

The Architectural & Typological Properties of Plans in Design of Historical Monuments in Arak from Qajar Period

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Abstract: According to the historical documents, the old fabric of Arak is the first pre-thought city in the history of Iran that was constructed based on a pre-planned design. In an era when most towns in Iran were gradually built as organic and based on need of the people, all stages of the construction of the city, from beginning to end, including orientation, spatial organization, composition of land application and building construction were first designed and then executed. Goal of the research is to identify the architectural and typological properties of plans in design of historical monuments in Arak from Qajar period including typology, architectural concept, axes, hierarchy, compositional center, scale, proportion & module. Methodology of the study concentrates on the documentation, descriptive and architecture analysis of the historical monuments and their classification. The combination of qualitative factors with quantitative factors for analysis of monuments has been used. Conclusion of the study is presentation of typology about each of the architectural characteristics, separately for different groups including religious, public, residential, communal, memorial buildings & minor architectural forms.

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1. Introduction

Arak city as the capital of central province is located in Iran central plateau and near the Zagros Mountains. Arak as a symbol of pre-determined designed historical cities in Iran was constructed in 1812 A.D & in the rule of Fathali shah of Qajar. In Qajar period, a style in typological features of architectural monuments begins that on the one hand has been influenced by Esfahan style in Safavid period and on the other hand it is an adoption of the western method. Since the style was formed in Tehran city for the first time thus it has been named after Tehran style. Arak old fabric as index sample of Qajar style has valuable monuments which each of them has unique architectural and historical values. Based on existing documents, monuments belonging to the Qajar period in Arak are divided into 6 groups including religious, public, residential, memorial, communal buildings and minor architectural forms. In each group, the buildings are divided into several types and an index building from each type has been analyzed as a representative of the type. In the group of religious buildings, Sepahdari mosque and Sheikh Abolhassan Mosque, in the group of public buildings, Naghshineh, Taghvai, Akbarian, Kashani, Nozari and Ketabforushha Sara, in the group of residential buildings, Khakbaz, Hassanpur and Hajagha Mohsen Araki house, in the group of communal buildings, Chaharfasl and Safai baths, in the group of memorial buildings, Hazrat Abolfazl, Mohammad Ebrahim, Molla Ghasem Saqakhaneh and in the group of minor architectural forms, Charsuq, Garmkhaneh, Sarbineh, Hassanpur and Nozari pool have been selected as

index buildings and representative of types. In the case of the architectural properties including the typology, architectural concept, axes, hierarchy, compositional center, scale, proportion and module, the classifications are presented separately for each group.

A. Religious buildings

In the group of religious buildings, mosques of Sepahdari and Sheikh Abolhassan have been selected as index buildings and representative of types. These two old mosques have remained with the original structure.

a. Mosque of Sepahdari

The building has been built with style of schools borrowed from the Safavid period and the typology of mosque is as two-porch mosques. The collection is as central courtyard and has a ground with regular geometry. Ratio of site and the courtyard dimensions are 1 to 1.5. Architectural concept of building is combination of an open space as central courtyard and a roofed space around of the yard.

The building has two floors that the second floor consists of two rooms in the southern and northern sides. The ratio of closed spaces area to open spaces is 1.5 to 1 and 10% of roofed area is allocated to the semi-open spaces (Ivan). The mosque has two longitudinal and transverse symmetry axes and the geometric center of the courtyard overlaps on intersection of the axes. The entrance axes are symmetrical compared to the longitudinal axis. There are two porches (Ivan) at the two ends of the longitudinal axes. Porches have different form and function of the other spaces and are more elevated

than the adjacent spaces (Hierarchy). System of repeat in rooms is based on a modular network with width of 4 meters and communication porches located on front of every room, has been caused communication between rooms and courtyard. The compositional center of the building is on intersection of axes and overlaps on the compositional center of the yard.

b. Mosque of Sheikh Abolhassan

The typology of the building is Shabestani mosques type. In this type, the Shabestan is a roofed space includes of the collection of columns and is without porch (Ivan). In the collection, the building is located on a side of the yard and ratio of the building dimensions is 1 to 1. Architectural concept of the building is combination of an open space and a roofed space and the building has two yard in levels with different height. The building has two floors and the ceiling of the first floor is yard for the second floor. The ratio of closed spaces area to open spaces is 1 to 1 and the building is without the semi-open spaces (Ivan). The mosque has two symmetry axes and the geometric center of the building overlaps on intersection of the axes. The entrance axes are symmetrical compared to the longitudinal axis. The sanctuary is located at the end of longitudinal axis, form and decoration of space in the sanctuary is different from other spaces (Hierarchy). System of repeat in rooms is based on a modular network with dimensions of 4*4 meters and in number of 5 modules along the axes. The compositional center of the building is on intersection of axes and overlaps on the compositional center of the building.

B. Public buildings

In Arak old fabric, the most important buildings belonging to this group are Timcheh and Sara. These buildings have commercial and chamber use. In the past, merchants who often travelled in from distant towns spent the night on Sara and Timcheh. This group of buildings is along the bazaar and their entrances are connected with the main axis of bazaar. All axes of the Sara and Timcheh are parallel to bazaar path. This group of buildings in Arak historical fabric is classified into six types based on the combination of Sara (central courtyard structure) and Timcheh (roofed space with central hall) compared to each other and their location in comparison with bazaar axis.

Type 1: This type consists of Timcheh as roofed space and is without Sara. This group of buildings has an overall plan in the form of rectangular and entrance is along the longitudinal axis. The names of some buildings located in this type are: Timcheh of Hezaveiha, No, Mesgarha, Naghshineh, Karimi and Fleshtin.

Type 2: This type consists of Sara with structure of central courtyard and is without Timcheh. This group

of buildings contains a row of porch as a semi-open space and entrance is along the symmetry axis. The names of some buildings located in this type are: Sara of Fadaei, Ghomiha and Kermanshahiha.

Type 3: This type consists of Sara with structure of central courtyard and the Timcheh as roofed space. Combination of Sara and Timcheh is in a way that Sara does not have direct access to Bazaar and to enter Sara, should be passed from Timcheh. The names of some buildings located in this type are: Timcheh and Sara of Ketabforushha and Hajibashi

Type 4: This type consists of Sara with structure of central courtyard and The Timcheh as roofed space. Combination of Sara and Timcheh is in a way that Timcheh does not have direct access to Bazaar and to enter Timcheh, should be passed from Sara. The names of some buildings located in this type are: Timcheh and Sara of Taghvai and Akbarian.

Type 5: This type consists of Sara with structure of central courtyard and The Timcheh as roofed space. Combination of Sara and Timcheh is in a way that while Timcheh and Sara communicates with each other, they have independent entrance from Bazaar. The names of some buildings located in this type are: Timcheh and Sara of Aghai, Nabizadeh, Kashani and Golshan.

Type 6: This type consists of Sara with structure of central courtyard and several Timcheh as roofed space. Combination of Sara and Timcheh is in a way that three Timcheh have surrounded The Sara from three sides. While Timcheh and Sara communicate with each other, they have independent entrance from Bazaar. The name of only building located in this type is: Timcheh and Sara of Nozari

Since for conducting of the analysis process, the sample of any type should be comprehensive and contain all the properties related to the type, so from any type, the building have been chosen that their Structure and details have changed less over the time and have greater diversity. Based on these criteria, the samples have been selected for the type 1, 3,4,5,6 are Timcheh and Sara of Naghshineh, Ketabforushha, Akbarian, Kashani and Nozari respectively. Because all the buildings belonging to type 2 have been demolished and rebuilt with new style, so this type cannot be analyzed.

a. Timcheh of Naghshineh

The building belongs to the type 1 of Timcheh and Sara. The type 1 consists of The Timcheh as roofed space and is without Sara. The collection has a ground with regular geometry and dimension of the building is based on the golden ratio. Architectural concept of building is a central roofed lobby and rooms which are located on around. Ratio of roofed spaces area to lobby is 4 to 1. Timcheh has a symmetrical axis that the building is symmetrical

compared to the axis. The compositional center overlaps on geometric center of the building and Entrance axis is located on longitudinal symmetry axis. The Timcheh has three floors consist of basement, first floor and second floor which have similar architectural design. At the two ends of longitudinal axis, form and function of space are different so that the beginning of axis has been devoted to entrance and the end of axis to the main space and has been decorated differently compared to other rooms. This matter reflects that design of the architectural spaces is based on hierarchy. The central hall of Timcheh is in form of octagonal and has an elongated shape so that the ratio of width to the length of space is 1 to 2.5. System of repeat in chambers is based on a modular network with width of 4 meters and communication joints located on middle of every two module, has been caused communication between rooms and lobby.

b. Sara of Ketabforushha

The building belongs to the type 3 of Timcheh and Sara. The type 3 consists of Sara with structure of central courtyard and The Timcheh as roofed space. Combination of Sara and Timcheh is in a way that Sara does not have direct access to Bazaar and to enter Sara, should be passed from Timcheh. The collection has a ground with regular geometry and is a combination of open and closed spaces. The placement of the components of the building compared to Bazaar is such that Timcheh and adjacent hallways are next to bazaar and the Sara is located after Timcheh and farther from bazaar. Timcheh and Sara have a common symmetry and longitudinal axis. Entrance axis is located on the longitudinal and symmetry axis of Timcheh and Sara and pass through the compositional center of the building. The Sara has two floors with a similar architectural design. Architectural design of Sara is in the form of a central courtyard so that the compositional center of the building overlaps the geometric center of the courtyard. The courtyard is limited to the chamber from three sides, and from one side to Timcheh and adjacent hallways. The ratio of closed spaces area to open spaces is 2 to 1 and 10% of roofed area is allocated to the semi-open spaces (Ivan). The Sara has two longitudinal and transverse axis of symmetry so that its longitudinal axis overlaps the symmetry axis of Timcheh. At the two ends of axes, form and function of space are different so that the end of longitudinal axis is allocated to main space and has a circular cross-section and is different from the other rooms. It reflects the fact that design architectural spaces is based on the principle of hierarchy. System of repeat in chambers is such a way that a communication joint is located between two rooms and has been caused communication between rooms and courtyard.

Ordering of rooms in northern and eastern sides is single-layer, but in the southern side of the yard, since it is overlooking the passageway, it is dual layer, so that one layer connected to the passageway and another to the yard.

Timcheh and adjacent hallways have an elongated shape and so that in central hall, the ratio of width to the length of space is 1 to 2.5. Form of The central hall is like an octagonal and to convert the rectangular to octagonal a triangle terrace is constructed which is repeated in both floors. The compositional center of Timcheh is located on the longitudinal symmetry axis and along the geometric center of Sara. The rooms located along the body of Timcheh have two entrances, one from Timcheh and another from the adjacent hallways.

c. Sara of Akbarian

The building belongs to the type 4 of Timcheh and Sara. The type 4 consists of Sara with structure of central courtyard and The Timcheh as roofed space. Combination of Sara and Timcheh is in a way that Timcheh does not have direct access to Bazaar and to enter Timcheh, should be passed from Sara. The collection has a ground with regular geometry and is a combination of open and closed spaces. Ratio of Sara dimensions is 1 to 1 and the same ratio in Timcheh is 1 to 2. Architectural concept of building is combination of an open space as central courtyard and a roofed space. Timcheh and Sara have a common symmetry axis so that this axis is located on entrance axis and is perpendicular to Bazaar axis and pass through the compositional centers of Sara and Timcheh. The Sara has two floors with a similar architectural design. Architectural design of Sara is in the form of a central courtyard and all components are symmetrical to geometrical center of the yard. Sara is in form of rectangular. There is a colonnade around the yard that it has given the courtyard a octagonal space. The ratio of closed spaces area to open spaces is 2 to 1 and 10% of roofed area is allocated to the semi-open spaces (Ivan). The Sara has two symmetry axes which are perpendicular to each other so that geometrical center overlaps compositional center. At the two ends of western and eastern axes, form and function of space are different (hierarchy). System of repeat in chambers is based on a modular network with dimension of 4*4 meters and colonnade has been caused communication between rooms and courtyard. Ordering of rooms in all sides of the yard is single-layer so that rooms located on eastern side of the yard have two entrances, one from yard and another from Bazaar. Timcheh has an elongated shape so that the ratio of width to the length of space is 1 to 3. Form of Timcheh is like an octagonal and to convert the rectangular to octagonal a triangle terrace has been constructed. The Timcheh has two symmetrical axes.

Entrance from Sara is located on transverse axis and entrance from bazaar path is on longitudinal axis. The compositional center of Timcheh is located on intersection of the longitudinal and transverse axes and is along the compositional center of Sara.

d. Sara of Kashani

The building belongs to the type 5 of Timcheh and Sara. The type 5 consists of Sara with structure of central courtyard and The Timcheh as roofed space. Combination of Sara and Timcheh is in a way that while Timcheh and Sara communicates with each other, they have independent entrance from Bazaar. The collection has a ground with regular geometry and is a combination of open and closed spaces. Ratio of Sara dimensions is 1 to 1 and the same ratio in Timcheh is 1 to 2. Architectural concept of building is combination of an open space as central courtyard and a roofed space. The communication axis of Timcheh and Sara overlaps on transverse symmetry axis of Timcheh and doesn't pass through the compositional center of Sara yard. The Sara has two floors with a similar architectural design. Architectural design of Sara is in the form of a central courtyard and all components are symmetrical to geometrical center of the yard. Sara is in form of rectangular. There is a colonnade around the yard that it has given the courtyard an octagonal space. The ratio of closed spaces area to open spaces is 2 to 1 and 15% of roofed area is allocated to the semi-open spaces (Ivan). The Sara has a symmetry axis which overlaps on entrance axis. At the two ends of this axis, form and function of space are different (hierarchy). System of repeat in chambers is based on a modular network with width of 4 meters and communication joints located on middle of every two module, has been caused communication between rooms and courtyard. Ordering of rooms in northern, southern and eastern sides is single-layer, but in the western side of the yard, since it is overlooking the Bazaar, it is dual layer. Timcheh has an elongated shape so that the ratio of width to the length of space is 1 to 4. Form of Timcheh is like an octagonal and to convert the rectangular to octagonal a triangle terrace has been constructed. The Timcheh has two symmetrical axes. Entrance from Bazaar is located on longitudinal axis and entrance from Sara is on transverse axis. The compositional center of Timcheh is located on intersection of the longitudinal and transverse axes and is not along the compositional center of Sara.

e. Sara of Nozari

The building belongs to the type 6 of Timcheh and Sara. The type 6 consists of Sara with structure of central courtyard and several Timcheh as roofed space. Combination of Sara and Timcheh is in a way that three Timcheh have surrounded The Sara from three sides, while Timcheh and Sara communicates

with each other, they have independent entrance from Bazaar. The collection has a ground with regular geometry and is a combination of open and closed spaces. Ratio of the building dimensions is 1 to 1. Architectural concept of building is combination of an open space as central courtyard and roofed spaces in the form of U around it. The western-eastern symmetry axis of Sara is perpendicular to the longitudinal axis of western Timcheh and is parallel to the longitudinal axes of southern and northern Timcheh. The southern-northern symmetry axis of Sara is perpendicular to the longitudinal axes of southern and northern Timcheh and is parallel to the longitudinal axis of western Timcheh. The main entrance is not located on symmetry axes. The Sara has two floors with a similar architectural design. Architectural design of Sara is in the form of a central courtyard and all components are symmetrical to geometrical center of the yard. Sara is in form of rectangular. There is a colonnade around the yard that it has given the courtyard an octagonal space. The ratio of closed spaces area to open spaces in Sara is 3 to 1 and 10% of roofed area is allocated to the semi-open spaces (Ivan). The Sara has two symmetry axes so the compositional center overlaps on geometrical center. At the two ends of the axes, form and function of space are different (hierarchy). System of repeat in chambers is based on a modular network with width of 4 meters and communication joints located on symmetrical axes and corners of the yard have been caused communication between rooms and courtyard. Ordering of rooms in northern, southern and western sides is single-layer, but in the eastern side of the yard, since it is overlooking the Bazaar, it is dual layer.

Timcheh has an elongated shape so that the ratio of width to the length of space in the western Timcheh is 1 to 3 and the same ratio in southern and northern Timcheh is 1 to 10. Form of the western Timcheh is like an octagonal and to convert the rectangular to octagonal a triangle terrace has been constructed. The compositional center of Timcheh is located on the southern-northern axes and is along the compositional center of Sara. In southern and northern Timcheh, Entrance axes from Bazaar are located on longitudinal symmetrical axes.

C. Residential buildings

This group of buildings is located in the depth of quarters and their entrances are connected with semi public and semi private passages. All axes of the house are parallel to the around passages. The residential buildings in Arak old fabric is classified into three types based on the combination of open and closed spaces compared to each other.

Type1: In this type, roofed space is in the center of the yard as closed space is associated with open space from four directions. This type consists of 30 percent

of old house in Arak. The names of some houses located in this type are: houses of Hajvakil, Yasrebi, Hajibashi, Roshanzamir and Khakbaz

Type 2: In this type, open space is surrounded by closed space so the courtyard located in the center of the building and is surrounded by roofed space. This type consists of 60 percent of old house in Arak. The names of some houses located in this type are: houses of Hassanpur, Maleki, Sotudeh, Sohrabi and Rastin.

Type3: In this type, the building includes of several central courtyards as independent from each other so that the courtyards has been surrounded by roofed space. This type consists of 10 percent of old house in Arak. The names of some houses located in this type are: houses of Hajagha Mohsen Araki and Arg.

Since for conducting of the analysis process, the sample of any type should be comprehensive and contain all the properties related to the type, so from any type, the building have been chosen that their Structure and details have changed less over the time and have greater diversity. Based on these criteria, the samples have been selected for the type 1, 2, 3 are houses of Khakbaz, Hassanpur and Hajagha Mohsen Araki respectively.

a. House of Khakbaz

The building belongs to the type 1 of residential houses. In this type, roofed space is in the center of the yard as closed space is associated with open space from four directions. The collection has a ground with regular geometry and is a combination of open and closed spaces. Ratio of site dimensions is 1 to 1 and the same ratio in the building is 1 to 1.5. Architectural concept of building is placement of an extrovert cubic in the geometric center of an open space as the building is the turning point of the space.

The building has basement and two floors as the first and second floor have a similar architectural design. The ratio of closed spaces area to open spaces is 1 to 10 and 20% of roofed area is allocated to the semi-open spaces (Ivan). The house has two symmetry axes which overlap on entrances axes. At the two ends of the axes, form and function of space are different (hierarchy). System of repeat in rooms is based on a modular network with width of 3 meters. Rooms linked together by a central hall as the Central hall located at the geometric center of the building and with stair is directly related. The compositional center of the building is located on intersection of the longitudinal and transverse axes and overlaps on the geometric center of the building.

b. House of Hassanpur

The building belongs to the type 2 of residential houses. In this type, open space is surrounded by closed space so the courtyard located in the center of the building and is surrounded by roofed space. The collection has a ground with regular geometry and is a

combination of open and closed spaces. Ratio of site dimensions is 1 to 1.5 and the same ratio in the courtyard is 1 to 2. Architectural concept of building is combination of an open space as central courtyard and a roofed space around of the yard. The building has two floors with a similar architectural design. The ratio of closed spaces area to open spaces is 2 to 1 and 10% of roofed area is allocated to the semi-open spaces (Ivan). The house has a longitudinal symmetry axis which overlaps on entrance axis. At the two ends of this axis, form and function of space are different (hierarchy). System of repeat in rooms is based on a modular network with width of 4 meters and communication joints located on middle of every two module, has been caused communication between rooms and courtyard. The compositional center of the building is located at the end of the longitudinal axis and is along the compositional center of the yard.

c. House of Hajagha Mohsen Araki

The building belongs to the type 3 of residential houses. In this type, the building includes of several central courtyards as independent from each other so that the courtyards has been surrounded by roofed space. [8, p.131]The collection has a ground with regular geometry and is a combination of open and closed spaces. Ratio of site and main courtyard dimensions are 1 to 1.5. Architectural concept of building is combination of several independent complexes which have common geometry. The building contains basement and two floors that basement and the first floor have similar architectural design. The building include of a main courtyard with a large dimensions and two side courtyards with small dimensions. The ratio of closed spaces area to open spaces is 1 to 1 and 5% of roofed area is allocated to the semi-open spaces (Ivan). The house has a longitudinal axis as main axis and three minor axes. At the two ends of the axes, form and function of spaces are different. So there is a three door room (main room) at the end of the longitudinal axis (hierarchy). System of repeat in rooms is based on a small modular network with width of 3 meters and a large modular network with width of 5 meters. Communication joints located on middle of every two module has been caused communication between rooms and courtyard. The compositional centers of the building are located at the end of the axes and are along the compositional centers of the yard.

D. Communal buildings

The communal buildings in Arak old fabric are of two types including single & multi complex that baths of Safai & Chaharfasl have been selected as representatives of types.

a. Bath of Safai

The building is classified in the Qajar style and its architectural concept is a complex with organic

geometry. Ratio of site dimensions is 2 to 1. All parts of the building are below ground level and the roof is same level with the floor of passages and surrounding streets. All spaces of the bath are closed and there are no open and semi-open spaces. The building has entrance, dressing space, communication joint, hothouse, and water storage. There is a symmetry axis in the bath. Entering the building is done through the corridor which is not along the axis. At the end of the axis, form of space is different (hierarchy). System of spaces repetition is based on a modular network in width of 1.5 m. The composition center of each space is along the symmetry axis.

b. Bath of Chaharfasl

The building is classified in the Qajar style and is Continuous collection with organic geometry. Ratio of site dimensions is 3 to 1. Architectural concept of building is combination of several complexes so that they are completely independent and don't have any form and functional connections with each other. All parts of the building are below ground level and the roof is same level with the floor of passages and surrounding streets. All spaces of the bath are closed and there are no open and semi-open spaces. The building has four complexes including of baths of Muslim men, Muslim women, religious minorities and the properties. Each complex has entrance, dressing space, communication joint, hothouse, and water storage. Shape of more space is Octagonal and each space has two symmetry axis are perpendicular to each other. But the whole building and each complex don't have axis independently. Spaces are connected with each other through a communication joints which are in form of octagonal and changing the angle of 45-180 ° is accompanied. In each space, intersection of the axes overlaps on geometric center of the space. Entering the building is done through the vestibules and entrance to spaces is not along the axes and is located on the corner of the space. At the end of the axes, form of space is different and area is more compared to adjacent spaces (hierarchy). System of spaces repetition is based on a modular network in width of 1.5 m. in each space; the composition center is on intersection of the axes and overlaps on the geometric center of the space.

E. Memorial buildings

The most memorial buildings have been destroyed due to lack of sponsorship. The only buildings which have remained are Hazrat Abolfazl Alabas, Mohammad Ebrahim & Molla Ghasem Saqakhaneh. These buildings are holy to people and are a symbol of Karbala battle.

a. Saqakhaneh of Hazrat Abolfazl Alabas

Architectural concept of the form is a rigid cubic so that it is connected with the outside only from one side. Ratio of the plan dimensions is 1 to 1. The form

has a symmetry axis. The compositional center of the form is along the axis and overlaps on its geometric center.

b. Saqakhaneh of Mohammad Ebrahim

Architectural concept of the form is a rigid cubic so that it is connected with the outside only from one side. Ratio of the plan dimensions is 1 to 1. The form has a symmetry axis. The compositional center of the form is along the axis and overlaps on its geometric center.

c. Saqakhaneh of Molla Ghasem

Architectural concept of the form is a rigid cubic so that it is connected with the outside only from one side. Ratio of the plan dimensions is 1 to 1. The form has a symmetry axis. The compositional center of the form is along the axis and overlaps on its geometric center.

F. Minor Architectural forms

In Arak old fabric, Minor Architectural forms include symbolic pools which are often located on the middle of urban & architectural spaces and give Intimate quality to the space.

a. Pool of Charsuq

Architectural concept of the form is an octagonal prism which is located in the center of an urban area as completely symbolic. Ratio of the plan dimensions is 1 to 1. The form has a symmetry center and components of form are radially symmetrical compared to the basis point. The compositional center of the form is on its geometric center.

b. Pool of Garmkhaneh

Architectural concept of the form is an octagonal prism which is located in the center of an architectural space as completely symbolic. Ratio of the plan dimensions is 1 to 1. The form has a symmetry center and components of form are radially symmetrical compared to the basis point. The compositional center of the form is on its geometric center.

c. Pool of Sarbineh

Architectural concept of the form is an octagonal prism which has been combined with four cubes from four sides. The form is located in the center of an architectural space as completely symbolic. Ratio of the plan dimensions is 1 to 1. The form has a symmetry center and components of form are radially symmetrical compared to the basis point. The compositional center of the form is on its geometric center.

d. Pool of Nozari

Architectural concept of the form is an octagonal prism which is located in the center of an architectural space as completely symbolic. Ratio of the plan dimensions is 1 to 1. The form has a symmetry center and components of form are radially symmetrical compared to the basis point. The compositional center of the form is on its geometric center.

e. Pool of Hassanpur

Architectural concept of the form is a cube prism which is located in the center of an architectural space as completely symbolic. Ratio of the plan dimensions is 1 to 1. The form has two symmetry axes and components of form are symmetrical compared to axes. The compositional center of the form is on its geometric center.

Conclusion

The typological features of plans in design of historical monuments in Arak from Qajar period are as follows: Plans are mainly of two types including blocked & courtyard composition. In the case of religious buildings, the great mosques are of courtyard composition and have two verandas and a dome (Sepahdari mosque). Small and medium-sized mosques are of blocked composition with the structure of column collection (Sheikh Abolhassan mosque). In the case of public buildings, the buildings are classified into six types based on the combination of Sara with courtyard structure and Timcheh with blocked composition and their location in comparison with bazaar axis. Small residential buildings are of blocked composition (Khakbaz house). Typology of medium-sized houses is courtyard composition (Hassanpur house) and the great houses are of multi courtyard composition (Hajagha Mohsen Araki house). In the case of communal buildings, baths are of single and multi complex composition. The complexes are completely independent and have no functional and formal communication with each other. In the case of memorial buildings, all Saqakhaneh are of blocked composition and are symmetrical compared to central axis of plan. In the case of minor architectural forms, pools are of two types in form of octagonal prism and cube that all of them have a symmetry center.

The architectural properties of plans in design of historical monuments in Arak from Qajar period are as follows:

1. In terms of hierarchy, in most buildings, main halls are in behalf of the courtyard and are along the symmetrical axes. The index spaces usually have notable dimension, form and decoration. In few buildings, the hierarchy of the complex corresponds to the unity of the volume.

2. Without any exception all buildings have at least one symmetry axis which is perpendicular to passageway and usually starts at the entrance point and ends of the main space. In most buildings except mosques & baths, the entrance axis overlaps on one of the symmetry axes. Approximately 60% of the buildings have two symmetry axes which are perpendicular to each other.

3. In most buildings, the composition center is located on the intersection of symmetry axes & overlaps on

geometric center of the space. In few buildings, the composition center is in behalf of the central hall and at the end of longitudinal symmetry axis.

4. Ratio of the dimensions of all buildings is horizontal in vertical direction. Excluding baths, the plans differ from square to golden section relation of the depth and width. Aspect ratio is linear in the baths. The Index elements are in sculptural arrangement in the great mosques.

5. Scale of all buildings except the great mosques is in natural size. The great mosques are of heroic scale.

6. In all buildings, structural elements are located on a modular network and spaces are repeated as monotonous & alternating.

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