Form characterizes a harmony of spaces good for a certain activity of man.

LOUIS KAHN 1960

Form is an integral theme in architectural theory because it defines the spirit of the architectural work itself. Louis Kahn was guided by a set of principles which influenced his architectural philosophy and manifested into his works. His concept of ‘Form’ was free yet concise and he expressed this understanding in the Salk Institute for Biological Research located in La Jolla, California. In analyzing this case study, it is evident how Kahn began to search for form through a series of design iterations and the social and cultural factors that influenced the form of the project. Finally, I will add my own thoughts on form in relation to Salk Institute.

Salk Institute is situated on a bluff overlooking the Pacific Ocean. Since no formal programme was given, the programme evolved throughout the course of the project. Kahn included three main programmatic functions in his first scheme: housing, laboratories, and a common Meeting Place (Fig. 1). In Louis I. Kahn: Building Art, Building Science, Thomas Leslie notes that this scheme was almost “immediately abandoned after its presentation to the city, and Kahn even apologized to Salk for its too rapid conception and lack of sensitivity towards the site”. After establishing a general site layout, Kahn shifted his focus to the form of the building itself. In a second iteration, he turned the vertical laboratories into four rectilinear two-story blocks. James Steele suggests in Architectural in Detail: Salk Institute, while this approach began to respond to the expansiveness of the area available to him, problems with access to pipe work led Kahn to think of another solution. In the final scheme, Kahn revised the number of laboratories, reducing the four blocks to two. He also increased the number of stories to three, but placed one storey below grade to give neighbouring developments clear views. Each block contained five ‘porticos of studies’ with a 45° wall looking out to the Pacific Ocean (See figure 2). Through meticulous design process, Kahn carefully considered the notion of ‘Form’ in relation to the site and for the laboratories.
The form of the Meeting place which was also carefully considered, changed significantly in all three schemes. In the first proposal, the meeting place was configured as a rectilinear group, around closed courts and connected by an ambulatory. In the second iteration, Kahn looked towards Hadrian’s Villa in Tivoli and grouped the spaces around a covered hall which acted as the ambulatory. He also began conceiving interstitial spaces between inner and outer surfaces and how to separate them. The final proposal shows the Meeting place as "a balance between the rational and the organic in which each element occupies its appropriate place in a thoughtful composition". This suggests for Kahn, the search for form not only encompassed the site, or an individual building, but in between the relationship of buildings.
Kahn struggled in finding a form for what is now one of the most iconic spaces of the Salk Institute—the central court. In fact, early sketches reveal Kahn had envisioned the court to include some kind of natural vegetation, but Steele notes, after collaborating with engineer and self-trained architect Luis Barragan, Kahn was advised against the idea. The addition of trees would hinder the purity of Kahn’s idea which was to “unite the surface of the façade to the sky as if everything had been hollowed out.” Indeed, had Kahn fulfilled the initial garden concept, the same effect experienced today would have been lost.

Several social and cultural forces also influenced the form of Salk Institute. One major event that helped Kahn gain the commission for the project was his speech entitled ‘Order for Science and Art’ related to the Richards Medical Research Building at the University of Pennsylvania. Here Kahn spoke of form as “…a harmony of spaces good for a certain activity of man” and making the ‘immeasurable measurable’. This sentiment aligned with Salk’s own values who envisioned a space where even Picasso could come to visit and believed “medical research does not belong entirely to medicine or the physical sciences. It belongs to Population”. Through a synthesis of these two ideas Kahn was able to devise a form that would test the limits of his philosophies because his client shared similar values.
Another challenge of form based on social and cultural influences relates to problems with financial funding. By 1965, the project had reached $14 million and the master-plan had not been fully realized. Today, only the laboratories have been constructed. Steele proposes: “While the residential portion of the complex may arguably have been omitted without serious damage to the form idea, the loss of the Meeting Place has seriously compromised it, to the great detriment of the institution…” Steele explains that the Meeting Place represented the antithesis of the laboratories and was an irreplaceable component to the project. Although the absence of the Meeting Place may have compromised the project, in hindsight, it has served a higher purpose within the history of architectural theory. The relevancy of ‘Form’ or lack of is constantly in contention in architectural theory.

Kahn was also very fortunate in having Salk share a similar vision with him. Without his commitment and trust, he would never have been able to develop a form that embodied his architectural philosophy completely. The absence of the living and communal aspects at Salk also raise important questions about the form of the project itself: what would the project be like if it had been fully realized? And would we have the same discussion if the master plan had been completed? Although we can only speculate, it serves as an important topic on the synthesis of ‘Form’ and relevance in architectural theory today.
works cited

4. Ibid.
5. Ibid.
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
12. Ibid.
13. Ibid.
15. Ibid.
I believe that consciousness is in all life. 

LOUIS KAHN 1969

The human body and architecture have always shared an intimate relationship with one another and this notion is completely embodied in the Salk Institute. Dr. Salk was guided by the belief that “medical research does not belong entirely to medicine or the physical sciences. It belongs to population” (Steele, 1). And what he meant was anyone with a mind, with or without a scientific background, could discover new frontiers in biomedical research. Grounded in this belief, Kahn was able to translate the theme of body into architecture at varying degrees. These include the building as body, the building for bodies, and the type of bodies the building produces.

Perhaps the most direct connection between the body and architecture relates to Dr. Jonas Salk and nature of his work itself. In 1955 Dr. Salk discovered a vaccine against polio and after successful tests he became an instant public figure. This in turn helped him establish the Salk Institute as a place where young scientists could focus on their careers and medical research.

However, the Salk project can also be considered as a body itself. In Vidler’s essay “The Building in Pain”, he illustrates how architecture was understood as a projection of the body, especially in the Classical and Renaissance era. Vidler draws on Renaissance theorists like Francesco di Giorgio who writes: “the organs are arranged in and around the body as a function of its needs and necessities; one should do likewise in cities (Vidler, 4). This is also suggested by Steele who notes, “…if the laboratories may be referred to as the lungs of the Salk Institute, the Meeting Place was to be its brains…” (Steele, 16). This analogy helps our understanding of the organization of the Salk Institute. Like a brain that needs oxygen to operate, the Meeting Place was situated closest to the Pacific Ocean because it needed the ocean to draw inspiration from. The function of lungs is to manage the flow of oxygen, and similarly in the laboratories this inspiration is processed into new medical discoveries.

Figure 1.0 Diagram showing the building as body and related functions
Facial symmetry also has associations with physical attractiveness, beauty, and health. The formal configuration of the laboratories shows a very symmetrical organization along the central axis in plan. One can speculate that after several iterations to find a form for the laboratories one factor which helped Kahn establish the symmetry was the associative bodily qualities.

The Salk Institute may also be regarded as a building for bodies. In “The Medical Body in Modern Architecture,” Comina writes: “Not only did modern architecture emphasize health and exercise...their architecture was understood this way” (Comina, 1). While no formal program was given, Kahn envisioned the Salk Institute as a place where researchers and scholars could live, work, and play, that is, a place where all functional and needs of the body were cared for. The emphasis of health and exercise is supported by Steele who writes: “the far-sighted theme of health as a unitary or holistic process is constantly stressed [in the Salk Institute], as is the study of both the body and mind of ‘total person’ (Steele, 1). The initial concept that the Salk project would extend beyond a medical research centre lends itself to what Steele notes as the study of a totality of values integral to a vision of total health (1).
Comina also writes: “even more significant is the impact of medical thought on domestic architecture, the constant preoccupation with ventilation, sunlight, hygiene, and white walls” (Comina, 1). Although this project is not domestic architecture, the same principles apply. In Kahn’s essay “Form and Design” he describes the laboratories as “the architecture of air cleanliness and area adjustability” (Kahn, 470). Kahn was very interested in the management of air. Since the nature of research work was ongoing throughout the day, Kahn had to devise a heating ventilation and air conditioning system that would remain in operation constantly. Leslie notes the air strategy was to make the air to breathe be away from the air to throw away (243). Kahn employed two strategies to handle air which included a ‘dual duct system’ in the north building and a ‘reheat system’ in the South. Proper air circulation of air and comparable to the human body’s circulation of blood. The implementation of two strategies employed for air quality management highlight Kahn intentions to make a building functional to the bodies that inhabit it.
Through the configuration of spaces, Kahn was also thoughtful about the human psyche and type of bodies the building could produce. For example, Kahn deliberately separated the porticoes of studies by bridges to maintain a sufficient physical and psychological distancing between private and collaborative thought (Steele, 4). The choice in materiality is also expressive of how the body should function. Kahn used teak wood in the private studies, a symbol of reflection and growth, and concrete in the laboratories symbolic of work and producing results. Steele notes that both Kahn and Salk were involved in the colour and quality control of concrete and that Kahn even researched the components used in Roman pozzolana in order to achieve a similar reddish hue (Steele, 9). This attention to coloration in the walls speaks to Kahn’s attention to the human psyche and overall concept of the building as a humanistic approach to medical research. It becomes clear that Kahn wanted the building to produce ‘total bodies’ that were well nourished and cared for both physically and psychologically.

The human body has played a significant role in architectural form as a metaphor and physical presence. In the Salk Institute, the importance of the theme of body was strongly felt from the onset of the project. This enabled Kahn to see the building as a body in terms of organs and symmetrical configurations, the building for bodies through ventilation and air quality control, and a place that promoted total health. Finally, the attention to the human psyche by materiality changes and color hues show how Kahn thought the building could inform the bodies it produced.
works cited

"...the assumption is of order as a rigorous delineation and within that the building as object. So the external boundary is set, and by grid and sub-grid a method of exact subdivisions begins..."

Cecil Balmond in New Structure and the Informal

After reading this article, I wanted to explore the Kahn’s technique of Order at the Salk Institute in plan view. I began with a regular grid 6.0 x 6.0 m grid and then began transforming it based on a hierarchy of spaces and Kahn’s notion of served and service spaces. The intention was to see whether or not an overall sense of Order could still be achieved based on an irregular grid system.
Architecture is an art because it is interested not only in the original need for shelter but also in putting together, spaces and materials, in a meaningful manner. This occurs through formal and actual joints. The joint, that is the fertile detail, is the place where both the construction and the construing of architecture takes place...

The Tell-the-Tale Detail by Frascari in Kenneth Frampton’s The Case for the Tectonic

Kahn was especially interested in the joint and paid careful attention in the details to reiterate broader concepts and ideas of his works. Steele notes that rather than trying to conceal the joint, Kahn chose to accentuate and that the holes left by the form ties were not patched so the spacing was carefully considered. The intention of these diagrams is to see what the building may have looked like if the treatment of the form-ties and spacing were considered differently.
...the single building is no longer an “object” now. It is only the place in which the individual cells, through elementary assembly, assume physical form...

M. Tafuri
Towards a Critique of Architectural Ideology

This diagram illustrates how the building may have been constructed (based on a detail drawing found in The Details of Modern Architecture by Ford). As suggested by Tafuri, much of the modernism movement began exploring mass assembly and a “kit of parts” approach towards architecture. After doing this exercise, it is evident that Kahn was unlike most architects of his time and thought of buildings differently through methods of construction.

Formwork Materials List
- 3/4” x 3/4” tapered wood strip inserted at joint between pours
- two 2x6 beams to counteract pressure of wet concrete
- screw type form ties
- 3/4” plywood formwork
- 4x4 structural wood support
Rapidly, we approach the final phase of the extensions of man – the technological simulation of consciousness, when the creative process of knowing will be collectively and corporately extended to the whole of human society, much as we have already extended our senses and our nerves by the various media."

M. MacLuhan
Understanding Media

How was the Salk Institute understood in the past and how is it understood today? Various forms of media have given meaning to the building. The purpose of this diagram is to see what types of media and methods of communication have influenced our understanding of the building, and what methods of communication continue to give meaning to the building today.

<table>
<thead>
<tr>
<th>Prior to 1959</th>
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I sense Light as the giver of all presences, and material as spent Light. What is made by Light casts a shadow, and the shadow belongs to Light.  


The purpose of the diagram on the following page was to explore the daylight effects and spatial qualities of the central courtyard at various times of the day. The mass model was geo-located in La Jolla, CA for accuracy. What I learned in doing this exercise was that in the mid afternoon, the courtyard experiences more shade than I previously thought and the most tranquil experience occurs at the end of work day, around 5:00 pm.
Materiality becomes important in understanding a character of the space. The intent of this diagram was to see how Kahn’s use of natural materials with concrete and wood informed the organization and formal logic of the space through a sectional perspective drawing. The notion of served and service space, public and private is clearly expressed through the proportions and consideration of different materials.

Abalos, Heidegger in his refuge: the existensalist house
The relationship between the space of flows and the space of places, between simultaneous globalization and localization are not predetermined in their outcome.

-Manuel Castells

The intent of this diagram is to represent the number and groups of people that would inhabit the building by doing a sample character profile of one person from each of the group. Next, I wanted to show the flows of people and exchanges of information in the use of the institution in plan and section. The learning outcome for this diagram was Kahn’s deliberate use of the open plan allowed for maximum flexibility and constant flow of communications and ideas. This formal move allowed for non-predicted outcomes to occur, an important concept for medical research.