

Syncretism of dissimilar Arches in Lahore Fort Complex

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Accepted 18 June 2016, Available online 21 June 2016, Vol.4 (May/June 2016 issue)

Abstract

Mughal era in Sub-continent appeared as a landmark of Mughal dynasty. The royal taste which they produced expresses a thoughtful level of imagination and skill. In Lahore Fort syncretism of dissimilar architectural elements provide dynamic aesthetical experience. Forcefulness of architectural design is achieved not only by employing technical expertise but also artistic implementations of patterns equally in construction as well as surface decorations. Ideal play of geometry and symmetry appears in the form of arches. Systematic use of dissimilar arches constructed in diverse phases and eras unfold the unity and harmony that is very skillfully and consciously applied to all the structures of the Lahore Fort complex which was constructed by various rulers at different times. Mughal architecture is measured as visual art like painting and sculpture, because it evolves a strong sense of aesthetics and craftsmanship. . This investigation focuses how diverse designs of arches employed in the complex show syncretism where Mughal builders very consciously attempted resolution and blending of different and opposing principles to bring harmony. Mughal builders planed buildings using an artistic course by which they maneuvered art elements to create an amalgamated and pleasing artistic account.

Keywords: Lahore Fort, Syncretism, Arches, Dissimilarity, Harmony.

Introduction

The dissimilarity in values and purpose of architectural elements are directly linked to the pluralism in design outcomes that subsist within architecture and design both. It is always a big causative factor as to how an architect operates in his relation to the requirement or function of the building. Architectural design values make up a significant component of what influences architects when they make their design decisions.

The Mughal period marked a remarkable revitalization of Islamic architecture in northern India, where Persian, Indian, and various provincial styles were amalgamated to produce works of great sophistication. White marble and red sandstone were most favoured materials of construction in these regions. Most of the early Mughal buildings used arches only cautiously, relying on post-and-beam construction. In Lahore Fort the use of the double dome, a recessed archway inside a rectangular fronton (arena), and park like surroundings are typical of the Shāhjahān's period (1628–58), when Mughal design reached its zenith. Symmetry and balance between the parts of a building were stressed, as was delicate ornamental detail.

Mughals have extensively used arches in constructions of their period. Arches are built for aesthetic reasons, as

well as to place Mashrabiya windows and to reduce expand of sunlight to pour into the building. Arches in Persia curves without any bumps or such, but in Mughal architecture features groves in the arches, signifying influence directly taken from older structures in India. Enclosed space, defined by walls, arcades and vaults, is the most important element of Islamic architecture which was also followed in Mughal Architecture.

The arch is noteworthy because, in theory at least, it provides a structure which eliminates tensile stresses in spanning a great amount of open space. All the forces are resolved into compressive stresses. This is useful because a number of available building materials such as stone, cast iron and concrete can strongly resist compression but are very weak when tension or stress is applied to them. By using the arch configuration, significant spans can be achieved. This is because all the compressive forces hold it together in a state of equilibrium.

The technical skill employed in surface decoration and the Mughal builders' structural abilities were no doubt phenomenal, but these by themselves do not fabricate architecture. It is rather a complete amalgamation of every detail of decoration, structure, mass, and space in the service of a single supreme idea which produces the best examples of Mughal architecture.ⁱ

There are various styles and kind of arches in the complex of Lahore Fort that are an integral part of

Mughal Architecture. Gates, walls and other constructed structures in various parts of Lahore Fort that belong to different phases of construction under different Mughal Emperors and later Sikhs and British included arches not only as an important element of construction but also used them as designs for aesthetical appeal.

Though these arches have been added in different phases in different eras and the selection of style was purely by the ruler of the time. The variation of arch designs either taken from Persian, Hindu or any other provincial style of architecture, they all are present in a remarkable harmony and add to the aesthetical appeal of the whole complex. This clearly shows the consciousness of the builder's aesthetical sense while selecting the design and skill applied while construction and his selection of style while bringing dissimilar designs in harmony.

Salient Features of the Lahore Fort

Lahore Fort is the leading Mughal monument of Pakistan. Lahore Fort as seen now was founded by Malik Ayyāz on a mound where existed a '*Kacha Qila*,' since the time Lahore happened to be under Rajputs. Emperor Akbar replaced it with a '*Pucca*' fort with proper Lahauri (Burnt) bricks. This construction with burnt bricks by Mughals, especially Emperor Akbar was continued by Jāhangīr and completed by Shāhjahān. Āurangzib added the Haḍuri bāgh gateway commonly called Ālamgīri Gate.ⁱⁱ There are various constructions in Lahore Fort that are fundamental style of Mughal Architecture. Gates, walls and other constructed structures in various parts of Lahore Fort belong to different phases of construction under different Mughal Emperors and later Sikhs and British included frequent use of arches, is not only as an important element of construction but also used as designs for aesthetical appeal.' Abdul Karīm Ma'mur was the 'Master Builder' who supervised and executed the major portions of construction works in the fort. Evidence to his being architect is inscribed on marble slabs in Makātīb Khāna and the Hāthi Pol or Shāh burj Gate of the Fort.

Under the benefaction of the Mughal emperors, Persian, Indian, and a range of provincial styles were combined to fabricate works of unusual excellence and sophistication. As mentioned before the fort as it stands today is not what it was when it was originally constructed in 1566. Historical reference indicate that in the course of the following five centuries the Fort was successively destroyed and rebuilt or repaired four or five times over, until sometime before 1556, the Mughal emperor Akbar finally demolish the mud fort and rebuilt it in burnt brick before this reconstruction the mud fort and mound appears to have been a rectangle, twice as long as it was wide, lying south of the present Dīwān-i 'Āam. Akbar extended this area northwards by building up the low-lying area on a system of basements and fortified the whole area with a massive brick wall and semi circular bastions. But except for the eastern wall the fortification

wall of Akbar has been drastically transferred by successive modifications, extensions and demolition by the Mughal princes themselves and the later Sikh and British rulers.ⁱⁱⁱ

Every succeeding Mughal emperor moreover the Sikhs, and the British added a pavilion, palace or wall to the Fort. Jāhangīr, Shāhjahān and later Āurangzib added modifications of massively fortified walls. Akbar got the Dīwān-i 'Āam (Hall for Commoners) built in the traditional Iranian style, all constructed in red sand stone imported from Rajistan. Shāhjahān also constructed the Dīwān-i Khās that overlooked Ravi, in 1631, the same year he started the Tāj Maḥal. Shāhjahān also constructed Moti Masjid (Pearl Mosque) and his own sleeping chambers. Emperor Jahangir extended the gardens and constructed the palaces in the Jahangir's Quadrangle and the whole complex of Lahore Fort appears with extensive use of domes, vaults and arches.

The Mughal period marked a striking revival of Islamic architecture in northern India, where Persian, Indian, and various provincial styles were fused to produce works of great refinement. White marble and red sandstone were favoured materials. Most of the early Mughal buildings used arches only sparingly, relying on post-and-beam construction. The use of the double dome, a recessed archway inside a rectangular fronton (arena), and park like surroundings are typical of the Shāhjahān's period (1628–58), when Mughal design reached its zenith. Symmetry and balance between the parts of a building were stressed, as was delicate ornamental detail.

Mughal comprehensively used arches in constructions of their period. Arches are built for aesthetic rationales, and also to place Mashrabiya windows and to diminish the measure of sunlight to enter into the building. Arches in Persia curve smoothly without any collide in its shape, but in Mughal architecture features coppice in the arches, signifying influence probably taken from old architectural structures of India. Enclosed space, defined by walls, covered passages and vaults, are the most important components of Islamic architecture which were also applied in Mughal Architecture.

The scientific skill engaged in surface decoration and the Mughal builders' structural abilities were no doubt unparalleled, but these by themselves do not fabricate architecture. It is somewhat a complete incorporation of every feature of decoration, structure, mass, and space in the service of a single principal idea which produces the best examples of Mughal architecture.^{iv}

The Fort is clearly divided into two sections, the administrative section, which is well connected with main entrances, and comprises larger garden areas and Dīwān-i Khās for royal audiences. The other a private and concealed residential section divided into courts in the northern part, accessible through 'Elephant Gate'. It also contains Shīsh Maḥal (Hall of Mirrors or Mirror Palace), and spacious bedrooms and smaller gardens. The original entrance faces the Maryam Zamani Mosque, whereas the larger 'Ālamgīri Gate opens to the Haḍuri Bāgh through to

the majestic Badshāhi Mosque. In most of the important buildings of Lahore Fort, pointed arches, multi-cusped, trabeated and four centered arches are frequently used standing independently, in form of gateways or sometimes in recessed form as a design to break the monotony of the surface.

The fortress now holds over thirty dissimilar buildings and structures of varying degree of significance and usefulness, and off course representing different eras of history.^v (Plate.1)

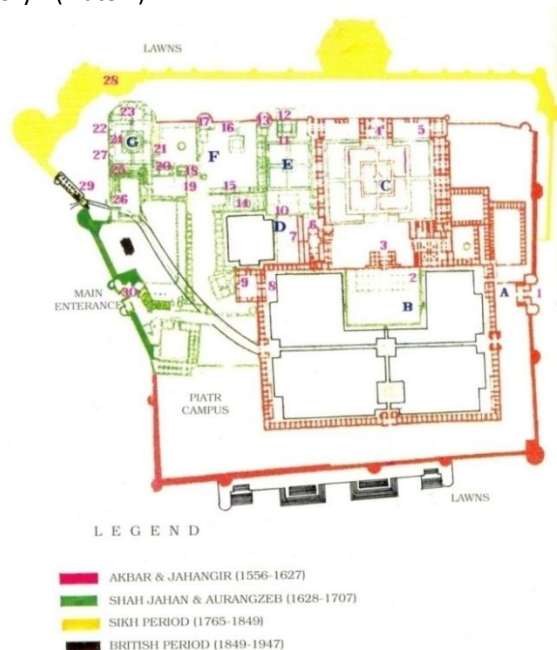


Plate.1 Thirty structures and six blocks of Lahore Fort

The Fort can generally be alienated into six blocks quadrangles in addition to Shāh Burj complex, south western section and the moat on the northern side. More or less all the worth mentioning buildings are located within these divisions. These areas and their important buildings are as follows:

Akbar's Quadrangle

Masti Gate

Dīwān-I 'Ām

Dīwān-I 'Ām (Hall of Common audience)

Daulat Khāna-i Khās-u 'Ām

Jāhangīr's Quadrangle

Bari Khāwabgāh

Sihdara

Shāhi Hammam

Moti Masjid Quadrangle

Dālān-i Sang-i Surkh

Makātīb Khāna

Moti Masjid

Shāhjahan's Quadrangle

Khāwabgāh-i Shāhjahanī

Dīwān-i Khās

'Arḍgah

Lalburj

Pā'in Bagh Quadrangle

Hammam-i Shahi

Pā'in Bāgh

Khilwat Khāna

Kāla Burj

Ladies Mosque

Hindu Temple

Shīsh Maḥal Complex

Forecourt of Shīsh Maḥal

Aṭhdara

Samman Burj or Shāh Burj

Shīsh Maḥal

Naulakha Pavilion

Hāthi Pol

Hāthi Pol Gate

Pictured Wall

Sikh Period Defense Wall

Postern Gate

'Ālamgiri Gate.^{vi}

The Lahore Fort hardly represents any structural accord of composition due to its construction and architectural additions by different emperors during different times. Though, it contains remarkable and diverse features of individual nature stretching on a period of over three centuries. In the whole complex changes and additions can easily be read and relate to specific era of construction.

Syncretism of Various Styles of Arches in Lahore Fort

Mughal architecture is measured as visual art like painting and sculpture, because it evolves a strong sense of aesthetics and craftsmanship. Mughal builders planed buildings using an artistic course by which they maneuvered art elements to create an amalgamated and pleasing artistic account. A very conscious effort has been applied while selecting and adding architectural elements to every building of Lahore Fort complex that came in totality after various phases of construction.

The history of Lahore Fort is incomprehensible. However there are five distinct periods that can be clearly marked. The British, Sikh, Ghaznavid, and Hindu which is based on the evidences found in excavation of the site. Among the early structures that remain was a twelve foot high wall constructed with mud bricks. Probably this mud brick fort was sacked by Sultan Ghazni in 1021.^{vii} Under the benefaction of the Mughal emperors, Persian, Indian, and various provincial styles were fused to produce works of unusual quality and refinement. Lahore Fort is the leading Mughal monument of Pakistan.

A. Akbar's Quadrangle

It is a vast court occupying the south-eastern area of the Fort. Most of the buildings have now disappeared, partly demolished by Emperor Jāhangīr to build his Daulat Khāna-i Khās -u 'Ām and partly by Shāhjahan to erect the huge pillared hall of the Dīwān-i 'Ām. The only perfectly

surviving building in this quadrangle is the Akbar's period imposing Gate which opens on the east. The gate is named as Masjidi (of the mosque) or more commonly, Masīti (from the Punjabi word for mosque, masīt) and corrupted to Mastī. It is called so because it faces the famous Mosque of Maryam Zamani.^{viii} Gate is very bold in character, linked by heavy bastions. Facade and back of the gate are subdivided with recessed pointed arches and approach is through its pointed arched entrance that shows the real vitality of Mughal architecture. (Plate.2).



Plate.2 Back View of Masti Gate

B. Dīwān-I 'Āam Quadrangle

A vast court originally enclosed by a range of vaulted chambers. It includes Dīwān-I 'Ām and Khāna-i Khās-u 'Ām. The Dīwān-I 'Ām is an open hall of forty lofty pillars of red sand stone, built by Akbar. Its pointed Arches with tie-rods and roof are all of British period, but the brick on edge pavement is of the Sikh period.^{ix} (Plate.3) The oldest of the known buildings of the Mughals in Lahore Fort is Khāna-i Khās-u 'Ām built by Akbar.^x (Plate.4) It is a fine example of four centered cusped arches built during the reign of Akbar. He frequently combined Muslim, Hindu and Persian elements and styles in his architecture. Obvious Persian influences in Mughal architecture are the extensive use of tile work, the aiwān as a central feature in mosques, the use of domes, the chahārbāgh, or garden, divided into four and the four-centre point arch. The form of buildings and some of the decorative motifs also suggest obvious Persian influence in Lahore Fort.



Plate.3 Dīwān-I 'Āam Quadrangle



Plate.4 Daulat Khāna-i Khās –u 'Ām.

Every successive Mughal emperor besides the Sikhs, and the British added a pavilion, palace of wall to the Fort. Jāhangīr, Shāhjahān and later Aurangzeb added modifications of massively fortified walls. Akbar got the Dīwān-I 'Āam built in the traditional Iranian style, all constructed in red sand stone imported from Rajistan. Shāhjahān also constructed the Dīwān-i Khās that overlooked Ravi, in 1631-the same year he started the Tāj Maḥal. Shāhjahān also constructed Moti Masjid (Pearl Mosque) and his own sleeping chambers.

C. Jāhangīr's Quadrangle

Emperor Jāhangīr extended the gardens and constructed the palaces in the Jāhangīr's Quadrangle. Jāhangīr's quadrangle commenced by Akbar and completed by Jāhangīr in 1617 AD, which is surrounded by Dālān (porticos) in trabeated style. Jāhangīr's Bari Khāwabgāh serving as Museum displays five pointed arches on its front side. (Plate.5) Other structures in Jāhangīr's quadrangle are Sihdara which is on the eastern side of Bari Khāwabgāh and Shāhi Ḥammam in the south-eastern corner of quadrangle.



Plate.5 Bari Khāwabgāh from Daulat Khāna-i Khās –u 'Ām

D. Moti Masjid Quadrangle

Moti Masjid quadrangle includes Dālān-i Sang-i Surkh, Makātīb Khāna and Moti Masjid. Dālān-i Sang-i Surkh is a closed Dālān of considerable dimension. (Plate.6) It has

three arched openings blended with red sand stone screens. The main entrance at present is from the north through a comparatively small door-opening. The entire surface has been treated with deeply recessed panels of various shapes and sizes.^{xi} Recessed panels are in square and rectangular divisions where rectangular panels having recessed cusped arches.

Makātīb Khāna is the building with high gates situated on the southern side of Jāhangīr's quadrangle. Makātīb Khāna follows faithfully the Persian models of cloistered court, with simple pointed arches forming an arcade on the four sides.^{xii} (Plate.7-8).



Plate.6 Dālān-i Sang-i Surkh



Plate.7 Eastern entrance view of Makātīb Khāna



Plate.8 Makātīb Khāna

West of Makātīb Khāna, is situated *Moti* Mosque built by Shāhjahān in 1645 AD. Front of the mosque displays a set of five arches in combination both pointed and multi-cusped. The central arch is pointed arch whereas the both sides are sets of two multi-cusped arches each that give a distinguished look to the facade of the mosque. All the arches in the prayer chamber are multi-cusped. (Plate.9) Side walls of *Moti Masjid's* courtyard show recessed cusped arches that add grace to the open area of Mosque. (Plate.10).



Plate.9 Moti Masjid



Plate.10 Courtyard of Moti Masjid.

E. Shāhjahān's Quadrangle

Straight away west to the Jāhangīr's quadrangle is located an open court enclosed with the buildings of the period of Shāhjahān on all the four sides.^{xiii} Some of the most beautiful palaces are located in this quadrangle manifest of the pinnacle of the Mughal art of architecture. Shāhjahān's quadrangle includes Dīwān-i Khās in north and Khāwabgāh-i Shāhjahāni on the south. It also includes Ardghah and Lalburj. (Plate.11)

Dīwān-i Khās is an arched pavilion, built in chaste marble in 1645 by Emperor Shāhjahān. Square on plan with flat roof having parapet with marble facing and decorated with delicate pietra dura work. It is supported on five rows of five pillars carrying scalloped arches.^{xiv} (Plate.12) The northern side of the pavilion is enclosed with latticed marble screens with a small window opening

in the center of each screen. Marble screens are set in multi cusped arched windows and light coming through those screens create illuminated scene. (Plate.13) Khāwabgāh-i Shāhjahāni is located between the quadrangle of Moti Masjid and that of Shāhjahān. The Khāwabgāh has five spacious rooms, the front of which had grand multi-cusped arched openings.



Plate.11 Dīwān-i Khās Quadrangle (Exterior)

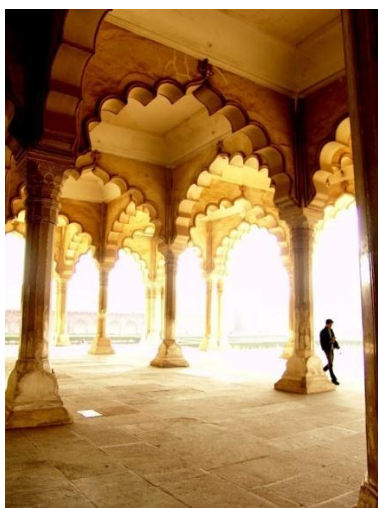


Plate.12 Dīwān-i Khās Quadrangle (Interior)



Plate.13 Latticed marble screen of Dīwān-i Khās

F. Pā'in Bāgh Quadrangle

Pā'in Bāgh Quadrangle is adjoining to Shāhjahān's quadrangle. Hammam-i Shāhi, Pā'in Bāgh, Khilwat Khāna, Kāla Burj, Ladies Mosque and a Hindu Temple are important structures in Quadrangle. Hammam-i Shāhi is a single storied structure and has a four-centered arched entrance. (Plate.14) Most of the structures in this quadrangle are followed by trabeated style of architecture. Hindu temple is constructed on a raised platform with sets of three recessed cusped arches in all four walls. (Plate.15).



Plate.14 Hammam-i Shāhi



Plate.15 Hindu Temple

G. Shīsh Maḥal Complex

The north western part of the Fort consists of buildings basically having their origin in the days of Emperor Shāhjahān, though later additions of the Sikhs are also still found. This area has signal distinction of portraying some of the real jewels in architecture and in building decorations of seventeenth century.^{xv} Shīsh Maḥal complex includes structures like fore court of Shīsh Maḥal, Athdara, Samman Burj or Shāh Burj, Naulakha Pavilion, Hāthi Pol, Hāthi Pol Gate, Pictured wall, Sikh period defense wall, Postern Gate and Ālamgīri Gate.

The famous Shīsh Maḥal or Palace of Mirrors, located in the north-east corner of the fort, with its five distinct

multi-cusped arches, is the most beautiful palace in the fort and is decorated with small mirrors of different colours set. The main access to the Forecourt of the complex is through a large arched gateway, in the shape of an ornate vestibule decorated with panels of frescos including geometrical patters and decorated flower vases divided in bands of geometrical and arched divisions. (Plate.16)

The Shish Maḥal is the luxurious place of resort particularly during summer months with rest rooms of a long hall at its either end, opening on to the luminously incredible Veranda that looks at the marble paved quadrangle with a fountain in the middle side. On plan the complex is a square having a series of Dālān, porticoes and pavilions set on all the sides of the courtyard. Four shallow water channels divided the square courtyard into four parts. The channels are connected to a shallow tank in the midst is a Mahtābi or a square platform, and four fountain-jet differing each corner. (Plate-17) It occupies north region of the square. Its longer side, facing the square, has a row of double five pillars. These pillars which are generously decorated with delicately inlaid marble form five archways surmounted by an eave of the same material. The spandrels over the arches and bases of the double columns of white marble are decorated with beautiful pietra dura. Element of arches is not only an important part of construction in Lahore Fort but arches also used as patterns in decoration like bases of column in Shish Maḥal containing floral motifs in pietra dura in a cusped arch pattern. (Plate.18-19) Same application is seen in painting in Khāwabgāh-i Shāhjahāni, showing landscape from a terrace through a cusped arch, (Plate.20)

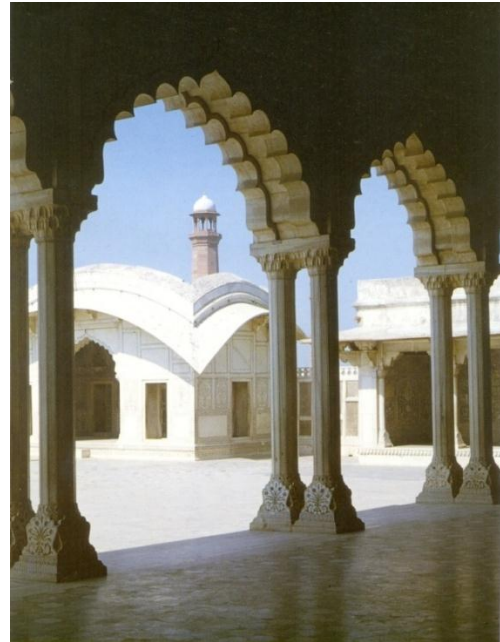


Plate.18 Double columns of the archways of Shish Maḥal



Plate.19 Bases of Columns-Arched patters in Shish Maḥal



Plate.16 Entrance to the Shish Maḥal Fore Court



Plate.17 Five distinct multi-cusped arches of Shish Maḥal



Plate.20 Painting from Khāwabgāh-i Shāhjahāni

Panels with Exquisite pietra dura designed in arched manner displayed in walls of Shish Maḥal. Shish Maḥal richly involved a range of decorations. The decorative

features of this hall and some of the smaller rooms is the convex glass mosaic workmanship (a'ina kari) with munābat kāri or stucco tracery and gilt work. The spandrels of the arches and the bases of the double columns carrying multi cusped arches are decorated with pietra dura work.^{xvi} (Plate.21).



Plate.21 Panel with Exquisite *Pietra Dura* designed in arched manner, Shish mahal.

The mirror reflects the stars and the bedrooms presents, in its ceiling, the panorama of a star lit Sky. Mirror work or a'inakari is set in divided bands of cusped arches contain geometrical and floral motifs. (Plate.22) Its central entrance to inner rooms and chambers is through a four-centered archway richly decorated with mirror works that reflect and create a heavenly ambiance. (Plate.23)

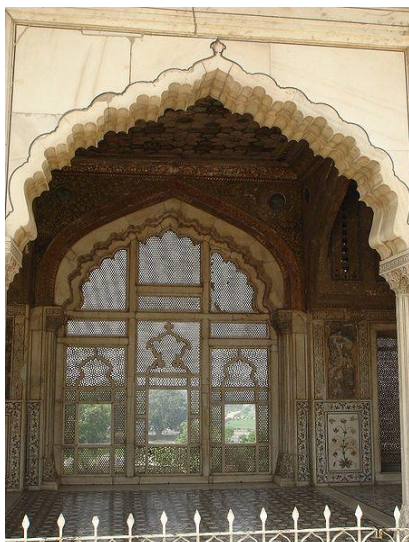


Plate.22 Outer and Inner Cusped Arches of Shish Mahal

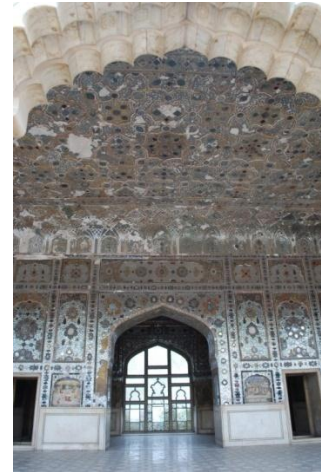


Plate.23 Central entrance to inner rooms and chambers of Shish Mahal

North-west corner of the square is now occupied by Aṭhdara an open pavilion having eight doorways. It dates back to the period of Mahārāja Ranjīt Singh who used it to hold his Kachehri or court of justice.^{xvii} (Plate.24) The Naulakha Pavilion is a marble building located at the Shish Mahal in the middle of the western extremity of the courtyard, built by the Shāhjahān in 1631 A.D. (Plate.25) Its western face provides a panoramic view of the ancient city of Lahore through a centrally placed multi-cusped arched entrance in East. It was built in the early years of in the reign of Emperor Shāhjahān.

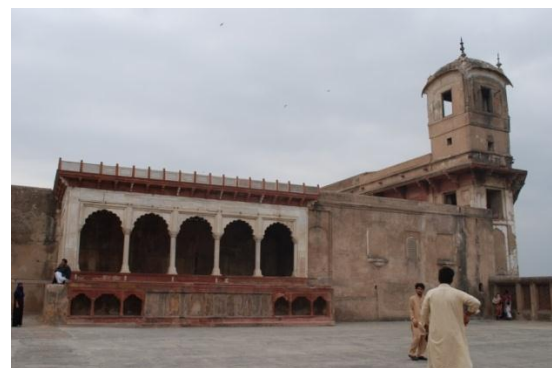


Plate.24 Aṭhdara Pavilion adjacent to Shish Mahal



Plate.25 Naulakha Pavilion.

The entrance of the Lahore Fort leads by way of a sharply angled passage with double storied arches on its right and recessed arches on its left, to the large courtyard of the Dīwān-I 'Āam. (Plate.26) On the western side of the main entrance to the fore-court of the complex lies a large stairway called the Hāthi Pāun or Hāthi Pair meaning the foot of the elephant. Huge pointed arched entrance in the centre was designed to allow the emperor's elephant mounted caravan to pass through. It leads to the central square hall having deep arched recesses on the east and north and a staircase leading to the upper storey buildings. (Plate.27) Central Square hall is richly employed with the combination of Trabeated, Four-Centered, Pointed and recessed pointed arches in the passage walls leading to Hāthi Pol. The archway on the south leads to interior of the fort. Turning sharply to the left, one passes under a high arch to ascend by way of a flight of giant steps of Hāthi Pol. It is large enough to consent to numerous elephants carrying members of the royal family to enter at one time. (Plate.28).



Plate.28 Wider flight of steps



Plate.26 Passage leading towards Dīwān-I 'Āam

The exterior wall of Fort in the north and north-west is the pictured wall with unique panels of tile mosaic and fresco paintings. (Plate.29) This part of the Fort presents the building belonging to the two of the Great Mughals, Jāhangīr and Shāhjahān, hence dating to the first half of the 17th century.^{xviii} Pictured wall is richly decorated with a range of images including sports, animals, and decorative vases with flowers, also including geometrical and floral patterns. It serves as exterior wall of the Shīsh Maḥal, where one can see the beautiful mosaic paintings that depict everyday sport of the Mughal princes for the enjoyment of the people who used to gather below the fort not only to have a view of the emperor sitting in the Jharoka but also to admire the brilliance of colours on the wall. Arched recesses running along the whole length of the wall are of different width. (Plate.30) The decorations are placed between the two cornices divided into a double row of arched recesses of different sizes. The fresco paintings are carried out in the arched recesses, while the spandrels are tastefully decorated with tile mosaic.^{xix} (Plate.31)



Plate.27 Hāthi Pol Gate



Plate.29 View of Pictured Wall from outside



Plate.30 Recessed pointed arches of Picture Wall, richly decorated with mosaics.



Plate.31 Tiled Mosaic in recessed arch.

Four-centered arched Gate known as Pastern Gate leads to that premises. Pastern gate also employed medallions on spandrels and either sides have recessed pointed arches. A four-centered arch, also known as a depressed arch or Tudor arch, is a low, wide type of arch with a pointed apex. It is much wider than its height and gives the visual effect of having been flattened under pressure. Its structure is achieved by drafting two arcs which rise steeply from each springing point on a small radius and then turn into two arches with a wide radius and much lower springing point. (Plate.32)

The last phase of the golden period of architectural activity of the Great Mughals saw the very masculine and bold buildings of the period of Āurangzib 'Ālamgīr (1658-1707).^{xx} The only building by Aurangzeb in the Fort was probably constructed along with Badshāhi Mosque in 1674. The impressive monumental gateway, facing the Bādshāhi Masjid, is flanked by two semi-circular bastions,

boldly fluted and decorated with lotus petal design.^{xxi} (Plate.33) Huge arched gateway is approached from the Haḍuri bāgh by a ramp. It is robust and massive in construction and expressed the military character of its founder.

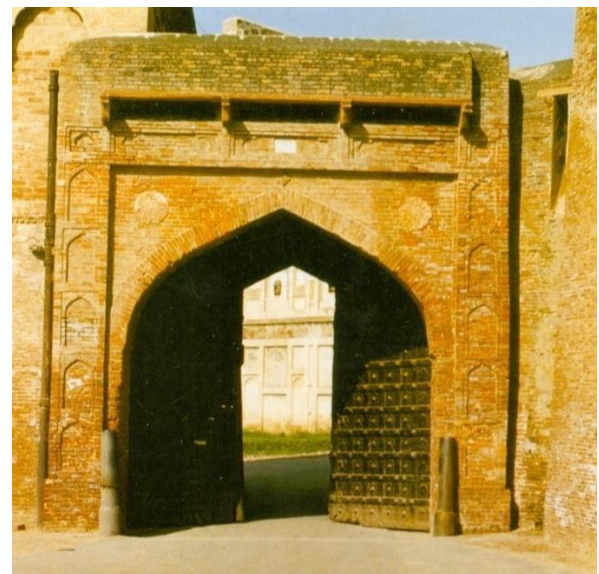
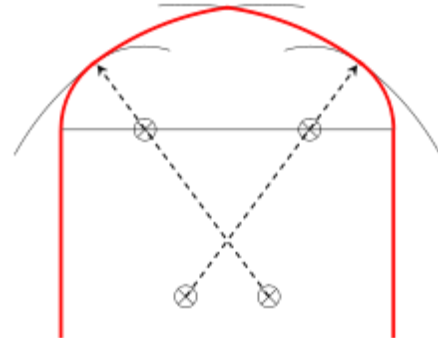


Plate.32 Four-centered arched Pastern gate



Plate.33 'Ālamgīri Gate.

Variation in styles and designs of arches used in Lahore Fort does not only satisfy aesthetic appeal but are equally functional because numerous of the available building materials such as stone, cast

iron and concrete can strongly defy solidity but are very weak when tension or stress is applied to them. By using the arch pattern, important spans can be achieved. This is because all the compressive forces hold it together in a state of stability which is essential for the construction of a fortress.

Conclusion

The Lahore Fort is a unique ensemble of buildings, which portray an almost continuous history of architecture from Emperor Akbar the Great (1556-1605 AC) to Emperor Āurangzib 'Ālamgīr (1658-1707 AC) and even later Sikh and British rulers. The first two ruler of dynasty, Babar and Humāyūn, did not leave any mark on the Lahore Fort.^{xxii}

A fortress with clear reflecting pools, complete with small islands in the centre, each with its own graceful bridge, towers, mosques, minarets, baths, sleeping chambers, an enormous stone stairway, built to accommodate the royal wives' elephants, mirrored pleasure palaces and delicate white marble latticework windows, all involving fine verities of arches, is a fine architectural contribution of Mughals in Lahore Fort.

The arch, as a natural form has been apparent in the form of eroded rock formations for ages. Its manifestation as a man made construction element is traced back roughly to the second millennium B.C. During this time period it is found mainly as an embedded supporting element in doorways walls or tunnels. This probably resulted from observation of the natural form and the realization that while arches can resist great compressive loads, they also need significant sideways base support to prevent blowout. Roman architects and engineers, influenced by the assimilated Etruscans, are generally credited with developing arches as full-fledged structural and design elements in construction. Examples of masonry arches are legion in the Roman infrastructure, with perhaps the best known being the triumphal arch and aqueduct structures. Related structures such as vaults and domes are also attributed to the Roman time period.

Mughals extensively used arches in their architecture. Arches are not only a construction element in Mughal Architecture but also as a decorative element in building structures of varied functions. Lahore Fort demonstrates a variety of arches in form and design that make most of the structure aesthetically pleasing. The Mughals used arches extensively for both aesthetic reasons, as well as technical, to resist great compressive load and to place Mashrabiya windows, to decrease expand of sunlight to pour into the building.

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- ⁱⁱⁱ Kamil Khan Mumtaz, "Architecture in Pakistan" (Lahore: Concept Media, 1985), 56
- ^{iv} Ibid., 52.
- ^v Ihsan H Nadiem, "Lahore, a Glorious Heritage" (Lahore: Sang-e-Meel, 2006), 61.
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