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The Mughals, Uzbeks, and the Timurid Legacy

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The Mughals came to India as Timurids. Founded by the Turko-Mongol warlord Timur (Tamerlane) (*c.* 1370–1405), the Timurid dynasty ruled much of Iran and Central Asia for over a century (*c.* 1370–1507), first from Samarqand (Uzbekistan) and then from Herat (Afghanistan). Toward the end of the fifteenth century its realms were already diminishing. In 1507 Babur, the proud descendant of Timur and Chinggis Khan, after having been driven from Samarqand by the Uzbeks to his exile in Kabul, sought new opportunities in India. In 1526 he vanquished the last Lodi sultan, literally, with the *Zafarnama* (Book of Victory, Timur's official history) in his hands (Babur 1996: 274–277; Balabanlılar 2012: 45–47; Zayn Khan 1982: 77–81). In this work the historian Sharaf al-Din ʿAli Yazdi had described Babur's ancestor Timur's conquest of Delhi of 1398. Shah Jahan, Babur's descendant in the fifth generation, still had the *Zafarnama* read aloud to him at night (Inayat Khan 1990: 573).

"Timuridity" always remained essential to Mughal self-understanding, and while the Ottomans and Safavids also attempted to partake in the Timurid myth (Balbanlılar 2012: 39–40), only the Mughals could claim a direct genealogical descent. In eighteenth-century Europe the Mughal dynasty was still known as the descendants of "Tamerlane," and portraits of the Great Mughals reaching back to their famous ancestor were valued collection items (Scheuleer 1996). Babur, the founder of the Mughal dynasty, was, of course, the most familiar with Timurid culture, having experienced it firsthand in both Central Asia and Herat. Nevertheless, his descendants, particularly Jahangir (r. 1605–1627) and Shah Jahan (r. 1628–1658) took renewed interest in affirming the relationship, as it lent prestige and credibility to their own reigns. Testimonies to the Mughals' awareness

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and conscious reference to their Timurid heritage abound in Mughal art. They celebrated this lineage in painted genealogies, dynastic group portraits, and calligraphic inscriptions on art objects and precious stones. The ingenious Jahangir went so far as to cover the Indian landscape with genealogical inscriptions which he had put on trees, rocks, and architectural frames of ancient springs (Koch 2007). The Mughals collected Timurid artworks and (illustrated) manuscripts. The famous Persian painter Bihzad (*c.* 1450–1535), head of the royal ateliers in late Timurid Herat and early Safavid Tabriz, was a proverbial model of excellence for Mughal painters.[1] The most visible and enduring expression of the Mughal–Timurid connection was, however, architecture. From the beginning the Mughals cultivated their patronage of building as a statement of their presence in India.

While the examples of art objects cited above are clear evidence for the Mughals' wish to sustain and assert their Timurid heritage, the case of architecture is more elusive. The alleged "Timuridity" of the Taj Mahal, the mausoleum built by Shah Jahan for his wife Mumtaz Mahal (1631–1643), has long been a subject of debate (Chaghatai 1938; Hoag 1968; Golombek 1981; Lentz and Lowry 1989: 324; Parodi 2000). The purpose of this chapter is to analyze the most emblematic of Mughal monuments to determine what aspects might have been intended to evoke Timurid architecture. Where possible it is important to distinguish these elements from those which would occur as a natural result of the architect's training. If the architect was familiar with the sixteenth-century architecture of Shaybanid (Uzbek) Bukhara and Samarqand, which evolved from Timurid traditions, the canon of proportions and aesthetics that he brought to Mughal India might unconsciously imbue his new work with "Timuridity." One of the difficulties presented by this exercise is the absence of statements providing insight into this question. We lack textual testimony. Even if we had a comment by Shah Jahan himself, how would we evaluate it? Would it deal with a single element of the Taj complex, for example, such as the tall bulbous dome? Given that comments about artists in medieval treatises on painters and calligraphers are difficult to match with actualities, this kind of testimony might not be very useful, even if it did exist. Lacking verbal commentary, we shall turn to the architecture itself. The first task is to discover what were the characteristics of Timurid architecture, what we may call the *leitmotifs*, insofar as they had survived and could be witnessed by the Mughals.

The *Leitmotifs* of Timurid Architecture

The systematic study of Timurid architecture began with the invasion of the czarist Russian armies into the Timurid heartland in the second half of the nineteenth century. The government sponsored ambitious projects to conserve these impressive buildings. This activity was continued under the Soviet governments of the newly formed republics of Uzbekistan, Turkmenistan, and Tajikistan. Teams of

Russian archaeologists and architects, informed by the research of scholars such as V.V. Bartol'd, excavated foundations, subjected materials to scientific analysis, and examined all aspects of the architecture, including the theory of design (Bulatov, Rempel'). In addition to the study of individual monuments, great interest was shown in urban history (Belenitskii), the context of monuments, and the villa/garden. The most prolific scholar was G.A. Pugachenkova of the Institute of Fine Arts in Tashkent. Collaborating with L.I. Rempel', she made accessible the results of Soviet-era research on the medieval monuments of the major sites in the Uzbek Republic – Samarqand, Bukhara, Shahrisabz, and Khiva (Pugachenkova and Rempel' 1958). One of the most important contributions of this generation was to draw attention to the variety of arcuate forms that define Timurid architecture – the range of arches and vaulting solutions and the construction of double domes (Man'kovskaia 1985; Pugachenkova 1963). The main weakness in this work was that the monuments of the rest of the Timurid world, Iran and Afghanistan, were not accessible to these scholars until much later.

These other regions had been studied and recorded by a series of Austrian and German scholars – E. Diez, F. Sarre, E. Herzfeld, O. von Niedermayer – and by the team of A.U. Pope, who produced the great *Survey of Persian Art*. None of these works dealt as broadly with the subject as did the Central Asian scholars, and the presentation of monuments in the *Survey* is not always reliable. Pope and his team did make available a large photographic record, now all the more significant as many of the monuments have disappeared or undergone heavy restoration.[2]

With the goal of rectifying these shortfalls, scholars who could travel in all of the Timurid realms initiated a new era in this field, collecting information that had not yet been available in the West (Golombek, Wilber, O'Kane, McChesney). Their studies also incorporated the newly published compendiums of monuments and inscriptions coming out of Iran (Afshar, Honarfar). They were also able to comb the Persian and Arabic historical sources, which contain much valuable information on the dates, patrons, and descriptions of the buildings.[3] Of particular importance to the understanding of architectural practice and the transmission of designs was the analysis of a scroll of geometric designs for two- and three-dimensional ornament, found in the Topkapı Palace Museum and attributed to the Timurid period (Necipoğlu 1995). As for the architectural decoration itself, which plays so important a role in Timurid architecture, interest in analysis of the design is increasing, but more attention has yet to be paid to differentiating and understanding the wide range of techniques that evolved in ceramic tile decoration (O'Kane 2011).

Timurid architecture shows innovation in every aspect of the practice if we compare it with its predecessors. However, this innovation was built upon earlier progress in the technology of domes and vaults. This knowledge arrived in Timurid Central Asia with master craftsmen, brought by Timur from Iran, among whom one was worthy of special mention in the historical sources, Qawam al-Din Shirazi (see below). His name also appears in inscriptions as the master architect,

as do the names of several other of his compatriots from Shiraz. The attention drawn to an architect by the Timurid biographers signals a new interest in the role of the individual architect in the creation of buildings associated with authority, parallel to the notices about prominent painters and calligraphers. This is a trend that would not be continued under the Mughals in India: while they mentioned their painters they hardly ever gave credit to their architects, and presented themselves as creators of their buildings. However, it did not keep them from seeking out the best talent from foreign lands, thus promoting the dissemination of ideas and technologies. Thus, the Timurid legacy passed from Samarqand to Herat, to Uzbek Bukhara, and thence to the Mughal realms.

The Mughals' ideas about Timur were shaped by actual experience through visits to Timurid cities as well as through testimonies in the literature. We shall take note of what failed to make a significant impression on the Mughals as well as what seems to have struck them as epitomizing the glory of their ancestors. Two major features of Timurid design do not seem to have caught on. These were the Timurid notions of urban planning and the signature tile revetments that enveloped their buildings. In the Mughal context the latter survived, with a few exceptions, mainly as a regional style at Lahore and were otherwise translated into stone intarsia in the mainstream buildings of Agra and Delhi. The preference for tiles at Lahore may be understood as a reflection of the indigenous brick architecture tradition of the Indus Valley region, in which tile revetment is commonly found.

Urban Spaces

Most Timurid cities had a fortified citadel, usually tangent to the city walls. In Samarqand the citadel lay just south of the Registan square. In Herat it straddled the northern side of the square walled city. Within these strongholds the ruler could safeguard the treasury and incarcerate troublesome subjects. Most government administration took place elsewhere, either in the large garden estates outside the city center, or in the *ordu*, the encampment. The government was not represented within the urban space by civil architectural buildings but by the religious monuments that it erected there – the Friday mosque, madrasas, and khanqahs.

Timurid cities generally had a major thoroughfare running through the city and serving as a covered bazaar. This type of urban model was an adaptation of the common configuration for cities found throughout the Iranian world. The second feature was the articulation of the public square through the construction of complementary buildings around its periphery. The square, or *maydan*, was common in Iranian cities, but under the Timurids it became the nucleus of an architectural ensemble, such as the Registan in Samarqand (Figure 32.1). Around it were situated a group of institutions, the madrasa and khanaqah of Ulugh Beg (Timur's grandson) and a mosque (Pugachenkova and Rempel' 1958: 126–132). Timurid ensembles proliferated in the years following Timur's death in all of the

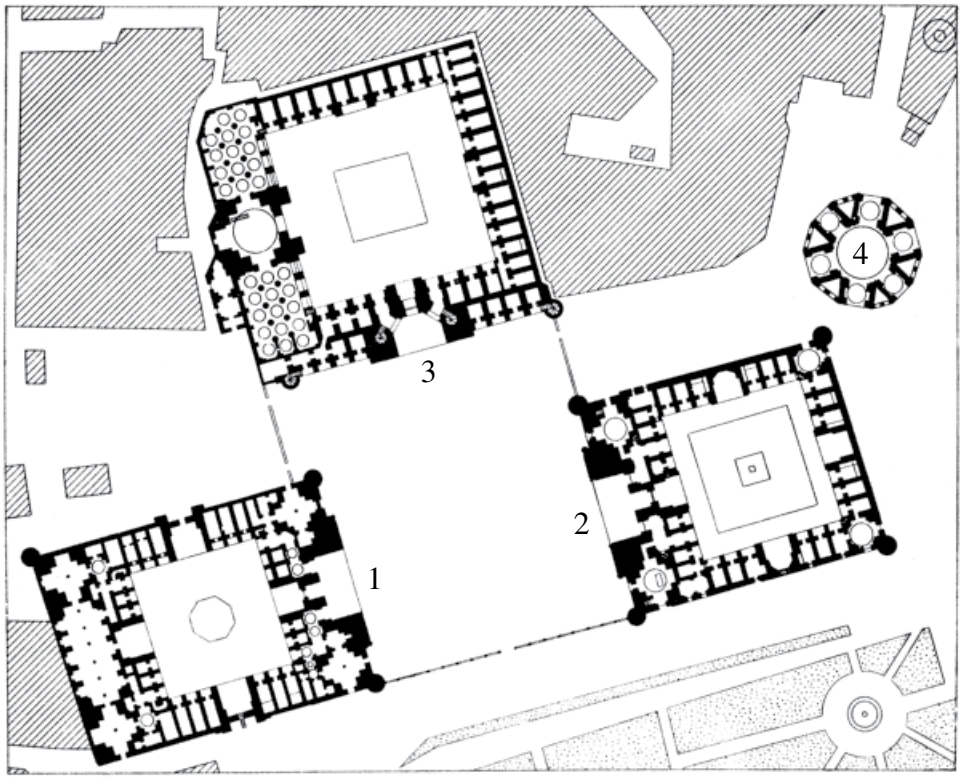


FIGURE 32.1 Registan Square in Samarqand: 1 Madrasa of Ulugh Beg (1417–1221); 2 Madrasa Shir Dar (1619–1636); 3 Tilleh-kari Mosque (1646–1660); 4 Chahar-su (commercial kiosk). Source: Pugachenkova and Rempel' 1958. Reproduced with permission of Rowman & Littlefield.

towns within the Timurid Empire. Their successors, the Uzbek Shaybanids, were particularly fond of ensembles, as found in Bukhara, or, under the later Uzbeks, at Balkh (McChesney 2009). The creation of ensembles around open space appealed in particular to the Timurids' taste for symmetry and order, about which we will have more to say below. These ensembles seem to have been comprised primarily of socioreligious, educational, and commercial institutions.

Timurid princes developed garden estates which were walled, but not fortified, as both administrative centers and a locus for pleasure and entertainment. The great garden estate of Sultan Husayn Bayqara (1470–1506) in Herat, known as the Jahan-ara'i (World-adorner), visited by Babur in 1506, is mentioned in Timurid literature as the site of both official and informal events (Allen 1981: no. 632, 195–198; Subtelny 2007: 94–96, 131–132). It had several buildings, including an administrative center. If the Mughals eventually abandoned the Timurid example of using garden estates as administrative centers, they did build numerous gardens, and we shall consider the garden form as a separate topic below.

Colossal Scale

Having looked first at Timurid urban planning, let us now turn to the architecture itself. Monumentality can be achieved through sheer size, but design can also create the impression of enormous scale. Timur's buildings were indeed very large, but other factors enhanced the sense of monumentality. One of the best examples of this use of design is the Friday mosque of Samarqand, built between 1398 and 1404 (Figure 32.2) (Golombek and Wilber 1988: vol. 1, no. 28, 255–260). The perimeter of this mosque is a rectangle 109 × 167 m. The entrance portal and the domed sanctuary lie at opposite sides of an arcaded courtyard. The portal and sanctuary rise to such a height that they can be seen from afar, like great ships on the ocean of the urban fabric. The portal arch originally soared to a height of 19 m. The entrance and main prayer hall iwans open onto the arcaded courtyard and, together with the two smaller lateral iwans, form the classical Persian four-iwan plan. However, unlike in most Persian mosques, the lateral iwans are followed by domes. This innovation is thought to have been inspired by the Friday mosque of Jahanpanah, the Tughluq capital of north India, which Timur saw in Delhi during his conquest of the city in 1398 (Golombek and Wilber 1988: vol. 1, 259). Four engaged corner towers, only a stump of one of them remaining, gave definition to the rectangle and probably carried high minarets. They anchor the mass

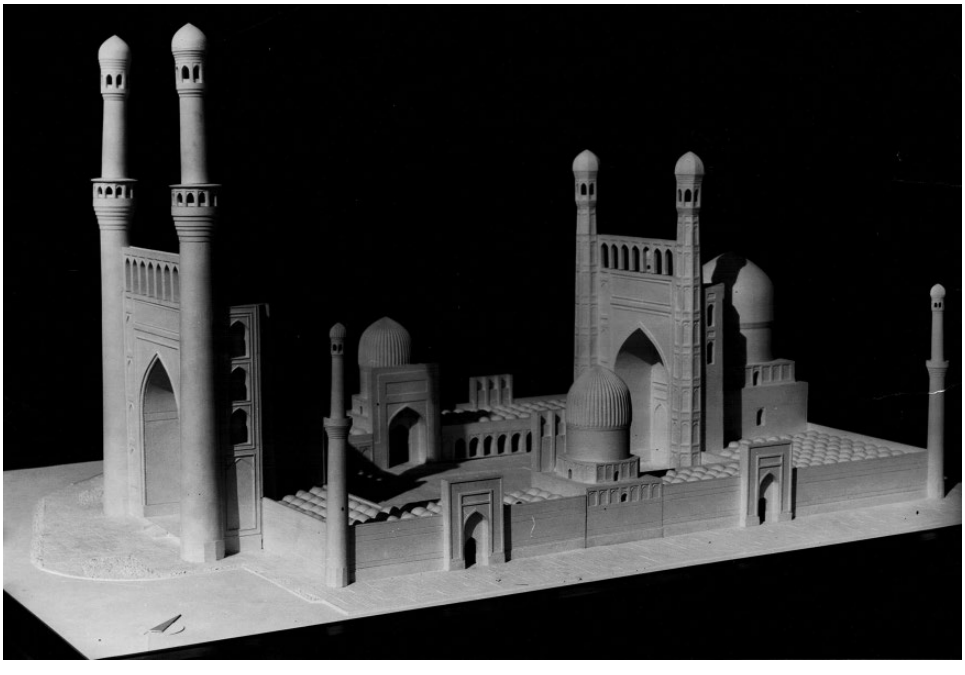


FIGURE 32.2 Model of the Friday mosque of Samarqand. Source: Pugachenkova 1966. Reproduced with permission.

and give it a sense of great stability, reflecting Timur's hope for the endurance of his new empire. Not only is the scale of this monument overpowering. Its design, with the major elements so much more massive than the delicate arcades joining them, evokes Timur's domination over his subjects, to whom one might compare the 400 stone columns that support the covered halls.

Not only was the viewer overwhelmed by the scale of Timur's buildings. They could not be missed, as they stood unobstructed by the clutter of houses in which public buildings were normally embedded in Iranian cities before then. Although the original context of most of the monuments has altered, that they were erected in isolation from the surroundings is confirmed by the presence of decoration over the entire exterior. While tomb towers and mausoleums often were cloaked in decorative brickwork or glazed tiles, before the Timurid period other types of buildings, particularly the large mosques and madrasas, stood bare except for those elements that peered over rooftops – domes, minarets, portals – or the internal façade. They left the exterior walls as bare brick because they did not consider the outward appearance of the building as a whole. Timur's buildings are completely draped in glazed tiles, assembled in patterns that look like masonry (hence are called *banna'i*, or "mason's" technique) or woven fabric (*hazar-baf*, or "a thousand-weaves"). The purpose of this type of decoration was to give clarity to the volume and to enhance the feeling of solidity, another trait one could relate to Timur's grip on power. His buildings are to be viewed from the exterior as well as the interior. Thus, the space around them must be clear. Accomplishing this in an open space, such as the site of the shrine of the Sufi shaykh Ahmad Yasavi in Turkestan City (1397–1399) (Figure 32.3), was not difficult, but creating such a space within a city required power. Timur's supporters could not have failed to be impressed – precisely what he hoped to achieve through his building program.

The popular shrine of Ahmad Yasavi (d. 1166) (Golombek and Wilber 1988: vol. 1, no. 53, 284–288; Man'kovskaia 1985) is located far from the Timurid urban centers but would have been visible to the many Turkish troops whose semi-nomadic migrations would take them across the steppes. The building is rectangular, fronted by a soaring façade which concealed the large dome behind it (Figure 32.3). Like the other colossal buildings, its (unfinished) façade also had corner towers. As in the Friday mosque, the shrine shows a dramatic change in scale from the core of the building to the extreme height of the entrance vault, which matches the height of the dome behind it. This contrasting of scale between the substance of the building and its towering entrance exaggerates the actual height and gives Timur's monuments a majestic air.

While the entrance iwan and its flanking towers gave these buildings a sense of height, reaching toward the heavens, as the sources often say, it was the dome that caught the visitor's eye. Builders used two devices to raise the dome high above the roof. From the level of the roof rose a tall cylindrical or octagonal drum, usually enclosing the apex of the actual dome that overlies the room below. Then, rising from the perimeter of this drum was another dome, steeper and

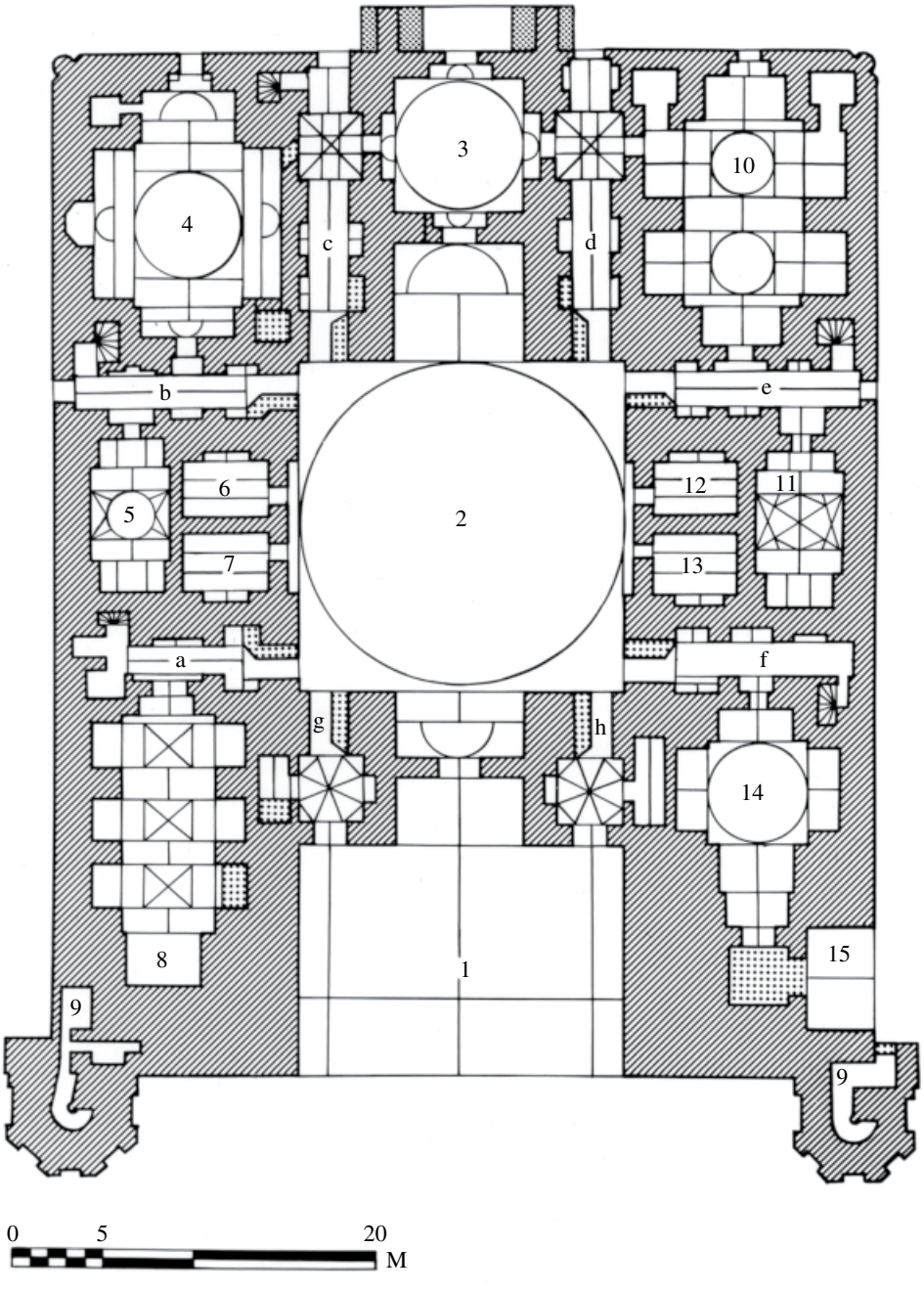


FIGURE 32.3 Plan of the shrine of Ahmad Yasavi, Turkestan. Source: Man'kovskaia 1985. Reproduced with permission.

thinner than the one inside. It was supported by a series of vertical ribs or fins, attached to the exterior of the inner dome. Because this outer dome had little mass, it could be very tall (Figure 32.4). Its elliptical profile resembles the end of a melon, and the sense of height is further enhanced through vertical fluting, as in the Gur-i Amir, Timur's tomb in Samarqand (1404) (Golombek and Wilber 1988: vol. 1, no. 29c, 261–263). Timur built this relatively modest structure for his nephew Muhammad Sultan, attached to the courtyard adjoining the latter's madrasa and khanqah, and was himself buried there. Under Ulugh Beg it became a dynastic tomb, which the Mughals several times sent funds to restore. Compared with Timur's other buildings, the mausoleum is small. Nevertheless,

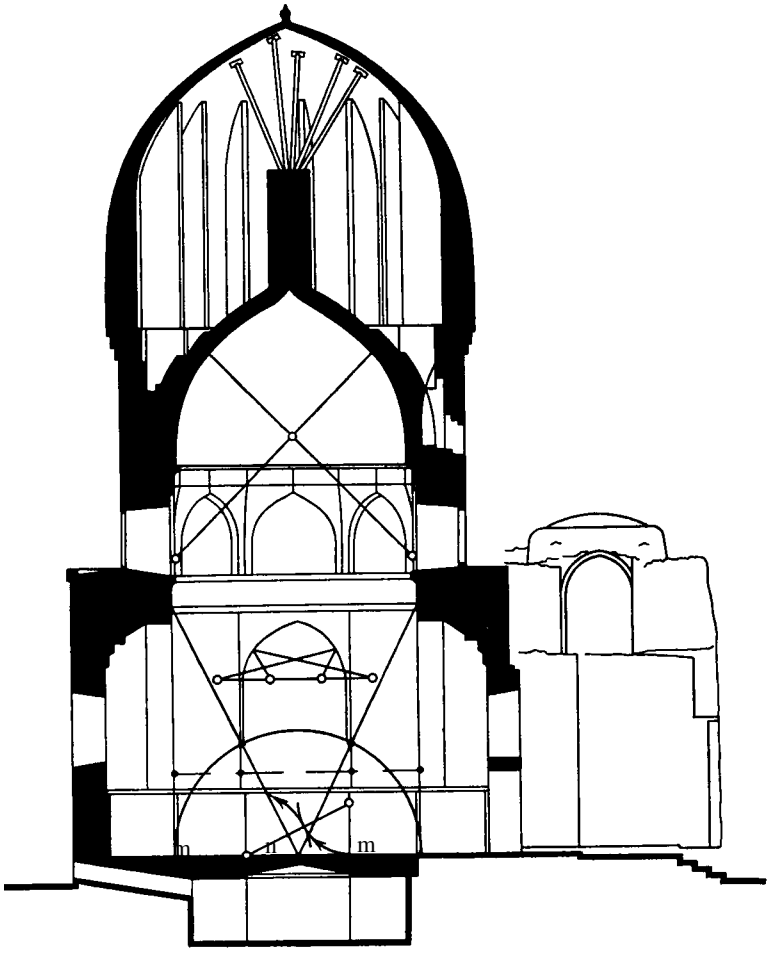


FIGURE 32.4 Section of the dome of the Gur-i Amir in Samarqand, showing the internal structure and geometric analysis of the proportions of the building. Source: Bulatov 1978. Reproduced with permission.

the tall drum and "melon"-shaped dome lend the structure an air of great majesty (Figure 32.4). The advantage of this double-dome system was to allow the architect freedom to sculpt in three dimensions whatever was called for, while ensuring that the inner dome remained stable.

Rationality of Design

From the outside, Timurid buildings assume simple forms – rectangular solids, cubes, or polygonal solids. Inside, however, the rooms may range widely in size and shape depending on the function and choice of superstructure. The shrine of Ahmad Yasavi has one of the most complex interiors in all of Persian architecture (Golombek and Wilber 1988: vol. 1, no 53, 284–288) (Figure 32.3). From the outside the building appears to be a rectangular solid, giving no hint of the variety and range of rooms and vaults behind the walls. This deception is characteristic of Timurid architecture – the outside is easy to grasp, its clear lines emphasized through its continuous overall pattern of decorative tilework. However the building is to be used, a penchant for symmetry dictates the distribution of rooms, courtyards, and passageways and also the treatment of the major and minor façades. This is also evidenced by the repetition of architectural elements employing a fixed canon of proportions and arch templates for the entrance portal (*pishtaq*), the arcade (open or blind), and the minarets or corner towers.

The buildings commissioned by Timur's successors retain this overarching principle. The madrasa of Ulugh Beg in Samarqand (1417–1421) (Figure 32.1, no. 1) (Golombek and Wilber 1988: vol. 1, no. 30, 263–265) displays many of the same characteristics as Timur's buildings: the contrast between the height of the entrance iwan and the flanks of the façade, the anchoring of the building at the corners by very tall minarets, and the ornamentation of the entire exterior. However, because of its function as a madrasa, like the shrine at Turkestan, it was designed to accommodate many different activities. As a school it had classroom space, consisting of interior rooms as well as the courtyard iwans. As a residential institution it needed dormitories, which are disposed around the courtyard on two levels. A large prayer hall occupies the wing opposite the entrance, and some of the interior rooms must have been allotted to staff as dwellings. All of these spaces have been arranged in a rational order, following the laws of symmetry and what might be called "geometric harmony" (Bulatov 1988). The allegiance to symmetry is so strong that it appears to ignore the functions to be assigned to each space, with the exception of the long hall that serves as the mosque. The symmetry develops around the two axes formed by the four iwans of the courtyard. The most striking solutions to organizing the space are to be found in the wing that lies behind the entrance façade. The *pishtaq* is very wide because it contains not only the main entrance into the courtyard but also two doors that give access to the corner rooms behind the façade. This assemblage, that is, the *pishtaq* and

the two domed halls with their system of corridors, constituting an "entrance block," became one of the most innovative areas for spatial design that occur in Timurid architecture, as well as in its Uzbek successors (see the later mosque and madrasa in Figure 32.1, nos. 3 and 2).

This enhancement of the act of entering a special space most likely derived from Timurid palace architecture, such as the great gate of Timur's palace, the Aq Saray (White Palace) in Shahrisabz (Golombek and Wilber 1988: vol. 1, no. 39, 271–275), and repeated as the portal to his mosque in Samarqand. The idea of punctuating the entrance to an important space with a gate-block seems to have penetrated Mughal architecture, either carried forward by Central Asian architects or selected by the Mughal patrons for its ceremonial character, conveying power.

The Timurid building type that best illustrates a love for symmetry is the centralized plan of eight parts around a central core, the *hasht-bihisht* (eight heavens). The surviving examples all seem to date from the second half of the fifteenth century, although the plan must have been popular much earlier (Jairazbhoy 1961), as descriptions of Timur's garden pavilions by Clavijo, the Spanish envoy to Timur (*c.* 1404) confirm (Clavijo 1928: 216, 227, 230). Clavijo described these as having a cross-in-square plan, with a domed space in the center of the cross and the axial spaces transformed into vaulted halls. These were used as openings to the outside or as a special place reserved for the throne. The corners of the square building were divided into rooms that filled the spaces between the axial halls. Thus, the building was composed of eight rooms and a dome chamber, making it the perfect embodiment of the mystical concept of the "eight heavens." As such, it was appropriate for mausoleums, connoting the celestial paradise, as well as for garden pavilions, connoting the terrestrial paradise. In the more exotic plans the corner spaces are transformed into octagons or into a second corona of rooms around the central core. The entire design can be reconstructed through geometry, following the radii that emanate from the central dome chamber.

One of the best examples of the Timurid *hasht-bihisht* plan can be found in the mausoleum of ʿAbd al-Razzaq b. Ulugh Beg b. Abu Saʿid, governor of Ghazni and Kabul in 1501–1502 (Golombek and Wilber 1988: vol. 1, no. 65, 299; Hoag 1968). However, because he was too young and power was immediately wrested from him, we have attributed the construction to his father, Ulugh Beg, son of Abu Saʿid, who ruled from 1460 to 1502. The building is planned around a central dome chamber, opening on four sides into deep alcoves that lead into rectangular spaces parallel to the sides of the central square. These long rooms are closed by semi-octagonal bays that have doorways in the center, leading into small square rooms. The interior appears to consist of two nested squares – the square containing the central dome, and the square formed by these rectangular and square rooms surrounding it. The most famous example of this pavilion type from the Timurid period has disappeared. It was built within the palace grounds of the

Aqqoyunlu ruler Uzun Hasan (1453–1478) at Tabriz and was described at length by several European travelers (Woods 1976: 150). We shall return to the *hasht-bihisht* plan in discussing Timurid gardens.

Construction Technology: Supports and Vaults

Under this heading we discuss those features which represent innovative techniques of construction under the Timurids that eventually became standard features of Central Asian, Iranian, and, in a modified form, Mughal architecture. Timurid architects seem to have been obsessed with making supporting walls "disappear." Already in the fourteenth century in Yazd and Isfahan, architects were experimenting with transverse vaults (Golombek and Wilber 1988: vol. 1, 102; Pugachenkova 1963). By bridging an open space with a pair of parallel arches and connecting them with another pair of arches set on the shoulders of these, the architect could construct a small domical vault. As it did not rest on walls, this vault appeared to float in space. A succession of such transverse arches thrown across a rectangular hall made it possible to dispense with the heaviness of the barrel vault. The spaces between the arches could be pierced by windows, creating a clerestory that admitted light. From this technology the successors to these Iranian architects, who emigrated to Transoxiana to work for Timur, developed the great domed halls that lie behind the façades of madrasas, such as that of Ulugh Beg in Samarqand.

This technology advanced further under the aegis of Shahrukh's court architect Qawam al-Din (*c.* 1410–1438 or 1440) (Golombek and Wilber 1988: vol. 1, 189–194). He built major mosques and madrasas for the ruler and his queen Gawhar Shad, but also for the vizier, Pir Ahmad. At Khargird, situated on the road between Mashhad and Herat, where the vizier held significant properties, Qawam al-Din designed a madrasa. Like most Timurid madrasas, the Khargird building is symmetrical and has a complex entrance block (O'Kane 1976). From the entrance vestibule beyond the portal, doors on either side lead into two extraordinary dome chambers (Figure 32.5). Both halls are examples of the square dome chamber with deep arched niches (*chahar-taq*, "four-arches") that allowed the architect to do away with the need for solid walls and a squinch zone. Prior to this innovation, domes in Persian architecture rose above solid walls on which an octagonal zone of transition was built to reduce the square of the room to the circle of the dome. The traditional system emphasized the horizontal. The new system provided four tangent barrel vaults on which a dome could be set. In the prayer hall (the room to the right of the entrance) short recumbent arches bridge the gaps between the arches, forming eight resting points for the dome. However, in the room on the left, the niche vaults intersect in the corners rather than standing tangent to each other. From this armature a network of plaster ribs was hung to give the impression that the intersection of arches was carried all the way up to the dome. Thus, it appears to the viewer that the dome, raised even higher on top of a lantern drum, is floating in midair. Timurid architects strove for height, and when large-scale building was not

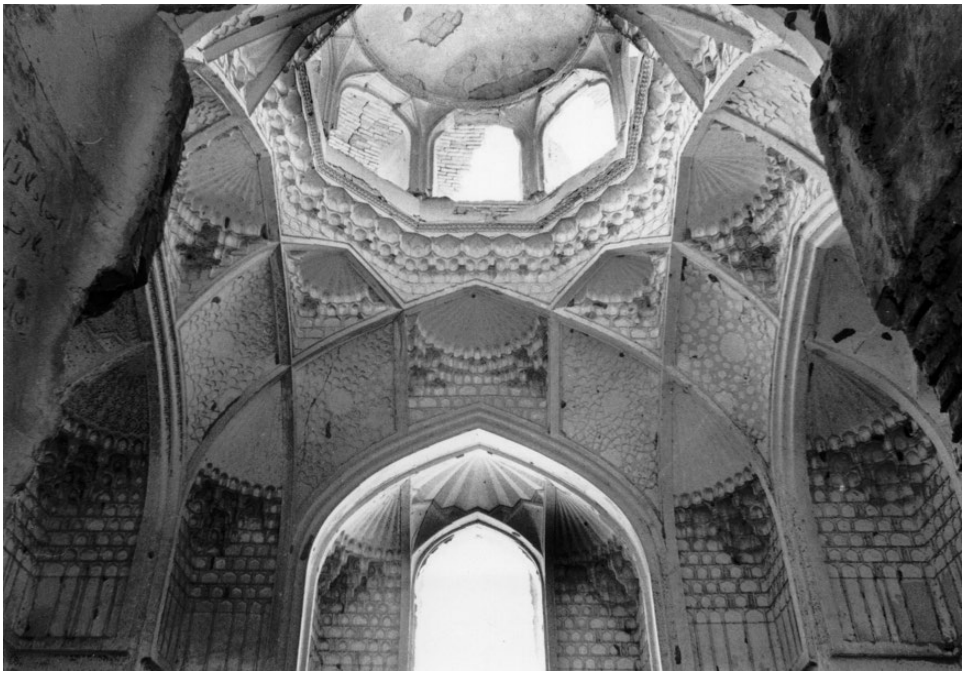


FIGURE 32.5 Interior of the dome chamber left of the entrance in the madrasa at Khargird. Source: Lisa Golombek.

feasible, they invented ways to give the illusion of height. In the new four-alcove dome chamber no horizontal barriers re-directed the view away from the highest point in the room.

Similarly, the "arch-net," a decorative device that developed out of the notion of intersecting ribs, could be seen as a standard Central Asian feature by the sixteenth century. The entire vault became a stellate design, based on rotated squares (Golombek and Wilber 1988: vol. 1, 169–172). All Timurid buildings from 1445 onward have some form of stellate vault. Initially, these were constructed in the masonry, but soon they were fabricated entirely from plaster, either in molds, which were then assembled when attached to the masonry, or simply created from the bottom up, "free-hand," by the mason, as could be witnessed in Isfahan as late as 1974. This type of faceting is often referred to as "squinch-net," but as there are no squinches, the term "arch-net" seems preferable. Common masons' terms for this device include *yazdi-bandi* (in the manner of builders from Yazd) and *rasmi-sazi* (construction based on a drawing).

Architectural Ornament

Timurid architects carried forward the growing intensity of architectural decoration in glazed tile and painting that had been developing in Iran and Central Asia since the eleventh century and particularly under the Ilkhanids and their

successors (Wilber 1955). The circulation of designs for architectural ornament, both two- and three-dimensional (*muqarnas*), was facilitated through the medium of paper, on sheets or in scrolls (Necipoğlu 1995). The most extraordinary innovations were to be found in the extensive use of glazed tiles resembling brickwork, mentioned above. The new elliptical domes were also tiled a cobalt blue, contrasting strongly with the buff-colored ground of the *banna'i* decoration of the supporting walls. Mosaic-faience panels, composed of thousands of cut-up glazed tiles, were reserved for accents, especially on portals and the interior. The less costly *cuerda seca* tiles tended to be used instead (O'Kane 2011). They could be produced as square or polygonal tiles and rapidly set in place. At the Shah-i Zindah cemetery complex in Samarqand (eleventh–fifteenth centuries) some of the later mausoleums are entirely reveted inside with such tiles. Large patterns spread over many tiles could be produced more efficiently than by using mosaic-faience. Geometric, vegetal, and calligraphic ornament drew upon the wide repertory of design developed by Timurid artists for book illumination and textiles, patterns for which were produced in the court ateliers and could be circulated widely for use in a wide range of media. Most plasterwork was painted with arabesque patterns related to other Timurid arts, such as leather bookbindings (Lentz and Lowry 1989). The exceptions are to be found in mausoleums where vegetation, particularly trees, was painted in a fairly naturalistic style, suggestive of the paradise gardens appropriate for a tomb (Golombek 1993; O'Kane 2005). Carved stone decoration was rare except for moldings and colonettes.

Garden Design

No Timurid gardens survive, but the evidence of texts and some archaeological data help us to reconstruct these gardens and to gain insight into the royal ceremonial and pastimes that took place there (Golombek 1995).[4] Timurid paintings depict life in the gardens and give a sense of the beauty of the architecture and the vegetation. Timur's gardens are described in the Persian chronicles but are also known to us through the reports of the Spanish envoy Clavijo, to whom we referred earlier. Two Timurid gardens in Samarqand are known archaeologically. For Herat the descriptions of the early gardens are sparse (Allen 1983), but for the later ones, several sources, including Babur (who visited them in 1506), have proven valuable (see relevant passages in Babur 1996). One of the most important sources is a treatise on agriculture which describes in detail both the architectural elements of the garden and its plantings (Subtelny 1993). Some traces of Timurid gardens in Herat are visible in old aerial photographs (Allen 1983).

Two variations of the formal garden (*chahar-bagh*) seem to have existed in the fifteenth century. In Timur's time the gardens were walled square spaces divided into quadrants by cross-axial water channels, forming the *chahar-bagh* (quadripartite garden) for which landscape architecture in Iran and Central Asia is famous (Fairchild Ruggles 2008: chapter 4). In the center, where the water

axes intersect, a pavilion was erected. In most cases the pavilion was at least two stories high and its interior was divided into nine spaces – a central domed space surrounded by eight spaces, thus, the classic *hasht-bihisht* plan described above. Sometimes a colonnade replaced the external iwan as in Ulugh Beg's Chehel Sutun (lit. "forty columns") at Samarqand (Pougatchenkova 1981: fig. 34d), which genre could have been the model for the Ottoman Çinili Köşk built within the Topkapı Saray in 1472. The pavilion could be set on a patio or might lie on top of a hill, as in the Daulatabad garden of Timur near Samarqand (Masson 1928; Pugachenkova 1987: 177–178). The quadrants of the garden were further divided by smaller canals, serving to irrigate the garden but also functioning as pathways, interrupted at intervals by pools. This type of garden places the owner in the very center of paradise, described in the Traditions of the Prophet Muhammad (hadith) as the biblical garden with four rivers (Genesis 2: 10–14; Sahih al-Bukhari, Book 52:48). He can look out in all directions but does not command a view of the whole.

The second variant of the *chahar-bagh* is described by the author of the agricultural treatise, Qasim b. Yusuf, who was well acquainted with the landscape architects of the day (Subtelny 1993). He held an official position in the government of Sultan Husayn Bayqara and was in charge of monitoring the distribution of water in Herat; he then served the Uzbek court in Bukhara and would subsequently serve the Mughals, thereby establishing a direct link of transmission. He describes the model *chahar-bagh* as having its pavilion, not in the center of the garden but at one end. It was fronted by a patio on which was situated an ornamental pool. Beyond this lay the quadripartite garden with its main canal leading away from the pavilion, intersected by the lateral canal that divided the layout of the garden plots into four sections. Within each section were nine planted plots. The great garden estate of Sultan Husayn known as the Jahan-ara'i in Herat, visited by Babur in 1506, is mentioned in Timurid literature as the site of both official and informal events (Allen 1981: no. 632, 195–198; Subtelny 2007: 94–96, 131–132). It had several buildings, including an administrative center.

A second late Timurid garden appears to the west of the funerary shrine of the Sufi shaykh, Khvajeh ʿAbd Allah Ansari, at Gazurgah outside Herat. Based on texts and old photographs Terry Allen identified the remains as those of the garden estate (*Baghcheh*) of ʿAli-Shir Nava'i, Sultan Husayn's confidant (Allen 1981: no. 657; Allen 1983: fig. 1; Ball 1981). It was a multicourtyard ensemble, with a large square *chahar-bagh* behind a monumental entrance portal. A large pool lay at the intersection of the cross-axial channels, and a pavilion stood at the end, facing the entrance. Beyond the pavilion lay a smaller courtyard with its own pool and a pavilion along its east side, possibly polygonal in form. Thus, here was an example of a garden estate with its main pavilion at the end of the actual garden rather than in its midst. It is this type of arrangement that seems to be described in the agricultural treatise by Qasim b. Yusuf, mentioned earlier. The garden with its pavilion at one end was a module that could be repeated or introduced into

larger compositions. The main difference between it and the pavilion-centered garden was that the visitor could visualize the entire "paradise" without moving beyond the pavilion.

Mughal Architecture – Assessing the Timurid Legacy

Mughal sources offer few explicit comments on the traditions from which the great Mughal architectural synthesis drew its inspiration: Central Asian styles merged with those of the different regions of India, and with Iranian and even European elements. The built architecture is our best evidence. This is even true for the time of Shah Jahan when the methodical appraisal of architecture became a new theme of Mughal primary sources and systematic descriptions of the emperor's building projects formed a subgenre of imperial chronicles and of eulogistic poetry (Begley and Desai 1989; Joshi 2010; Kanbo 1967–1972; Koch 1991: 143; Koch 2013: 351–353; Lahawri 1866–1872; Nath 2005). Such scientific assessments of architecture give expression to a distinct interest of Shah Jahan, as they do not appear so consistently elsewhere in Mughal India and the Persian-speaking world.

Modern research on Mughal architecture began in the second half of the nineteenth century, after the British conquest of Agra and Delhi in 1803. In 1861 the Archaeological Survey of India was founded with the initial agenda to survey and record the historical monuments, to which conservation was eventually added. But the resulting publications included surprisingly few monographs of Mughal sites (Cole 1884; Smith 1894–1898/1985; Smith 1909/1994) and consisted instead of detailed descriptions of buildings focusing on their ornament as a potential model for industrial design (Smith 1894–1898/1985: vol. 1, xii). No scientific documentation and analysis was ever devoted to the entire Taj Mahal complex until the early twenty-first century (Koch 2006a). The history of Mughal architecture was only considered in the context of general works (Brown 1957, 1975; Fergusson 1972; Havell 1927) and here the treatment of the buildings confined itself to general characterizations, a more detailed syncretistic analysis being hampered by the limited number of recorded monuments, the lack of available measured drawings, and the paucity of accessible primary sources. Furthermore the identification of regional styles which led to the formation of Mughal architecture was overshadowed by the categorization of "Hindu" and "Muslim" ("Muhammadan," "Saracenic," "Islamic") which reflected the colonial approach of the British to "divide and rule" (Metcalf 1989). Trabeate constructions were classified as "Hindu," and arches and domes as "Muslim" (e.g., Brown 1957: 540; Fergusson 1972: vol. 2, 292–293). The issue divided scholars and led to a heated debate between those who saw Mughal architecture as an Islamic style (Fergusson, Smith) and those who denied or minimized foreign influences (Havell). The shapes of domes and arches became key elements of the debate and here Timurid

and Persian architecture entered the discussion. Fergusson expressed the hope that the Russian takeover of Central Asia would facilitate access to Timurid buildings which would throw light upon the origins of Mughal architecture. He pointed out the similarities between Mughal domes and the bulbous domes of Samarqand and Iran and noted that the decoration with tiles was common to all three regions (Fergusson 1972: vol. 2, 286). Muhammad Abdulla Chaghatai made extensive use of newly available Russian government publications to go deeper into the issue and devoted a whole chapter of his *Le Tadje Mahal d'Agra* (1938) to the architectural connections between Central Asia, Iran, and India. But in the following discussion the distinction between Timurid and Persian architecture became again blurred which is also true of Brown's classical study *Indian Architecture (Islamic Period)* (1942; with numerous later editions), despite the author's having given more space to the identification of regional styles than to "Hindu"/"Muslim" interaction.

After India's independence in 1947, the institution of Archaeological Survey of India was maintained and a new Department of Archaeology was created in Pakistan. The divide had also an impact on scholarship. In India the survey and documentation of monuments of the Islamic (Mughal) period (which was seen as an earlier form of colonialism) was largely left to the initiative of individuals (Koch 1991, 2006; Parihar 2006; Petruccioli 1988), but even in Pakistan which identifies strongly with the Mughal heritage (in Lahore a popular name is Timur), only a few studies in Mughal architectural history were undertaken, again either devoted to individual monuments (Chaghatai 1972, 1975; Khan 2011) or as chapters in general treatments of Islamic architecture in the subcontinent (Khan 2003; Mumtaz 1985). The first monographic treatments of the history of Mughal architecture appeared only in the later twentieth century (Asher 1992; Koch 1991; Nath 1982, 1985, 1994, 2005) and now also the iconology of architecture was thematized (Begley 1979; Koch 1982, 2001). Until today Mughal architecture is still comparatively little studied and more attention has been given to Mughal gardens (Crowe *et al.* 1972; Hussain, Rehman, and Wescoat, 1996; Kausar, Brand, and Wescoat 1990; Koch 1997a, 1997b, Petruccioli 1994, 1997; Rehman 2001; Villiers-Stuart 1913, Wescoat and Wolschke-Bulmahn 1996).

The "Hindu" and "Muslim" issue inherited from the colonial period continues to inform much of what is written about Indian architecture, and since Mughal architecture relates to both there is a certain resistance to include it within the framework of Islamic architecture. The argument of Havell has been revived with renewed polemic by the Institute of Rewriting Indian History founded by P.N. Oak in 1964 (e.g., Oak 1974), whose adherents claim an Indian origin for nearly all forms, though even R. Nath, the most prolific art historian of this school, concedes a "Persian inspiration" for the "high, bulbous double-dome at Delhi, e.g. at Subz Burj and … the tomb of Humayun" for which he adduces the dome of Gur-i Amir at Samarqand [Figure 32.4] as a comparative example (Nath 1982: 210, pl. CXLVI [with wrong caption]). Jairazbhoy (1961), Hoag (1968), Golombek (1981) and

Koch (1982) undertook more detailed investigations into the connections between Central Asian and Mughal architecture, especially after Pougatchenkova (1981), O'Kane (1987), and Golombek and Wilber (1988) had made Timurid and Uzbek architecture and the findings of the Soviet research on it more accessible. Asher (1992: 15–17) briefly acknowledged the Timurid and Shaybanid antecedents of Mughal architecture but classified them again under "the Iranian tradition."

City Planning

Our most comprehensive source of the Timurid transition into India is Babur's autobiography where he writes that his main architectural activities were directed towards the creation of gardens with an aim to establish the Timurid garden tradition on the banks of the river Yamuna at Agra, the previous capital of the Lodi sultans (Babur 1996: 359–361). The determinant for the riverfront garden was the geography of Hindustan with the available water source in the form of a large river (Koch 1997a/2001). The Timurid gardens that Babur had seen along the canals surrounding Herat might have reconciled him with the Indian riverfront landscape, about which he had initially nothing good to say as the site for his gardens. Earlier he had founded gardens in Kabul and other parts of present-day Afghanistan and consequently the Indians (*mardum-i Hind*) called the new Mughal gardens on the banks of the Yamuna "Kabul," which shows that they were considered as new and foreign (Babur 1996: 360). Babur's successors expanded the riverfront city and by the late sixteenth century Mughal Agra consisted of bands of residential and funerary gardens lining the Yamuna on both sides (for this and the following see Koch 2006a: chapter 1). The new Mughal city had thus a suburban character and even its most prominent building, the Taj Mahal (1632–1643, completed 1648), was built a century later as part of Agra's riverfront landscape. The scheme was partially realized in other cities of the empire, at Lahore and Ahmadabad.

Mughal urban planning flourished with new and decisive impulses under Shah Jahan. To develop Agra also inland, he ordered in 1637 the insertion of a large bazaar in the form of an irregular octagon with four longer and four shorter sides (which the Mughals designated with the enigmatic term *muthamman baghdadi*, meaning Baghdadi octagon) as an organizing link between the riverfront palace fortress and the inland projected Friday mosque (Jamiʿ Masjid) that was completed only in 1648. The creation of an urban ensemble around an octagonal plaza (demolished in 1858 by the British) stands by itself in India, a pointedly geometric Mughal response to the urban spaces of Central Asia and to the Iranian tradition of urban plazas (*maidan*s).

The preoccupation with large-scale geometrical shapes and octagons in an urban context determines also the plan of the fortress palace, called the Red Fort, of Shah Jahan's new city Shahjahanabad (1639–1648) in Delhi. It is laid out as a giant oblong Baghdadi octagon, the longer sides of which measure *c.* 656 m, the

shorter sides *c.* 328 m, and the corner chamfers *c.* 116 m, but modified in the execution. The "democratic" scheme of Agra where, besides the emperor and the princes, royal women and the nobility had access to riverfront sites, was abandoned in Shahjahanabad. Now the riverfront was almost exclusively used for the palace where the main courtyards and gardens form a band overlooking the Yamuna; most of the nobles had to build their residences within the city (Koch 1997a: 144–145). A covered bazaar on the landward side of the palace extended on the north–south axis in the form of a large street into the city, a second street running east–west formed the other determining artery. The rest of Shahjahanabad was built by infill. The covered bazaar, new and unique in India as the historian Kanbo assures us, was an afterthought and modeled on an Iranian-type bazaar, which Shah Jahan had seen in 1646 at Peshawar during his Balkh and Badakhshan campaigns (Kanbo 1967–1972: vol. 2, 391; Koch 1991: figs 130–131). At this time, when the Mughals were preoccupied with regaining their Timurid homelands, an awareness of Timur's covered bazaar of Samarqand might have heightened the interest in this design.

Gardens

Formally laid out gardens functioned for the Mughals as they did for the Timurids, as open air palaces and were indispensable for the Mughal lifestyle. The Mughals also made them the setting for their tombs. Babur calls his first garden at Agra, laid out in 1526, a *chahar-bagh*, like some of his earlier gardens in present-day Afghanistan. Babur used the term in its widest sense, not necessarily for a garden on a strict cross-axial plan but rather for large architecturally planned gardens with intersecting raised paved walkways, platforms, and pools. He even called his rock cut garden at Dholpur a *chahar-bagh* (Koch 2007; Moynihan 1988).

After Babur the Mughals did not use the term *chahar-bagh* very much; in Shahjahani sources it is employed metaphorically, for the earth or the terrestrial "*chahar-bagh* of the world" (Kanbo 1967–1972: 1, 270). Otherwise, a garden was usually called just *bagh*, garden (or *baghcheh* for smaller versions). Still, we owe to the Mughals the grandest and most consistently planned *chahar-bagh*s in the entire history of garden architecture. The Timurid garden with its pavilion at one end proved itself as the ideal solution for the riverfront garden in which the main building was put on a terrace overlooking the river; the design found its most spectacular expression in the Taj Mahal.

Rationality of Design

Monumentality and rationality, prominent characteristics of Timur's buildings were given a new and spectacular Mughal expression in the mausoleum of Babur's son Humayun at Delhi (1562–1571). The *chahar-bagh* and the Timurid centralized plan of nine parts, the *hasht-bihisht*, were here combined on a new scale in a

grandiose manifesto of the transformation of Timurid ideas into the new Mughal idiom. The large domed mausoleum on a podium was erected by the builders of the young Akbar (Humayun's son and successor) in response to Timur's tomb at Samarqand, and at the same time as an answer to the tombs of the Delhi sultans, which reached an apogee with the monumental tomb of Humayun's rival Sher Shah Sur at Sassaram (1545) in eastern India (Lowry 1987).

Humayun's tomb was set in the center of a large *chahar-bagh* at the crossing of the two main garden avenues (*khiyabans*), and the combination of tomb and formal garden established the prototype for future Mughal funerary gardens (Figure 32.6). In the tomb, four radially symmetrical *hasht-bihisht* units occupy

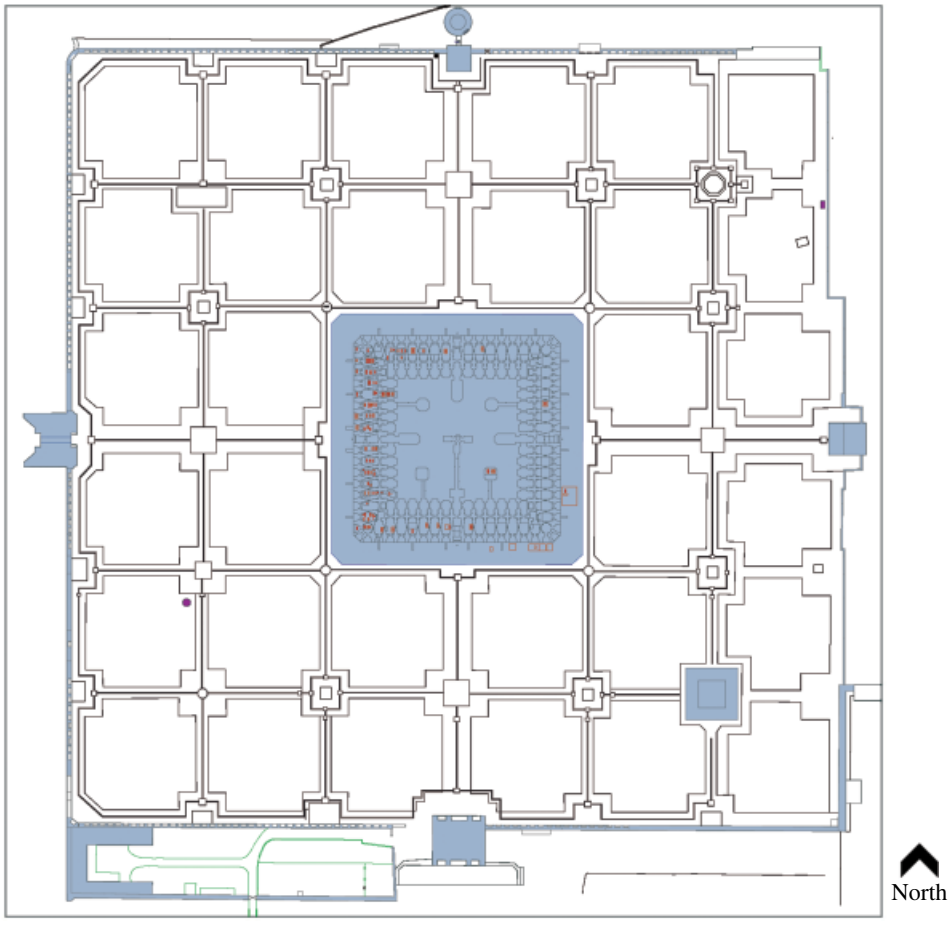


FIGURE 32.6 Tomb of Humayun at Delhi, built between 1562 and 1571, plan of the garden showing in the center the platform of the tomb with surrounding rooms and burial chambers. The so-called Tomb of the Barber dated 1590–1591 is situated in the southeast corner of the garden. Source: Aga Khan Trust for Culture. Reproduced with permission.

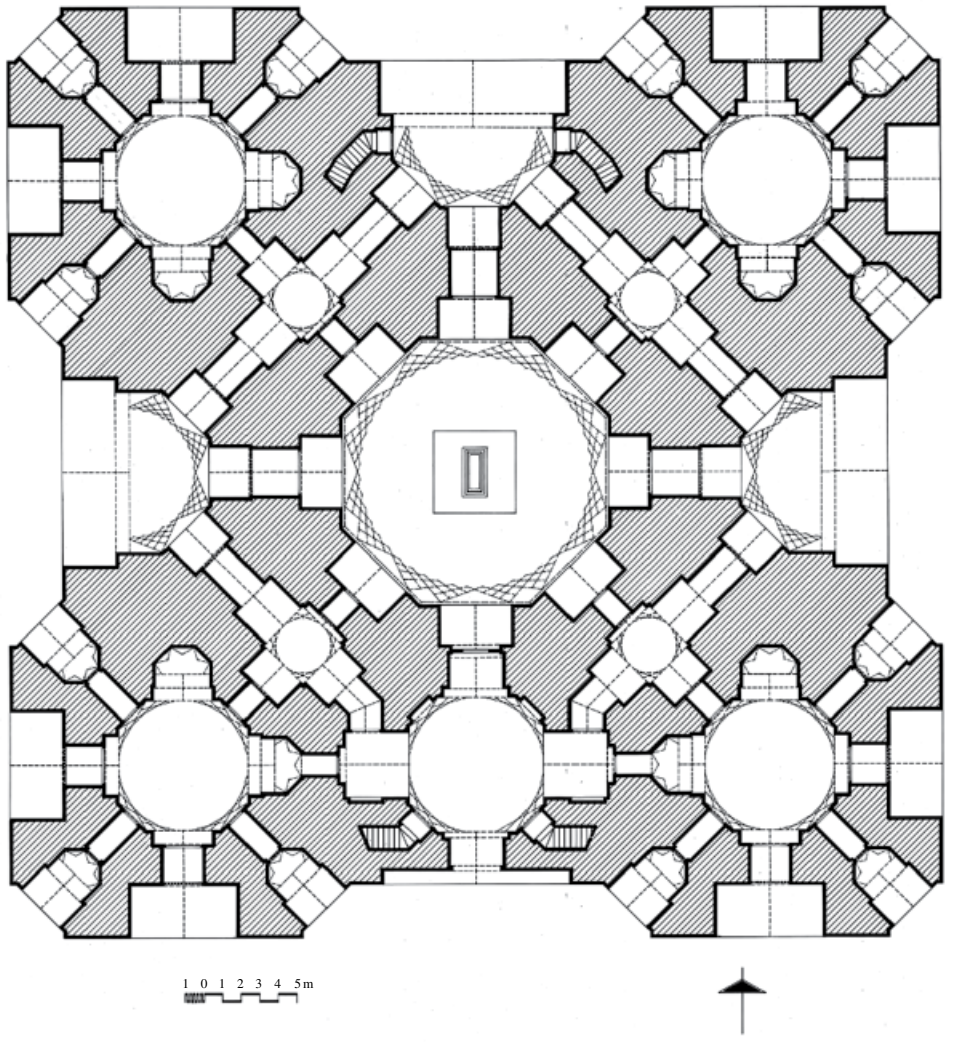


FIGURE 32.7 Tomb of Humayun, ground plan of the tomb structure on the platform. Source: Drawing R. A. Barraud and © Ebba Koch.

the corners of the overall structure, which in itself follows the ninefold plan (Figure 32.7). Thus, the typical was used to produce the outstanding. The builder of the mausoleum was Sayyid Muhammad, son of Mirak-i Sayyid Ghiyath from late Timurid Herat and Uzbek Bukhara, which has been mentioned above as a place where Timurid architecture had strong influence (Subtelny 1997:114). The ingenious composition was inspired by a wooden boat palace devised by Humayun himself (Golombek 1981: 48; Jairazbhoy 1961): his historian Khwandamir reports that the floating structure was made of four two-story pavilions (*chahar-taq*) on boats joined together with four arches (*taq*). The four pavilions and four arches

enclosed an octagonal pool which in the tomb is replaced by the domed hall in the center (Khwandamir 1940 [Persian text]: 52–56; 1940 [trans.]: 37–40). But although the idea of generating a superimposed form with smaller versions of itself does occur in Timurid geometrical designs (Necipoğlu 1995), here it has more to do with Indian conceptions of micro-architecture and self-referential buildings (Koch 2006a: 27, 103; Lambourn 2010). It is applied to generate a ground plan and the interrelationship of the parts also extends to the garden because the subdivisions of the *chahar-bagh* correspond in turn to a nine-part design.

Such complex and interrelated solutions aiming at perfect symmetry extend Timurid geometry to new horizons, moving toward even more systematic planning principles. Here we find a *hasht-bihisht* plan that is entirely successful on the exterior, a strong contrast to even the most symmetrically conceived *hasht-bihisht* plans of late Timurid architecture, such as the mausoleum of ʻAbd al-Razzaq b. Ulugh Beg at Ghazni (1501–1502), which features a much less coherent elevation (Hoag 1968; Golombek and Wilber 1988, 1: 299; 2: pl. 145, fig. 70; Pougatchenkova 1981: 182–184). We can, however, only judge from the preserved evidence since a large number of *hasht-bihisht* pavilions are not preserved, most famously the Aqqoyunlu *hasht–bihisht* in Tabriz, which could have served as inspiration to use the design in a funerary structure (Jairazbhoy 1961).

Humayun's tomb has a facing of red sandstone in which each structural element of the elevation is lined with white marble (Figure 32.8). In this, the Mughals elaborated an architectural praxis which had already been adopted by the Delhi sultans[5] (Lowry 1987: 140–141) which in turn conforms to older Indian concepts, laid down in architectural treatises (*shastra*s). These theoretical Sanskrit texts about art and building recommended white colored stones for the buildings of Brahmins, the priestly caste, and red ones for those of the *kshatriyas*, the warrior caste. The synthesis of the two colors had an auspicious connotation. By adopting the use of white and red of sultanate buildings, the Mughals represented themselves architecturally in the terms of the two highest levels of the Indian social system (Koch 2006a: 215–217). It is characteristic of their approach that they employed the symbolically highly charged color dualism with a studied rationality and intentionality in a much wider context than the Tughluq sultans before them. Within the overall red and white conception of Humayun's tomb, Timurid tile cladding was not entirely forgotten. The small domical roof kiosks *(chhatris)* around the large white central dome were originally covered with tile mosaic (only recently renovated by the conservation architect Ratish Nanda of the Aga Khan Trust for Culture) and presented a distinctly visible Timurid reference on the outside of the building (Figure 32.8).

With Humayun's tomb, the Mughals set an example of successful architectural synthesis and made their own imperial statement in Delhi, the old capital of the sultans. Also, from the very beginning Humayun's tomb became a site of dynastic cult and was revered like the tomb of a saint during the pious visitations (*ziyarat*)



FIGURE 32.8 Tomb of Humayun after its restoration by the Aga Khan Trust for Culture, seen from the west. The restoration included the facing of the niches in the platform with white stucco plaster (*chunam*) and the renovation of the original tile mosaic of the small kiosks (chhatris) topping the frames of the grand entrance niches (*pishtaqs*). Source: Photograph by Narendra Swain, courtesy of Aga Khan Trust for Culture. Reproduced with permission.

of Mughal emperors whenever they came to Delhi and performed ritual circumambulation (*tawaf)* (Koch 1993).

The *hasht-bihisht* was the architectural scheme about which the Mughals thought most intensely. They varied this centrally symmetrical plan type in tombs, garden pavilions, and *hammam*s in ever new but always perfectly symmetrical versions. The *hasht-bihisht* design finds its most balanced and harmonious expression in the Taj Mahal (Koch 2006a: 153–156). That symmetry took precedence over functionality is manifested most powerfully in pleasure pavilions which seem to have been set into the Indian landscape as formal statements of Mughal order, rather than edifices for providing comfort and recreation.

The Mughal solutions might have had, in turn, an effect on Central Asia that provided their original inspiration. The symmetrical plan of the Shaybanid *khanaqah* of Qasim Shaykh at Karminah/Kermin (1579?) in Central Asia, probably built a couple of years after Humayun's tomb, invites this line of thought. Or else, commonly shared prototypes may have generated similar forms. Geometrical planning which perfects and elaborates Timurid ideas is found in practically all Mughal building types.

An especially noteworthy Timurid reference is made in the main *zanana* (harem) building of Akbar's palace fort in Agra, called misleadingly "Jahangiri Mahal" (late 1560s to 1570s). This typical example of the creative adaptation of Timurid prototypes and the wide range of the architectural synthesis fostered by Akbar features a ground plan echoing that of the aforementioned funerary shrine complex Timur built for Ahmad Yasavi in Turkestan (1397–1399) (cf. Koch 1991: fig 36 no. 4 with our Figure 32.3). But in the Agra palace, this plan type is combined with the elevation of an open courtyard. The inner courtyard taking the place of the central domed chamber of the model is in the regional sandstone style of the Gujarat-Malwa Rajasthan tradition of western and central India, whereas the western façade quotes the red sandstone facing highlighted with white marble of Delhi. The composite plan exhibits a characteristic Mughal symmetry (the present irregularities on the northern side are due to later changes). In contrast, the vaults are less symmetrical, perhaps to enliven the concept with controlled variety. The Jahangiri Mahal not only adaptively reinterprets the plan of a Timurid masonry structure; its riverfront verandah quotes from another imported tradition: the high slender columns and their inserted pot-like element are a translation into stone of the timber iwan of the vernacular building traditions that existed in Central Asia throughout the centuries, complemented by the monumental masonry constructions of representational architecture (Koch 1991: figs 14, 39). As we shall see below, this column type, further transformed under Shah Jahan, was to have a great career in later Indian architecture.

The Mughals also reinterpreted the Timurid madrasa, but while it had been a major building type in Timurid architecture only two examples of their patronage have survived in India. The first one dating from the early period is the Khayr al-Manazil, built in 1561–1562 by Akbar's wet-nurse Maham Anaga opposite the Purana Qil'a in an area which was then Mughal Delhi. It fuses a Timurid madrasa of the two-iwan plan (such as the madrasa of Muhammad Sultan in the aforementioned Gur-i Amir tomb complex in Samarqand) with the characteristic single-aisled mosque type of the Delhi Sultanate (Koch 1991: fig. 57). Similarly, the later madrasa of Ghazi al-Din Khan of *c.* 1700 combines the same mosque type with a symmetrical four-iwan plan (Koch 2006b: fig. 1.2). Comparable to the Shaybanid madrasa of ʿAbd Allah Khan at Bukhara (1589–1590), it has an entrance block which integrates a partial *hasht-bihisht* plan. The patron of this madrasa was Mir Shihab al-Din, who came from Bukhara in the 1670s to seek his fortunes in Hindustan. His origin and the lack of a Mughal madrasa tradition seems to have motivated him to adopt the post-Timurid forms of Uzbek Bukhara.

Overarching Space

Timurid arch-netting became a common feature of Mughal transition zones and almost entirely replaced the older squinch system employed in the Delhi Sultanate. Prior to its deployment by the Mughals, we find it in Deccani architecture which

had established Timurid contacts on its own. The Mughals also adapted the Timurid four-arch vault system which projected the nine-part *hasht-bihisht* layout onto vaults. We find a dome resting on four intersecting arches creating partial vaults in brick masonry, covered by polished stucco with geometric ornament in the great *hammam* of Fatehpur Sikri (1571–1585). Translations into sandstone appear in the so-called Barber's tomb within the garden of Humayun's tomb (1590–1591) (Figure 32.6) and in the giant sandstone vault of the Govind Deva temple, built in 1590 by Akbar's vassal, the Kachhwaha Rajput Man Singh at Govardhan, north of Agra (cf. Figure 32.5 with Koch 1991: 50–51, figs. 32, 33, 67). That the most daring transformation of a Timurid vault appears in a temple sheds significant light on the architectural open-mindedness of Mughal India in the sixteenth century and contradicts the still popular polarizing equation of "Hindu" architecture with "trabeate" and "Muslim" architecture with "arcuate" construction (Tillotson 1990: 24–25, 108, 118 et passim).

Minarets

A renewed interest in Timurid architecture under Jahangir and Shah Jahan could also explain the introduction of minarets, so far not found in Mughal architecture. Examples include the use of four minarets on the roof of the south gate in Akbar's tomb at Sikandra (1613), the four corner minarets of Jahangir's tomb at Lahore (1628–1638), and another four around the mausoleum of the Taj Mahal and the tomb of Rabiʿa Daurani at Aurangabad (1660–1661) (Figure 32.9 and Koch 1991: figs 68, 106, pls. XVII, XVIII). Earlier, quadruple minarets had also been used in the Deccan: the Charminar in Hyderabad (1591), which was copied in the "Charminar" of Bukhara in 1807 (Yaralova 1969: 333). One cannot exclude a reference to the quadruple minarets of Ottoman mosques, the earliest example being the Üç Serefeli mosque in Edirne (1437–1447), which itself may have drawn inspiration from Timurid models, judging by its Persianate decorative program in the "international Timurid" style (see Yürekli, CHAPTER 29).

Architectural Ornament

In the fusion of disparate traditions from which Mughal architecture was created, Timurid ornament remained a source of inspiration well into the seventeenth century, ranging from direct quotations to translations and adaptations in other materials. Geometric Timurid tile mosaic appears on early to mid-sixteenth-century Mughal tombs such as the Sabz Burj and Nila Gunbad at Delhi, on the *chhatri* cupolas of Humayun's tomb mentioned above, in the tomb of Akbar's *wakil* Atga Khan at Nizamuddin in Delhi (1566–1567), at the *chhatri*s of Akbar's tomb (completed 1613) in Sikandra (Smith 1909/1994: pls XX–XXIV), and in the new floral patterns favored by Shah Jahan on the outer walls of the tomb of his *diwan-i kul* (finance minister) Afzal Khan Shirazi, known as "Chini ka Rawza,"

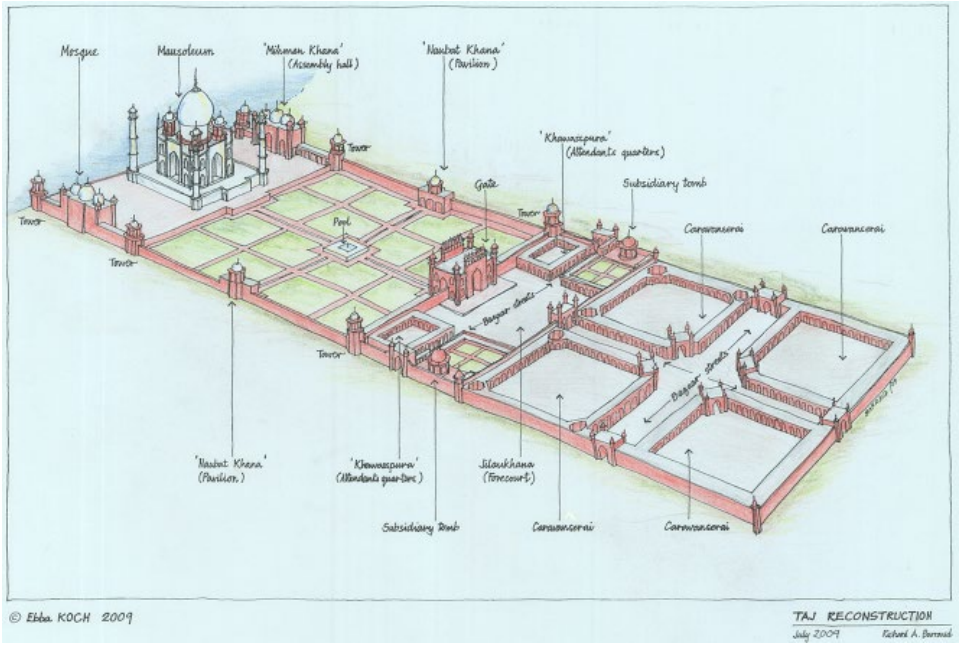


FIGURE 32.9 Reconstruction of the entire Taj Mahal complex with its now lost bazaar and caravanserai complex in the south, length 896 m, width 300.84 m. Source: Drawing R.A. Barraud and © Ebba Koch.

in Agra (*c.* 1639) (Smith 1901: pls. XIX–XLIV). While tile facing occurs only sparingly in the Mughal mainstream architecture of Agra and Delhi, it is a distinctive regional practice at Lahore which was far from the sandstone and marble quarries of Hindustan. Jahangir made spectacular use of tile mosaic in the facing of the outer wall of the Lahore fort which shows a Solomonic program of courtly scenes, angels, demons, beasts, and birds (Koch 1983; Vogel 1920). Translations of geometric tile patterns into stone intarsia and mosaic are more frequent and make their most spectacular appearance in the southern gate and the *pishtaq*s of Akbar's tomb at Sikandra (Smith 1909/1994: pls. XXVI–XXX, XL–XLVIII). This tomb is altogether a compendium of early seventeenth-century Mughal ornament in which Timurid decorative forms feature strongly, not only in the translation of geometric tile mosaic patterns into stone intarsia but also in the medium of painted plaster decoration, recalling Timurid *kundal* work in the vestibule (Koch 1991: pl. VII). Stone carving, on the other hand, takes up Timurid relief patterns of the "distinctive *haft qalam* (seven scripts) idiom of the late fifteenth century," featuring "large blossoms and sharp jagged petals in tightly coiled chinoiserie arabesques that were deemed suitable for wooden doors … as well as for tomb stones" (Lentz and Lowry 1989: 208–211; cf. O'Kane 1987: 341–342, fig. 54.3). This type of relief appears in Mughalized patterns on Akbar's carved marble

cenotaph and on the pedestal next to it (Smith 1909/1994: pls. XV-XVIII), as well as the spandrels of the gates and false gates of Akbar's tomb in sandstone and stone intarsia (Smith 1909/1994: pls. XXVI, XXXIX, XLIX-LII, LIV, LVI, LVII). Under Shah Jahan, Timurid decorative forms were explored anew, in such examples as the lining of arches with rope molding in the Taj Mahal (Koch 2006a: fig. 223), the Aramgah (1637), and the Moti Masjid (1653), both of them in the Agra fort.

The Baluster Column

The longest lasting impact of Central Asia on Mughal architecture came, however, from vernacular architecture, from the wooden baluster columns of a characteristic, elongated shape forming a bulb at their base. Such wooden columns provided one of the inspirations for a type of Mughal column which had a complex genesis and was to become the dominant columnar form of later Mughal architecture and its regional derivates. This was the baluster column of Shah Jahani architecture, a column emerging from a pot with overflowing leaves and forming a bulb at the base of its tapering shaft, with a capital composed of leaves (Koch 1982, 2001).

Already before Shah Jahan, Mughal architects had turned their attention to baluster-shaped columnar forms, but they had refrained from fully accepting the characteristic baluster shape. The wooden baluster columns of Central Asian porches called iwans had inspired the stone columns of Akbari architecture, as we have seen above in the east verandah of the Jahangiri Mahal. Other splendid examples form the colonnade surrounding the Rani ki Mahal of the Allahabad fort, dated 1583 (Koch 1991: fig. 53). The elongated shaft of these early Mughal versions is not tapering but straight and a pot-like element is inserted at its bottom instead of the characteristic bulb. Such forms also appear among some of the wooden Central Asian examples, which altogether show a great variety in the relationship between the tapering shaft forming a bulb and an inserted pot-like element. The majority express the bulb as a stylized pot with overflowing leaves; the pot here is compressed into the bulb, so to speak. A whole range of variants of this columnar type is found in the Jamiʿ Masjid of Khiva, dating from the early middle ages to the modern period (Yaralova 1969: figs. 31, 32, 33; Figure 32.10). The column type goes back to ancient Sogdian times and seems to be an adaption of baluster columns and/or columns emerging from pots with overflowing leaves, the *purna ghata* or *purna kalasha*: the old vase of plenty of Indian architecture, which could have been transmitted to Central Asia through the Kushan Empire. Elongated columns with a tapering shaft, forming a bulb at their foot, with a globe/pot-like element inserted between the shaft and the base are found in ancient residential architecture, for instance, at Jumalak -tepe north of Tirmiz (fifth to sixth century) (Chmelnizkij 1989: fig. 47), at the two half columns framing the altar niche



FIGURE 32.10 Jamiʿ Masjid, Khiva, Uzbekistan, reconstructed in the eighteenth century with wooden columns dating from different periods reaching back to the ninth century and earlier. Source: Photograph by Britta Elsner, 2010. Reproduced with permission.

of Gardani Khisor east of Samarqand (sixth to seventh century, Chmelnizkij 1989: fig 76), and at the throne hall of the palace of Bunjikat (sixth to seventh century, Chmelzniskij 1989: fig. 80; see also Yaralova 1969, 188, figs 6, 7; 194, figs 15, 16). An early Islamic adaptation would be the engaged corner colonettes framing the squinches of the tenth-century mausoleum of the Samanids in Bukhara (Yaralova 1969: 214, fig. 14).

The actual shape of Shah Jahan's baluster column, with its revolutionary naturalistic acanthus decoration taking the third dimension into full account, was derived from European sources, most likely prints of the Dürer circle brought to the Mughal court by the Jesuits (Koch 1982, 2001).

The Central Asian column has been revived in the architecture of post-Soviet Uzbekistan as a symbol of Uzbek national identity. It features significantly in the colonnade surrounding the Museum of Timur at Tashkent, built in 1996 to celebrate Timur's 660th birthday. Timur has become the new hero and identification figure of Uzbekistan, where the objects of his museum, glorifying his life and deeds, even include a model of the Taj Mahal.

Conclusion

In conclusion we can say that geometry, symmetry, and rational planning represent the principal link between Timurid and Mughal architecture. This relationship is highly dynamic and confronts us with the rather unfashionable notion of diachronic development over longer time periods and in a wider regional frame. The Timurids had a more pronounced interest in geometry than the Seljuqs and Ikhanids (Golombek 1981: 44), an interest that manifested itself progressively in an increasing number of building types. The Mughals built on the geometrical groundwork of the Timurids but, aiming at even stricter functional planning and perfect symmetry, they systematized ideas that had been more informally expressed in Timurid architecture. This Mughal adaptive process reinforces the principle of organization and binds the elements of Timurid models into a more symmetrical composition. This is especially true of coherently organized elevations which reflect every element of the ground plan. The Mughals elaborated Timurid solutions by merging them with the other traditions – Indian, Iranian, and European – which informed their style. They extended their geometric approach to all building types and to the planning of ever larger complexes.

In the seventeenth century, the Mughal obsession with symmetrical correspondence found new forms of expression under Shah Jahan in a shift in emphasis from radially to bilaterally symmetrical schemes. In the enormous complex of the Taj Mahal, the Timurid-derived central plan of the *hasht-bihisht* for the mausoleum proper and for its oblong variant in the gate were subjected to an overall mirror symmetry on both sides of a central axis (on which are placed the main features), an arrangement which the Mughals called *qarina*, an Arabic term meaning companion or counter-image (Figure 32.9). Bilateral symmetry dominated by a central axis has generally been recognized as an ordering principle of the architecture of rulers aspiring toward absolute power, an expression of authoritative rule that brings about balance and harmony (Koch 2006a: 105). Architecture reflected the political structure of the Mughal Empire, where power was never as focused as it became in the reign of Shah Jahan. The rationality of planning was counterbalanced in his reign by the sensual aesthetic of decorative surfaces with relief in stone and stucco and inlay work.

The above discussion lays out the "buffet" of monuments that could have influenced Mughal architecture, whether because they were associated with their ancestor Timur, or because Mughal architecture was, in some way, a direct continuation of the Timurid tradition. For the artists and craftsmen arriving from Iran and Central Asia, the borders of the Mughal Empire were highly permeable. Among the many examples, albeit lesser known, is the artist who painted the vaults of the so-called Zarnigar-khanah (Gilded Pavilion) adjoining the shrine at Gazurgah in Afghanistan (Golombek and Wilber 1988, vol. 2, col. pl. X). He may well have been responsible for the paintings commissioned by Jahangir for the vestibule of the tomb of Akbar at Sikandra (Koch 1991: pl. VII). If not

the movement of craftsmen themselves, then access to the *aides-memoires* of the architects, such as drawings on paper, might have served as vehicles for the transmission of specific ideas, particularly ornament (Necipoğlu 1995). What the Mughals saw in Timurid and Uzbek architecture, they liked and further developed. In some cases, the link was more tangible. We have seen that Babur admired the Timurid gardens of Herat and his son and successor Humayun had a barge designed to emulate the *hasht-bihisht* plan. Later on, at least one architect from Uzbek Bukhara, himself steeped in the late Timurid aesthetics of Herat, built the mausoleum of Humayun in Delhi (Figure 32.6 and Figure 32.7). While Babur stood closer in time to the Timurids, it was under Shah Jahan that a renewed calling forth of "the Timurid spirit" (Golombek 1991) seems to have become an avocation. In promoting the incorporation of clearly identifiable Timurid features into their own architectural production, the Mughals felt that they could acquire some of the mystique that had enveloped the mythologized figure of Timur. They thereby actualized an Arabic saying that is often cited in the Timurid chronicles: "If you want to know about us, look at our works (*al-athar*)"

Notes

1 See CHAPTER 25, Part 2 by Masuya and CHAPTER 26 by Roxburgh.
2 The original photographs reside in Shiraz at the final home of A.U. Pope, but copies were made in 1964 and are accessible through the University of Michigan, Department of the History of Art.
3 Most of the significant passages have been translated by W.M. Thackston (1989).
4 See O'Kane, CHAPTER 23.
5 On the Tughluqs see O'Kane, CHAPTER 23.

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