My intention here is to describe the process by which we arrived at the design for the Aga Khan Medical University and Hospital Complex in Karachi, Pakistan (fig. 1). I want to explain how we conceived of scale in terms of human activity and how we expressed that activity in both building form and architectural detail.

The Aga Khan complex consists of a 721-bed hospital, a medical school for 500 students, a school of nursing, housing for staff and students, and a mosque, built on a sixty-five acre site just outside Karachi. It was designed in 1972-73; construction was completed in 1985. To give you some idea of its size in relation to comparable Western institutions, Massachusetts General in Boston is a 1,080-bed hospital, and the Johns Hopkins in Baltimore is a 940-bed hospital. So this one was within range of some of our largest. Yet Western medicine is very new to Pakistan.

The challenge we confronted was how to introduce a Western institution into an Islamic culture that had no tradition of technologically oriented medicine. Under those circumstances, the architect assumes the role of cultural innovator along with that of builder. We began with questions. How do cultural patterns influence spatial organization? What is the tradition of a hospital or a medical school in an Islamic culture? What are the essential functions of a hospital? A medical school? A nursing school? How must they work together? How will the expectations of the

Figure 1: Aga Khan Medical University and Hospital complex, Karachi. External view showing roof forms and wind scoops.
culture affect the juxtapositioning of critical functions. How do traditional building technologies influence design? Could we produce the ambiance of a traditionally crafted environment using modern construction techniques? In short, we looked at behavioral patterns to find the cultural elements that could be utilized to allow a new building type to fit into the community, even though no historical precedent existed. As architects, we had to discover in human activities those details of history, climate, environment, and symbolism that would encourage the people of Karachi to find something familiar in the new form.

Each culture has different architectural standards. A Muslim views the built environment as an extension of the natural environment, in harmony rather than in discord with it. The qualities valued in traditional Islamic architecture are wisdom, craftsmanship, unity, integration, and respect for nature. As architects, it was our job to discover a new synthesis in the design, construction, and landscaping of a facility housing a Western educational institution.

We began by learning about Islamic hospitals. We learned that the earliest hospital was built in Syria by Caliph al-Wahid in 707. Eighty years later the Caliph of Baghdad Haroun al-Rashid attached a college (madrasa) to every mosque and a hospital to every college. From its earliest inception, the college, hospital, and mosque were linked. Teaching and the advancement of medicine were seen as integral parts of a hospital’s function. By the twelfth century, hospitals were in use throughout the Islamic world and made their way to Europe by way of the Crusaders, who marveled at these “new” institutions.

The design team visited several of the major historic sites in Spain, North Africa, and Turkey. We studied how buildings were developed in earlier times and how they are used today. We looked at the buildings of some of the great Islamic architects. We learned about the values a “successful” building was supposed to express. We studied old Islamic designs, analyzed building techniques, and the traditional work of artisans. We looked at indigenous building forms, the geometry of courtyards, and the impact of natural forces on design. We studied building placement in relation to the sun and the wind. We looked at entrances and passageways and the use of water. We looked at color and texture and what was cooling and comforting in a desert climate. That process of discovery was the soul of the design process. The results freed us from some of our Western assumptions about what a hospital ought to be.

Michelangelo once remarked that he did not so much create the David as discover the block of marble that contained the David within it. In much the same spirit we did not so much create a design for the Aga Khan complex as we discovered it within the traditions and cultures of the people of Pakistan.

Westerners conceptualize a building by standing on the outside and viewing it from a distance—a piece of sculpture in space. Muslims perceive the identity of a building in the arrangement of interior spaces. They experience architecture in the interplay of space with natural elements.

Take entrances for example. In the West, an entrance to an office building is usually a revolving door leading into an elevator lobby. It contains no mystery or sequence of experiences. In the Islamic world the entrance is both physical and metaphysical. It is a symbol of what is yet to be experienced. Within a paradigm of continuous spaces, the entry signals the dynamic of the building’s totality: transition, entry, arrival, passage through. The entry signifies place and time and symbolizes the beginning of an aesthetic experience. In the past entrance portals were often the only means by which mosques could be distinguished from markets and other buildings, and therefore their doorways always received very special volumetric treatment and surface design.
The entry we designed for the Aga Khan complex (fig. 2) exemplifies the essence of a new synthesis of cultural experience using modern rectilinear reinforced-concrete post-and-beam construction. The calligraphic border design inscribes verses from the Quran in marble. The ornamental bronze gates at the entrance and throughout the complex are decorated with verses from the Quran in metal. While Westerners might view this kind of decoration as surface ornamentation, the Muslims see it as the spiritual values of their culture integrated into the design.

But what does all this have to do with a hospital complex and teaching institutions? A modern hospital imposes its own functional requirements and technological complexities, which in the West are usually been placed in a high-rise building. The assumption is that the most efficient hospital model is one where elevators link the upper floors of wards with the middle floors of labs, clinics, and operating rooms, and the lower floors of support services such as laundry, kitchens, and storage. However, when we look at the specific activities that go on in a hospital, we find that they are actually small scale and consist of diagnosis and treatment involving a patient, a doctor, a nurse, and a piece of equipment. None of these individual activities demand a particular building form. We put hospitals in high-rise buildings because in our culture high-rise is synonymous with important. Since we experience a building as an external object in space, a skyscraper must be an important building.

Having examined our attachment to the vertical structure, we reviewed some of the technological biases of our culture. We learned that even in our own culture when hospitals become too high-tech, people retreat from them. When maternity wards and obstetrical units became too technologically oriented, for example, we saw a revival of home births. Then we began to design birthing units in hospitals.

In Karachi, as in Boston or any place else, people are often under great stress when they go to a hospital, and they seek comfort and reassurance in their
surroundings. Comfort derives from familiarity. We could not adapt our design for an American hospital and put it in Karachi. We had to discover traditional elements which, while used in a new way, would elicit an impulse of recognition. Although a great deal of attention has been given to our "horizontal design," the issue we confronted was not whether this would be a vertical or horizontal solution, but how to design a health-care facility that expressed our concern about the people using the building.

The hospital building we came up with is three stories high and set back from the road to minimize noise. It is designed to house the most advanced technological equipment and activities. The patient wards are located in another building within easy reach of the main hospital and connected by a corridor. The medical college is sited to allow an integral relationship with the hospital.

The dimensional issue, then, becomes one of how people interact. Scale is expressed as an issue of sociability, privacy, and technical requirements. We think of medical education as extremely complex. Yet the basic form of education has not varied in the last several hundred years. The ratio of students to professors is not all that different. Education still depends on interaction between individual students and the lecturer. We may have designed a large lecture hall with rear image projection equipment, but the critical element is the human activity which takes place in that hall. Again I want to emphasis my focus on dimension as a result of human activity rather than on any particular building type.

Some of the technologies that influenced spatial organization and surface form treatment were our adaptations of traditional climate control. Techniques of passive climate control—the brise-soleil, wind scoops, courtyard design, landscaping, and wall mass—allowed us to dilute the building's dependence on Western technologies such as air conditioning. The resulting forms provide unity with nature and a link with tradition. The sloped roof and integrated air scoops, which are a traditional feature of buildings in the region, capture the breeze that travels over the buildings and help to cool the spaces beneath. Dormitory rooms, classrooms, patient rooms, and administrative offices are all connected by open corridors which allow for natural ventilation. The terra cotta brise-soleil or jali block screens provide shade, breeze, and privacy. They are another example of a design solution which arose from cultural and environmental requirements. Although the teak jalis resemble handwork, they were made using a semi-industrialized process worked out by the design team in collaboration with local craftsmen (fig. 3). Windows facing the sun were recessed and angled so that the

Figure 3: Jali block screen
overhang would shade the window and capture the breeze for air circulation (fig. 4). Walls were constructed of massive double-insulated concrete blocks. By varying building placement, we were able to affect wind velocity significantly and capture prevailing breezes (fig. 5). Varying roofline height affects wind speed and internal building temperature. In addition to its environmental effect, the variations in placement and roof height give a dynamic silhouette to the skyline creating a cultural resonance with traditional desert cities.

Figure 4: Captured breezes cool the building; the overhang shades the windows.

Figure 5: Building orientation and placement can modulate the direction and intensity of the wind.
Water is an important element in Islamic culture both for its cooling properties and as a symbol. In the courtyards it helps to establish an environment of tranquility for private contemplation. But fountains and pools are not just visually pleasing and restful; they also make effective climate-control elements (fig. 6).

Marble, a building material used throughout the complex, was entirely cut, polished, and finished in Pakistan. Marble artisans came to the site to match the grain and color and code the stones for placement.

A continuously corrugated plaster surface (weeping plaster), applied by hand with cement slurry, increases surface shade and reduces glare. In regional buildings, it is often painted, but to make it more permanent we added a natural pigment so that it would not require painting. We selected the pigment color to blend with the reddish desert soil so that the collection of surface dust would not be noticeable (fig. 7).
Throughout is an extensive network of courtyards linking the buildings of the complex, with landscaping using appropriate desert vegetation. They are visually pleasing and relaxing, and are also effective climate-control elements (fig. 8).

The key challenge we faced in designing the Aga Khan Medical complex was how we as Western architects could use post, beam, and slab construction in a way that would find its link with Islamic culture. We had to set aside theories of how a modern hospital must be designed in order to discover the indigenous visual and cultural vocabulary of the country. We had to integrate that vocabulary into a medical institution which had limited historical parallels within the culture. Finally we had to blend economical building technologies with the recruiting and retraining of regional artisans and craftsmen to apply their skills in modern construction methods.

The contemporary architectural vocabulary in Karachi is derived from the economical post, beam, and slab construction. Buildings with rectangular
geometric forms and crisp lines are going up everywhere. What is missing is the sense of beauty and rhythm and order that was the architect’s traditional mission for Islamic buildings.

Buildings alone are not architecture. We see too much designer architecture isolated from its historic fabric. Architecture is an attitude toward human activity. It should express more about the people who use a building than it does about you and me. It finds its forms in the characteristics of the site, in the direction of the sun, in the prevailing breezes, in the vitality of nature and human interaction. Each building design emerges from its own context and use. It is discovered.