gardens were just a convenience. But one is really a place; you put meaning into it; you feel loyalty to it."^{xviii} This sense of singularity or loyalty is further heightened by the final design of the courtyard. What would otherwise be a space of recreation and

tangibility; of human scale, is obliterated by the continuation from one laboratory building to the other. The only division then becomes the thin channel of water, itself centering the entire complex as a frame of the intangible sky and sea beyond. At sunset, the golden sky merges with the water of the ocean, before shooting "like a line of fire, up through the gathering darkness of the plaza's stone floor, to reach its source in the cubic fountain."^{xix} Then the concrete laboratory towers come into our sight, with the central courtyard split and centered by the long water canal, eventually emptying into a sunken pool beneath the horizon. It is a garden without vegetation, a monastery without roof.

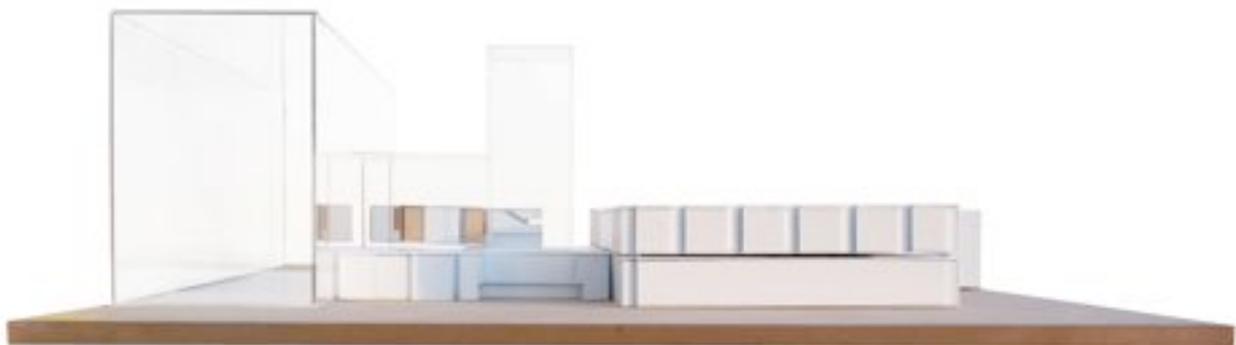
The iconic central courtyard at Salk aims to put "the sun on trial" (one of Kahn's more provocative elocutions). At Salk, Kahn uses architecture and mainly the courtyard, to direct the scientific eye skyward.^{xx} By establishing the courtyard, Kahn implements a series of measurable and immeasurable contrasts. The central courtyard is the core of the whole design and if it sufficiently manifests Kahn's attitude towards the principle of geometry and nature, it also reveals his aspirations for order.



With its program-less inner courtyard and isolated situation upon the ridge overlooking the ocean, the meeting house was the closest attempt to re-create the qualities of the monastery of San Francesco at Assisi. It further represented the marriage of social contribution and collaboration with the transcendental notion of a something intangible. This of course parallels the desire on Salks part for an expression of the measureable and immeasurable qualities of science.

As Edmund Burke claimed in *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*, the feeling of the sublime is derived from fear. The source of sublime that Kahn created at Salk Institute is the continuity and consistency depicted by the consecutive surfaces of concrete ground and facades, together with the discontinuity inconsistency caused by the existence of the stream of water in horizontal dimension. They unfold a wondrous integration of both symmetrical harmony & stable extension, and the disharmony of gradient and unstable distention. Thus, a subtle feeling of balance between repetition and diversity is created making every mind in the domain start to question both sides of a real thing as the limpidity of water and the solidity of concrete.

Contrasts can motivate the act of questioning. However, they can't give a convincing answer to the questions. That mixed feeling of confusion and curiosity eventually lead to the naissance of sublimity, alienation and monumentality. These draw the senses into an illusion that the whole sequence of spaces is a pilgrimage. In this pilgrimage towards the infinitely perpetual yet unknown truth, the concrete towers are as milestones looking down to every movement that people make on their way. And the canal of water, the stream of life is even as a guide, an imageless mentor who only exists in another unknown dimension but can talk to the pilgrims by persistent unchangeable sound, leading life in the process of pilgrimage from merely knowing the existence of itself, to immortal.



As Kahn once said, "Architecture is the reaching out for the truth." The same might be said of biological study. What is waiting at the end of the pilgrimage? Perhaps is the consummate combination between the effable reason and ineffable intuition, between the rational science and perceptual art, the impersonal existence and personal emotion, the thousands of momentary phenomenon and only invariable verity.

Kahn organized the exterior of the Salk Institute as a tremendous combination of contrasts. By bridging each study tower to the main laboratory complex by a flight of stairs with large apertures cut into the concrete walls, he created a sequence of spaces which could possibly cause sublime feelings, derived from a sharply appeared comparison between human body, which is warm and soft, and cold, industrial concrete. The courtyard is the focal point of this composition. "Ideally, a Kahn courtyard is a place to which we come to be oriented intellectually as well as literally", says Kathleen James.^{xxi} And the courtyard at Salk far exceeds this task. When people get involved into the activities and feelings of this courtyard, they can see and feel two types of places and time, distinction between the measurable and immeasurable work of the scientist.



Proof by facts, Kahn adopted a rigorous geometric logic when he dealt with the relationship between the lab and the central courtyard. They exist as a unity of organized squares. Moreover, the courtyard itself is a superimposition of two squares. The resulting composition puts occupants in contact with a dualistic rendering of the question of life in which "measureable" and "immeasurable" knowledge represent two sides of the same reality.

The volume of concrete towers, the divided stripes, the water canal and the constrained vista of sky and ocean belong to the measurable part. The meanings that these things emblemize belong to the immeasurable part. Like a circle, the substance of each art circulates in this whole system, from measurable to immeasurable, known to unknown, consecutive to inconsecutive, tangible to intangible. If the courtyard at Salk has a poetic equivalent, surely it is a species of the kind of psychic space. Wallace Stevens called it "the dumbfounding abyss between ourselves and the object, or between ourselves and other selves."^{xii}

Kahn is an architect, not a mystic. To the extent he enjoyed insightful observation, he sought to translate these insights into built form. At Salk, it is not form so much as its opposite condition, emptiness that activates the genius of Kahn's solution. Its emptiness is neither religious nor philosophical: as Kahn often suggested, it belongs only to Architecture. As Kahn quoted Wallace Stevens, "What slice of sun does your building have? And one could paraphrase by saying, "What slice of the sun enters your room?" As if to say, "The sun never knew how great it was until it struck the side of a building." At Salk, Louis Kahn directs the sunlight to edge down upon and slowly touch each cell of the body of the whole building, each tissue that composes the form of contrasts and balances, each corner that he uses to create the unique spirit within this work, from day to night, from the architecture to the void. And at last, when the sun reaches the shining surface of the running life steam, it follows the endless enquiry from the steam, towards the essence of life, and finally merges into the façade of sky, which is silent but full of philosophical spectacle. Even if the sun won't comprehend how great that Salk Institute is, the eyes will.

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- ⁱ Dorothy Ducas, "Jonas Salk," in *Heroes for Our Times*, ed. William Yolán and Kenneth Seeman Giniger (New York: Overseas Press Club, 1968), 70-71.
- ⁱⁱ Thomas Leslie, *Louis I Kahn: Building Art, Building Science* (New York: George Braziller, 2005), 131.
- ⁱⁱⁱ *Ibid*, 131.
- ^{iv} *Ibid*, 132.
- ^v Anne Griswold Tyng, *Louis Kahn to Anne Tyng: The Rome Letters 1953-1954* (New York: Rizzoli, 1997), 10.
- ^{vi} Robert McCarter, *Louis I. Kahn* (New York: Phaidon, 2005), 16.
- ^{vii} Thomas Leslie, *Louis I Kahn: Building Art, Building Science* (New York: George Braziller, 2005), 133.
- ^{viii} *Ibid*, 133.
- ^{ix} David Brownlee and David De Long, *Louis I. Kahn: In the Realm of Architecture* (New York: Rizzoli, 1991), 330.
- ^x *Ibid*, 331.
- ^{xi} *Ibid*, 330.
- ^{xii} Richard Saul Wurman, *What Will Be Has Always Been: The Words of Louis I. Kahn* (New York: Access Press and Rizzoli, 1986), 130.
- ^{xiii} Thomas Leslie, *Louis I Kahn: Building Art, Building Science* (New York: George Braziller, 2005), 143.
- ^{xiv} David Brownlee and David De Long, *Louis I. Kahn: In the Realm of Architecture* (New York: Rizzoli, 1991), 332.
- ^{xv} *Ibid*, 333.
- ^{xvi} Alessandra Latour, *Louis I. Kahn, Writings, Lectures, Interviews*, (New York: Rizzoli, 1991), 180.
- ^{xvii} David Brownlee and David De Long, *Louis I. Kahn: In the Realm of Architecture* (New York: Rizzoli, 1991), 336.
- ^{xviii} Richard Saul Wurman, *What Will Be Has Always Been: The Words of Louis I. Kahn* (New York: Access Press and Rizzoli, 1986), 269-9.
- ^{xix} Alessandra Latour, *Louis I. Kahn, Writings, Lectures, Interviews*, (New York: Rizzoli, 1991), 206-7.
- ^{xx} Robert McCarter, *Louis I. Kahn* (New York: Phaidon, 2005), 209.
- ^{xxi} Ezra Stoller, *The Salk Institute* (New York; Princeton Architectural Press, 1999), 11.
- ^{xxii} *Ibid*, 9.