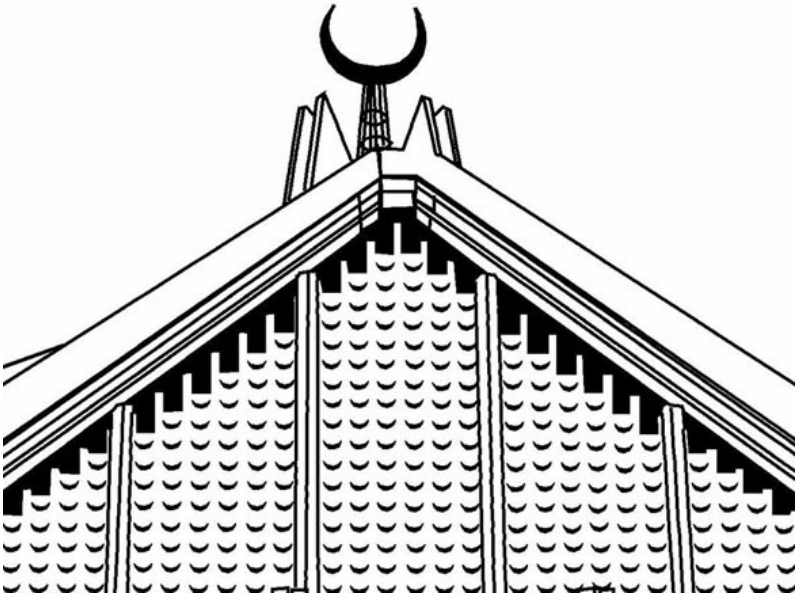
Chapter 1

External features of the Faisal Mosque

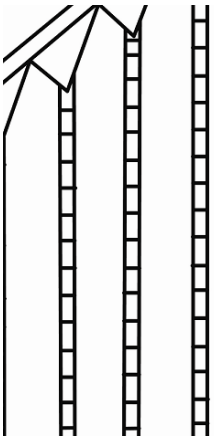
Throughout the architectural style has been a mean of expression of thought in constructive form. It has undergone several stages of development in its design and style. Every civilization developed its own architectural style which became its identity. The Faisal Mosque as a modern representation of religious monument became a symbol of national identity and has international preeminence due to its uniqueness of exterior constructive design (plate 1). The mosque represents a modern phase of architectural decoration in constructive form and as surface ornamentation.

From the exterior the sanctuary and minarets are the most prominent features of the Faisal Mosque. The huge sanctuary has a plan of 656.66 square feet.[1] The peak of the roof is 131.24 feet above ground level.[2] The four walls are in the form of isosceles triangles with a base of 215 feet and sides of 128 feet and are constructed of steel and concrete. These outer walls have different decorative designs. The main entrance of the sanctuary is from the east and this wall is divided into nine vertical sections made of concrete filled with crescent motifs (plate 2). Each crescent is one foot one inch in length, five inches thick at its center and eight inches high (plate 3). Clear glass is fitted into the crescent shapes and provides light to the interior (drawing figure 1). The crescent motif is used as a finial above the roof, and also appears on the low walls of the *mu'adhdhin* pew in the eastern courtyard. The north and south walls are designed with twenty raised vertical sections, with horizontal lines between the verticals that produce rectangles measuring two feet nine inches by one foot two inches. Black tinted glass is fitted between the vertical panels of rectangles (drawing figure 2). There are several small openings in the eastern and western sides under the eaves to allow birds to enter the sanctuary. The lower part of the west wall is patterned in bold thick crossed lines with tinted glass interstices. Above this there are twenty vertical divisions with vertically

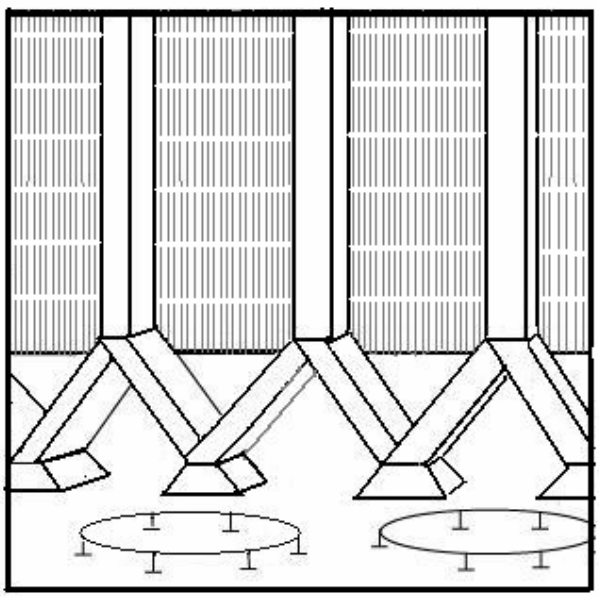
and horizontally composed linear designs, which are not similar with the north and south walls. The surface of these twenty divisions of the wall is composed in vertically arranged thin lines (drawing figure 3). The linear design is giving an impression of low relief work (plate 4). Such triangular-shaped walls have never been used in mosque construction previously.



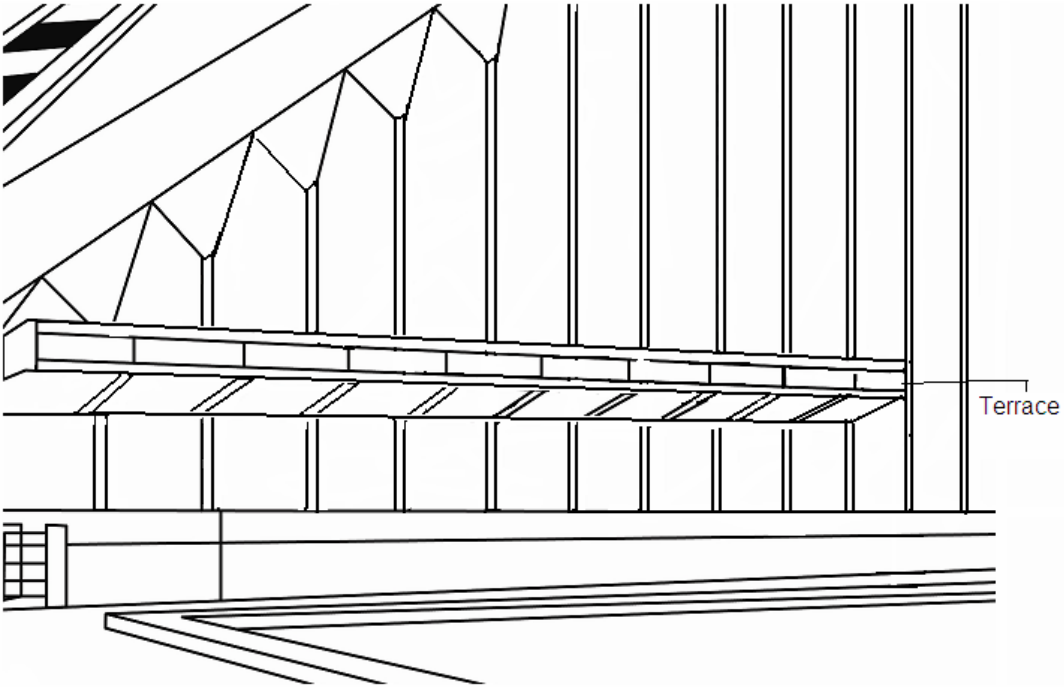
Drawing figure 1. Crescent design on the east exterior wall of the Faisal Mosque.



Drawing figure 2. Design used for the south and north walls.

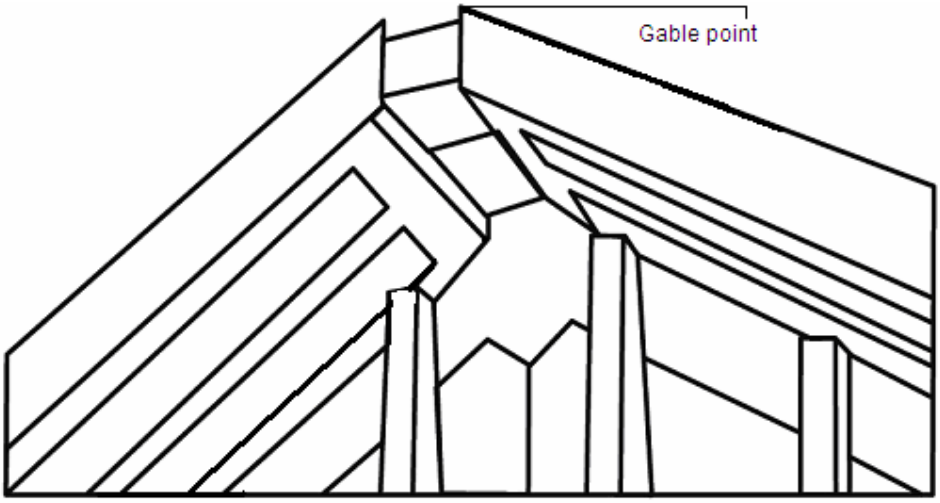


Drawing figure 3. Exterior west wall of the sanctuary.



Drawing figure 4. Terrace attached to the north wall of the sanctuary.

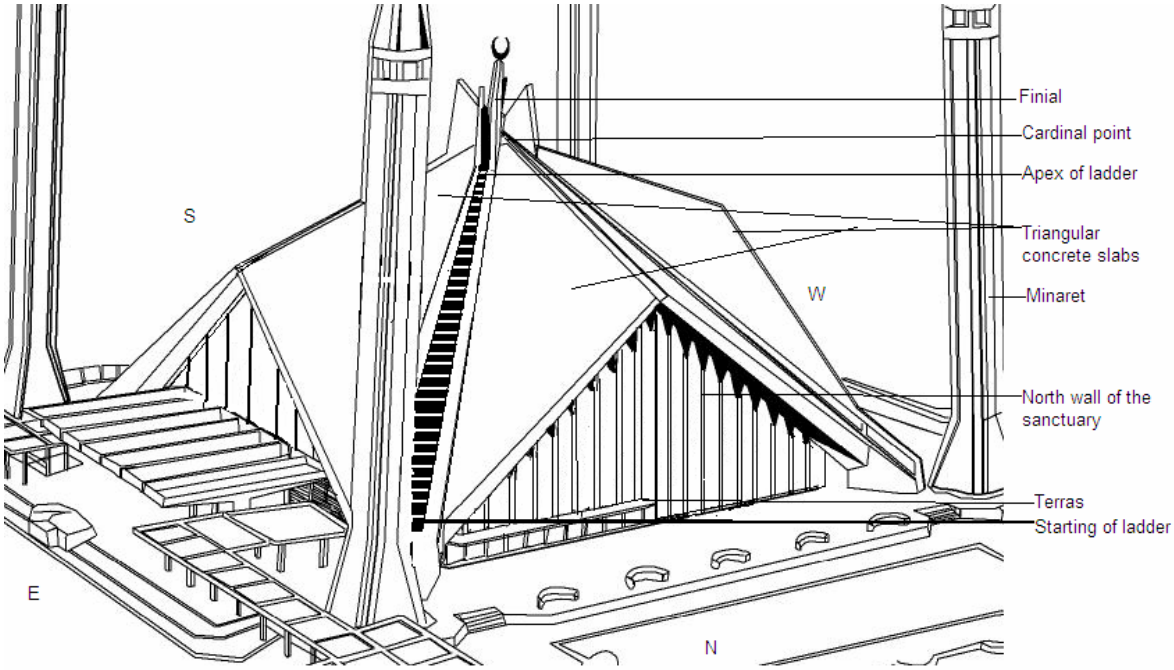
A terrace, thirteen feet four inches above the floor level of the northern court is attached with the north wall (plate 5). It is six feet two inches wide and ninety-six feet two inches in length (drawing figure 4). A low wall, three feet six inches high, surrounds the terrace (plate 6). The floor of the terrace is paved with grey granite that contrasts with the white colour of the mosque.



Drawing figure 5. Joining of triangular slab of the roof showing a gable point.

The roof is a major attraction of the mosque. It is consciously designed combining historical and modern concepts. The top of the roof is based on a pyramidal roof form but the lower part has a gabled roof structure. Every joining of slanting triangular slab makes a gable point (drawing figure 5). This gable point is forty feet high from the floor of the portico. Front beams which make a gable point on the top are connected with a rectangular, solid, three dimensional block measuring four feet high, three feet wide and four feet seven inches long.

The gable appearance of the Faisal Mosque is influenced by Greek architecture, and the sloping lines at the corners are inspired by the pyramidal roof. The slopes down

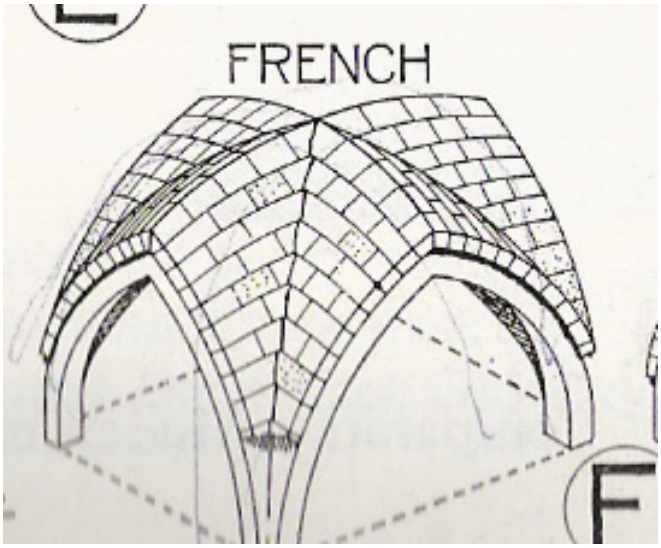


Drawing figure 6. Exterior of the Faisal Mosque from north and east side.

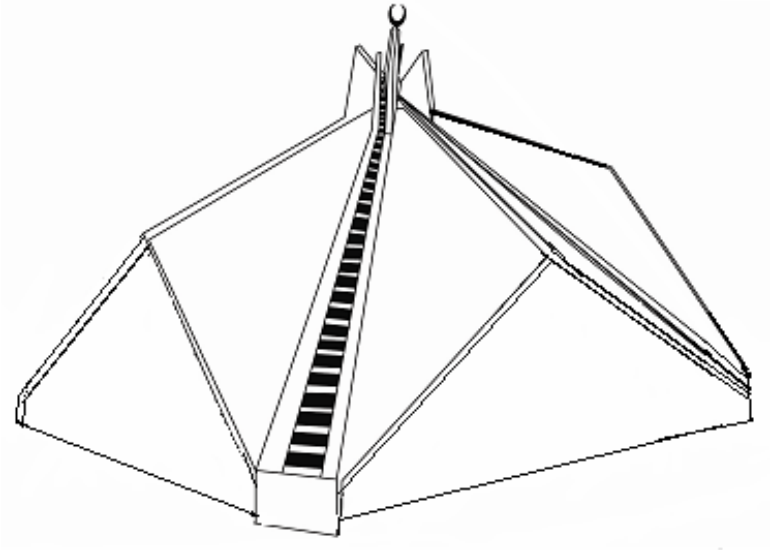
from all four sides from the apex of the building are a perfect example of pyramidal form. In the Faisal Mosque roof, all slopes come down from its cardinal point (drawing figure 6). Secondly, the roof structure somewhat resembles the Gothic rib vaults in French method of the years 1140-1194 (drawing figure 7).[3] But the Gothic vault gives flexibility and soft contours rather than stiff sharp edges of the Faisal Mosque design (drawing figure 8). The technical term for this form is hyperbolic paraboloid construction, which is introduced during modern times as discussed below.

The angular setting of the eight triangular slabs of the roof is itself a major decoration in its structural form. Each slab is an acute isosceles triangle 198 feet on the hypotenuse and 128 feet on the other two sides, with the hypotenuse running towards the minarets. A veneer of white Thassos marble covers the eight roof panels. It is cut into one foot two inches squares and two feet three inches by one foot two inches rectangles that are randomly arranged. The design formed by the various sizes of these marble

sections is visible from a distance, and gives a soft impression of a network of vertical and horizontal lines.



Drawing figure 7. Gothic vault in French system. Source: Banister Fletcher, *A History of Architecture on the Comparative Method,* 17th edition London, 1963, p. 373

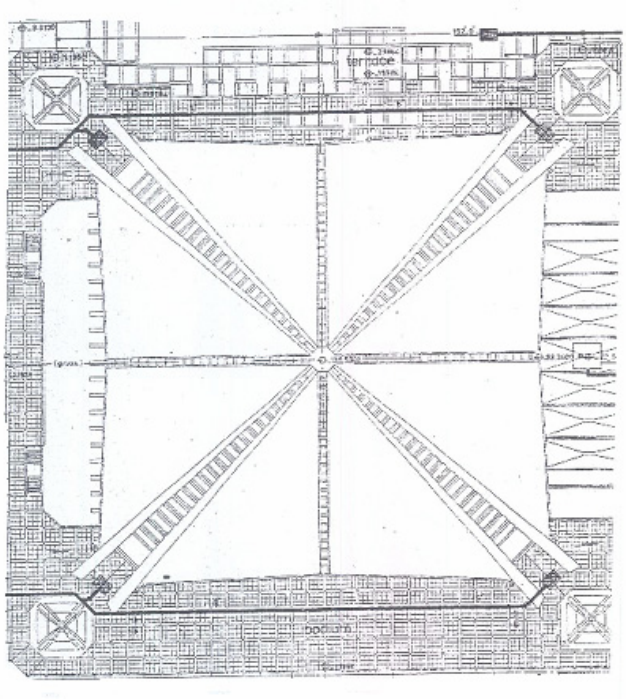


Drawing figure 8. Comparison of exterior of the sanctuary of the Faisal Mosque and the Gothic vault in French system. But the vault gives flexibility and soft contours rather than stiff sharp edges of the Faisal Mosque design.

The eight triangular concrete slabs are arranged in four pairs, with narrow rectangles of transparent glass between them (drawing figure 9). The double slab roof has hinged beams and cross beams that transmit the load to the girders.[4] Tapered giant concrete girders play an important roll in joining the four pairs supporting the roof. The girders coverage at the summit and their thrust is balanced by the four minarets at the corners of the main prayer hall (plate 7). These girders bear the load of the roof instead of the walls. The girders are eight in number and are set in four pairs. Between every two girders there is a ladder-like design starting at the height of nine feet from the floor of the portico. The ladder is eighteen feet one inch wide from its starting point and two feet one inch wide at its apex.

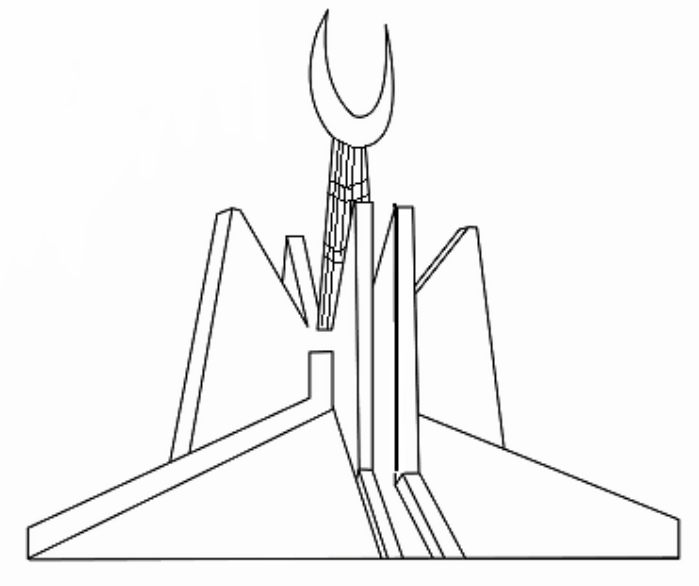
Transparent glass with a cerulean blue metallic frame is fitted into the ladder. Its prototype is the clearstory built by Greek architects. At that time the clearstory was constructed as an important element of their buildings for ventilation. In the Faisal Mosque the design does not resemble a clearstory and only the quality of ventilation can be compared. In the roof of the Faisal Mosque glass is fixed only for light. Cross ventilation is through doors and small openings are for birds. The two solid girders at both sides of every ladder-like design are ten inches thick. They are attached to the underground base of the minarets. Each base is six feet, ten inches square and stands two feet, one inch above the floor. The transparent glass allows day light to enter the sanctuary and reflects the shimmering light of the sun in a pleasant manner. At night the artificial light of the sanctuary reflects out side through these glasses and gives a very different “skeletonal” effect (plate 8). Taking the whole mosque in view it seems that the mosque is hanging in the dark. From the middle to the top the minarets look like candles or lamps.

A linear tapered finial of gold plated brass is placed at the apex of the mosque roof (plate 9). It is supported by four triangular double pieces of stone slabs; one fourth



Drawing figure 9. Bird eye view of the roof of the sanctuary.

Source: Administration office of the Faisal Mosque.

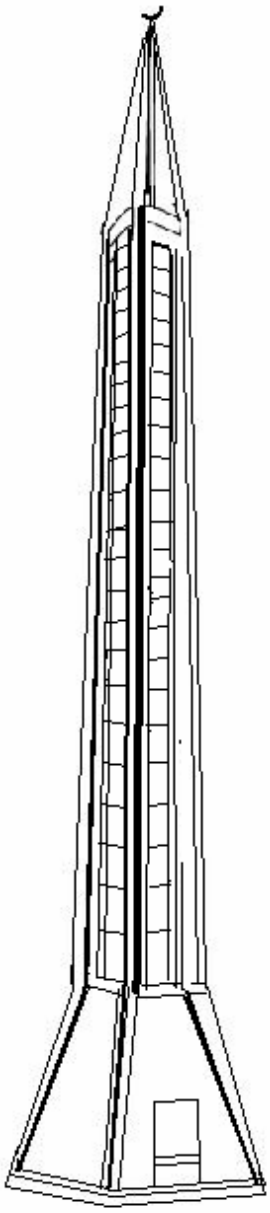


Drawing figure 10. Finial with triangular double pieces of stone slabs.

part of these triangular slabs is not visible (drawing figure 10). It is crowned by a gold plated brass crescent that is forty-five feet in diameter and weighs 4.5 tons. The drawing of the crescent is by Vedat Dalokay, but it was actually built by the Pakistani artist Gulgee. The finial with crescent gives a neat, elegant finishing to the roof decoration.

Four rocket-like minarets are built at the external corners of the square sanctuary (plate 10). Each minaret is 285 feet high including fourteen feet of the gold plated copper finial with crescent.[5] Four tapered girders, which are set in the roof, are directly linked with the foundation of the minarets. The common foundation of minarets and girders are embedded 42.65 feet deep under ground. The minarets are thirty-six feet seven inches square in diameter. The base for the minaret rests on an octagonal platform one foot two inches above the portico level.

The minaret has three parts base, shaft and top that follow Arabian, Turkish and Persian architectural styles. The square base tapers upwards thirty feet. The slender square shaft is decorated with diagonal, vertical and horizontal lines. A gallery is located 199 feet above ground level (drawing figure 11). Above the gallery the top tapers sharply to a point and is crowned with the gold plated crescent. The minarets combine a monumental square base and a tapered form that shows a break from previous minaret construction. The shaft is decorated with linear criss-cross, vertical and horizontal lines instead of traditional decorative techniques such as inlay, relief, carving, brick work, tile work and mosaic work. Open spaces between the criss-crossing provides light and air for the interior of the minaret. The white colour of the structure and touches of brown colour of its design area gives grace to the entire composition. The simplification of its structure is looking stylish and supports the geometrical decoration of the mosque. The north-east and south-east minarets are equipped with electric elevators: the other two are built with 240 steps.



Drawing figure 11. Minaret of the Faisal Mosque.

The most obvious way Faisal Mosque is different from all preceding mosques structures is that it has no dome and the roof is constructed with triangular slabs. Heretofore the dome had served as an important visual symbol of Muslim identity. The most important domed structure in the Umayyad period was the Dome of the Rock at Jerusalem, which followed earlier Byzantine buildings. The Great Mosque of Damascus has a dome only covering the *miḥrāb* area a series of pitched roofs over the three aisles.[6]

These are the usual roofing systems for all mosques, although some simple mosque structures have only a flat or pitched roof. Pyramidal, conical and tapered roofs are variations of pitched roof construction. Pitched roofs have further differences of shapes and styles which are gable, cross gable, hipped, cross hipped, gambrel and mansard roofs.[7] All these kinds are characterized with diagonal or angular roof construction.

The pyramidal roof is based on a square plan with four sloping triangular roof sections.[8] Its most notable antecedents are the Egyptian pyramids (plate 12). Such as the one the Great pyramid of Khufu at Giza built 4,500 years ago.[9]

The chief characteristic of the gabled roof is that the triangular front and back are covered by rectangular roofing at an acute angle.[10] Gable roofs were used in the construction of buildings in Greek, Roman, Byzantine, Gothic and Medieval architecture. During the Gothic revival (1840-1880) roofing was at its most complex, with gable, cross gable and conical roofs.[11] In the nineteenth and twentieth centuries American houses had angular roofs similar to gable roof construction called "Stick Style".[12]

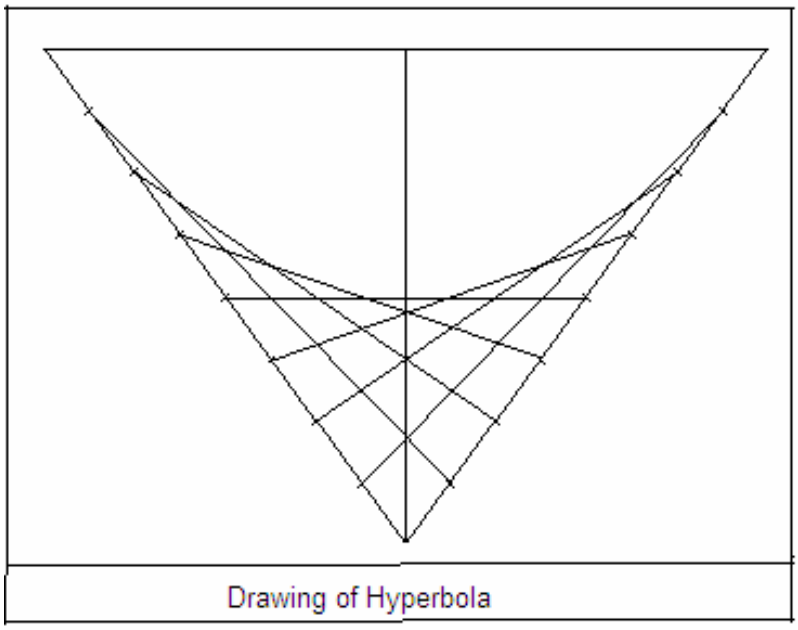
The Faisal Mosque, as an example of pitched roof mosques of the Islamic world is the part of long tradition. The gable roof of the Great Mosque of Damascus is the earliest example in the history of pitched roof mosque.[13] The roof of the Al-Aqṣā Mosque, built by Al-Mahdi at Fustat has a series of parallel gable roofs.[14] The ablution fountain of Qairuwān Mosque at Fez, 1135-1143 was crowned by a pyramidal roof.[15] But gabled roofs are not common, flat or domed roofs were more often used.

In more recent times, before the construction of the Faisal Mosque pitched roofs have been successfully used for several twentieth century mosques, The Said Naum Mosque, Jakarta, Indonesia completed in 1977 (plate 13) is one of them.[16] Although these mosques are superb examples of pitched roof construction they do not resemble the roof of the Faisal Mosque.

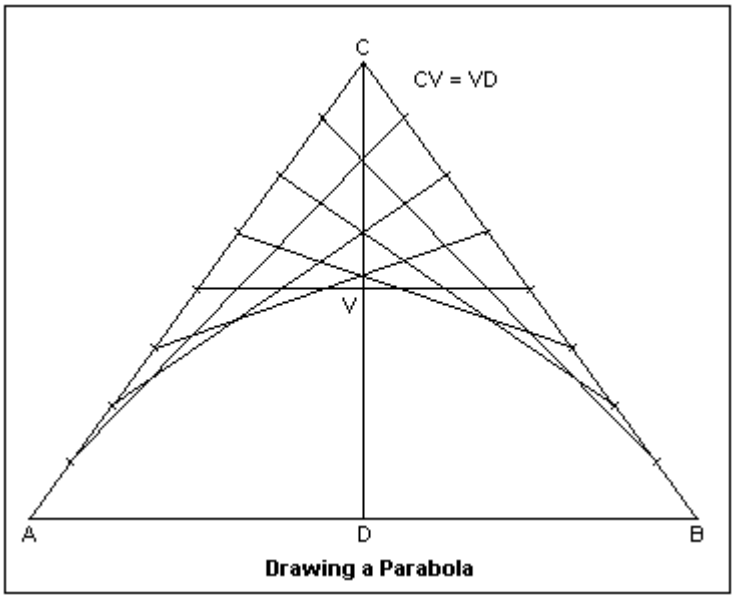
Pitched roofs having gable or cross gable character were used for the mosques of Kashmir because of snow. Pitched roof construction is suitable for that area which has heavy rain and snowfall as a climatic factor such as the northern areas of Pakistan. On the plains of Pakistan, the pitched roof is just an architectural style.

The vaulting system of the Faisal Mosque is an advanced form of hyperbolic paraboloid construction. It is based on shell construction, which can be constructed with large or short span. The main purpose of this concrete shell structure is to cover a large area without any interior supports. Its geometry was explored in nineteenth century.[17] Giorgio Baroni was the first architect to use hyperbolic paraboloid construction system in 1938.[18]

Miss Amina Jahangir and Miss Shazia Hanif lecturers in Comsats Institute of Information Technology Lahore, made clear to the author that Hyperbolic paraboloid is a doubly curved structure that creates stiff skin. It is a long span structure, which is a combination of two shapes: hyperbola (drawing figure 12) and parabola (drawing figure 13). At the joining of hyperbola and parabola the load is transferred on the joining and edges (drawing figure 14). It is not necessary to use all parts of the shape and short parts of the shape can also be used in construction.[19] Similar in the case of the roof of the Faisal Mosque, the principle of its saddle quality or load shifting is used only. Curved lines of hyperbola and parabola are converted into straight lines for the sake of stylization according to the requirement of the mosque design. At every joining of the triangular slabs of the roof load is transferred on girders, hinged beams and cross beams instead of walls. The modern method of shell structure can be used in curve lines as well as in straight lines. Hyperbolic paraboloid roof and pitched roof has similarity if the roof of the hyperbolic paraboloid construction is designed according to the straight lined geometry instead of curves (plate 14).

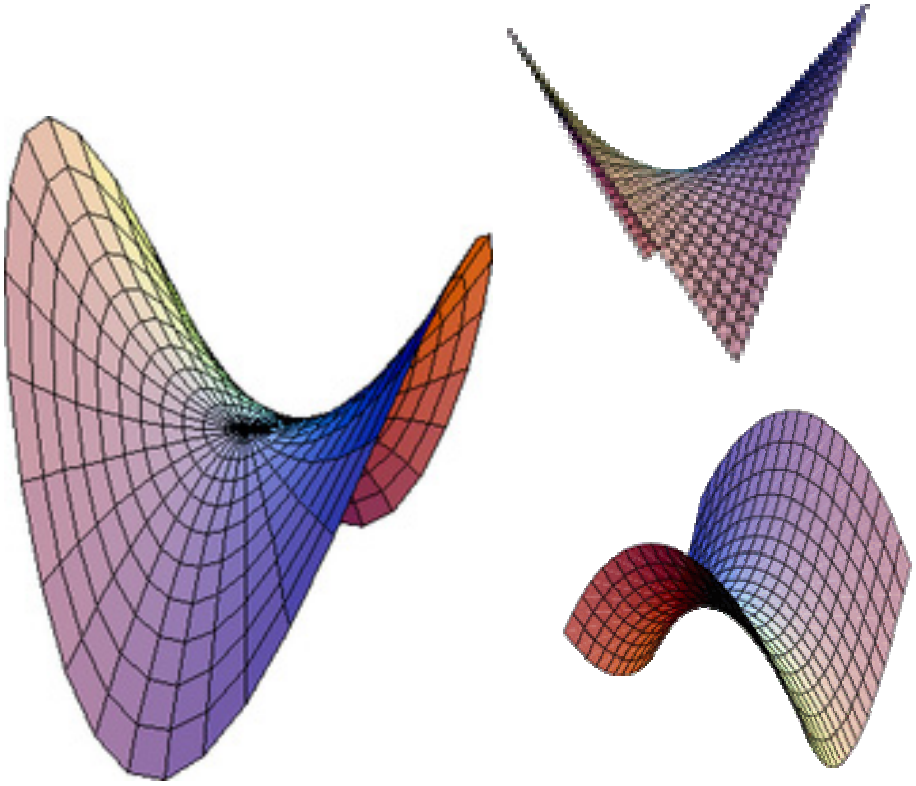


(Drawing figure 12) Hyperbola.



(Drawing figure 13) Parabola. Source:

http://www.ketchum.org/shellpix.html (accessed Jan 5, 2008).



Drawing figure 14. Hyperbolic paraboloid roof structure, that combines hyperbola and parabola shapes. Source: http://mathworld.wolfram.com/HyperbolicParaboloid.html and http://www.answers.com/topic/paraboloid?cat=technology

The *Masjid* Negara Kuala Lumpur in Malaysia, built in 1957 (plate 15);[20] the Kinali Island Mosque in Istanbul, built in 1964-65 (plate 16),[21] built before the construction of Faisal Mosque.[22] Azad Jamu Kashmir University Mosque, Islamabad, built in 2000, after the construction of the Faisal Mosque (plate 17). All are constructed according to hyperbolic paraboloid construction, but they do not resemble with the roof design of the Faisal Mosque. It is an international style, adopted by architects all over the world. Churches are built under the rules of this construction.[23]

Ahmad Nabi Khan writes, "Its triangular geometry is merged with natural background which resembles with pyramidal tent".[24] Renata Holod and Hasan-Uddin Khan say, "The mosque resembles a small mountain or an enormous white tent".[25]

Different scholars, writers and websites have described the Faisal Mosque as tent or tent-shaped.[26] Historically, there is no evidence of tent shaped monument. Tents are made with thick fabric rather than solid material. The roof of the Faisal Mosque is a superb reminder of history but has characteristics of the modern age. The mosque is not adequately characterized as a tent or tent shape. It is designed according to the strict triangular geometry of its external structure, which is based on a pyramidal shape. The architect has focused his attention on creating something new, combining abstraction and symbolism. The triangular shape is prominent in the whole composition of the monument. In interviews with Ahmad Rafiq, civil engineer of the Faisal Mosque, by the author, he said that Dalokay was balancing the shape of the mosque against the Margala hills; he did not think about the construction of tent or tent shape. Actually the roof is designed according to the harmony and continuity of diagonal lines of Margala hills. The external design of the mosque is based on triangular shapes in realistic or abstract forms.

The sharp contours of the mosque do not reflect the hills behind it. The architect has tried to highlight its white structure by contrasting it with the softness of muddy olive hills, thus making the design dominant with the center of interest.

It has been clearly discussed, how diagonal lines of Egyptian pyramids traveled through out the centuries, all over the world. This angular construction has become a feature of twentieth century construction in the form of hyperbolic paraboloid buildings.

Minarets with the passage of time have become an important element of mosque and are also considered a symbol of Islam. A minaret was once used for the traditional purpose of *adhān* (call to prayer).

The first *adhān* was delivered in Madina by *ḥaḍrat* Bilal from the highest point of the neighborhood on the order of *Ḥaḍrat* Muḥammad (peace be upon him). The concept of the minaret began in the early years of Islam, but none was constructed during the period of the Prophet (peace be upon him) and the four orthodox caliphs.[27] Creswell writes that minaret first became a part of the architecture of the mosque; when it was

added in the mosque of Amr at Fustat in Cairo. During the period of the caliph Mu'awiya in 673A.D. four minarets were constructed at its four corners and these were square in plan. They were the first purpose-built minarets in Islam.[28] The Great Mosque of Qairuwān, in Tunis, was probably founded in 670 and rebuilt during the period of the caliph Ḥisham (724-43); its square minaret is recorded to have been built in 724-727.[29]

Andrew Petersen mentions that Syrian minarets also have square plans. The form derives from earlier Byzantine church towers. The minaret of the Great Mosque of Damascus, built in the early ninth century is the oldest minaret in Syria. Syrian minarets traditionally consist of a square plan stone tower. North Africa and Spain also have a square form, and derived from the same source (Syrian church towers).[30] Tulunids, Fatimids, Almoravids and early Almohads also built minarets with square base and tall impressive square exterior with decorative motives in various techniques.

In Saljuq Iran tapering cylindrical minarets were introduced. The minaret in early Ottoman Empire was the continuation of the Saljuq tradition. Their tall and pointed top gives them a unique silhouette. Their pointed top can be traced back to the church towers of Byzantium.

The decorative techniques and designs of the minarets are selected according to the times and the taste and materials of the region. When brick is the medium the shaft was decorated with various patterns using diagonal, horizontal and vertical placement of bricks ornamented with bands of calligraphy, stucco, carved plugs and colourful tiles. Andrew Petersen writes that the earliest known Iranian minaret was built for the congregational mosque at Siraf and dates to the ninth century. The minaret at Fahraj built in the tenth century has a tapered cylindrical form. So in Islam the tapered form minaret was first introduced by the Iranians. From Iran tapered minarets spread all over the world.[31]

Petersen mentions that in South Asia, before the arrival of the Mughals, minarets were not consciously built. Solid tower-like buttresses attached to the corners of mosques

were used in their place. Minarets of the Mughal period were based on tapering constructions with two intermediate balconies and an open canopy on top, following Iranian and Central Asian worlds. Octagon minarets crowned with cupolas were common in the Jahangir period. Minarets having fluted shafts were also characteristic of South Asia.[32]

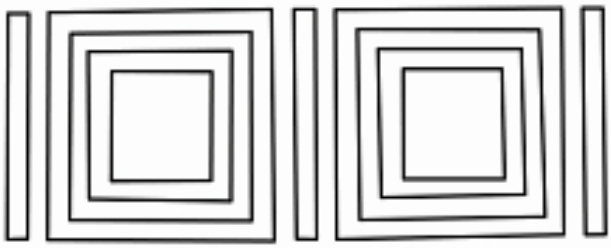
In modern times different shapes and designs were adopted from various countries for the construction of minarets. They are pencil pointed, cylindrical, octagonal, square based or tapered, with different techniques used for its decoration. This variety of construction is also witnessed in the form of various Pakistani minarets.

Minarets can be found in various numbers, one to six. In the seventh century one minaret was built; later on the quantity was increased to two, four and six. Four minarets at the corners of the mosque has been the norm since the eighth century A.D. Construction with four minarets was also favored for Ottoman mosques. In Pakistan, *Masjid* Wazir Khan, Lahore, built in 1634 and Badshahi Mosque, Lahore, built in 1674 have four minarets. Historically, minarets were used for *adhān* because height was needed to broadcast the call. Today the loud-speaker is used for *adhān* and minarets are constructed just as symbol of Islam or to continue historic tradition as in the case of the Faisal Mosque's minarets.

The design of the Faisal Mosque's minarets presents a break from the prototype. It is designed with a combination of various features from different countries Arab, Turkish as well as Persian. One source, Hagia Sophia in Istanbul, was originally constructed as a church between 532 and 537 AD. [33] In 1453 it was converted into a mosque. Its four minarets were added in 1453 by Ottoman Turks.[34] The square tapered base of Hagia Sophia minaret is the direct model of the base of the Faisal Mosque's minaret (plate 18). Square bases from Arab minarets are common but none are tapered as found at Hagia Sophia. Ottoman minarets themselves have round shafts on square bases. On the other hand, the slender tapering shafts and a balcony of the Faisal Mosque are a modification

of the traditional Persian minaret. Thus the combination of square base, square shaft and pointed top of the Faisal Mosque minarets are a break from the prototype of Ottoman minaret style.

A carved decorative panel is fixed on every entrance door of the Faisal Mosque's minaret (plate 20). It is made of teak wood imported from Burma (drawing figure 15). Its rectilinear design has similarities with Greek design (plate 21).[35]



Drawing figure 15. Design on the hand railing of the entrance doors to the minarets of the Faisal Mosque.

Abstraction can be defined as stylized form or artistic expression which is created by an artist. Abstract forms can express meaningful thoughts, rather than clear individual naturalistic appearances. Sometimes abstract forms have little resemblance with the original naturalistic object or source of conception. Geometry gives meaningful prominence to artistic thoughts and expression. It helps to encourage a physical state of abstraction. At the Faisal Mosque abstraction seems to have a relationship with the natural environment.

Vedat Dalokay, explaining the design of the mosque to school students on a study tour, said that he created the mosque out of the cube of the Ka'bah in Mecca. He explains,

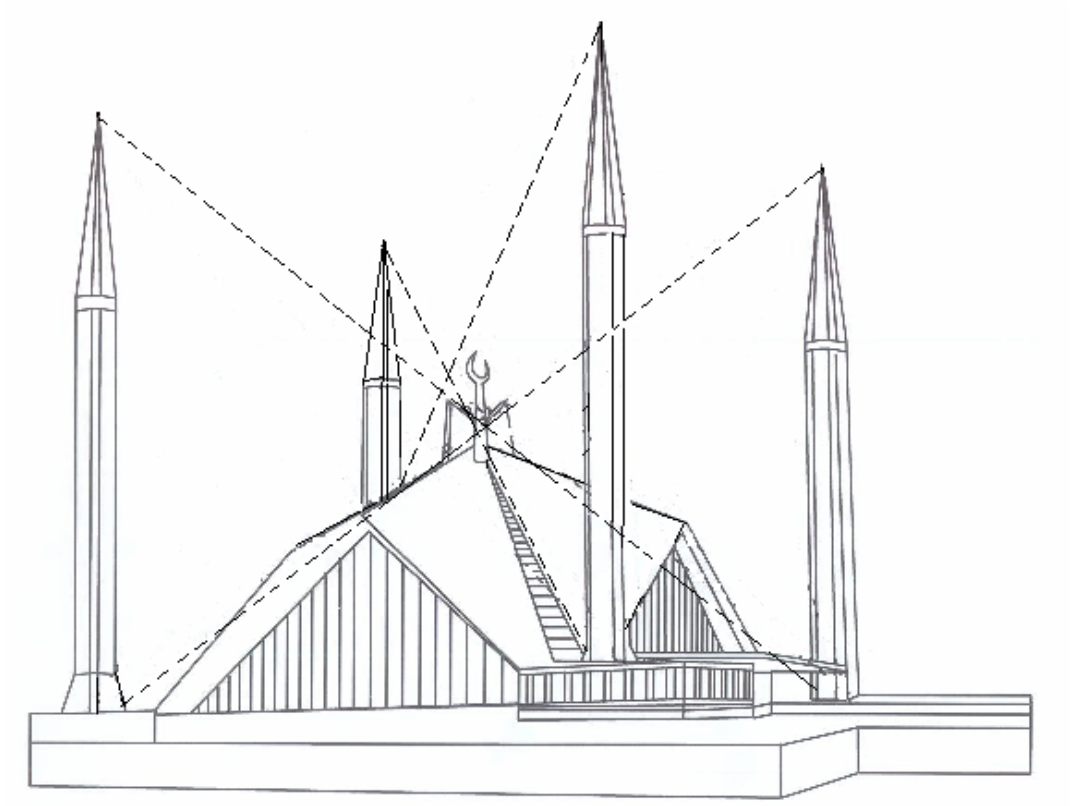
> I tried to capture the spirit, proportion and geometry of the Kaaba in a purely abstract manner. Imagine the apex of each of the four minarets as a scaled explosion of four highest corners of Kaaba thus an unseen Kaaba form is bounded by the minarets at the four corners in a proportion

> of height to base akin to Kaaba. Now, if you join the apex of each minaret to the base of the minaret diagonally opposite to it correspondingly, a four-sided pyramid shall be bound by these lines at the base side within that invisible cube. That lower level pyramid is treated as a solid body while four minarets with their apex complete the imaginary cube of Kaaba.[36]

Dalokay`s words indicate an idealism present in the design elevation of the Faisal Mosque. The concept of the architect was a triangular network of polygonal geometry. Imagine! A diagonal line scaled from the zenith of north-east minaret to the base of south-west minaret and then another line from the pinnacle of north-west minaret to the base of south-east and others from the base of one minaret to the top of the one diagonally opposite. From the cross-section of these lines four invisible symmetrical triangles will appear with the apex of the mosque at the point of their crossing. The same triangular shape is repeated throughout the entire sanctuary as we shall see (drawing figure 16).

Overall composition of the Faisal Mosque has reached the level of maturity that indicates a considerable period of prior thought by the architect. The over all appearance of the minaret gives the impression of square based rocket. They are a symbolic mark of infinity, the inter-relation between Muslims and Allah. The importance of white colour plays a great role for its beautification. Over the centuries colours have been associated with human emotions. Different people and cultures have given different associations to it. Sensation of colour choice depends on the psychology, knowledge and visual perception of the selector. A place becomes more attractive and effective with the selection of a balanced colour scheme. Likewise every colour has its great value and represents in its intensities the feeling of lightness and heaviness of the architectural monument. Colours in architecture are not just an assemblage of tones. They are considered a most useful and powerful source for expressing feelings. The Faisal

Mosque is composed as the center of interest of the surrounded landscape. Minarets play an important role in separating the external pyramidal structure of the sanctuary from



Drawing figure 16. Imaginary network of triangular shapes of the exterior of the Faisal Mosque.

diagonal lines of the hills. Secondly, they set the mosque in a square frame. The white colour gives an effect of light weight and softens the sharp contours of the mosque. The architect selected white colour for its meaningful symbolism related with Islamic religion: white is the colour of the clothing of the pilgrim to Mecca during the *ḥaj*.

To summarize, the unusual design of exterior of the Faisal Mosque helps to create a great aesthetic impact of beauty, through colour and line. Its sharp contours with white dominant colour give a bold impression against the soft lines of the olive green hills. The colour contrast keeps a balance between light and dark. As a result the mosque looks like a sculpture in the round. The vertical lines of the minarets stabilize the diagonal lines of the sanctuary and separate it from hilly background. They serve as a

frame in which sanctuary of the mosque is set. So the minarets are not only built to maintain the Islamic tradition, but are have structural significance and also supporting the balance of the structural lines and give importance to it.

Notes

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[26] Frishman and Khan, *The Mosque*, 262;

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