

Analyses of Iranian Garden Design Art from Landscape Architecture and Urbanism View

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Abstract—In Iranian mind, garden has a pervasive picture as it has changed into an internal view through centuries and is considered part of its culture. From one side Iranian Gardens got their feature and shape from their geometric and structural definitions and from harmony of their sustainable orders. As each of these orders were modern but an unwritten principle and norm that systematized definition, planning, shaping and forming of a part of garden in relation with other parts of it. This order was in such an extent that no Iranian Garden is designed except if it included both orders of structure and geometrical point and forming Iranian architecture space, elements and arena. Investigating experiences of Iranian urban design in relation with methods of exploiting garden in urban structure and spaces can have significant role in reconstruction, repair and development of cities. Therefore, we have tried in this article to analyze basics of landscape architecture and Iranian Garden Urbanism together with its teachings in contemporary garden design of Iran from different points of view.

Keywords— Domestic Technology, Iranian Garden, Landscape Architecture, Order, Structure,

I. INTRODUCTION

THE word “Behesht” which means garden of heaven is changed into “Ferdows” in Arabic and “paradise” in other languages. The word Behesht or “vehesht” means the best life and Behesht was imagined as a green, beautiful and fresh garden. We use the words “Jannat”, “Ferdows”, “Behesht” or “Rezvan” to refer to this concept. Thus, the imagination of Behesht as a place which is awarded for the good deeds in Iranian mind is a green and fresh garden. If paradise is full of “kossar” waters (sweet waters), flowers and streams, nice flowing water, beautiful flowers and the tree on whose shade one can rest are found in gardens and all these are surrounded by a fence to stop hell people from entering into it.

In Iranian mind garden has a pervasive picture as it has changed into an internal view through centuries and is considered part of its culture. Aspects of this internal garden which takes its form from historical characteristics, religion and especially rooted customs of poems and spiritual schools can be seen in all aspects and stages of life.

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In other words, gardens are considered as spirit and symbol of nature and all over the world they are a way to refer to internal beliefs. Sometimes these flowers are portrayed in words but not in dry and senseless words like western literature. Even though in different stages some equal words for western ones are developed but in Iranian literature they are mostly expressed like conventional gardens in their natural form and growth as the nature plants them and not in rows or groups. Iranian Garden is a heading to the most internal layers of thinking ideologies and Iranian imagination and mind, it is expression of the meaning of life, extremity of human, eternity, paradise and life and earthen concepts of spiritual world from Iranians' view. [1]

II. IRANIAN GARDEN DESIGN ART

Generally speaking Iranian art significantly benefits from use of different colors (in architecture, weaving, and even in inks used to write the books). In Iran, these colors are found in flowers and more or less appear separately on tiles, mosaics, domes and walls, in clothes and in carpets that their pattern is garden picture. Valuable carpets named “Char Bagh” that were weaved in Safavid times became very famous. The pattern of these carpets got the pattern of original Iranian Gardens and for the interest of the kings in “Char Bagh” (four gardens) these carpets were also sometimes divided into four parts and sometimes they were divided into smaller parts. The picture of main poles and “Kolah Farangi” buildings were weaved on the carpet and different kinds of beautiful trees and flowers and fish in water canals and the birds in between tree leaves and branches could also be seen. In the beginning of nineteenth century in Sisil country, there were garden of Iranian style whose origin went back to the times of Arab conquer. Gardens had significant role in miniature paintings in the books prepared for kings. [2]

The book of Shahnameh by Ferdowsi which dates back to tenth century is in its kind full of pictures of gardens and flowers as miniature gardens in different patterns and its most noticeable part was the 250 paintings that the first Safavi King ordered them for his son Tahmasb Shah Father of Abbas Shah. In these books terrific scenes of hunting places and jungles could be seen in furnished like world of beautiful gardens. These similar gardens were also places for love stories such as Khosro Shah and Shirin. It was natural that garden and its complicated relations would create a world of simile for famous and spiritual poets such as Jaleleddin Rumi and Sadi

in thirteenth century and Hafiz in fourteenth century. Using the imaginary pictures of gardens and the complicated structure of the expression they used and flexibility of Persian language, these poets had enough tools to compose beautiful poems with completely tangible and meaningful imaginations. The poem (Gonbadeh Siyah) of Nizami in twelfth century shows that how a sear heart is looking for flourishing and this flourishing is accomplished through Iranian Gardens. It was for such a reason that these gardens were treated as valuable treasures and people kept them in palaces and yards even if it was an only one tree to make shades or a small vase of geranium flower to paint the environment and people lay on flowered texture clothing when they went on a picnic.

Thus it can be said that garden design art is inspired from sustainable symbols. The garden is located in the hillside of the hills, it is surrounded by fences and it is divided into four parts; this division was done by employing streams and water ways decorated with water passages or through building constructions in conjunction points which will be discussed in detail later in this article.

III. SOURCES

Let us go back then to the sources. At the beginning God created a garden whose name was Eden. The tradition locates it in Mesopotamia. Before the fall, the Eden was a place of peace and pleasure, of fruitfulness, fragrances, enchanted by the music of water and the laughter. Since the first kingdom of Assyria, the men always tried to recreate this mythical paradise. At the beginning of the third millennium, Gilgamesh prides orchards and gardens of his city. With the length of the second millennium, all the kings of Mesopotamia maintain the royal gardens. The courses interiors of the palates shaded by trees and are decorated floral plantations. At the first millennium, has Nimrud, king Assurbanipal brings by channels the water of the mountains to irrigate a planted garden of vines and many trees, of which the apple tree, the pear tree, the quince tree, cedar and the cypress; certain species indigenous, but are imported much following the military campaigns. Its successor transfers his capital to Ninava, which it surrounds by parks and gardens, and it reconstitutes even a marshy environment for the wellbeing of plants and animals which it brought back at the time of military campaigns. Most legendary among the gardens of antiquity were those of Babylon. In 5th. century B.C. King Nabuchander made arrange terraces in staircases, glazes of plants, which according to Greek historians were built for his wife, who was originating in Persia and regretted the mountains and wooded slopes of her country. They are the Egyptians who left us oldest pictorial testimonies of plant species: in 1495 B.C. The Hatshepsut queen had sent a true forwarding in the middle of Africa in order to bring back trees to incense and palm trees which it made plant in her garden Dar-Al-Bahari. However, in fact the Persian gardens will be the true sources of inspiration of the palace-gardens developed initially in Baghdad and Samarra in current Iraq, then in Andalusia, in Africa, in

Central Asia and India. The Prime Ministers Caliphes found in legendary the Takhts (platform) Sassanid's which, thrones of Amrats and Qasrs (house, palate), collected the water of the mountains and dominated the landscape, a practical solution and adapted to their first establishments.

However the tradition of palace at the Sassanid's went back to one more remote time. The vestiges of several park-gardens Achaemenid (VII-V B.C.) testify to the importance of these gardens, called "Pardis (Paradise)" according to the word into Persian Old Pardis, which means "closed gardens". Of geometrical structure divided into four parts, connecting the official palate and the residences by long alleys called Chahar Bagh (4 Garden), these gardens comprised cut stone channels and planted squares of trees, shrubs, and flowers. Houses acting as view-point made it possible to the monarch to dominate this domesticated nature. Thus which Xenophon evokes the garden of Cyrus II to the VE century B.C., and described the harmony of the walks and the spacing of the trees as well as pleasure of the refined scents. The princely gardens which follow the Sassanid's palates are the heirs to this tradition.

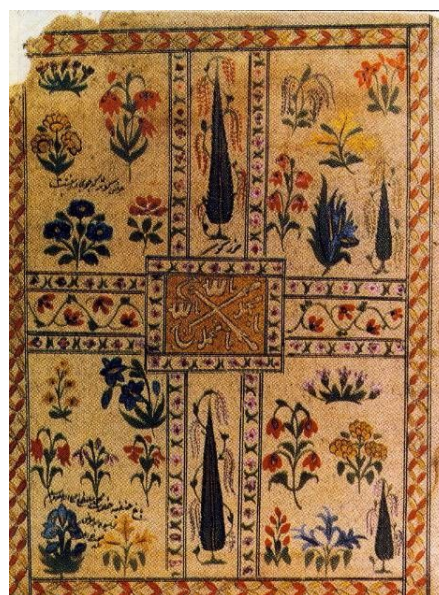


Fig. 1 Eden garden

The place of Koran in the transmission of this tradition must be appreciated with measurement: the conquerors converted with Islam choose the garden to control the distribution of water, to settle with the variation of the cities all while dominating them, and adopt primarily the tradition of the paradises Sassanid's and their Chahar Baghs to build their gardens. However this place promised by Koran with all the elected officials becomes a prototype who while exceeding the practical motivations gives again a direction to them. Because yew is necessary to specify that the paradise of Koran has a quite precise architecture.

In the account of its night voyage, the mirage, the Prophets is led by the angel Gabriel with the paradise. It is for the elected

officials, the piles, the saints, that God prepared the paradise: the garden of the retirement, the garden of eternity, the garden of delights, the garden of the Eden, the residence of the hello, the stay. This garden is located close to the jujube tree of the limit, and is called "Mava": the tradition places this garden at the seventh heaven. The centre of the paradise is called by the Persian word Ferdows (paradise centre), the highest stage is the garden of the Eden that God planted his own hands to be his supreme residence: the climate of the paradise is eternally moderated, it has neither sun nor the moon, one distinguishes the day from the night, it resigns there an eternal clearness, the Khuarna, word of origin Mazdeene. In its centre, where Ferdows is, take their sources the four large rivers which sprinkle the paradise with water, wine, honey and milk. In addition to these four large rivers, God promised to the prophet a Marvellous Brook, Kothar, with gold banks and the beds of pearls and ruby. The tradition transmitted the names of the four paradisiacal mountains to us: Ohod, the Sina, Lebanon and Hasib. The paradise has eight doors, it east surrounds by enclosures, a model of Ka'ba is used as mosque to the elected officials. It appears that the Islamic world chose this archetypal place, this celestial body like Henri Corbin, to express the relation of the human being with beyond idealized an eternal paradise. Today from other disciplines, based on the study of the texts, come to be added to the archaeology and the history of art to highlight secular dimension, the differences in climates, the size of agricultural, and the practices of cultures, which through time played their part in the development of various types of gardens. Thus let us revisit the structure, quite precise, of this paradise visionary.

IV. The image of the world in Practice

Perpetual Object of an unfolding of direction and a set of references of reality to fantastic, the garden is nevertheless bases on well defined pillars.

Firstly, it is place in extreme cases: Henri Corbin helps us to interpret the notion of the limit. He explains why the garden is the prototype of a fundamental place in extreme cases of the physical world (Malakut). He is an interval, he constitutes the imaginary world. The tree of jujube tree marks this limit, left enclosure which breaks with external chaos.

Secondly the garden is located in time: It is located even at horse on two designs of time. The first time is cyclic and repetitive, it represents the change of the seasons, these is a domestic and tangible time which takes into account the sites, the proximity of the sources of water, and the choice of trees and of floral plantations which offer flowerings and perfumes in any season. The second is a time transcendental; the garden is a place of recall to the divinity. It is thus a celestial place (buckled) and is a physical body (revealed). In the architecture of the garden water will be used as instrument for it face to face of the form and to be it.

The third pillar is the division of the garden in four parts. For the Mazdeene religion, ancient belief of Persians, the world was divided into four parts. The figure four returns to the crowned elements, four seasons, etc One finds it in the

Buddhist symbolic system, where four rivers start from a centre and represent the eternal life and the fertility. The archetypal paradise of Koran is heir to this division of the garden into four with a source in its centre.

The fourth pillar of the garden is its centre: In the first examples, there is only one center with a basin in the medium where torrent a shelter. Later the intersections of the alleys multiply; the water levels subdivide the garden in several Chahar Baghs.

The fifth element of this garden founder is the kiosk, word French for Persian Koushk. A construction with eight doors, open on all its sides, offering axial sights towards the four alleys, returns indeed in a multitude of the architectural types, tries, house, watchtower, kiosk, gate, tomb, as many loans dune culture to the other.

V. GEOMETRICS, STRUCTURE AND ORDER OF IRANIAN GARDEN

On the whole Iranian art used in Iranian Gardens has got its feature and shape through its geometrical and structural definition and the harmony of its sustainable order. As well as having a role in formation of architecture, geometrics is considered the base of Iranian Garden shapes; as the most important feature and indicator of Iranian Garden is its complete geometrical, orderly and pre-planned space. This geometrical base has a role in drawing out concepts, basics and building material of the garden and the composition way of these elements and parts which finally leads to general shape of it. From the other hand other orders can be recognized which have effect in shaping the garden.

These orders include a collection from norms and ideological bases, designing and living customs of people to the methods of giving orders to the spaces. Some of these orders go further than having effect on shaping the garden determining the whole shape of habitats and human environments such as land ownership, economical and living and social orders, and some of them are mainly dedicated to architecturally shaping spaces and something which is of more importance to us, i.e. the garden. When related to each other or better to say when corresponded with each other, the collection of these orders shape a symbol of paradise with the help of what they get from natural and artificial surroundings considering the Iranian principle, geometry and architectural norms in a defined range.

If we postpone the broad study of human life of order collections such as economical and social orders hoping to be able to study their role in shaping the garden which is of importance in its own place, we should talk about some other orders such as applied, irrigation, plant and stability orders.

Iranian Gardens were either constructed in flat lands and were plain gardens or constructed in slope lands where waterfalls and trees make them more beautiful like Natanz Garden, Shahzadeh Mahan Garden and Takhte Shiraz Garden.

Special attention was paid to geometry in Iranian Garden and square shape which clearly and simply showed the distance between different parts of garden was of special importance. The first stage in planting a tree was to determine

its distance from all sides; thus squares were shaped and it was possible to see the row of trees from all sides. For example we can see in Jafari Garden in Bam that palm trees are not even one centimeter out of their row. Depending on the type of tree be it mulberry tree, walnut, apple, sloe, plum tree or other without-fruit tree, the distance was different. For example in one piece of land that trees such as pistachio got ripe later, nectarine was also planted; Nectarine wasted in 6-7 years and main trees emerge from land and grow up. Separately or mixed, the trees were planted on vertical lines in square shape. [3]

Another important principle in Iranian Garden design was an open rectangular shape landscape in front of garden. In these gardens in front of building there was an open and long space in main landscape site. To avoid making a barrier in front of garden scenery instead of long plants short plants which were always beautiful were planted in front of it. Sometimes alfalfa was planted in the field and now planting grass is more common.

The building was constructed in different parts of the garden; for example sometimes the main building was in the middle of garden and could be seen from all sides and secondary buildings and portal were located around it. Or sometimes the main building was in one side and secondary buildings were around it with two crossing ways and the main landscape was located in longitudinal axis of the garden. In some gardens palace was located in longitudinal axis line of the main space with one third ratio and internal buildings situated in solitude part of garden and the main landscape was in the opposite direction of internal buildings. The garden around the internal building had planting piece and other elements but behind of the building was blocked like Delghosha Garden.

There was another kind of garden where an enclosed yard was situated behind the main building; main building had a good view in front but behind of it was only a solitude yard like Eram Garden in Shiraz, Bagh Mazar in Kashan and Sarvestan in Fars. In addition to the main garden, some other gardens had an external garden which was more public and after passing through it people could enter the main garden like Dolat Abad Garden in Yazd front of which Behesht Aeen Garden was located. Jahan Noma Garden of Shiraz had also external garden where a factory is built now but the main garden still remains the same.

There was a canyon, girth or forecourt in front of some gardens like Shahzadeh Mahan Garden. But, in front of all these gardens there was definitely a water-passage or a rectangular shape space where pool or water passage was drawn. No garden could be found without this open space (except if it is constructed after Ahmad Shah kingdom). In oppose to water passage, trees were planted in both side of street and this changed the street scene into green corridor and different kinds of trees were planted in sub-streets in an orderly square shape. Palaces of gardens were between 12 to 20 meter and the biggest one reached to 25 meters such as

circle, octagonal, splayed or square.

Therefore, garden divisions usually included streets in both sides of garden which were drawn to the front of building and round the streets there were square shape pieces which were in fact water passages. Before reaching to palace there was a traditional pool in the middle of street. Most important and active part of the garden was one fifth of its width including palace, main streets and water passages. In some gardens it also included secondary doors such as secondary door of Ghadamgah Garden in Neishabour.

In addition to the main building or main palace there were portal buildings in Iranian Gardens which were in fact external part of garden or reception part of the garden and they were usually very beautiful. Sometimes there was a normal door instead of portal but a "Press" meaning a lattice wall which hindered the garden to be seen directly from outside was constructed in front of it. Other buildings of the garden included summer, winter, water storage, bathroom and other needed buildings which were constructed in suitable places regarding their function. On the whole two criteria were important in Iranian Garden geometry: three expanding beside each other and dividing the garden into squares which had their own orderly square shape divisions. History of these principles goes back to thousands of years ago. Apart from rectangular and square shapes there were octagonal, palace and solitaire shapes as pool in garden. Among them 12-angle pools are also seen; such as the pool in front of Behesht Ayeen Garden in Dolatabad of Yazd where 3 long and rectangular pools were also constructed and their water was gathered and sent to surrounding villages.

A. *Water in Gardens*

One of the important characteristics of Iranian Garden was its high inclination to show water. Since water was usually very few and wanted, garden design architecture played strangely with it. For example in Dolat Ababd Garden of Yazd which has a building and a ventilator in higher land of garden and has a corridor and three room upstairs and in both sides, a building in right side and one in left side and a portal, the architecture has playfully and unbelievably has led the water inside the land and has got it out of it several times. At first under the ventilator water is gathered in a marble pool where it bubbles and comes up and then it is drawn into three rooms from the middle of corridor. In front of "Orsi" of the rooms there are three "Sineh Kabki" made of marble which was scarped in a shape to create wave and show the water dense when it really was not dense. From each "Sineh Kabki" water flows into traditional pool and from there it flows into both side water passages till it reaches portal; sometimes water entered into a very beautiful water circulator which is destroyed completely in Dolat Ababd Garden. From under the portal water went into a big 12-angle pool and then it was led into the three big pools around it. Water went out through these pools into the streets and villages and was used for farming and agriculture. [5]

In Fin Garden of Kashan a big art show is done using a very

old water stream which has a very beautiful water district; a big deal of this water flowed into Fin Garden and then it flowed out of it. At the beginning water flowed out from a “main throat” and then spread into the two pools in both sides later it reached to water streams which had several waterwheels and after circulating inside the garden it flowed out of the garden and reached into farming lands. Sometimes a pool was constructed instead of waterfront like Chehel Soutoun (Fourty Columns) of Isfahan which was show place before the pool was constructed there.

If garden was on a plain land waterfronts would have very little slope like Fin Garden in Kashan and if it was on slope land it changed into waterfall like Shahzadeh or Natanz Garden. If a pool was constructed in front of palace its size was arranged to be such that there would be a space left for sitting around the pool. Pool houses were constructed in octagonal and half-octagonal shape: in constructing a pool it was done in a way that small angle of octagonal and half-octagonal made an octagonal pool. In addition to pool houses in some places that there was shortage of water, pools were constructed inside the rooms as well.

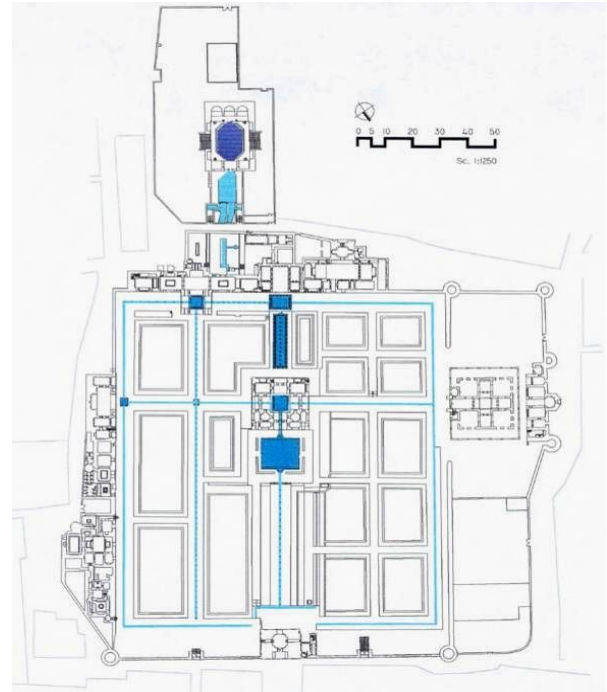


Fig. 3 Plan of water’s show and its flowing form in Fin Great Garden of Kashan City

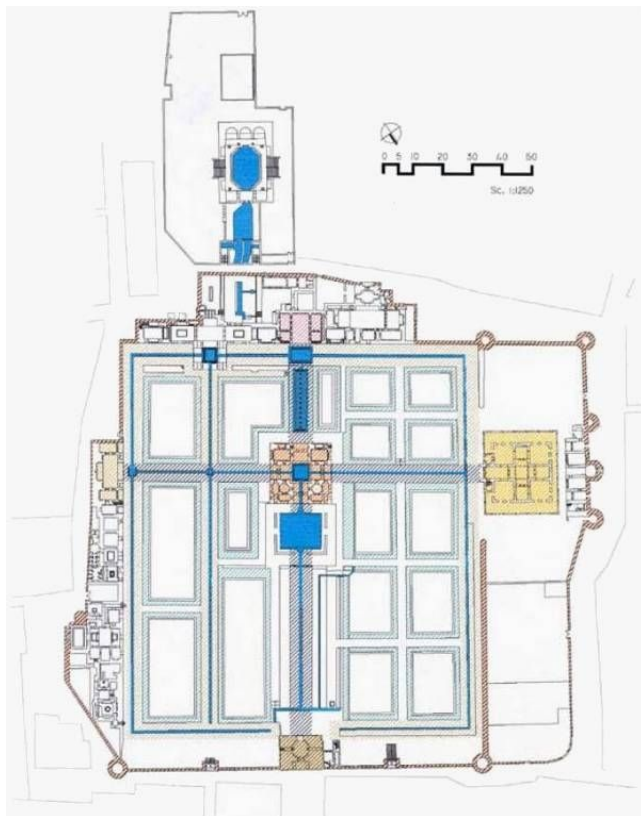


Fig. 2 Plan of characterizing elements of Fin Garden as an Iranian Garden

B. Plants in Garden

As it was said short plants were planted in half-waterways of Iranian Gardens to be always short and green and beautiful. But in both sides of half-waterway and waterfront there was a porch shape corridor of trees. The kind of tree varied from a zone to zone. In some areas like Khouzestan Province and Bam City palm, Khar Zahreh, red willow and orange trees were very common. On the whole depending on the weather condition the kind of trees included cedar, pine and elm or Zou, pine and plane or cedar and pine and judas trees. And sometimes fruitless trees were planted instead; such as: Shouraneh, ash, Tabrizi, Shang, Shoung, Eshen and Ghareh Aghaj trees. Shang tree of Shiraz was a tall tree and the meaning of this word is also tall. The purpose behind combining cedar and Pine trees with these trees was to make a scene much better than a plain green by combining always green trees with the ones who change color seasonally.

If we consider the length of these streets, we would see that a beautiful corridor was made by orderly planting of one cedar, one pine and one plane trees beside each other and in the opposite side of the street the order was the same and in a way that cedar trees in both sided was located next to each other and pine – to – pine and plane – to – plane trees respectively.

Around the secondary streets which cut each other in an orderly and square shape manner, leave white-berry was planted which was both beautiful and remained short if it was resized regularly and it didn’t occupy any space in the middle of street. Willows were usually planted in watery areas but not beside pools because they caused the pool to break. Pussy was

decoration tree and its flowers were used to make distil and sometimes weeping willow was planted in these gardens.

In their own place secondary streets have street division in a stack or boundary form. In the conjunction of boundaries which was in the middle of square shapes, shading trees were sometimes planted to avoid hindering other trees and sometime different types of fruit trees were planted such as apricot tree, and different types of pear trees (Natanzi, Dabbehee, Choghondari, Pir Bodaghi). In some gardens one part was devoted to white berries (Ghazvini, Shemirani, Tehran, Bi deneh and Harati berries). In some spaces in the place of conjunctions blackberries were planted. In some dry lands pomegranate was planted around the waterway in main streets and in half-dry lands in inner parts trees such a soar apple, sole and apricot trees were planted. Beside garden wall usually fruitless trees were planted such as Sepidar, Kaboudar, ash and sometimes Ananb and Senjed trees.

On the corners or curvature shape spaces sycamore was planted which grew more fruits when placed in shade. Grape scaffolds were made to face east. Grape was usually planted inside the waterways of garden in a place which was not so eye-catching. For different types of peach a place named peach-area was considered. In some areas that weather condition allowed walnut and almond were planted in big amount. The trees near the main street or half-waterway was of a kind that was beautiful in all four seasons and the trees with lower density of leave were planted in far places.

The place of flowers in gardens was under trees to use both their smell and their calycle to make jams and other food stuff. The noticeable point which should be mentioned here is that what is known as garden order here is a conceptual definition and expression of the main subject and they are not the main or part of the general definition of he subject like economical and architectural principles were are known from long ago but cannot be separated. It is clear that this collection of orders is just a tool to ease our understanding of the garden and assuming that each of which exists individually is not so correct. It can maybe said that each of these orders got meaning when related to geometry, spatial structure and Iranian Garden design and they are just geometrical expression of the considered subject of land, water and plant.



Fig. 4 Helicopter photo taken from Shahzadeh Mahan Garden in Kerman and its adjacent gardens

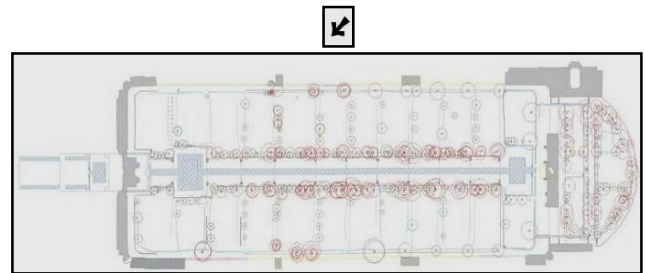


Fig. 5 Plant order plan of Shahzadeh Mahan Garden of Kerman

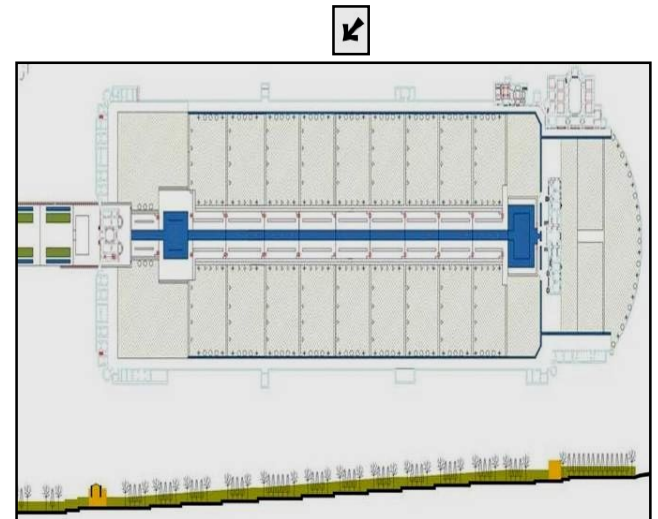


Fig. 6 Plan and section of plant order - Shahzadeh Mahan Garden in Kerman City

VI. PLACE OF GARDEN IN IRANIAN CITY

A. Selecting subject and its Reasons

Historical cities of Iran has always welcomed gardens inside of themselves in different shapes and types and the existence way of garden in cities has different dimensions and depending on weather condition, environment and culture they have got different forms.

Since the extent of Iranian Garden existence is not limited to solitary gardens and several dimensions of its presence can be found in private and public life of Iranians and since the size of Iranian Garden shows up from a very little yard of houses to bigger sizes of cities such a Isfahan in Safavid times. The place of garden in Iranian cities is of special importance.

VII. CASE STUDY: CHEHELSOTUN GARDEN, ESFAHAN

When Shah Abbas, the Safavid king, was at war with the Ottomans, he decided to move the capital from Qazvin ro Esfahan. He did so to distance the capital as far from Ottoman reach as possible; thus Esfahan officially became the capital in 1592 (1500 AH). Once he made this important decision, he also set out to change the design of Esfahan to make it worthy of the great Safavid Empire, and to create a new city centre different from the previous one.

This new city was created in the southwestern quarter of the city above the garden of Naqsh-e-Jahan. Considered a royal

property before Esfahan became the state capital, Naqsh-e-Jahan Garden was used by the Safavid king as a residency. The garden has an approximate area of 57 hectares. Its eastern wing borders the Esfahan-Shiraz road while its northern wing borders the carpet dyers' section of the bazaar; a wall dating from the Deylamid period rings the west wing was near the royal kitchen. This is why Esfahan is called Naqsh-e-Jahan on maps drawn by Russian topographers in 1850.

The Safavid Administrative Headquarter (the new city centre) consisting of a square, royal palaces, the largest mosque in the city, and numerous new bazaars, was established in and around this garden. In constructing the new city center of Esfahan, its designers followed traditional Iranian architectural models. This tradition can be seen in the Old Square Complex, the Seljuk city centre of Esfahan that consist of one main square with administrative centers on one side, religious centers on the other and the new bazaar (Qeysariyeh) on another. At the same time, this new city centre differs greatly with the older ones in several ways.

The most important of these differences is the overall angle of the complex, which unlike the old square near the Kiblah or the southwest, is here inclined 15 degrees southeast of the north-south axis. The reason of this angle is most likely that the Naqsh-e-Jahan Garden and the buildings within it, including different parts of the 'Aliqapu Palace, were facing that direction. Later, each element of the square and complex would conform to the same pattern. What is interesting is that the complex faces in the same direction as Takht-e-Jamshid (Persepolis) and Takht-e-Soleyman.

The Sheikh Safi ed-Din Ardebili Complex also faces this direction.

Close study reveals that the sun would set and rise at a perpendicular angle to the square in the first month of autumn t Naqsh-e-Jahan, which means that the same thing would occur at the beginning of spring. To conclude, the angle of the square (similar to the Takht-e Jamshid complex) conforms to the sunrise and sunset of the first day of spring, which is the Iranian New Year.

Another attractive aspect of the city centre that didn't exist previously is the complex private palaces, including the administrative headquarter –the Safavid forbidden city– located in the vicinity of the 'Aliqapu Palace towards the west of the square. The gates were closed to the public and were constantly guarded.

The Naqsh-e Jahan square complex is designed intelligently. The length of the square overlaps the north-south axis, which creates the minimum amount of shadow. The city's Grand Mosque lies to the south of the square, which creates an appropriate entrance for the mosque-facing Kiblah.

The west wing is located to the administrative palace and faces the sun when it rises. The northern wing is allocated to the Qeysariyeh, which is an extension of the Old Esfahan Bazaar. And the East wing, which bordered the Esfahan-shiraz road, was kept back for construction of the sheikh Lotfollah Mosque (the royal religious school) in order to fill and

complete the spatial elements of the square.



Fig. 7 Pool and Iwan of Chehlsotun Palace



Fig. 8 Chehlsotun Palace Iwan

The gates of the administrative quarters would open towards Naqsh-e Jahan Square from one side and the Khargah and Hashtbehesht gardens from the other, with Chaharbagh Street at the extreme end. Even though the city wall of Esfahan has been built in the Deylamid tradition, this is the first example of combining administrative headquarters and a Deylamid-style wall.

The geographical setting of the Chaharbagh axis plays an important role in creating a calm and tranquil environment. Its construction dates back to the establishment of the new city, if not further, and served two main purposes. First, it brings order to city development.

Along this axis we find the Abbasabad (the affluent section of Esfahan) and Jolfa (the Armenian section) districts. Secondly, the area was a promenade for state officials and neighborhood residents, around which a circle of gardens formed.

The location of the Chaharbagh axis was chosen with care. It is almost southerly-northerly and perpendicular to the Zayandehrud River. It began at Dowlat City Gate and moved south along an open space. We are not certain whether it had an older history.

The administrative quarters served both a formal and informal function. Surrounded by other buildings, the 'Aliqapu Palace opens towards, and is completely visible from, the square. It was used for informal events. The Chehelsotun Palace, on the other hand, was situated in the garden and was the Safavid administrative centre. It was used to formally entertain guests of the king and its entrance was through the 'Aliqapu gate and through a network of covered corridors that connected various buildings of the administrative quarters.

The Chehelsotun Garden is roughly in shape of square, with an approximate size of 225*275 meters along the east-west axis. Its almost square shape and the axis of Chaharbagh (in contrast to other gardens of the Safavid era and Naqsh-e Jahan Square, with a ratio of 1:3, and the Chaharbagh axis, which were rectangular in shape) demonstrates its function in uniting the administrative quarters.

The main layout of the garden is along the three east-west axes, contiguous with the boundaries of Naqsh-e Jahan Square and the eastern buildings of the complex. The most important of these axes goes through the middle of the gardens, with the Pavilion situated along its western third. Along the northern axis is a tributary of the Fadan Water Canal (*maadi*). The southern axis is symmetrical to its northern counterpart. These are less important axes.

The Pavilion inside the garden was not built all at once. The inner core was probably built before the Safavid era. It resembles the old palaces of the Sassanids, at which time it was probably on a southerly-northerly orientation. This can be surmised by the large *Iwans* in that direction.

During the Safavid era, new buildings were gradually built in the eastern section, of which the Mirror Hall and the Pillared *Iwan* were the most significant. It is following these annexations that the orientation of the Pavilion faced Naqsh-e Jahan Square. We cannot find any records of the architecture of the Pillared *Iwan*, which is the most important element of the Pavilion, and the Chehelsotun Garden in the pre-Islamic era. This is because the older *Iwans* were covered on three sides and only had one open side, where as the three sides of the Chehelsotun *Iwan* is open and only one side is closed. This concept is new to Iranian architecture and creates a unique association space between the interior and exterior of the building.

The large pool in front of the *Iwan* was most likely created at the same time as the Pillared *Iwan*. Its most notable effect is that it creates a reflection in the water that has the illusion of "weightlessness", especially when the sun shines off the exquisite mirrorwork and the ornamentation of the design and plasterwork.

There is another pool on the western side, similar to the eastern pool which has a similar effect, though to a lesser extent. A canal that went around the pavilion joined these two pools, fed by water from the Juyshan canal. There were other changes in the layout of the garden as a consequence of additions to the east of the pavilion. The most important change was the addition of a north-south axis through the

middle of the pillared *Iwan*, crossing the main axis at a perpendicular angle. There is a beautiful pond where these axes meet, with pillars bearing lion heads at the four corners that project water into the pond. At the southern end of the pond there is a pigeon tower, the garden entrance, and the private garden. A path also leads to Narenjestan Palace between Chehelsotun Palace and the private garden, yet such paths were seldom used as the Palace was mostly used for formal entertaining and guests would walk on the main path.



Fig. 8 Chehelsotun Palace Pool

The reason that the palace and garden were named Chehelsotun (forty-pillars) is because the twenty pillars on the eastern *Iwan* were reflected on the surface of the water in the pool. The number of forty occurs in the Farsi language, as in the words Chehelcheragh (chandelier) and Cheheltekeh (quilt), and signifies multitude. The royal palace of Qazvin is also called Chehelsotun, even though it has less than forty pillars. On the other hand, the prayer hall (Shabestan) of the Jami' Mosque of Esfahan, which is supported by more than forty pillars, is usually called the Chehelsotun Hall.

The name has existed since the time of Shah Abbas II, when new buildings were added to the garden. The author of Qesas al-Khaqani (al-Khaqani Tales) writes, "On Monday the second of Rabi'-ol-Avval 1055 AH, the Divankhaneh Building of the Delgosha, Jahan-nama Garden was finished."

The Chehelsotun Palace stands at the very pinnacle of Iranian architectural achievement. It symbolizes a style that began before Islam, carried through the Achaemenid and Sassanid eras and peaked with Seljuk architecture, yet never reached the exquisiteness of Chehelsotun. Subsequent structures, such as the Hashtbehest, Tavileh Hall, Ayanehkhaneh Estate and other buildings from the Zand and Qajar periods, were all influenced by this architecture.

VIII. CONCLUSION

Through its long history, Iranian culture has appeared in different forms. Different patterns of human and public life has always been the best and most glorious starting point of

Iranian culture in the very significant expansion of Iranian art and architecture. Deeply considering garden and garden design subject, the formation of Iranian cities and their growth and expansion has taken place in the body of the city considering both structural relation between garden and city and use of garden and its making elements. In this connection, not only gardens are affected by city situation but the city and its complex are affected by garden or a collection of gardens and even sometimes they make the skeleton of main axis of the city. Iran's architecture and urbanism is a space for presence of garden in its special style and they create an exceptional mixture, joint and oneness between garden, architecture and city; a connection which brings together structural and shape effects, spiritual and conceptual dimensions and the environmental and life needs of man and their living place.



Fig. 9 Wooden roof and column of Chehelsotun Palace

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