



# Symmetry: Art and Science

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## **DYNAMIC SYMMETRY, HARMONY, AND BALANCE IN NAQSH-E-JAHAN SQUARE OF ISPAHAN M.MAHDI ALIZADEH and CLARA PIMENTA DO VALE**

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**Abstract:** *The desire for order, harmony and balance is a crucial aspect of all fields of art, from architecture to music, from literature to poetry, and symmetry has long been among the tools to achieve some sort of order in chaos. Yet the approach to symmetry, differs in various contexts and eras. This paper intends to discuss the questions of symmetry in a specific context in order to re-think the definitions and boundaries of symmetry in a particular era in order to make a juxtaposition to a more contemporary understanding of symmetry. The chosen study case is the Naqsh-e-Jahan square of Ispahan which is among the prototypes of the Persian urban design and of a great significance. Symmetry is among the key architectural elements of the square, yet arguably how symmetry plays its role in Naqsh-e-Jahan is not limited to the more traditional definitions of the era. Hence this paper has analysed some elements of the square in order to better explain the correlation between symmetry and the questions of harmony and balance in the square. Furthermore, this paper extends to mention the differences between Symmetry and Dynamic symmetry and that symmetry in Naqsh-e-Jahan is not absolute and rather relative, in other words, one is observing asymmetry within a symmetry.*

Keywords: Dynamic Symmetry; Harmony; Order; Balance; Persian Architecture.

### **INTRODUCTION**

Symmetry has been among the key topics when discussing the principles of beauty and harmony since the old days. As the American novelist Edith Wharton said, "The desire for symmetry, for balance, for rhythm in form as well as in sound, is one of the most inveterate of human instincts" (Wharton, 1897, p.2). However, one could argue that the perspective towards symmetry has been

altered throughout the 20<sup>th</sup> century in the world of architecture. Not that symmetry was completely denied, perhaps was interpreted differently, but also because the search for astonishing unbalance, disequilibrium, is among the characteristics of contemporary art. Perhaps what has been used is a symmetry of function rather than form. As Le Corbusier said "To create architecture is to put it in order. Put what in order? Function and objects" (Harrouk, 2021, p.1).

Having said so, this paper intends to question whether symmetry has always been the core principle of design in the pre-modern era? The object of the study is the Naqsh-e-Jahan square of the city of Ispahan of Iran. Naqsh-e-Jahan is among the most renowned squares of Persian architecture, one which has served as a prototype and continues to be among the references of traditional Persian architecture and design. At the first glimpse, one could argue that the Naqsh-e-Jahan square is symmetrical as many other masterpieces of Persian architecture and urban design. But once observing the square with more depth, elements of asymmetry capture one's attention, which raises the question whether we are dealing with an asymmetry in a symmetry and of dynamic symmetry in the square?

## THE NAQSH-E-JAHAN SQUARE AND THE QUESTIONS OF ORDER AND SYMMETRY

Firstly, it would be essential first to define the formal characteristics of the square and later assess the parameters of symmetry in this given study case. As it has been mentioned, the first impression one has of the square is rather a symmetrical one, so much so that André Daulier Deslandes when visiting the Naqsh e Jahan square depicted a drawing of the square in which it is completely symmetrical and square shaped. Deslandes' depiction of the square is certainly not a correspondence to the reality of the square as he visited Ispahan in the year 1663 meaning 35 years after the completion of the square, yet the only reason for this depiction could be that he drew the image from memory and the square must have seemed very symmetrical, for him to draw it as he did.



Figure 1 Deslandes's Drawing<sup>1</sup>



Though the square is not as symmetrical as it seems. When discussing the plan, the initial one was a rather very symmetrical rectangular shape built between the years 1598-1929, with a row of trees surrounding the square in the absence of the central fountain (Savory, 1980, p.155). The square has 4 main facades or programs surrounding it. The principal mosque of the city by name of Sheikh Lotfollah Mosque situated in the eastern side of the square, extending all the way to the southern block of the square where a second mosque *Shah* or *Emam* mosque is situated. Facing the principal mosque and on the western part of the square is the Imperial Palace of Ali Qapu and finally on the north is the entrance to the Bazaar meaning the *Qeysarie Gate*. The two mosques are the representation of the religious establishments of the era, with the palace representing the imperial power and the Bazaar (market) as the economic authority of the society. Basically, three of the main functional organs of the society (Pourjafar, 2014, p.12).

Nevertheless, among the main principles of the square which breaks the symmetry is the Shah Mosque on the south of the square which is tilted towards the south-east. The main reason is a functional one, the sanctuary should be headed towards Mecca (Qibla). Yet it is arguable that perhaps it is not the functional reason that has been the sole reason for the axis shift, but as well an architectural gesture to break the symmetry. As for the Sheikh Lotfollah Mosque, the overall structure is also not positioned heading Mecca, it is only the sanctuary within the mosque that is oriented, not the whole grid of the mosque. As it is visible in Figures 3 and 4, the Mosque is designed in regard to the new axis, and it is only its main entrance which remains a relation to the square's axis.

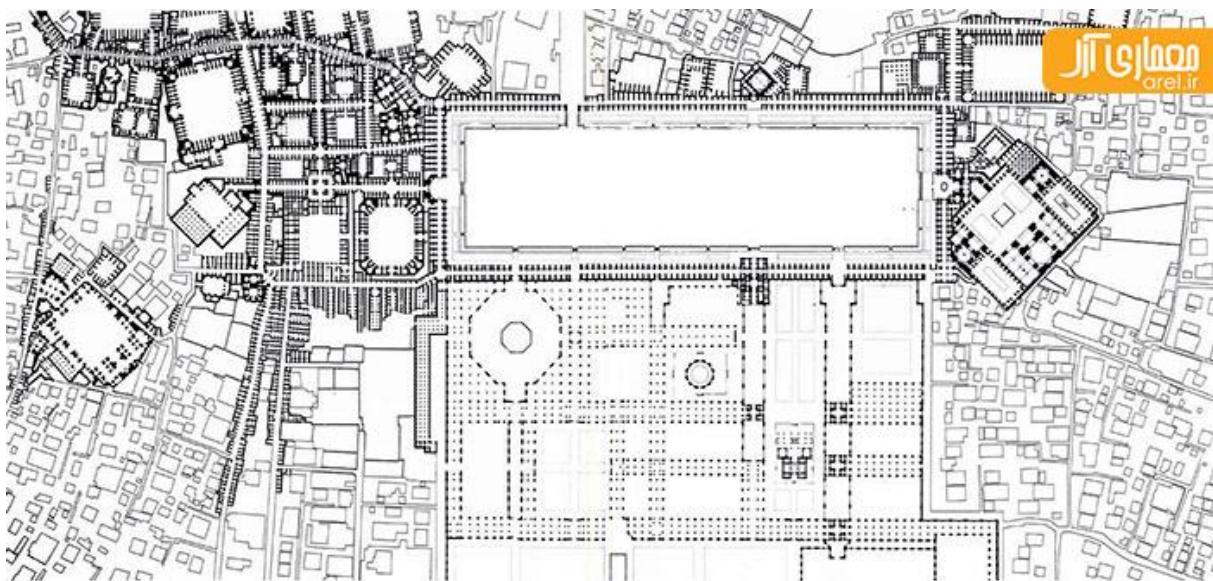


Figure 2. Master plan of Naqsh-e-Jahan square (Arel Atelier, 1395 [2016])

Having said so, the shift in the axis of the Shah Mosque, which resulted in breaking the symmetry was rather a ground-breaking decision, as Persian architecture of the Safavid era was symmetrical

in the traditional sense of symmetry, hence the square seemed very modern for its era. Perhaps a parallel could be drawn with the architecture of the 20<sup>th</sup> century and its interpretation and the use of symmetry. When stating that the perspective towards symmetry has been altered throughout the twentieth century architecture, it is rather a statement which requires a thorough analysis. Perhaps a very thought-provoking example is Louis Kahn's Fisher House, basically consisting of two cubic volumes, light wooden structure on a stone foundation, the Fisher House is among the important works of Kahn in a rather smaller scale than his more famous works. Arguably Kahn has avoided the linearity of the Modern plan and the combination of these simple cubic volumes allows a separation between the public and private space.

The 45-degree tilt of one of the volumes and the relation it establishes with the other cube, is a rather an interesting mechanism which was used in the Shah Mosque of the Naqsh-e-Jahan square, some 4 centuries prior to the Fisher house. Ironically a while after the compilation of the Fisher house, Kahn visited Ispahan for the first time in 1970 to participate in the First International Congress of Architects in Ispahan. A visit which left a noticeable remark on him (Mohajeri, 2015, p.485). However, it is difficult to argue whether Kahn had any notion of the Shah Mosque of Ispahan prior to designing the Fisher house or not since the house was completed in 1967, meaning three years before his first visit to Ispahan which makes it hard to draw a direct connection or to say that Kahn's technique was influenced by the Shah Mosque. Nevertheless, what can be stated, is that Kahn was impressed by the architecture he encountered in Ispahan, and perhaps one of the reasons was that he could have related to it so well based on his thinking and works.

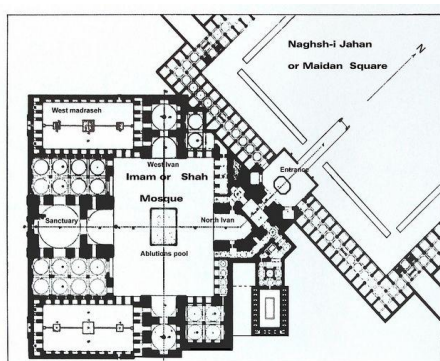


Figure 3 Shah Mosque  
(Arel Atelier, 1395 [2016])

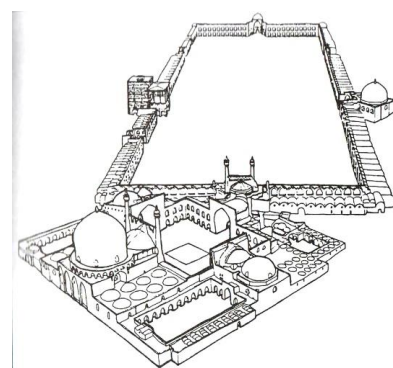


Figure 4. Representation of Shah Mosque  
(Arel Atelier, 1395 [2016])

In order to better understand the square, it is essential to give reference to Persian gardens as a prototype. The central garden, even though quite recent, meaning it has appeared throughout the last 100 years, was designed in a way that it would resemble the Persian gardens. With the exception that the principal fountain is not being positioned in the centre of the square which reduces the

symmetrical representation in contrast to the majority of the famous Persian gardens where the fountain, or water representations, are quite symmetrical and central.

The reason for such a design was to give more emphasis to where the mosques and the palace are positioned in comparison to the market which has a lesser touristic importance. As for example, Taj Mahal Garden is among the most classic examples of Persian garden, where the square shaped garden is completely symmetrical, and the position of the fountain is exactly in the centre of the garden to maintain the symmetric depiction. This is exactly a question of balance rather than mere symmetry. It should be mentioned that in some cases, balance could be achieved by breaking a mechanical symmetry and putting emphasis on the focal points of the design. In the case of Taj Mahal, there is one main *kooshk* (kiosque) which is the palace and hence the order is maintained.

When discussing the elements of the Square, one should mention the important role of geometric symbolism and motifs as constructing elements of the square. All of the main four elements of the square are decorated with geometric patterns which are in many cases repetitive throughout the square. In contrast to traditional Christian architecture which has integrated painting as a decorative element, in Islamic architecture, ornament is built around calligraphy and Islamic rich geometric patterns. This element of the Islamic-Persian architecture has its roots in the pre-Islamic era in which the Zoroastrian temples were built around geometric ornaments (Pourjafar, 2009, p.102).

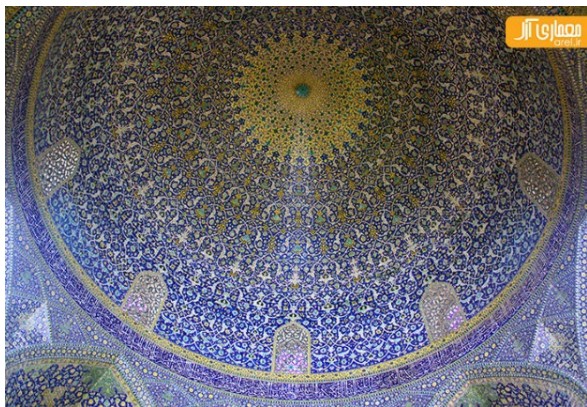


Figure 5 Shah Mosque  
(Arel Atelier, 1395 [2016])

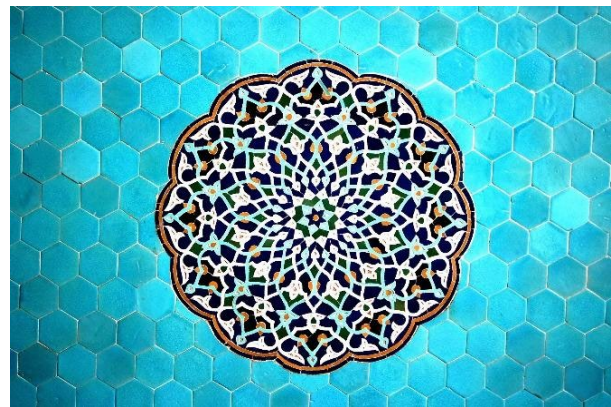


Figure 6 Representation of Shah Mosque  
(Arel Atelier, 1395 [2016])

According to some, Islamic patterns do not merely have aesthetic functionality but rather the purpose behind them is to create an atmosphere for spirituality, for one to get prepared to enter a phase of self-purification. The patterns are mostly made of a combination of simple, regular, and symmetric shapes like circles and squares which by intersection result in more complex geometric patterns.

These more “sophisticated” and complex patterns are then repeated through the architectural elements, from ceiling to walls to doors, inside or outside, using one or several different planes of



symmetry (Berczi, 1999, p.14). Figure 6 is an example of Persian-Islamic geometric pattern in Jame Mosque of Yazd which is rather a complex pattern but created from very simple shapes. It should be noted that the pattern is completely symmetrical meaning if a line were to be drawn from any axes, the pattern will remain completely symmetrical. One could argue that most Islamic geometric patterns follow symmetrical principles and the repetition in the shapes are made with the logic that it does not break the symmetry created. However, on the contrary, calligraphies which are another form of Islamic ornaments that convey meaning, are not symmetrical. In the figure 5, from inside of the Sheikh Lotfollah Mosque a complete symmetry is seen between all elements meaning, the windows, the patterns of the windows, the tile works, the geometric patterns on the dome and even the spread of colors are symmetrically chosen. However, the only element which is not symmetrical is the calligraphy work which breaks the absolute symmetry. On the other hand, a higher meaning is conveyed, as in the words of Hadi Mirmiran the famous Iranian architect

*From the point of view of human feelings, perception and understanding, the light glowing through the windows of the dome Sheikh Lotfollah mosque makes the physical weight of the dome lighter. (Mirmiran, 1996, p.30)*

This is where the composition, harmony and dynamic symmetry intersect in order to form human experience. As Juhani Pallasmaa the famous Finnish architect says, “As we enter a place, the place enters us” (Pallasmaa, 2014, p.232).

Perhaps the point to be made clear is that symmetry is a mean to order chaos but sometimes it is also necessary to avoid symmetry for a higher purpose. This is where dynamic symmetry gains relevance, dynamic symmetry in architecture is about creating atmosphere, to stimulate continuity. To achieve so, sometimes it is essential to get around the traditional meaning of symmetry (mirroring) and by doing so, on gives room to asymmetry within a symmetry, as seen in Naqsh-e-Jahan square.



Figure 7 Picture of Naqsh-e-Jahan square (Arel Atelier, 1395 [2016])

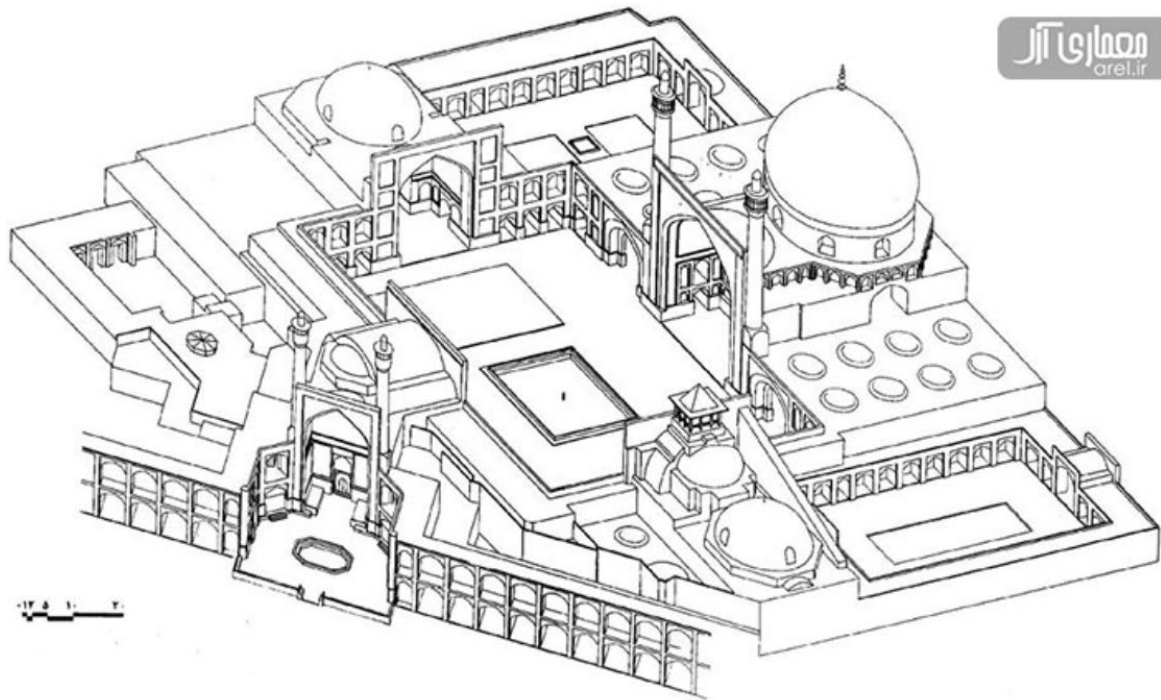


Figure 8 Axonometric drawing of Shah Mosque (Arel Atelier, 1395 [2016])

## CONCLUSION

In order to summarize, this article intends to convey the message that in search of symmetry a higher meaning could be found in Dynamic symmetry, where symmetry is used to create a meaningful scene rather than a rotation that repeats the depicted image. Dynamic symmetry is about balance, it refers to composition, rhythm, and meaning/significance (known as *mino* or *ma'na* among the Muslim Persian mystics). Symmetry on the contrary to what is the common belief, is not the core principle of traditional Persian architecture, but rather the symmetry created in many of the famous masterpieces are broken to create a scene or composition. One could argue that the main purpose behind symmetry in geometry is to initiate a certain human feeling in a given place and time, yet for the same reason it would be essential to fragment symmetry to convey a higher meaning. In this article, the square of Naqshe-e-Jahan of the city of Isfahan has served as the case study where some of the parameters of symmetry were discussed.

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<sup>1</sup> Source: fr.wikipedia.org, Caption date January 2022, [https://fr.wikipedia.org/wiki/Andr%C3%A9\\_Daulier\\_Deslandes](https://fr.wikipedia.org/wiki/Andr%C3%A9_Daulier_Deslandes)

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