

A Tomb Brought to Life

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by Ratish Nanda

A major garden restoration project in India sees traditional techniques
successfully married to modern methods of research

A sensitive, kind and intelligent man, deeply interested in astrology, Nasir ud din Muhammad Humayun (1508-1556), was the second of the Great Moghul emperors who ruled India between 1526 and 1857 and his garden-tomb in Delhi is the earliest of the grand dynastic mausoleums that presaged the flourishing of Islamic architecture in India. The huge tomb at its centre houses over a hundred Moghul family graves, and is popularly known as the Dormitory of the Moghuls, or as The House of Timur after Timur or Tamerlane, from whom the Moghuls traced their descent.

It was built in the 1560s by Humayun's grieving widow, with the patronage of his son and successor, Emperor Akbar, and under the supervision of a Persian 'architect', Mirak Mirza Ghiyas.

The Moghuls were great garden builders. Timur took great pride in the gardens he built, which became famous world-wide. Within them were rich encampments decorated with plunder from captive nations, and his throne was set over the watercourses that represented the four rivers of life.

Babur, the first Moghul emperor, built many gardens, never without water, and used them as outdoor rooms where he planned military campaigns, held public audiences, wrote his memoirs, composed poetry, entertained and revelled.

It is, though, the imperial tomb gardens, of which Humayun's tomb is the first, that

are considered the greatest innovation of the Moghuls in garden architecture.

Symbolically, the tomb-garden represented the perfect embodiment of that ancient ideal, the ultimate paradise garden, with the emperor forever in paradise. Its large square enclosure, divided with geometric precision, was the ordered universe. In its centre, the tomb itself rose above the four main water-channels, signifying the four rivers of the Koranic paradise, which seemed to disappear under the tomb. Sweet-smelling, fruit- and flower-bearing plants, fountains and pools of water, and birds kept within the enclosure added further character to the garden.

Located centrally in Delhi, at what is now the edge of Sir Edwin Lutyens's New Delhi, the enclosure of Humayun's Tomb, entered through majestic gateways on the west and the south, occupies 13 hectares (30 acres). Sited on the banks of the river Yamuna, with the tomb as its centrepiece, the garden is enclosed on three sides by arcaded walls 6m (20ft) high.

Laid out as the classical Char-Bagh (literally 'Four-fold Garden'), it is divided into quarters by wide paths 14m (46 feet) across, with each quadrant further subdivided by minor paths into eight plots, making 32 in all. A central water channel flows along the centre of all the paths, which are edged with large blocks of quartzite stone.

Pools, rectangular or octagonal, occasionally flower-shaped, emphasize the

1 Humayun's Tomb
splendidly reflected in a
pool after its restoration.

intersections of the pathways. Each of the four central axial paths has a large 11m (40ft) square pool with a single fountain in its centre.

When, in 1992, an expert ICOMOS report recommended that the mausoleum should be granted World Heritage status, it noted the neglected state of the gardens and advised urgent attention. A decade later, World Heritage Day in April 2003 was celebrated in India with a ceremony at this site, graced by His Highness the Aga Khan, which marked the completion of India's most substantive garden restoration so far.

It was also the first privately-funded project at any of India's nationally protected monuments, as the Aga Khan Trust for Culture had financed the US \$650,000.00 restoration programme and implemented it in collaboration with the Archaeological Survey of India.

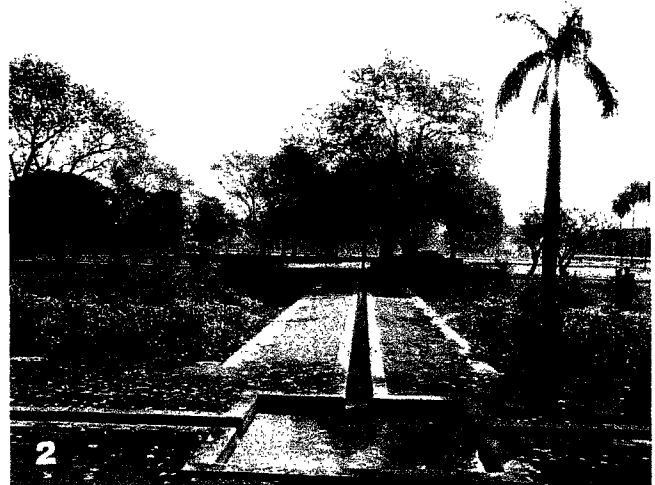
Work began in 2001 and encompassed a variety of disciplines including archaeological excavation, conservation science, landscape design and hydraulic engineering. Every operation was based on both archival research and excavations at the site itself. Traditional building materials and techniques were used, and a minimalist approach towards intervention was adopted.

In addition to conservation work on minor structures within the garden, historic wells had to be desilted and 3,000 truck-loads of excess earth removed manually. Over 3km (2 miles) of water channels were repaired, 3.5km of pathway edging restored, 25,000 square metres of pathway repaired, and 4km of sandstone hand-chiselled to edge the water-channels.

In accordance with modern requirements, wheelchair access and a site interpretation centre were provided and a system for harvesting rainwater was introduced. Finally, 2,500 fruit trees and flowering plants favoured by the Moghuls, such as mango, pomegranate, hibiscus, and citrus species, were planted.

All this was preceded by two years of archival research and excavations during the course of which much new information came to light.

Soon after the building of the mausoleum in the late 16th century the garden seems to have fallen into neglect, especially after the moving of the capital to Agra in 1556. By the early 18th century people were farming within the walled garden: brinjal (eggplant), chillies, cabbage and tobacco are known to have been cultivated here.



2 The north-west corner of the garden in 2003, with the pathways repaired and the water system restored.

3 How this area looked in 2000 before restoration.

Systematic archive research produced a continuous photographic record from 1849. In 1857 the last Moghul king, Bahadur Shah Zafar, was arrested by the British, putting an end to the First War of Independence. This led to British interest in Humayun's Tomb and its Moghul plan was considerably altered in 1860 in favour of a more English layout, including roundabouts replacing the four large central tanks on the axial pathways!

Early in the 20th century, the Viceroy Lord Curzon ordered a return to the Moghul plan, and a major garden restoration scheme was carried out between 1903-9 which included lining the plaster channels with sandstone.

In 1916 a planting scheme emphasizing both the central and diagonal axis with palm, tamarind, ficus and neem trees was implemented, with some trees planted on the platforms originally reserved for tents.

After Indian independence in 1947, the garden enclosure became a refugee camp and during the next five years there was much destruction of historical features



such as the water channels. Eventually the cenotaphs within the mausoleum were encased in bricks to prevent vandalism.

The fourth unsuccessful attempt to restore flowing water to the garden in under 100 years was made in 1985. Ornamental plant species, quite unsuitable for a Moghul tomb-garden, such as, among others, asoka or Indian willow (*Polyalthia longifolia*), bottle-brush, morpankhi hedges and palms, continued to be planted in inappropriate planting patterns.

In parallel with the new picture of the site from various archival sources, a series of excavations also produced a better understanding of the garden and its relationship to the building and adjoining features such as the river.

Amongst key features discovered were buried wells, aqueducts, pipes in copper and terracotta, fountain mechanisms, siphons and underground drains. These indicated that water was a major element of the historic garden and, by indicating the original

4 Repaired pathways and new plantings along the northern enclosure walls.

5 In 2000 this area was covered in dense undergrowth.

garden levels and water movement patterns, helped form the project brief.

Among the first works carried out in the garden was the removal of 12,300 cubic metres of earth that had accumulated over four centuries, especially while the site was inhabited by refugees in the post-independence period. This was essential to restore the relationship between the pathways and the 32 garden plots.

In order to ensure that no underlying archaeology was damaged, the earth was removed manually with shovels and transported outside the garden on head load or cycle rickshaws. Removing the earth revealed thousands of metres of pathway edging blocks in Delhi quartzite stone.

Over 3,500m (roughly half) of these stones, some weighing over 800kgs, had to be manually dismantled using traditional tools and then reset on a lime mortar base.

Pathway repair also required the rebuilding of over 25,000 square metres of path. The traditional detail of a layer of brick rubble, covered with *mooram* (local coarse sand) and manually compacted by tamping for over a year, was preferred over simpler (and cheaper!) modern details.

The removal of earth also gave the opportunity to provide the garden with 128 ground-water recharge pits, four in each garden plot, for collecting rainwater. This is the largest rainwater harvesting initiative in India on any single site.

Though many key elements of the 16th century garden could be determined through excavations, it was not possible to ascertain original plant species or planting patterns. The earliest sketches dated only from the 19th century, while pollen analysis and paleo-botany tests revealed limited information on historic flora, possibly because the site was used for commercial farming for over two hundred years.

So the choice of plants and the planting patterns were derived from a combination of scientific data, such as analysis of pollen and of the soil and climatic conditions, and archival material, including accounts by visitors and descriptions from the Moghul chronicles, such as the *Akbarnama*.

Along the periphery of the garden large shade-giving trees such as mango and neem (*Azedarachicta indica*) were planted. Over 300 lemon and orange trees, known to have been favoured by Humayun, were placed in two rows along the outer pathways, and a pomegranate orchard was planted in the sunken area towards the east.

Clusters of sweet-smelling flowering shrubs such as the hibiscus (which was recorded in the *Akbarnama* as having been grown here), *chandni*, *harsingar*, *motia* and *mogra* have also been planted along the periphery and the four central pools.

Though several hedges lining the pathways were removed, the only trees to be transplanted were the spindly ashoks (*Polyalthia longifolia pendula*) planted in the 1980s, which broke up the expanse of the garden visually.

Prior to this planting, decided on after much deliberation, Professor Mohammad Shaheer, the landscape consultant, had carried out detailed surveys of the existing vegetation and also produced computer-generated drawings showing the effect of removal of the ashoks, plus at least sixteen alternate schemes for the planting pattern.

A major component of the project was to restore flowing water to the garden's channels and pools, so extensive excavations were carried out to understand how they functioned. Among items such as the size and slope of the channels, it was revealed that originally the water was raised from wells and, after circulating around the garden, drained away to the river in the east or to the north.

Several alternative proposals were prepared to suit a conservation philosophy based on minimum intervention and the need for re-circulation of the water. This meant that not all portions of the original system would be restored for flowing water.

There are over 3,500m of water channel in the 30-acre garden enclosure and between 1902 and 1985 they had had their slopes altered on at least four occasions, changing their character to an enormous extent. One of the effects of this was that water could flow in no constant direction, leading to overflowing and significant seepage.

Excavations across 24 of the 58 channels revealed that only three still retained their 16th century rubble masonry bedding, while for the rest the historic bedding had been replaced during an earlier restoration attempt with a 4-5cm thick concrete layer.

For the 2,200m of water channels to be restored for flowing water, major repairs were required. They had to be partially dismantled, then provided with a lime concrete base and a wall surface of brick tiles in lime mortar. This was waterproofed in traditional fashion with a layer of fruit extracts and *gur* (molasses), then a layer of lime-compatible waterproofing surface, and a



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penultimate layer of lime plaster, followed by a final layer of almost pure lime.

The channels that are thought to have been introduced during the 1903-09 restoration, such as those in the south-western section of the garden, have been repaired in all respects including the final lime plaster, but they no longer hold water, mainly since changed garden levels meant that it would have had to be mechanically pumped out. The beds of these channels have not been disturbed and no waterproofing treatment has been done on them.

It was determined that the slope of the channels had to be in the range of 1:3,000-1:4,000 (or a 1cm drop for every 30-40m). It was an enormous challenge to build the channels with traditional materials and techniques to such exacting standards – made possible only through sophisticated surveying equipment and an extremely high level of supervision. The water now flows with gravity from west to east in the channels, as it would have done historically, is collected in the sunken eastern area and taken out of the garden to the filtration plants to the north, from where it is once again pumped back into the system.

Similar careful conservation, using traditional materials and construction techniques, was required for the garden's four large central tanks and 46 smaller tanks. High craftsmanship was a key component for all the work carried out and training workshops for stonecutters and for creating lime mortar masonry (both skills much in demand) formed an integral part of the project.

Over 90 craftsmen worked for two years to hand-chisel 4km of sandstone for lining the water channels. The waterfalls, benches, fountains were all hand carved in sandstone. Traditional lime mortar was used for all masonry work; the pathways, channels, platforms, minor structures and wells were repaired using lime mortar mixed with traditional materials such as *gur*, *bel-giri* (fruit pulp) and *surkhi* (brick dust) in addition to coarse sand. The lime was also prepared and cured using age-old techniques such as a lime-wheel for compaction.

Small structures – an 18th century mosque, a stone platform contemporary with the tomb, a large grave platform – were also conserved, and three historic wells, that had been filled in and covered, were discovered and desilted to their original depth. Similarly two buried staircases leading to the river from the garden were located, excavated and repaired.

A significant portion of the garden is now accessible by wheelchair with a discreet ramp at the entrance and sandstone slabs bridging the water channels. Forty benches, hand-carved in sandstone to a design first used in the garden in 1917, have also been reintroduced – though at a cost of 5,500 rupees each compared with Rs55 including transportation from Agra in 1917!

The project has served as a platform for a major educational awareness programme targeting school-children from over 20 local schools. Its objectives were to introduce the children to the significance of their heritage, help each child understand the need for and benefits of conservation – and to make the study of history and architecture interesting! Aspects of archaeology, architecture, nature conservation, history and geology were discussed with the children during workshops, using the collection of historic photographs and archival material and the extremely detailed documentation, with each plant and stone listed.

This work with young people was especially important as the case for conservation, which is largely seen as an elitist, almost

irrelevant movement, still needs to be made in India. Supporting the case today are the increased numbers of visitors who spend a significantly longer time at the site, and the numerous birds attracted to the garden by the water and fruit.

Another bonus is that the project has provided the impetus for a sympathetic development of the surrounding areas of this World Heritage Site.

The Aga Khan Trust for Culture is maintaining the site until April 2004. By then a management plan will have been prepared and a long-term maintenance plan put in place. At current visitor numbers, exceeding 1000 every day, ticket sales collected by the Archaeological Survey of India for two days would cover maintenance costs for a month. The challenge is actually to plough these receipts back into maintenance!

Now flowing water is restored to the garden and its fountains spring to life after more than four hundred years. Hibiscus, lemons, pomegranates, *motia* and *mogra* are already in bloom, the birds are chirping. Emperor Humayun's tomb stands once again amidst Paradise.



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AKTC is part of the Aga Khan Development Network, a group of agencies working in the fields of social and economic development and culture. It is involved in the revitalisation of another Moghul garden, Bagh-i-Babur in Kabul, as part of a broad, multi-sectoral development programme for Afghanistan. The Trust has also created the 30-hectare Azhar Park in historic Cairo and restored urban spaces in Zanzibar. For more see www.akdn.org



6 A restored fountain, carved in a single piece of sandstone, gurgles to life after 400 years.

7 Workers with some of the 3,000 truck loads of excess earth which had to be removed by hand.