The Baha'i house of worship, New Delhi

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Edifice Baha'i, lieu de recueillement, Nouvelle Delhi

Das Baha'i Haus, Stätte der Andacht in Neu-Delhi

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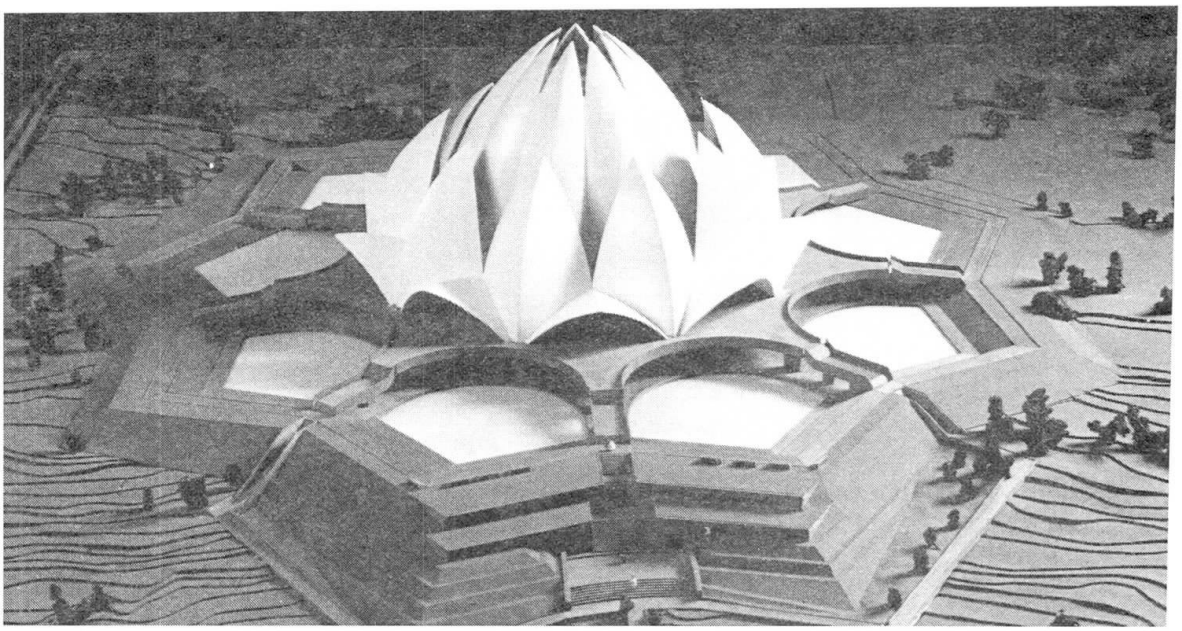
Fariburz Sahba born in 1948, received his Master's Degree in Architecture from Tehran University. In 1975 he was selected to design the Baha'i House of Worship of the Indian subcontinent on which he spent 10 years as architect and project manager.

SUMMARY
In designing the structure, the architect sought a form both expressive of the essential tenets of the Baha'i Faith and responsive to the culture and the people of India. He chose the lotus flower, a traditional and pervasive element in Indian religions and a symbol of purity. At once traditional and modern, the new Baha'i House of Worship is an important example of contemporary religious architecture, its form unmistakably expressing its function as a place of assembly, contemplation and prayer.

RÉSUMÉ
Dans sa recherche pour la forme, l'architecte a cherché à appliquer les principes de la Foi baha'ie et à rendre hommage à la culture et au peuple de l'Inde. Il a choisi le lotus pour son caractère traditionnel largement répandu parmi les religions de l'Inde et pour son symbole de pureté. A la fois traditionnelle et moderne, la nouvelle Maison d'adoration est un exemple important d'architecture religieuse contemporaine ayant adopté une forme exprimant clairement sa fonction de lieu de rassemblement, de contemplation et de prière.

ZUSAMMENFASSUNG
Der Architekt war bestrebt, in seinem Entwurf sowohl die Grundsätze der Baha'i-Religion auszudrücken als auch der Kultur und dem Volke Indiens zu entsprechen. Er wählte die Lotusblüte, ein traditionelles und verbindendes Element und Symbol der Reinheit, als Vorbild. Traditionell und gleichzeitig modern ist das neue Baha'i-Haus ein bedeutendes Beispiel für zeitgenössische religiöse Architektur, mit welcher unverkennbar die Funktion als Ort der Versammlung, des Nachdenkens und Betens ausgedrückt wird.



Design

It is possible to see in the architecture of India, to an extent probably unknown elsewhere, the roots of religion in a most clear and distinct manner. The meaningful, significant, and powerful symbols which can be seen in the buildings and in their ornamentation, and even in the surroundings in which they have been placed, draw their inspiration from the religious convictions of the people, convictions which form an integral part of the Indian way of life.

Against such a background, the Architect finds himself faced with two major questions regarding the design of a Baha'i House of Worship. As per Baha'i Writings, House of Worship should be a symbol manifesting the Baha'i Faith, revealing the simplicity, clarity and freshness of this new Revelation, in distinction to the beliefs of the many divided sects who are clinging to dead, manmade concepts, each desiring to pray in his own fashion, or to display the symbols of his own faith.

On the other hand, in showing respect for the basic beliefs of the religions of the past it must act as a constant reminder to the basic Baha'i principle that all the religions of God are one and that the Baha'i Faith, for all that it may have many new features, is in no way cut off or detached from the life of the Indian people, but rather looks upon them all with respect and love.

Basing our researches on the above sentiments, the Architect undertook a study in the hope that he could prepare a design which, while it would in no way imitate any of the existing architectural schools of India, would remain familiar to the Indian people, and they will accept it as their own temple.

Researches on India and Indian architecture clearly show that, despite the outward dissimilarities to be seen between various temples, one can sometimes discover significant and sacred symbols regarded as holy and divine by all the Indian religions, symbols which have even penetrated to other countries and other religions such as Islam. One of these symbols is the sacred flower of the Indians, the lotus.

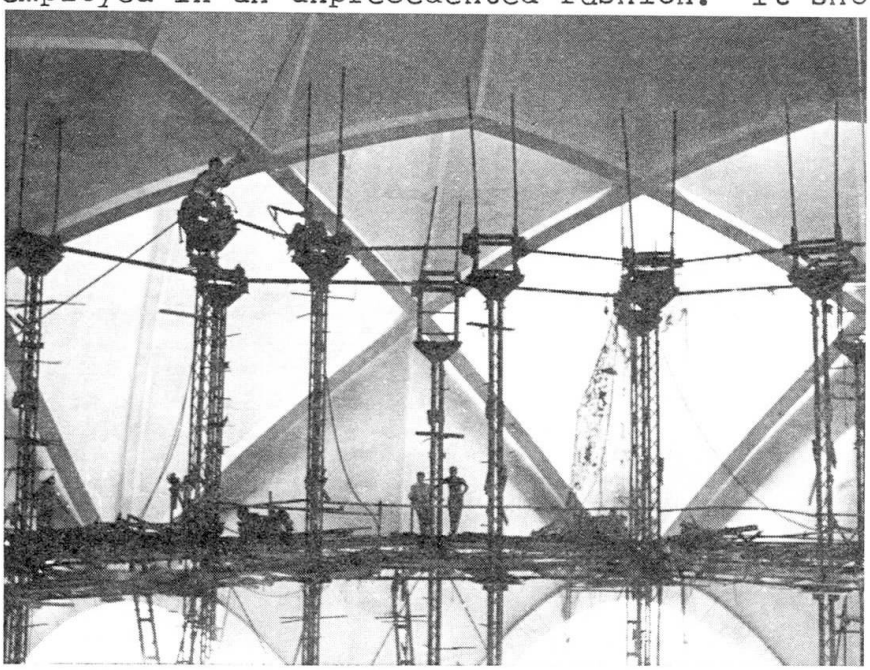
Although it would be preferable to begin a discussion of the Lotus with a survey of the Mandala, one of the oldest religious symbols in the world, we shall move directly into our discussion without such preamble.

To the Indian taste the lotus has always been the fairest flower; it has enjoyed an unparalleled popularity throughout the length and breadth of India from the earliest times down to the present day, as is shown by its predominance in literature and art. Beginning to be mentioned in the oldest Veda it plays a prominent part in the mythology of Brahmanism. To the later Sanskrit poets it is the emblem of beauty to which they constantly compare the faces of their heroines. The lotus, moreover enters into Indian art of all ages and all religions as a conspicuous decorative element. It appears thus on the oldest architectural monuments of Hinduism as well as later on those of Buddhism and Jainism and Islam all over India.

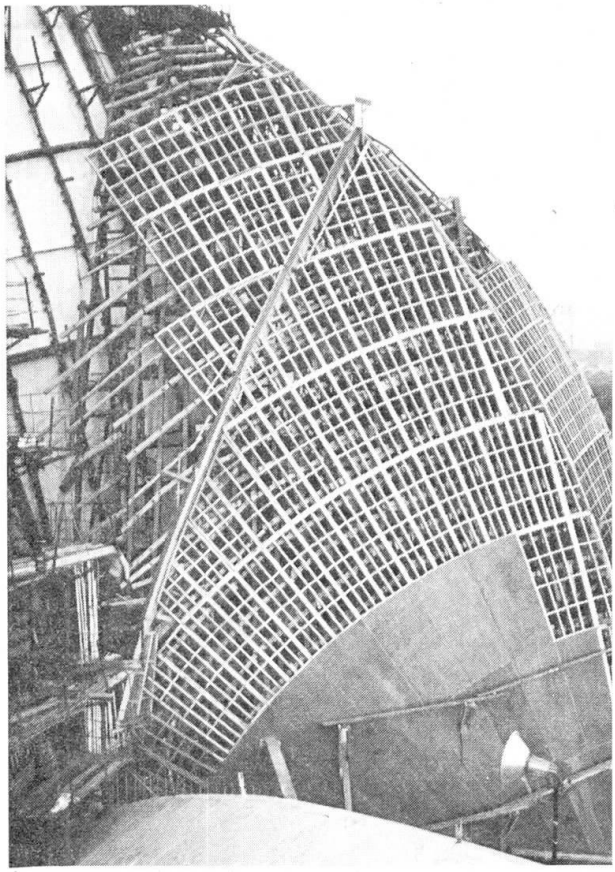
In the epic poem of the Mahabharta the Creator, Brahma, is described as having sprung from the lotus that grew out of Lord Vishnu's navel when that deity lay absorbed in meditation. In Buddhist folk-lore the Bodhisattva Avalokitesvara is represented as born from a lotus and is usually depicted as standing or sitting on a lotus pedestal and holding a lotus bloom in his hand. Buddhists glorify him in their prayers "Om Mani Padme Hum" Yea! O, Jewel in the Lotus! Amen.

The lotus symbol can be easily traced in Zoroastrian architecture. The carving of Ardashir II at Taq-i-Bustan shows Mithra standing on a lotus flower. In the bas-relief at Persepolis king and most of his nobles each hold a lotus in their hands. The lotus flower is one of the oldest and most beautiful elements used in the patterns of Persian carpets, and it can often be seen in Islamic architecture of Seljuq and later periods. For example the shape of a lotus occur in the design of the perforated plaster work in the mihrab (prayer niche) of the Malik mosque in Kirman.

In the design of the Baha'i House of Worship, lotus has been employed in an unprecedented fashion. It should be said that the most basic idea in the design is that light and water have been used as its two fundamental elements and that these two elements are alone responsible for the ornamentation of the House of Worship, in place of the thousands of statues and carvings to be found in other temples. The structure is composed of three ranks of nine petals each, springing from a podium which elevates the



Interior Dome



Outer Leaf formwork

building above the surrounding plain. The first two ranks curve inward, embracing the inner dome; the third layer curves outward to form canopies over the nine entrances.

The petals, constructed of reinforced white concrete cast in place, are clad in white marble panels, preformed to the surface profiles and to patterns related to the geometry. White marble also covers all the interior floors, while the insides of the petals are bush-hammered concrete. The walkways and stairs in the podium are finished in a local red sandstone.

The double-layered interior dome, modeled on the innermost portion of the lotus, is comprised of 54 ribs with concrete shells between. The central hall is ringed by nine arches, which provide the main support for the superstructure.

The entire superstructure is designed to function as a series of skylights with glazing at the apex of the inner petals, the internal vertical surfaces of the outer petals, and the external side of the entrance petals. Light is thus filtered into the central hall in the same way that it passes through the lotus flower.

Nine reflecting pools surround the building, their form suggesting the leaves of the lotus. External illumination is arranged so that the lotus structure appears to float on water.

Ventilation and cooling are based on techniques traditional to the Indian subcontinent whereby the building itself functions as a chimney. Fresh air, cooled as it passes over the fountains and pools, is drawn in through openings in the basement, up into the central hall, and expelled through a vent at the top of the structure. During the humid season a set of exhaust fans in the basement recycles air from the main hall into the cool basement and back.

Construction

For the Architect and his Structural Consultant M/s Flint & Neill Partnership of U.K. it took nearly 18 months of work with state-of-the-art computer techniques to translate the lotus into structural designs and working drawings.

Translating the geometry of the design, in which there are virtually no straight lines, into the actual structure presented particular challenges in designing and erecting the formwork. Not only was it difficult to align, so as to produce accurately the complex double-curved surfaces and their intersections, but


Manual Excavation

The closeness of the petals severely restricted work space. Nevertheless, the task was carried out entirely by local labourers using traditional techniques.

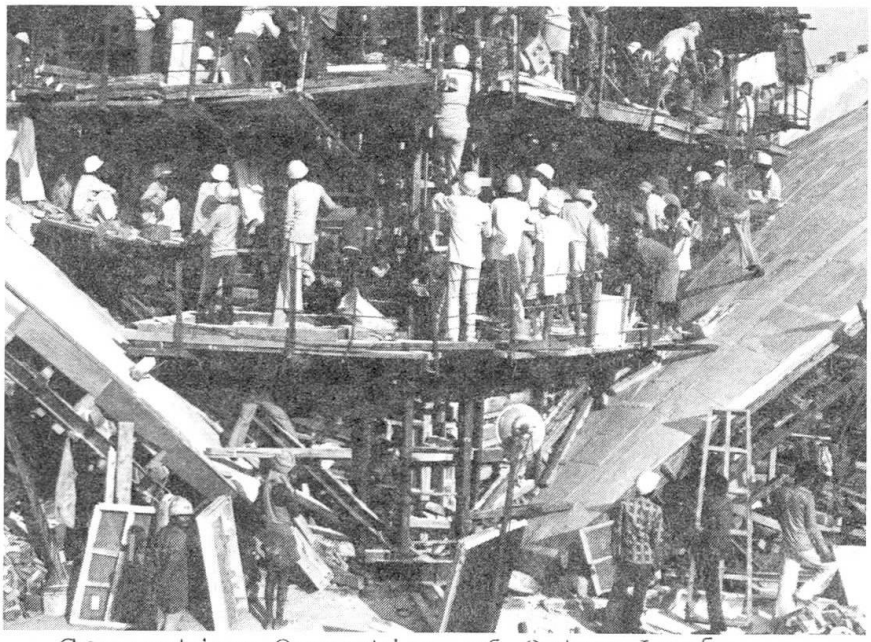
The inner leaves are a uniform 200 mm in thickness and 33.6 meters high. The outer leaves, 22.5 meters high are 135 mm thick from their cusps to the line of the glazing, beyond which they thicken to 250 mm to enhance their stability. The entrance leaves vary in thickness from 150 mm to 300 mm at their edges and are 7.8 meters high. The shells of the interior dome are 60 mm thick.

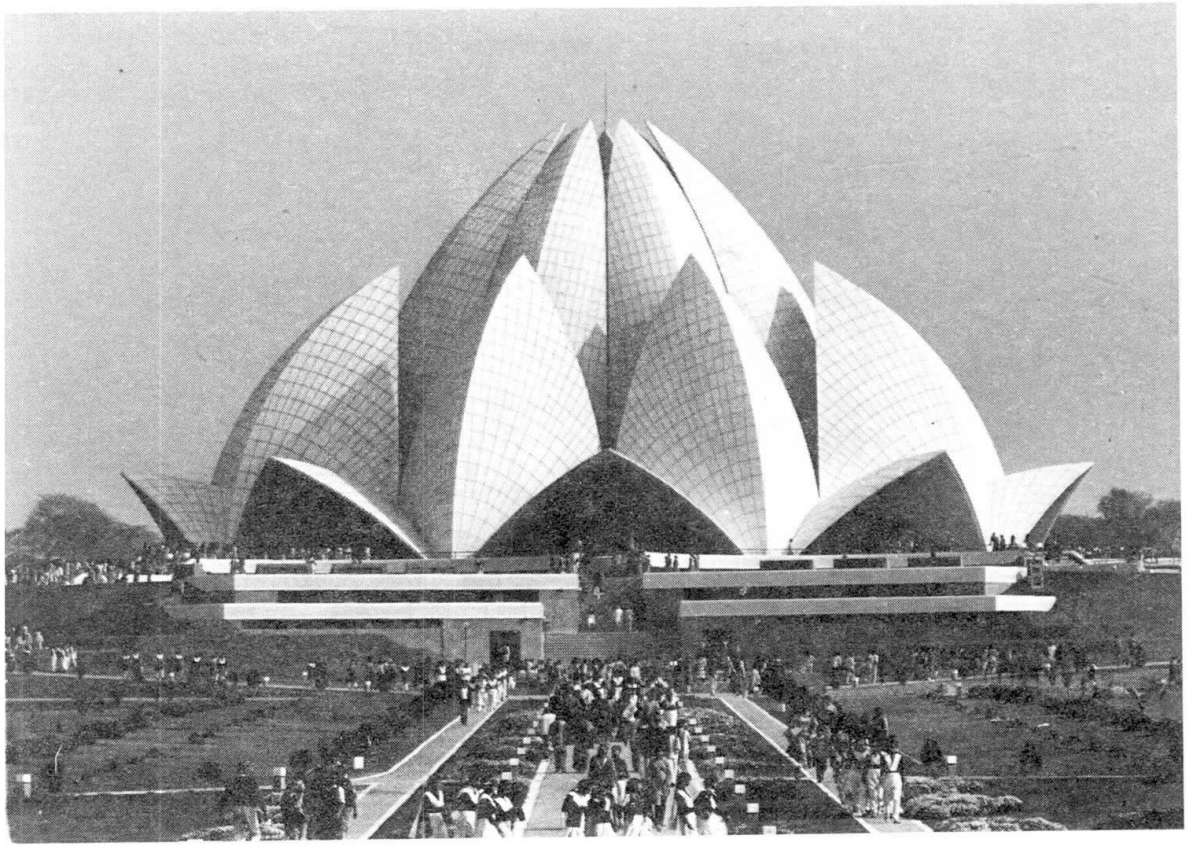
The interior dome - 28 meters high by 34 meters in diameter - was developed from nine intersecting spheres, making a double-layered 'bud'. 18 ribs span between points on the arches and lie on the surface of a base sphere. From each of the 36 intersections, a circular rib springs upward to support the hub to the radial beams between the inner leaves.

Poured-in-place reinforced concrete was selected as the most elegant and cost-effective method of construction. All of the steel reinforcing for the shells were galvanized to avoid rust stains on the white concrete in the prevailing humid conditions.

Before assembling the temporary works for the roofs, a number of full-scale mock-ups were constructed to check the feasibility of the proposed methods of construction, geometric form, practicality of fixing the complex reinforcement, entrance and inner petals, and interior dome elements.

Numerous trial mixes formwork finishes, concreting procedures and finishing


Concreting Operation of Outer Leaf



processes were used to manufacture sample panels of exposed concrete. White concrete composed of white cement, silica sand, and dolomite aggregate, was selected.

Forms and their supports for all the petals were designed to withstand pressures from continuous concreting. Three inner leaves were concreted at a time, generally in only two lifts from their bases to the level of the star beams above. To avoid the construction joints that would ordinarily have been necessary, each entrance and outer petals was concreted in a continuous operation, one at a time, using the removable outer shutter panels for access for concrete and vibrators. Concreting time for an outer petal was approximately 48 hours.

Because ambient temperatures can exceed 46 degrees centigrade, precautions were taken to cool the concrete. Aggregates were cooled by blowing chilled air onto closed stockpiles, and crushed ice was used in the mix. Canopies were erected from the staging to provide shading of the petals being concreted. Systems of horizontal sprinkler pipes were used in curing.

Pentilicon marble from Greece cut to size and geometry in Chiampo, Italy, was shipped to India and fixed to its exact locations like small pieces of huge jigsaw puzzle with the help of carpenters.

After the construction period of six years and nine months about 9000 people from 149 countries took part in the colourful dedication ceremony of the building on 24th December 1986.