

As the design evolved, Kahn called in Mexican architect Luis Barragán to assist with the design of the courtyard garden. Kahn had been exposed to Barragán's work in an exhibition at The Museum of Modern Art. He recalled the first time Barragán saw the space:

He turned to us and said, "I would not put a single tree in this area. I would make a plaza. . . . If you make a plaza, you will have another facade to the sky." I was so jealous of this idea that I could not help adding to it by saying "then we would get all those blue mosaics for nothing," pointing to the Pacific Ocean.<sup>17</sup>

There were concerns that a plaza made entirely of stone would appear harsh, so the architects created a central channel filled with water, which emptied into a fountain located in a lower courtyard, where staff could gather. This can be seen in Images Twenty-three and Twenty-five.

- **Have your students look at the images of the plaza. Have them compare the plaza to the garden concept in the model. How did the mood or tone of this place change when the trees were removed and a plaza was created?**
- **Next, show your students the cross-section view of one of the Salk Institute laboratory buildings (Image Twenty-eight). Ask your students to describe what they see. What do they think this drawing might represent?**

These rendering details show us a view of the side of the building as if one of its walls had been cut away. To the right are studies and stairway structures. To the left are three laboratory floors with mechanical structures above each one. The series of six rectangular shapes represent the trussing.

- **Print out and enlarge a copy of the image so that your class can work together to locate and identify the laboratory floors, mechanical areas, stairway structures, and studies. Have your students label the drawing like a map. Use the photographs included in this lesson as a guide for this exploration.**

In the design of the Salk Institute, Kahn and Komendant incorporated a type of support called a **Vierendeel truss** (named after the Belgian engineer Arthur Vierendeel, who developed the design in 1896). Kahn first used this style of trussing in the design for the Richards Building. The Vierendeel truss features rigid upper and lower beams connected by vertical beams. Previous to this innovation, diagonal beams connected the upper and lower beams in trusses; you can see this in many railroad bridges. This new style of truss could support the floor above and give lift to the ceiling below without any additional support system. This was the perfect solution for the Salk Institute, where laboratory spaces had to be flexible enough to be customized for the needs of incoming scientists. The laboratories could be designed as wide-open horizontal spaces, with their mechanical facilities stored above in the trussing, leaving more room in the laboratories themselves for people and equipment. Also, this allowed the space to include two separate channels, one for incoming clean air and one for outgoing gases expelled from experiments.

## ACTIVITIES

1. Have your students conduct research to investigate other modern building styles. Information about modern structures can be found on MoMA's teacher Web site at [www.moma.org/modernteachers](http://www.moma.org/modernteachers). Search the site for the term *architecture* to find images and lessons. Have your students work in groups to create a presentation comparing the Richards Building to other buildings of its time.

17. Louis I. Kahn, quoted in Leslie, *Louis I. Kahn*, 165–66.

2. Have your students compare the Salk Institute and the Richards Building. These buildings were created to serve similar functions. How are they the same? How are they different? How does the environment in which they were built play a part in their designs?

3. Have your students explore structures further through the online curriculum of the Salvadori Center, at [www.salvadori.org](http://www.salvadori.org). On this site, you can order books and download lesson plans covering a range of architectural topics, including trussing, which will guide you in working with your students through a hands-on exploration of structures.

## LESSON FIVE: The Spirituality of Matter



**IMAGE TWENTY-NINE:** National Assembly Building (center), Sher-e-Bangla Nagar, Dhaka, Bangladesh, c.1972. Louis I. Kahn Collection, University of Pennsylvania, and the Pennsylvania Historical and Museum Commission



**IMAGE THIRTY:** Interior Prayer Hall, Sher-e-Bangla Nagar, Dhaka, Bangladesh. National Assembly Building, 2002. Photograph: Raymond Meier



**IMAGE THIRTY-ONE:** Exterior Prayer Hall, Sher-e-Bangla Nagar, Dhaka, Bangladesh. National Assembly Building, 2002. Photograph: Raymond Meier



**IMAGE THIRTY-TWO:** Kahn and assistants with model of the Assembly complex, spring 1964. Louis I. Kahn Collection, University of Pennsylvania, and the Pennsylvania Historical and Museum Commission. Photograph: George Pohl



**IMAGE THIRTY-THREE:** Construction photo, National Assembly Building, Sher-e-Bangla Nagar, Dhaka, Bangladesh, c. 1970. Louis I. Kahn Collection, University of Pennsylvania, and the Pennsylvania Historical and Museum Commission

### INTRODUCTION

In August 1963, Kahn received a telegram from the Pakistani department of public works asking him if he was interested in a commission to build the new National Assembly building in Dhaka, East Pakistan. Kahn accepted the commission, and in January 1963 he flew to Dhaka for the first of many visits. He was given a tour of the thousand-acre site of open farmland and was also given the design program from the Pakistani government. The project was designed in two phases. The first phase included the National Assembly Building, a prayer hall, and dormitories. With the expectation that eight hundred more acres would be acquired, the complete master plan included courtrooms, a hospital, a museum, schools, and low- and high-income residential areas. This lesson examines Kahn's process of designing a ceremonial building that was to serve as a political and spiritual symbol for a community.

### LESSON OBJECTIVES

- Students will learn about creating an architectural structure in another country and environment.
- Students will consider the design of structures that are meant to fit within an overall master plan for a site.
- Students will compare different types of construction techniques.

## INTRODUCTORY DISCUSSION

Organize your students into pairs. Assign one student to be the “drawer” and the other to be the “describer.” Give pencils and paper to the drawers and give the describers copies of the photograph of the National Assembly Building (Image Twenty-nine). Then, ask the describers to explain what they see. The drawers should draw what they hear being described, without ever seeing the image, and the describers should limit their comments to descriptions of the image—they must not comment on the drawing that is being created. Various additional rules can be applied to this exercise. For instance, the drawer may not be allowed to ask the describer any questions, or the describer may not be allowed to see what the drawer is drawing. Decide which rules you want to apply, or take turns trying them all out. The activity works best when the drawers and describers switch roles. After ten minutes of describing and drawing, discuss the process with your students. What was the most challenging part of the exercise? Talk to your students about the ways individual perception and language play into this exercise. Inform your students that this photograph shows the National Assembly Building in Bangladesh (formerly East Pakistan)(center), designed by Kahn, and that it serves as the political seat of Bangladesh.

## IMAGE-BASED DISCUSSION

- **Give your students a few minutes to look at the photograph of the National Assembly Building complex (Image Twenty-nine). Have your students note the different geometric forms they see.**

With this project, Kahn first focused on the National Assembly Building itself, which was to include a two-hundred-seat chamber for the legislature to convene in, a prayer hall, a dining hall, and numerous offices. He started his design process with rough sketches of a large square structure (or diamond-shaped, depending on how it is viewed) with four corner towers. Then he went on to make rough sketches of the entire site, including secondary structures, such as dormitories and hostels, to the east and west of the National Assembly Building.

- **Have your students look closely at the photograph, taking note of the way Kahn incorporated geometry in his design.**
- **Next, show your students the photographs of the Prayer Hall (Images Thirty and Thirty-one).**

After he finalized his **concept** for the National Assembly Building, Kahn reconsidered the Prayer Hall. Originally, this space was not to be significant in size or **scale**. But the more Kahn thought about the nature of the space (designated for prayer and reflection), the more strongly he felt that it should be a significant part of the design. Kahn decided that the Prayer Hall should serve as the main entrance for the National Assembly Building. (Although, officially, this space was called the Prayer Hall, Kahn often referred to it as a mosque.) Kahn described his new design:

The first design submitted . . . showed a Mosque as a separate building adjoining the Assembly Building. In this new second scheme, the Prayer Hall of the program is made a part of the spaces of the Assembly block and woven into the architecture as one. In this way, its meaning is equally emphatic as a mosque and gives equal spiritual significance without inviting controversy.<sup>18</sup>

- **Have your students compare the interior and exterior views of the Prayer Hall (Images Thirty and Thirty-one). How are they similar? How are they different? Ask your students if they have ever experienced a building whose interior and exterior seemed very different.**

18. Louis I. Kahn, quoted in Brownlee and De Long, *Louis I. Kahn*, 376.

- Ask your students to consider what the experience of approaching, entering, and being inside the Prayer Hall would be like.
- Ask your students to consider what Kahn may have meant when he talked about weaving the Prayer Hall into the Assembly Building as one architectural form, giving it more “spiritual significance.”
- Next, show your students the photograph of Kahn and his assistants in his studio (Image Thirty-two).

For months, Kahn continued to refine his ideas and make additional **scale models** of the structures included in the master plan. In this photograph you can see Kahn and his assistants maneuvering the various models, trying out different configurations.

Kahn and his team also considered the placement of the structures within the cardinal (directional) points. Eventually they decided to shift the Prayer Hall east, to face toward Mecca, a city in Saudi Arabia considered to be the spiritual center of Islam because it is the birthplace of the prophet Mohammed.

- Ask your students how this choice connects to Kahn’s idea that this space should have “spiritual significance.”

Kahn felt strongly that the structures he designed for this site should not just stand for the political nature of the National Assembly’s activities but also for their spiritual nature. Ask your students if they feel that Kahn succeeded in this.

- Next, show your students the construction photograph of the site (Image Thirty-three).

Once the design was complete, Kahn and his team began to plan the construction phase of the project. Kahn worked with his long-time colleague August Komendant, a **structural engineer**. This project presented engineering issues unlike any they had dealt with before.

- Ask your students to compare these construction photos to the images of the Alfred Newton Richards Medical Research Building under construction from previous lessons (Images Fifteen to Eighteen). Have them describe the differences they see. What do these photos reveal about the construction process? Ask your students to consider how environment and culture might affect this process.

The issues surrounding the construction of this project included the climate of the region and construction techniques in Asia. The structures were built by hand, with workers carrying concrete on their heads up and down bamboo scaffolding, and they were not completed for twenty-three years. Construction was held up in 1971 by war, as East Pakistan (Bangladesh) sought independence from West Pakistan. Many feared that the site would be bombed during the conflict, but enemy pilots bypassed the site, thinking it was an ancient ruin. Eventually, the conflict was resolved and the site was renamed Sher-e-Bangla Nagar (the city of the Bengal tiger). By 1983, most of the work was complete. Kahn, who died in 1974, was posthumously presented the Aga Kahn Award for Architecture for the Sher-e-Bangla Nagar National Assembly Building.

### ACTIVITY

Have your students research the history and culture of Dhaka, the capital of Bangladesh. Have them consider the area, its climate, food, music, population, and architecture. Working in groups, students should select areas of individual research, then combine their work into a group presentation. Compare the process of designing the National Assembly complex with the process of designing the First Unitarian Church of Rochester, discussed in Lesson Three. Have your students consider the cultural and environmental factors of each project.