

Research Article

ANALYZING CONCEPT OF TRANSPARENCY IN ARCHITECTURE OF SAFAVI PERIOD WITH ANALYZING CASE STUDIES

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ABSTRACT

Nowadays because of population growth and demands of making Buildings at high density, building masses brag in cities and there is no empty space, transparency or opening and special continuity. But in Iranian traditional architecture, there was always transparency and visual Continuity beside the massive architectural structures to prevent abrupt visual disconnection. Concept of transparency in architecture which is one of the necessities for modern human being is analyzed in three realms of the form and combination of the water and the light with buildings. In fact in Architecture the empty space should be carved and created out of the heart of the mass and space shouldn't be replete with mass. Since Iranian architecture evolved to the most in Safavi period, the aim of present research is mostly searching in works of this period and analyzing them in several samples. In this research in order to achieve the aim, the descriptive – analytic researching method is utilized and the method of collecting information is documental study, book based study and site visiting, this method analyze the information by analyzing the received data.

Keywords: *Safavi Style/ Transparency Proportion of Porous Space Decorations*

INTRODUCTION

The most significant characteristic of architecture of Iran that makes it different from architectures of other countries is the transparency of it. Space is the quintessence of architecture and transparency of architecture of Esfahan style can be recognized in its spacial transparency. Architecture of Esfahan is the heart of Iranian architecture in historical periods after Islam. Because this city has been the capital city of Iran in Saljuqi and Safavi periods and important buildings are mostly placed in Isfahan and since the government of Iran has been strong, vast and Centered after Islam it can be realized that the city of Isfahan has had the most phenomenal specimen of Iranian architecture after Islam and its architecture has the most clear features of Iranian architecture in this historical period. The most outstanding feature of Iranian architecture that differs it from architecture of other lands is the transparency of this architecture. The transparency is one of the most important bases of universe and its meaning is perpetual motion and evolution of universe from worldly quality to spiritual one. Since the transparency is one of the bases of universe, then it is not surprising to see that this rule runs in general movement of architecture of the world and through history, architecture of the world moved toward transparency or architecturally speaking it moved toward decreasing mass and increasing space. But this process is more clear in architecture of Iran and Islamic cosmology that ruled over Iran after Islam, believes to evolution of universe from Worldly quality to spiritual one and accelerates this process of architecture movement of becoming more transparent, architecture and transparency depend on each other as much as body depends on soul, One to be alive and another to exist in this world. When transparency flows through the body of space, both of them could be recognized in the world. One of the issues that modern architecture deals with, is answering the question that existence of transparency especially natural light can mean more than light or achieving a right pattern of using transparency is possible? Or it is necessary? The matter is that at modern period, transparency is not concerned as it was in past ages. Transparency was utilized in various styles of Iranian architecture and in other countries. But the powerful lever in understanding the space and enhancing the quality of architecture and living conditions is not utilized any longer.

The presence of transparency is a tool for expressing architecture and influences on other architectural tools. Transparency is consisted of several elements that one of them is light. The hierarchy that architect

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considers for getting desirable light for the building, plays an important role for creating the general circumstance of the building and forms those general goals which are the initial steps of creating the spiritual aspect of the building. The light is crucial, suitable light at night is usually selected by interior designer and architect doesn't play an important role for choosing it but the role of architect is vital in designing the hierarchy of light and shadows that audience face. A element of transparency like water space has been always used in Islamic- Iranian architecture in order to create and combining form with space that creates special hierarchy. In this research the quality of epiphany of elements of transparency in architecture of period of safavi and the quality of using these elements in architecture of period of safavi is scrutinized.

Questions of present research are:

- Is the transparency used in architecture of period of safavi?
- What is the connection between the transparency in architecture and buildings of period of safavi?
- What were reasons of Muslims of using transparency?

MATERIALS AND METHODS

Material and methods is tool or way of specifying that how a subject of research is verified or rejected or material and methods could be considered as the frame work of searching actions for examining the hypothesis or answering to research's questions (Bazargan and Others, 2006). In present research the material and methods is descriptive- analytic and the method of collecting information is book based and site visiting. In this method researcher utilizes the most important tool s/he posses and it is taking notes. With going to afore discovered references, s/he writes important and necessary points down. With mentioning references exactly and later with observing and interviewing in site finally s/he will analyze data.

RESULTS AND DISCUSSION

Forming Architecture of Safavi Government in Iran

Undoubtedly forming the safavi government in Iran at initial years of ninth century of hijri (initial years of 16th century) is one of the most outstanding events in Iran (Rajabi and Kiomars, 2015).

Safavi government in Iran (1729-1524) is along with the Mogul period in India (1526-1707) – (Khazaie *et al.*, 2013) Safavian founded the new Persian empire in Islamic period (Hooshangi, 2000). One of the characteristics of civil design in this period is their comprehensible knowledge of site features and using sites best features in their designs, for instance, choosing the best direction for using sun light and protecting natural environment against the city and having the highest standards of design (Haghighat and Steen, 2009).

From the appearance of Isfahan it can be understood that civil design in this period accords with a sort of design that three aspects of life of a humankind, spirituality, living and plutocracy is considered by means of mosques, market and palaces as the most basic elements of a city (Taghavi, 2013). In Isfahan no radical transformation in shape of buildings is done and the form of "Char ivani" (four porches) started from the period of Saljuqian (Esmi and Saremi 20th).

Spiritual System of Architecture and Civil Design of Isfahan in Safavi Period

Undoubtedly forming Safavie government in Iran in the form of "Shiite asna ashar" government should be considered as one of the most important events of history of Iran and Islam, because efforts and fights of shiites continued for more than 9 centuries until Shiite branch was chosen as the formal religion of Iran (Mazavi, 1990). After the termination of period of Ilkhanian, their Iranian territory was invaded and ruled by local independent governments. When king Ismael the founder of Safavi government rose for seizing the power of Iran, Iran was ruled by these hind of powers (Navaie and Ghafari, 2002). After foundation of Safavi government in Iran, because of attention of Safavi kings and creativity of architects, the Isfahan school was formed that made itself different from the architecture of past ages. Or in this period, architecture transformed from organic architecture that was purely formed because of natural needs to a logical architecture that has philosophical, artistic and technical values (Tabasi, 2007).

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On the other hand it could be told that in traditional architecture of Iran, hierarchy in architecture goes along with geometry of direct, curved and angled lines and it goes along with two dimensional shapes and three dimensional volumes and it goes along with shapeless empty spaces that are formed among geometric spaces and it let the imagination to be relieved and elevated (Khatami, 2011). Hierarchy means organizing and combining spaces and elements according to some of their functional and physical characteristics that cause hierarchy in the way of ordering, observing or utilizing elements (Sultanzadeh, 1993). So hierarchy in architecture could be observed in two shape related aspects connected to architectural elements and special aspect, related to architectural space. Second aspect is kind of phenomenon of transparency and transparent space in architecture. The special hierarchy could be recognized in formation of a space. If there was a kind of special order in designing a room or one porch that its base was about continuity and transportation, then this special order would form the base of continuity of positive space (Ardalan and Bakhtiar, 2007) this special continuity conveys the meaning, which while providing for functional and special necessities will cause continuity and conditional, emotional sequence and will transport audience from one location to another one and from one concept to another concept (Tabasi and Fazelnasab, 2012), and creating the transferring space with considering psychological aspects is important. Hierarchy is useful for two reasons. One of them is gaining merits and necessities and another reason is neither making the situation in a way so that audience would not get shocked neither spiritually nor psychologically (Naghizade, 1999). After Islam Godly guidance of Islam improved gradually in scientific and cultural aspects in Muslims' society and bloomed in form of philosophical and spiritual dimensions. This atmosphere caused the progression of logical life of the Shiite and created different scientific movements in most parts of the country centered in Isfahan. These scientific movements that was named "spiritual school of Isfahan" was founded by Mir-damad and was fully improved by Mulla Sadra, (Nasr, 1986) the school's theories influenced lives of people of that time in various fields, and artists of different fields tried to convey these theories. Architects and civil designers of Safavi period also presented symbolic pictures that expressed modern ideas of Shiite by learning these theories, among all of those spaces, mosques and scientific schools had special roles. Like all Islamic periods as places for connection to spirituality had the highest rank and capacity to impress mono theist meanings of Islam and on the other hand since it was one of the places for spreading ideas of Isfahan school these spaces were influenced directly by those ideas (Safaie and Pourmand, 2012). So the school of Isfahan, founded some thinking principles that was looking for creating a utopia and promised land in their works. In Muslims' societies there was such understanding of an architectural works before. But because of existence of a monolithic artistic, scientific, philosophical order of school of Isfahan this theory had a different reflection, in fact spiritual and symbolic role of architectural elements was observed only in some specific parts of buildings in historical period of Safavi, but what occurred in the architectural space was a symbolic role that was given to any architectural elements in various buildings specially to the public buildings and this was so generalized that influenced physical parts of the building and got combined with it (Falamaki, 1990). According to these subject different parts of building was designed in a way that every one as a graphic sign, shows a part of paradise and as a unit had a reflection of paradigmatic heaven, by assistance of engraved elements and Islamic inscriptions has been demonstrating vastly in Safavi buildings. And made these buildings to become "Godly word" paraphrasing Arthur pope (Pope, 1986).

Transparency and Continuity

Opposite of finished and closed space is the concept of transparency and continuity, in this space, direction of movement of a human or his/her look is formed in a constant continuity, as special openings in horizontal and vertical lines, cause transparency among walls and columns that the vista is revived in infinite horizon.

Concept of hierarchy and continuity are considered correctly to be items that explain architecture of Iran. Continuity isn't related to the size of a space and human is a connection that eventually understands the space and its sub textual message, with his/her sensual chain, by using natural sensitivity, considering a sophisticated complex and then by collecting various outspread elements in his/her final understanding.

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Among bodies of architectural buildings of Iran, space isn't recognized transparently and ambiguity of its complex combinations is for enriching the vista that could not be explained limitedly. This space conveys the message of a phenomenon that carries other one in its heart and movement toward that is a motion to another space with a vast totality.

In discussing the concept of hierarchy and sequence, one of the features of architecture of Iran is making locational continuity. Sequence specifies special beginnings and clear preludes and its acme is when inward feeling lead to a complete inner understanding in this special movement because of passing the way and the time.

Preludes, is related to the way of evolving, forming spaces of the whole building to passage space that central space is the quintessence of that. This preparation is formed influenced by time, motion, and light and volume variation. by utilizing multiplicity geometry that like nature is formed of a complex of surfaces and dots, special sequence and continuity maintain their connection with their center, the two dimensional and three dimensional geometry that forms this architecture, define and adjust look and way by transparency of vista in locational opposition because of continuity of forces of complex axes (Diba, 1999).

Elements of Transparency in Architecture

Concept of transparency and transparent space in architecture has vast definitions, but it can be categorized in three groups of elements of light, water and form. By looking more precisely we can analyze other concepts like special hierarchy and the shadow in this field. Transparency elements are listed and generally explained below.

Light and Transparency

Light is the first need to any understanding and vision. In absolute darkens we can't see neither space nor form and color, but light is not just a physical element and its psychological value is one of the most important factors in human lives. Light has had symbolic values beside practical uses. Light is a part of nature of life and in many cultures including Iranian culture is considered as Godly element and it is respected (Falamaki, 1996).

It could be said generally about the connection between light and architecture that architecture is a precise and spectacular show of a complex of elements under the light. Considering the importance of light it could be understood that how light isn't opposed to architecture and it is in harmony with it.

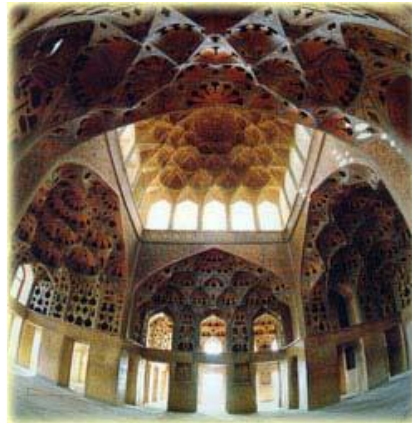


Figure 1: Curved form of dome and diffusion of light and its transparency (Mokhtarshahi, 2009)

Generally light is connected with transparency considering the spiritual nature of light and this subject that in many Godly religions including Islam, God is mentioned as light (Allah is the light of heavens and the land) and Zoroastrians believe that light isn't earthly and it does not get polluted and it is opposite of darkness and devil. It can be mentioned that in all of what was mentioned above, light is used to create an unearthly quality that noting the function of space, the density and quality of incoming light is considered (Homaie and Fahime, 2013) For example, by entering into palace (kushk) of Hasht Behesht (eight

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heavens) we reach to a semi opened space under the dome, from the vast space of garden that finally reaches to closed space of rooms. This process is effective on the amount of light that enters into this building according to its function. By passing the intense light of the garden and entering in open porches which are effective on entering light into the inner parts of the garden, we reach to the space under the dome. This space under the dome also is provided with light by reticular openings that are above it and by other openings which are patios (Ivans). The curved shape of the dome is also effective on directing the light so that the light gets diffused on this surface.

This kind of lighting emphasize on this subject that spaces are hierarchical so that it has personalized each space according to their light. Passing the public space of the garden, we reach to porches and stairs which are semi-public spaces that have more limited light. In rooms considering that they are private spaces, windows are installed at a higher level and the rooms provide its light only in this way (Figure 1).

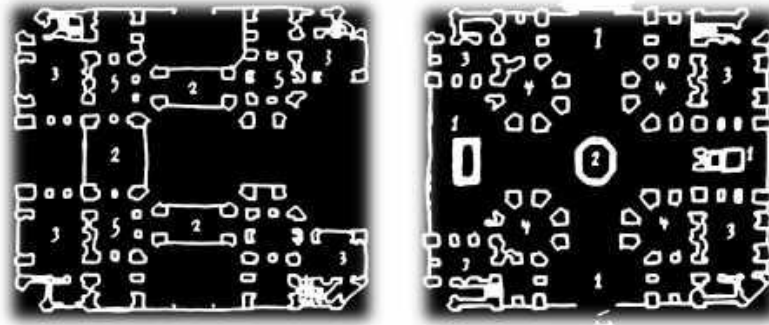


Figure 1: Lighting levels of kushk's spaces (Homaei and Nazemzadeh, 2013)

Depth as the third dimension in architecture is significant. One of the factors of perceiving the depth, is increasing the amount of light that is seen on dark or clear surfaces dependant on the light rays' angle. The amount of light that different parts receive is different so depth and as a result, form and space can be understood. In this building the depth is formed with decreasing and increasing materials and with arches and porches and several parts which are dislocated forward and backward and also emphasizes on transparency. In fact, when a spectator took a glance at this palace s/he would understand a contrast between black and white parts.



Figure 2: Space of central dome (Mokhtarshahi 2009)

The contrast can be used for supporting one special strategy that finally will give the audience the understanding of depth and third dimension (Homaei and Nazem, 2013).

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By analyzing plans and sections of this building we can understand that spaces lighting, has been selected according to special function of this building. Porches which are placed symmetrically on four corners of this building lead the light to the center under the dome. In fact these porches create two axes which at the intersection, the main dome is located. In this space the light above the dome will make this light stronger (figure 2) and then we reach to neutral zone which ends simply to the lighting of rooms.

Decorative techniques and principles have been very effective in lighting of this building, in a way that help providing the light of this dome with decreasing the material and generally decreasing structural mass inside, and increasing the material appropriately in necessary parts, , for example, reticular openings under the dome. The surface of every opening is decreased but the number of these openings under the dome is increased. Reticular nets on these parts not only increase the beauty and proportions of chiseled chalk and painted figures on the dome but also those create light and shadow on these figures. These shadows and light also make a different texture on the inner surface of the dome. According to various angles of sun rays during a day and different seasons, the lighting will be different, the difference of lighting also influence on the view of the spectator as s/he will not have a same image of the dome in his/her mind on any day.



Figure 3: The role of the light in creating shadows and light under the dome (Utaberta et al., 2012)

By putting these openings at the final part of the dome and entering light through these parts, the architect has been trying to give the spectator the feeling that this dome, with all of its greatness is floating above audience and not only it does not invite audience into an unearthly space but also it emphasizes on earthly pleasure and regal recreation. Height and light above the dome also conveys the logical sense of human and kingly greatness, as a physical volume and mass is placed above to invite audience to see it with its replete ornamentation. The influence of light is so intense that with changing the direction of sun rays and creating shadows and light it shows various forms and gives the dome, kind of texture. In fact this shadow shows the surface dislocated forward and backward that demonstrate kind of rhythm and motion on the ceiling (figure 3).

Decreasing the mass in middle region makes the structure lighter and provides light and also it shows dominance of the light over the mass which reminds us the theory of transparency. Presence of light under this dome gives it a floating quality and shows it so light. Solar movement during a day and creating various forms of shadows and light, all emphasize highly on making the building alive and dynamic. Generally the presence of light in this building causes greatness in the body of the building.

Generally Iranian gardens were built for various purposes. In these gardens water could be static or dynamic, according to expectations that we have of water. Being understood to be deep by audience is the quality of static water. It is transformed to a mirror because of the reflection in it. But dynamic water makes sound because of its motion. The water is shallow and transparent and in fact waters motion makes it available to use.

Motion of water in side streams not only makes the sense of motion in minds of audience, but also it gives the road a kind of guidance. The bubbling sound of water also intensifies the sense of motion. In complex

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of garden and kushk (palace) of Hasht Behesht, side pools contain static water, according to the function that we know about static water. Fountains are not working, and it could be one of reasons of making the water look static. In fact the reason is the reflection on the pool.

Peace and making pause and staying near the pool that is in front of the entrance could also be one of the reasons of immobility of the water (figure 4).



Figure 4: One of the pools of Hasht Behesht kushk (Taghvai, 2010)

Noting this matter that role of water is very important in Iranian gardens, water in these buildings not only makes the architecture fresh but also it intensifies the beauty of gardens by reflecting the building in the pool. Perhaps one of the most profound uses of water in this building and in its landscape is paying attention to the inherent quality of water which is transparency and reflection and disappearing the limit between reality and unreality. Putting two pools on axes emphasize on this matter.

Form and Transparency

Form is a concept and in order to exist, something is needed to make that form. Space is something three dimensional and naturally its shape is three dimensional too. Defining elements of space at least are two dimensional surfaces sensually, that inherently their defining elements are lines. The task of architect is to form the conceptual model which is made according to function. Process of design always includes finding forms.

This process is influenced by many factors: body of building, kind of usage, climate, environment, structure, style and etc. on the base of circumstance, one of these factors could be more important. When function or structure defines the form, this matter not only means that general form of building demonstrate structure or function but also it means that we made priority for structure or function but it should be noted that the form is one of these factors and naturally we can make priority for it and in that case, structure and function and etc, must follow the form.

The architect in building of Hasht Behesht increased the size of arches and generally openings that s/he used in this building and this demonstrates the general form of the building and its function which has been hosting users in summers, and it also shows that this building has been extroverted.

This porous form that is created by openings, arches and dome in the volume, shows transparency which emphasize on decreasing mass and increasing space, and structural factors are considered in that porous form.

Decreasing the volume in order to reach to a proper form for helping the building to be lighter and carries structural loads and be resistant against natural disasters, is one of the advantage of the building that in fact transparency assisted this building (Homaie and Nazem, 2013).

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Table 1: Analyzing case studies (Author)

| Title | Transparency in form | Transparency of light | Transparency of water | Picture of the building |
|--|--|--|--|---|
| Masjed jame Isfahan (Main mosque of Isfahan) | -The ceiling has long mogharnas (type of decoration on ceiling specially in corners) | -Audience are faced with a chain of different open and closed paces that guide them toward a shiny light. | -Existence of many troughs in yard of mosque (reminder of water) and pool. |  |
| Si-O-Se pol (Thirty three bridges) | -Empty and full space and backward dislocation of every floor. | -Reflection of the image of the bridge in water and passing of light through empty and full spaces | -Combination with Zayandeh roud river |  |
| Chahar Bagh(Four gardens) school | -Using Backward and forward dislocation, was decreased in plans of buildings but making chamfered edges started from this time. | -Existence of carved wooden windows | -Existence of many troughs in yard of mosque (reminder of water) and pool |  |
| Vank Church | -Its ceiling and its dome are relying on arches that are connected to walls of church and two large columns connected to side walls. | -Penetration of light into circular dome - Main dome of church is twelve meters high and has eight openings that are built double glazed which are not decorated. | |  |

It could be told that octagonal forms, rectangles and squares are the dominant forms in the plan of this complex. These regular forms obeys geometrical rules and contains structure and made the building heavy and creates kind of connection with the ground and it looks like that the building is nailed to the ground. It is worth mentioning that the convoluted complex of these forms and solving them in the whole plan structure of this complex made this heavier (figure 5).

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| Title | Transparency in form | Transparency of light | Transparency of water | Picture of the building |
|--|---|---|---|---|
| Chehel Sotoun (Forty columns) palace | -Backward dislocation and buildings porch that provides a regular rhythm by columns at the moment of entrance. | -Reflection of image of 20 columns in the pool in front of the palace conveys the concept of forty columns ("Chehel sotoun", means forty columns) | -In front of Chehel sotoun place, a pool by the scale of 110 and 16 meters has created a beautiful spectacle. The pool inside the porch is made of marble. On every four corners of it, four columns of porch is placed and at the base of every columns, heads of two lions with a mutual mouth is placed on four large stones, that the water has been pouring from the loins' mouth in to the pool and then water flows through shallow marble streams in the porch and then water falls off a waterfall then with circulating around the garden it pours into lake in center of the garden. there were a lot of fountains in this road. |  |
| Hasht Behesht (Eight paradises) palace | -On the second floor of the building there is a complex of rooms, arches and windows that has created a porous space. | -Penetration of light through central opening | -Existence of pool on eastern part. -Existence of octagonal pool at the center of saloon as the pearl pool |  |

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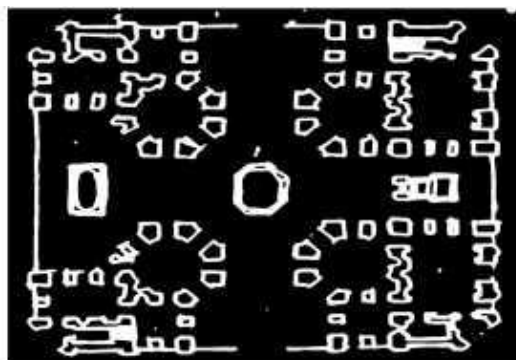


Figure 5: Plan and lightening process mutually reinforcing against forces and transparency (Homaie and Nazem, 2013)

Since the surface plays an important role in architecture, by analyzing the general volume of the complex, it can be said that the walls which makes the linear surfaces in this complex play neutral and immobile role, but embowed ceilings in this building demonstrate kind of motion and emphasis, and emphasize on dominance of the space over the material (transparency)

Analyzing Case Studies

After mentioning various and effective phenomena of transparency in architecture of historical period of Safavi, we will analyze case studies and their significance in this period. These buildings are Masjed Jame Isfahan (main mosque of Isfahan)

Si O Se Pol bridge (Thirty three bridges), Char bagh School (Four gardens school), vank church, Chehel sotoun palace (Forty columns palace) and Hasht Behesht palace (Eight paradises palace). In present study it will be demonstrated that how each building shows transparency in light, water and form.

Conclusion

After Islam, the ideas of this godly religion grew gradually in scientific and cultural fields of the life of Muslims' society, and those ideas were improved in the form of spiritual philosophical and imperative aspects. Ideas of this religion influenced lives of people in different aspects and artists of different fields tried to convey these ideas by their words and their works. In Safavi period, mosques as places for making connection with spirituality had the highest rank in demonstrating monotheistic ideas of Islam and on the other hand since they were politically, scientifically and socially, places for spreading ideas of school of Isfahan they were influenced directly by these ideas. Spiritual and symbolic role of architectural elements was observed only in some specific parts of the buildings but what occurred in redefining the Iranian architectures space was a symbolic role that was given to every architectural parts in various buildings especially public buildings, in a conceptual transcendent principle. According to this, different parts of building were designed in a way that every one of them as a photographic sign embodied a part of paradise and as a monolithic totality reflected the paradigmatic heaven. One of the characteristics of architecture of Iran is making locational continuity. Sequence defines special preparation and its acme is when the introverted feelings reach a complete understanding passing time and space. Preparation is related to evolution of the whole spaces in building to passage space which central space is the heart and quintessence of it. This preparation is created and influenced by movement, time, and light and volume variation. Concept of transparency and transparent space has vast interpretations in architecture but this concept could be classified in three realms of light, water and form. In present research its different phenomena were scrutinized by analyzing case studies.

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