An Investigation on Interior Spaces Related to Ornamentations (Based on Material) of Selected Spatial Houses of "Kashan" (IRAN) in QAJAR Period (19th)

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ABSTRACT

Iran is a country with ancient history and architecture. Iranian architecture basically is classified in general in two periods; before and after Islam. One of the significant periods of Iranian architecture was during the Qajar dynasty in the 19th century. Housing is a very important topic in Iranian traditional architecture and house has a close relation with the Iranian culture. Moreover the diversity of climatic zones in Iran has led to creation of various types of architecture in different parts of the country.

One of the considerable cities from Qajar period is Kashan, which is located in the hot and arid climatic zone. Due to the climate houses in Kashan are known as 4 season houses and were built by specific materials. The four season house layout has been formed because of hot summer sun and cold winter nights in this area. In this manner, one part of the house is facing the sun and is used during the winter, but the other part of the house is on the opposite side and is used during the hot summer. This is the framework that makes specific characteristics for Iranian architecture in the houses of this climate. It also makes the design of houses mostly introverted; and it is also a feature of Iranian culture, which means that privacy is greatly respected in the culture of this country and it is reflected in its architecture.

One noteworthy feature of Iranian architecture in traditional housing is that ornamentations which were mostly used in interior spaces. “Talar” and “The King Room” were two parts of Iranian traditional houses that contained the richest and

most luxurious ornamentations of all spaces in the house. These two parts are located in summer residence and winter residence, which were used to be the place for special events, ceremonies and big family gatherings.

In this study elements of the interior ornamentation in summer and winter residence of some cases from Kashan will be analyzed. The main ornamental elements are brick work, plaster molding, tiling, mirror work, Moqarnas, stucco and different types of windows, which are analyzed in two summer and winter residences.

Plaster molding, painting, sharp and shiny colors, high domed ceilings and Ivan are the elements of the “Talar” and “King Room” in summer residences of these houses; and windows were utilized in order to circulate the air and day lighting in these houses.

Keywords: Iranian Islamic Architecture, “Qajar period”, “Kashan” City, Four Season Houses, Interior Ornamentation

ÖZ

İran tarihi ve mimarisi çok eskilere (3200BC-1979) dayanan bir kültürdür. İran mimarisi 2 bölüme ayılır. İslamiyetten önce (678BC-63AD) ve islamiyetten sonra (875-1736.İran mimarisi en önemli dönemlerinden birini 19. yüzyılda Qajar Hanedanlığı süresince yaşamıştır. Geleneksel İran mimarisinde evler oldukça önemli bir yer tutmakta ve İran kültürü ile yakından bağlantılıdır. Bunun yanında iklim değişikliği de mimariyi ciddi şekilde etkilemiştir. Qajar Hanedanlığı döneminin en önemli şehirlerinden birisi olan Kashan sıcak ve kurak bir bölgedir. Kashan'da bulunan evler dört farklı mevsime uygun malzemelerle inşa edilmiştir.

Burada evlerin dört mevsime uygun olarak planlanması sebebi, bölgede görülen sıcak yaz günleri ve soğuk kış geceleridir. Bundan dolayı evlerin bir kısmı kış için güneş dikkate alınarak tasarlanmış, güneş dolayısıyla bu yönde konumlanan odalar kış mevsiminde yoğun olarak ısınmıştır. Güneşi görmeyen kısım ise güneşten korunduğu için yazın daha serin olur. Bu nedenle yazları kullanılır. Farklı iklim koşulları, planlamanın dışa kapalı, içe açık olmasını sağlamıştır. Bu etkenler ev kültürünün tasarımında etken olmuştur.

İran kültüründe özel hayat önemli bir yer tutmaktadır. Bu da mimariye yansımıştır. İran mimarisinin geleneksel evleriyle ilgili ekleyebileceğimiz diğer detay iç mekanlarda kullanlmış olmasıdır. Özel günler için kullanılan "Talar" ve "Kral Odası" olarak adlandırılan odalar süslemelerin en çok kullanıldığı yerlerdir. Bu odalar evin kışlık ve yazlık bölümlerinde kullanılır. Özel aile toplantıları, düğünler ve çeşitli etkinlikler bu odalarda düzenlenirdi.

Bu çalışmada geleneksel İran evlerinde bulunan yazlık ve kışlık bölümlerinde kullanılan iç süslemeler ve bu mekanlardaki özel alanlar, çeşitli pencereler ve çeşitli unsurlar konu alınarak analiz edilecektir.

Anahtar Kelimeler: İran İslam Mimarisi, süsleme(dekor), Kashan, Qajar dönem, dört mevsim evler.

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I would like to dedicate this thesis to my beloved family, who has put more than their share of life during my studies. I would like to also thank my husband for his support and believing in me.

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INTRODUCTION

Residence and housing always had a significant position in Iranian culture and arts. residence has been the safest settlement for living, praying and generating, and accordingly cultural, moral, economic, subsistence, aesthetic and art have been applied in the process of making it. Iranians made a considerable effort in making their settlements during the history and Qajar period which is one of the significant eras in Islamic Iran.

Qajar period architecture has improved Iranian traditional architecture's rules and paradigms and brought new ideas in the field of space organization. Use of windows, colors, motives and ornamentations, façades, masonry and materials, are generally showing the impact of Western arts on Iranian architecture at this certain period.

Traditional architecture of Iran is based on five main fundamentals which are: Human scale, self sufficiency, modularity, statics, introversion and efficiency. Residence is one of the most important issues of Iranian architecture; also climate and culture are the two impressive features of Iranian Islamic architecture, which had great roles in architecture and also in specific case of Kashan that is under study in this research. This city has been built based on the climate and culture.

There were some important points while a spot were being chosen in order to locate a city in, such as being near to main roads and pathways, trading credits, being centered in the region, also it should have been secure from earth quakes with a solid ground and some other factors .(Monshizadeh, 2009)

Valuable historical places, mansions and elegant residences in the old city of Kashan are strong evidences for existence of experienced architects in those times that were preparing suitable dwellings for people, designed based on climatic situation and cultural habits of the residences in a complete artistic way.

Historical buildings of Kashan, especially residences, have complete harmony in organization of spaces and ornamentations, with different architectural arrangement, because architects considered variety in all buildings to reach different outcomes and they were trying to avoid designing similar buildings. In fact traditional residences were not built upon the same typical architectural plan of "Qajar" period and creativeness innovation were very important. For instance in case of "Ameriha residence" (Figure 59), which is the greatest historic residence of the country with seven courtyards, although all parts of the residences are located around each courtyard, there are different forms and shapes for each courtyard different than others. "Boroujerdi residence" (Figure 58) is famous for its magnificent "Ventilation shaft (badgir)"; Tabatabae residence (bride of the residences), (Figure 57) is famous for its beauty and "Abbasian residence" (Figure 56), because of its coherent architecture, has a universal fame as an architecture master piece.

Other notable issue about these residences is that they were named four season residences. In hot and dry climate region of Iran the harmony between lifestyle and

climatic situation has a great importance, and Kashan is not an exception. These four season residences are divided in two parts, summer house and winter house; and each part is functioning specifically and they have different ornamentations that are under investigation in this study.

In “Qajar” period traditional residences there are various parts, including rooms (three doors room, five doors room and chamber), which have their specific ornamentations. Five doors room was the guest room located in the winter residence, with the most elegant ornamentation; also “talar” (chamber) was used for the guest visits during the summer time which is the most interior embellished part of the residence.

Aristocratic residences of Kashan are all located in the same region for known reasons: this region was the entrance for five among seven aqueducts which supplied the water for the whole city; and definitely this region was the first spot that had access to the water.

1.1 Aim of the Research

This study aims to answer below mentioned questions.

- What is different between summer residence and winter residence ornamentation of “Qajar” period according to focus on “Reception Halls” and” King Rooms”?

The mentioned houses are known as “four-season” houses as they have four sections on North, South , East and Western front and they are significantly important due to having both “summer-residence” and “winter-residence”. Here the focus is on these

two parts of the four season houses. The aim is to investigate interior ornamentation of these houses and king rooms and reception hall (talar) both in summer and winter residence parts because these parts has the exaggerated ornamentations.

There were not researches related with Kashan's houses' interior ornamentations. Generally, all the available resources and researches whether in Iran or other countries focused on ornamentation of exterior design regarding to landscape, structure, space design and ventilation system, arches and extraordinary domes and there is not so much attention to ornamentation of interior design.

There was no detailed analytic research on ornamentation of interior design of this "4 season house" yet, because the most attention to these houses was on introversion of architecture and it was only landscape and structure`s analysis, these houses are mostly seen in researches.

Analyzing the interior ornamentation of traditional houses of Iran can be a guide to the contemporary architecture and also to help to discover new types and designs by connecting the new and traditional arts. And also can help to keep Iranian traditional art as a useful encyclopedia for students and who are interested.

1.2 Limitations

There are 4 limitations in this research:

1. *" Qajar period" in Iran:* "Qajar" (1796-1925) is the period, which its architecture is worthy to discuss; and is a significant part in "Kashan" city.

In order to create a city in the "Qajar "period, there were a number of important issues to pay attention to such as: being located near to the main and important roads,

commercial credit, being central to the surrounding area; and also it was really important to not to be in the flood's path and stand on a solid ground and so on.

2. *Iran -"Kashan" city :* "Kashan" was located in "silk road", a road, which trades men, had solidification there, and that is a reason for houses for being built with significant ornamentations and architecture. Their owners were rich tradespeople that we are supposed to explain "4 season houses".

All the noblesse houses of Kashan are all located in a specific area and this arrangement was because among seven aqueducts that was entering the city, five were entering the area from this district and for sure the fresh and clean water was accessible for the owners of these houses .

3.*four season houses:* There is a big number of traditional houses in" Kashan" and only a few of them is restorated. (Appendix B).

Six house of "Kashan" are located in "*Alavi Street"* and this historical district is where the houses are located. (Appendix C)

Four of the houses are protected by "Cultural Heritage Organization", renovated and refunctioned as the museum for public. Name of these houses are "Boroujerdiha", " Tabatabai " , "Abbasi", Ameri" Residences. (Appendix D)

Additionally there are two other residences called " Ehsan" and Manouchehri", which belong to private owners and their function has changed to hotels , there was no interior ornamentation such as plaster molding and paintings in king rooms and

“reception halls (Talar)” and all the room, all the walls were simple and uniformed without any decorative elements. (Appendix E)

So my research was limited to those four houses that are considered as the most beautiful and decorated houses of “Kashan”.

4. ornamentation in reception hall (Talar) and king room: These houses are divided mostly to summer and winter residences (sections or part). This research is going to investigate the inner ornamentations such as plaster work, stucco,, painting, Muqarnas, Yazdi Bandi, colors and various types of oppenings and windows according to the most important part of the house which was used for the guests, ceremonies and events; that were called “Reception Hall (Talar)”and King’s Room (Shah-neshin), in both winter and summer parts.

1.3 Methodology

This is a qualitative the research, which it is classified in three sections: literature survey, field studies and analysis that are to be performed, based on document survey and observation on Kashan’s “4 Season house” of “Qajar period” (19 century) in Iran.

After studying on several books about Islamic Iranian architecture in ”Qajar” (19 century) period, the best of residence of “Kashan” regarding to interior ornamentation and its popularity were selected.

- Searching through internet and using researches by reading too many written articles and also on-line books about interior design of traditional house of “Kashan” focus on ornamentation.
- Traveling to Iran and city of “Kashan” two times in 2011-2012 that the second visit was 10 mouth after first one and visiting these houses in reality and also collecting information directly from “Cultural Heritage Organization” in “Kashan” and studying on many books there and also consulting with masters and architects that had enough and useful information

First chapter is introduction, aim and limitation , Second chapter is literature review, based on studies and observations; including comprehensive information about the Review on History of Iranian architecture, before and after Islam, “Qajar” period. Additionally there are comprehensive information about traditional Iranian residenceial architecture and its types, effects of culture and climate on architecture of “Kashan” and investigating fundamental principles in Traditional “four-season houses” in traditional Iranian architecture and interior design of traditional buildings.

In the third chapter, the focus is on material and interior ornamentation of Qajar period’s houses. Forth chapter is analysis of 4 houses according to ornamentation by focusing on “reception halls” (Talar) and “king rooms” of specific houses of Kashan and determination of ornamental elements in each wall of the rooms according to inventory of each room, in summer and winter residences separately.Final part is conclusion of the whole study.

Table 1: History of IRAN. (Developed by Author)

History of Iran			
ANCIENT			
Proto-Elamite		3200–2700 BC	
Elam		2700–539 BC	
Mannaeans		850–616 BC	
IMPERIAL			
Median Empire		678–550 BC	
Scythian Kingdom		652–625 BC	
Achaemenid Empire		550–330 BC	
Seleucid Empire		312–63 BC	
Parthian Empire		247 BC – 224 AD	
Sassanid Empire		224–651 AD	
MIDDLE AGES			
Umayyad Caliphate		661–750 AD	
Abbasid Caliphate		750–1258AD	
Ziyarid Dynasty	928–1043	**Saffarid Dynasty**	867–1002
Buyid Dynasty	934–1055	**Samanid Dynasty**	875–999
Ghaznavid Empire		963–1186	
Great Seljuq Empire		1037–1194	
Khwarazmian Empire		1077–1231	
Ilkhanate Empire		1256–1335	
Chobanid Dynasty		1335-1357	
Muzaffarid Dynasty		1335-1393	
Jalayirid Dynasty		1336–1432	
Sarbadars		1337–1376	
Timurid Empire		1370–1405	
Qara Qoyunlu		1406–1468	
Timurid Dynasty		1405–1507	
Agh Qoyunlu		1468–1508	
Safavid Empire		1501–1736	
Hotaki Dynasty		1722–1729	
Afsharid Empire		1736–1747	
Zand Dynasty	1760–1794	**Afsharid Dynasty**	1747-1796
Qajar Empire		1796–1925	
MODERN			
Pahlavi Dynasty		1925–1979	
Interim Government		1979–1980	
Islamic Republic		1980-present	
Pahlavi Dynasty		1925–1979	

Chapter2

LITRETURE REWIEW

2.1 Review on History of Architecture in IRAN

2.1.1 Iranian Architecture before Islam

Iranian architecture can be noted as old as the ancient history of this terene. It dates back to the late 6^{th} and early 5^{th} centuries BC. Iranian architecture has been a unabridged embodiment of Iranian characteristics in various historical periods. (Naghizadeh.2011)

The Iranian architecture's style before Islam can be divided into two main period. Each of these period has some general characteristics which are described in the following parts.(pirnia,2005).(Table 1)

Iranian Architecture before Islam

1. **The "Parsian" style (Median, Scythian, Achaemenid, Seleucid empires):** Prehistoric Iranian architecture until formation of the first national rule by the Medes. (678-63 BC)
2. **The Parthian Style (Parthian and Sassanid period):** Persian architecture from the Medes period to the end of "Sassanid's Empire". (247-651 AD)

The first Iranian kingdom was instated by the Medes (800 BC). Their king, Cyaxares, sellected Ekbatana (modern Hamedan, 336 km from Tehran) as the

capital. Ekbatana had been one of the earliest Iranian cities built upon architectural and urban principles.(Pirnia, 2009)

Herodotus (480-428 BC), a Greek historian, writes that in building Ekbatana, Iranians have stuck in urban planning principles dominaiting them. The word Ekbatana means "a gathering place". The city was expanded on a road through which the Assyrians could enter into the land of Medes, That is why the architecture played such important role in preventing the enemy from breaking into the city.

(Figur 1), (Pirnia,2005)

Figure 1:"Takhte Jamshid", IRAN (URL 18)

One of the most ancient monuments discovered in the Iran plateau is the painted mansion of "Zaghe Tappeh" in Qazvin plain. Its history dates back to the 7th and early 6th century, considering the availability of materials in prehistoric period, the painted mansion of "Zaghe Tappeh "(Figure 2) has been embellished and decorated as much as possible.

The building was intended and used for a sort of social gathering and holding of meeting. (Memarian, 2008)

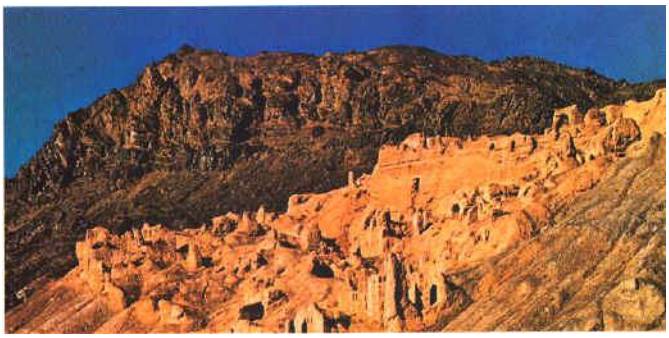


Figure 2: "Zaghe-Tappeh", Qazvin, IRAN (URL18)

1. **The "Parsian" style (Median, Scythian, Achaemenid, Seleucid empires) (678-63 BC).**(Table 2)

Important Architectural characteristics of these period

- Central location of building in the square plan.
- Use of Columns for support the ceiling and construction of columned halls.
- Use of Minarets: They were constructed at least from the time of "Achaemenians" in ancient Persia to be used as light houses in the deserts or watch towers at the country borders.
- Dome ceiling structure system with column and beam
- Use of stone, wood and cloth in interior design of buildings.
- Use of Arches in entrances and gateways. (Eskandari, 2011).

After the fall of Achaemenid Empire, Iran witnessed a period of slack in the development of Parthian architecture. Parthians managed to relieve Seleucids from the mainland Iran after successive fights against Macedonian forces, and establish the Parthian dynasty (174 BC - 224 AD). (Memarian, 2008)

2. **The Parthian Style (Parthian and Sassanid Period) (247 BC – 224 AD)**

Important Architectural Characteristics of These Period. (Table 2)

- Internal courtyard.

- There are no corridors in the buildings.
- The rooms for the most part open one into the other.
- Use of high and small round arches and semi-circular arches.
- Dome arches is the typical form of ceiling The domes are circular at their base; but a section of them would exhibit a half ellipse
- Use of series of tall narrow arches including niches, as ornamentation.
- Use of local material such as wood.
- Use of stucco wall and brick.(URL 18)

The “Sassanid empire (224-651 AD)” architectural style can be identified from the existing ruins of palaces, temples, fortifications, bridges, and barriers. Sasanians built big tcities the residues of which remind us of their significant achievement and expanse of mind. An prominent feature in their architecture is the construction of high-rised brick vaults wider than any vault in their contemporary world. “Tagh-E Kasra” at “Ctesiphon” (present-day Iraq), (figure 3) with a huge open vault which confines 75 feet, is 90 feet high and approximately 150 feet deep, and is noted as one of the most majestic palaces of Sasanian period. Aconstructors used stone and heavy gypsum as construction materials and adornmented their masterpiece with unique stucco or mosaic works. (Pirnia, 2009)

Figure 3:”Tagh-E Kasra”, IRAQ (URL18)

Parthian architects used to apply cut stones for construction of palace walls; and also used stucco to cover the walls. The backgrounds of their stuccos were geometric lines and floral patterns. creation of equestrian sculptures in relief was the most significant aspect. (URL 18)

2.1.2 Iranian Architecture during Islam.

After the Islamic invaders conqured Persian empire, remarkable religious buildings have been built in Iran. The architecture of Iran was based on local geometry, local materials and local building methods to express, each in their own way, the order, harmony and unity of Islamic architecture. Architecture and art such as calligraphy, stucco, mirror work, and mosaic work, became closely tied together in this new period. Islamic architecture and building ornamentations are one of the most magnificent tools of expression. (Pirnia, 2005), (Table 2)

Overall, the traditional architecture of the Iranian during Islam can be categorized into the four styles 1) Khorasani style, 2) Razi style, 3)Azari style, 4)Esfahani style
A brief explanation of architectural characteristics of buildings are given in scope of styles:

1) **Khorasani Style (7-10 Century)**

Khorasani is the first Islamic architecture style in Iran, and it is named because of the primary buildings that have been built in the region of Khorasan. This is a style, which was popular in first Islamic in the late 7th century, and the 10th century. İt was a combination of Arabic mosque plans and Iranian building (Parti) with a simple space without ornamentations. (Pirnia, 2001)

İmportant architectural characteristics of Khorasani style:

- Rectangular Plan.
- Use a single minaret with a circular plan in the northern side of the building. (Figure 4)
- Elliptic and Oval Arches.
- Dome Ceilings.
- Rooms with Columns.
- Thatch Covering Without Ornamentation
- Adobe and Brick as Main Masonries. (Figure 5)

Figure 4:"The Arge-e-Bam", Kerman, IRAN, (Khorasani Style) (Pirnia 2001)

Figure 5: "Fahraj Mosque", Fahraj, Yazd, IRAN, (Khorasani Style). (Pirnia 2001)

2) Razi Style (875-1194)

Changes happened slowly in the architectural principles ,beggining of these changes was the Khorasani style and through the Razi style in Samanid period (875-999). Razi is the second style of Iranian architecture after Islam and it was in its highest

position during the Seljuq period (1037-1194). The most diverse and principal Iranian architectural style is Razi. This style is under the efffect of Parti and Parsi styles. Great changes in this period includes disappearance of bedchambers (shabestan) and its columns, and construction of porch, dome and planing with four porches. (Figure 6)

İmportant architectural characteristics of Razi style:

- Rectangular plan
- Plan with four porches
- Square shaped porches
- Use of couple minaret
- Ribbed vaults
- Construction of dome and its enclosures.
- Use of ornamentations such as tore, brickwork, adobe tiles

  Use of brick as basic masonry.
- Multi-functional complexes (Caravansary (type of public house)), Madrasah, Mosque)

Figure 6: “Gonbade Ghaboo”, Gorgan, IRAN, (Razi Style) (URL18)

3) Azari Style (1256-1450)

This style began since Ilkhanid Dynasty entered Iran (1256-1335), and it lasted until Safavid period (1501–1736).First building of this style were built in Tabriz, so it is called Azari Style. Monarchy of Ghazan Khan is known as the begining of Azari style. Azari style is divided into two methods: (Pirniea, 2001), (Figure 7)

İmportant architectural characteristics of Azari style:

A. "Ilkhanid period "(1256-1335). (Pirniea, 2001**)**

- Construction of massive complexes.(Mosques)
- Vertical facade.
- Porches with rectangular plan.
- Variety in constructing porches.
- Use of ornamentations such as tore, golden tiling, embossed tiles.

B. "Teymourid period" (1370-1450).(Pirniea, 2001**)**

- Use of pharynx between the dome space and the space below
- Creating relieved surfaces all over the building
- Use of diaphoretic tiles or mosaic

Figure 7:"Yazd Mosque", IRAN (Naghizadeh, 2011)

4) Esfahani Style (1501-1736)

The architectural style during Safavid period (1501-1736) is called Esfahani style, because the first building was built in Isfahan. Monarchy of Shah Abbas is known as the golden season of Isfahani style.it is the most ornamental style of Iranian architecture. (Figure 8)

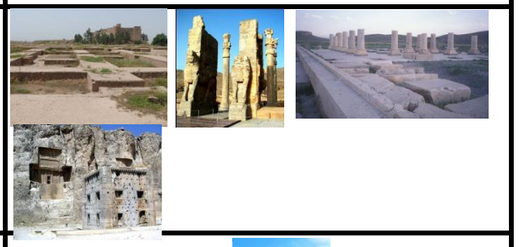
İmportant architectural characteristics of Esfahani style:

- Mosques were located in the center of cities.
- Big complexes such as bazaar were established.
- Rectangular plan
- Porches
- Ornamentations such as: adobe tiles, seven colors tile (Haftrang), "Mogharnas", and "Yazdi- bandi".
- High quality and long lasting construction materials. (Pirniea, 2001).

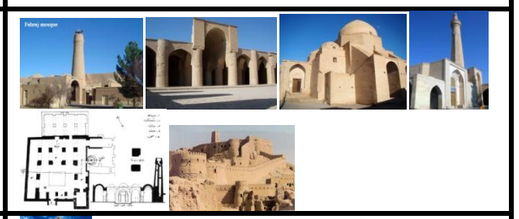
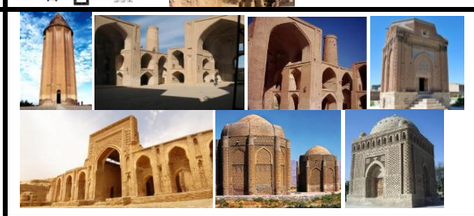
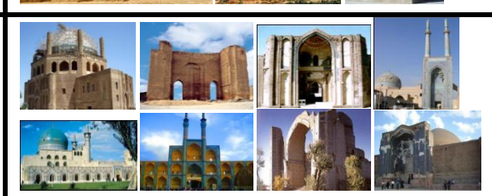
Figure 8:"Chehel Sotoun (40 Columns)", Isfehan, IRAN (Pirniea, 2001)

Table 2: Iranian Architecture Before, After and During Islam (678BC-1736) (Developed by Author)

Iranian Architecture Befor Islam

period	style	properties	Buildings as example	Picture
Median Empire 678–550 BC Scythian Kingdom 652–625 BC Achaemenid Empire 550–330 BC Seleucid Empire 312–63 BC	The“Parsian”	Central location of building in the square plan. Use of Columns for support the ceiling and construction of columned halls. Use of Minarets: They were constructed at least from the time of Achaemenians in ancient Persia to be used as light houses in the deserts or watch towers at the country borders. Dome ceiling structure system with column and beam Use of Arches in entrances and gateways Use of stone, wood and cloth in interior design of buildings.	- Darius' Palace at Susa - Persepolis in Fars province - Pasargad in Fars province - Naqshe Rostam Fars province	
Parthian Empire 247 BCE – 224 AD Sassanid Empire 224–651 AD	The Parthian	Internal courtyard. There are no corridors in the buildings. The rooms for the most part open one into the other. Use of high and small round arches and semi-circular arches. Dome arches is the typical form of ceiling The domes are circular at their base; but a section of them would exhibit a half ellipse Use of series of tall narrow doubly recessed arches as ornamentation. Use of local material such as wood. Use of stucco wall and brick decoration.	- Ghal'eh Dokhtar(The Maiden Castle) in Firozabad - Anahita Temple in Kangavar - Sarvestan city in fars - Kasra vault in Tisphon - Bishapur city in Ilam - the Palace of Ardashir in Firouzabad	

Iranian Architecture during Islam

period	style	properties	Buildings as example	Picture
the late 7th century to 10th century	Khorasani Style	- Rectangular plan. - Use of a single minaret in with a circular plan in the northern side of the building. - Elliptic and oval arches. - Bedchambers with columns. - Thatch covering without decorative elements and ornamentation. - Adobe and brick as main masonries.	- Fahraj Mosque in fahraj(yazd) - Damghan Mosque in damghan - Isfahan Mosque in isfahan - Ardestan Jame Mosque in ardestan(yazd) - Naeen Neyriz in naeen - Bam arg in kerman	
Samanid period 875 - 999 Seljuq period 1037–1194	Razi Style	- Rectangular plan. - Plan with four porches. - Square shaped porches. - Use of couple minaret. - Chevron vaults. - Construction of dome and its paraphernalia . - Use of ornamentations such as tore, brickwork, adobe tiles. Use of brick as basic masonry . - Multi-functional complexes (Caravansary (type of public house), Madrasseh, Mosque)	- Qaboos dome in gorgan - Zavareh Mosque in zavare - Ardestan Mosque (added) in ardestan - Red Dome Maragheh - Rabat Sharaf in sarakhs - Towers Kharaqan and Amir Ismail - Samani mausoleum in Bukhara	
Ilkhanid dynasty 1256-1335 Teymourid era 1370-1450	Azari Style	- Construction of massive complexes.(Mosques) - Vertical proportionality. - Porches with rectangular plan. - Diversity in constructing porches. - Use of ornamentations such as tore, golden tiling, embossed tiles. - Use of pharynx between the dome space and the space below. - Creating ragged surfaces all over the building. - Use of diaphoretic tiles or mosaics	- Soltanieh Dome in zanjan - Ali Shah arg in Tabriz - Varamin Mosque in varamin - Yazd Mosque in yazd - Gohar Shad Mosque in mashhad - Yazd Myrchaqmaq in yazd - Ms. Bibi Mosque in samarghand - Blue Mosque in Tabriz	
Safavid 1501-1736	Esfahani Style	-Rectangular plan - mosques were located in the center of cities. - Big complexes such as bazaar were established -Porches -Ornamentations such as: adobe tiles, Seven colors tile (Haftrang), Mogharnas, Yazdi bandi. -High-grade and lasting construction materials	- Imam Mosque in Isfahan - Sheikh Lotfollah mosque in Isfahan - Khan Shiraz school in shiraz - Ganjalykhan complex in Kerman - “Chehelsotun” mansion in Isfahan - “Eight heaven” mansion in Isfahan - “Chahar Bagh” School in Isfahan	

2.1.3 Iranian Architecture in "Qajar period" (1796-1925) (19 Century)

The first king of "Qajar" period "Agha Mohammad Khan" founded his kingdom in 1796 and established Tehran as capital After 129 years, the young king "Ahmad Shah" gave up the kingdom to "Pahlavid" dynasty in 1925.

The first world war (1914–1918) happened contmporary to "Qajar" period (19 century) and Iran gave up many parts of the country to Russia and England as a result of powerless management in this time.

Even though "Qajar period "was one of the worst periods of time in Iran's history in terms of political issues. But by that time Iran faced cultural changes; and this change, affected the Architecture and art. (Farmanfarmaian, 2008)

According to researches, the architecture of "Qajar period" is divided into three periods, 1)before Nasser-al-din Shah reign, 2)Nasser-al-din Shah's reign, and 3)after Nasser-al-din Shah reign (1848-1896). (layla and ekhtiar,1998)

1) *Before Nasser-al-din Shah reign:* at the time before Nasser-al-din Shah's govern, we generally see less architectural innovation. Highly colored, ostentatious tile works and colorful brick buildings are particular features of this pre- Nasser-al-din Shah period. (Layla and ekhtiar,1998)

2) *Nasser-al-din Shah's reign :* The second period, during Nasser-al-din Shah's reign, actually started with the trip of king to Europe. Nasser-al-din Shah visited Europe and he became evolved with European art and architecture during this trip. On his return to Iran, Nasser-al-din Shah ordered the construction of many palaces and

mansions built in the European renaissance style of architecture. Another prominent feature of buildings from this period was the elaborate decorative plasterworks, and beautiful engravings on stones and columns of palaces. The engravings and designs were often European-inspired , such as mermaids and rampant lions, and colourful crowns . These designs were not native Iranian. (Eiraji.2011)

3) *After Nasser-al-din Shah govern :* In the third "Qajar period ", these non-Iranian European-like designs even found their way inside Iranian homes, distancing the architecture of this period from traditional Iranian architecture. (Eiraji,2011)

Columns have long been used in Iranian architecture, but in the late Qajar period, columns in buildings became a particularly prominent feature. In palaces, houses and even shops from this period, one often saw a row of columns, or porches (Ivans) with columns, facing the street. The columns were invariably cylindrical in shape. (Farman farmaian, 2008)

The"Qajar period" marked a transition from traditional to modern architectural design in Iran. Mention to a pre-Islamic, Iranian legacy with the incorporation of pre-Islam style was complemented with the rigorous lines of European neo-classical forms, the architects wanted to keep the old architectural elements in each building and also have the new west or east elements in the building according to the owners` interests. (Eiraji.2011)

By increasing the relation of Iran with west, Iranian architects tried to combine Persian specific factors with an insight and certain devotion to western architecture elements until it was desirable artisticly. This also was the result of king "Naser-al-

din's" and his sons' travels and raising number of Iranian students' transmission to Europe. The government and elected communities were also effectual. "Qajar period" architecture promoted old basic principles of Iranian architecture and its patterns, and it created an innovative space.

This period was continuation of "Azari" and "Esfahani" styles. At the same time Iranian architecture was a combination of original and modern architecture under the effect of European art. "Azari" and "Esfahani" style were usually using ostentatious tiles and colored glazes particularly in "Safavid (1501-1736)" period; afterwards it entered to "Qajar (1796-1925)" period and specially, use of "Esfahani" style was obviously in popularity and mostly was used in religious construction. (Farman Farmaian, 2008)

Places and rank of Qajar period's architecture was more evolutionary than former periods' architecture such as Safavid (1501-1736) and Zandieh (1760-1794). Because of the increase of special creativities in architecture of this period, also increase in variety of new spaces, and great style of spaces and old architecture pattern developed space expansion. (Ayatollahi, 2002)

Considering features of "Qajar"architecture such as proportions, shapes and ornamentations, situation of Qajar architecture is lower than previous periods, particularly in Safavid period; its shapes are not stable and new shapes entered architecture. Proportions and harmony of shapes are also in lower level than previous periods. Sometimes, architectural ornamentations are too much and chaotic instead of limited ornamentations and it characters of the bright architecture of Safavid period. (Pirnia, 2001)

Molding and tile work are mostly used in façade of the buildings, as an ornamentation in early "Qajar period " but use of complicated ornamentations in spacing decrease passing of this period particularity entering to ancient Iranian periods, using of internal construction ornamentations regarding to rise of constructions and use of new material in construction making. (Pirnia, 2009)

There are different arts applied in private houses of "Qajar period", showing that the west and east culture have great impacts on them , but painting is the main artwork that was done on the walls and ceilings, which exactly showed the culture of eastern and western people. (Layla and Ekhtiar, 1998)

2.2 Traditional Persian Residential Architecture

2.2.1 House in Iranian Architecture

One of the important fields of Iranian architecture is housing. Today, the word "home" is in common use. Previously it has been applied to "the Room" in Iran. The private room was called "vestach" or "Gostach" or "Vesagh". Nowadays the word "house" is mostly used instead of home in Iran. (Ghobadian, 2009)

2.2.2 Effect of Culture on Interior Architecture of Traditional Persian Residencies during "Qajar Period"

The key mission of culture in the societies is to present the conceivable ideas and thoughts which will display through visible visualizationt. During this communication, architecture has an essential role. Each building should make these imaginable points of society visible by using forms, therefore they will consequently be a sign to recognize the culture.

Life is very depending on religious identity and sense of belonging in Iranian society, because Islamic-Iranian culture mostly was formed through these factors. Religious beliefs are the focal factors of Muslims' their cultural indulgence in life.

Consequently, urban plan is separating public from private domains and land parcels, while the tradition of separating or women and men has been emphasized. Even though during "Qajar period" Europe and even some Eastern countries like China and Japan had some effects on Iranian culture, architecture and art, and Iranians became more interested in modern world; religious beliefs were the main concept for traditional designers, architects and artists for their designs in public places like mosque, bazaar and karvansaray. (Ghobadian, 2009)

The main changes in culture, architecture and art were seen in their personal places like their own houses and even in these houses they wanted to have their own attitude beside new elements of west or east. In fact they wanted to have old and new together. (Naghizadeh, 2011)

Culture and religion are two elements that affect the traditional architecture and according to these features privacy became important.

Privacy in Traditional Iranian House:

The concept of privacy, which is highly related to the culture, can be explained as preventing the outside from becoming dominant of the interior and households' life and vice versa.

A combination and relation between open and closed spaces, are another important indicators of privacy. There were separate semi-private buildings for family members

and especially for women and other building and rooms for ceremonies and guests. Finally, in traditional architecture of Iran, there were two different types of privacy, one for outside the house and the other for inside the house. (shabani,2011)

Still there are other different categories in the relationship of the building with its surrounding, most of the traditional Iranian houses were designed in sharing the same qualities which are inaccessible from the street and also surrounded by high walls.

(Andarouni) was the private space for the family, In traditional culture house was the place for resting after a busy day. According to the culture and religion, see many activities in these houses took place that needed privacy. Privacy in spaces of these houses can be categorized as following: (Memarian, 2011)

Public area: which were used for activities such as ceremonies and guests. Majority of decoration and ornamentation were used for these spaces. They consist of courtyard, sitting rooms and Ivan.

Semi-private area: This space just was used for family members and close friends.

Private area: These spaces completely belonged to the family members.

2.2.3 Effect of Climate on Architecture of Traditional Iranian Residencies Buildings

One of the important issues related to urban design was orientation of "home", It also has been related to the climate, the radiation mode, wind direction, location and the material of the ground. (Pirnia, 1992)

Traditional architecture of Iran has “golden proportions”, in spatial design. It was a rectangle, which was inscribed in a “hexagonal” plan. All courtyards, rooms and other parts of the house were built according to this golden ratio. (Pirnia, 2009)

With this manner, this “golden proportion of Iran architecture” have considered in three parts, which are generally called *“Run (Persian direction of home)”*. (Pirnia,1992), (Figure 9)

1) “Running” Run. (Roune Rasteh)

2) “Esfahanian” Run .(Roune Esfehani)

3) “Kermanian” Run. (Roune Kermani)

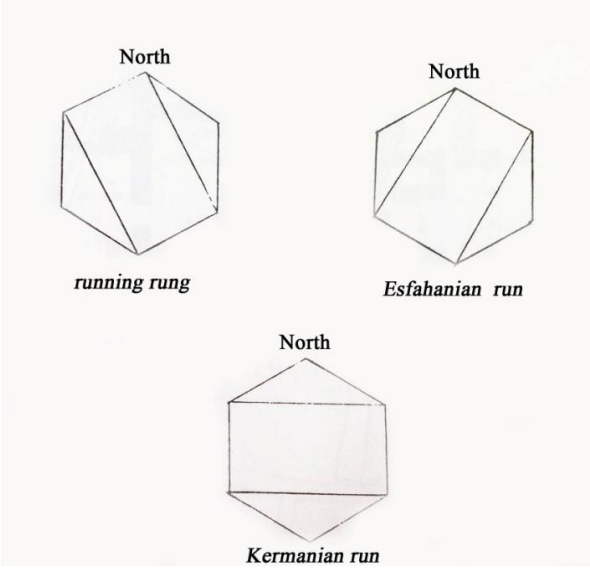


Figure 9: Using Of Hexangular for Runs (Pirnia, 1355)

1) “The Running” Run (roune raste): a rectangular (as a house plan) set in a “hexagonal” in the northwest (NW) - southeast (SE) orientation. This run has been used in central and northwestern cities of Iran such as Tehran, Yazd, Jahrom, Yazd . (Figur 10)

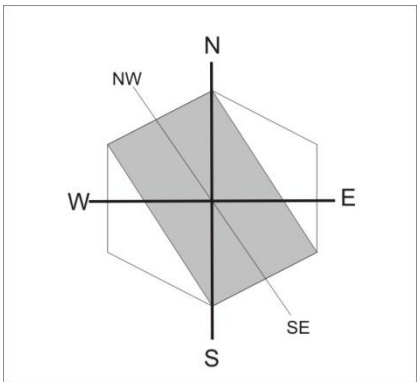


Figure 10: “The Running Run” (Roune Raste) (Pirnia, 1355)

2) “Esfahanian” Run: Esfahanian the run has oriented from northeast to southwest like houses in Esfahan, Estakhr, Takht Jamshid city of Iran. (Figur 11)

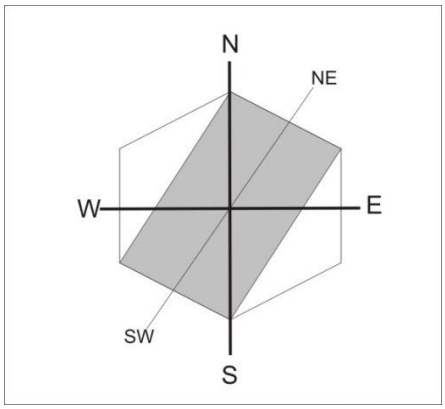


Figure 11: “Esfahanian” Run (Pirnia, 1355)

3) “Kermanian” Run: Kermanian run is extended in west-east orientation such as Kerman, Hamedan and cities of Western Azarbayjan in Iran. (Figure 12)

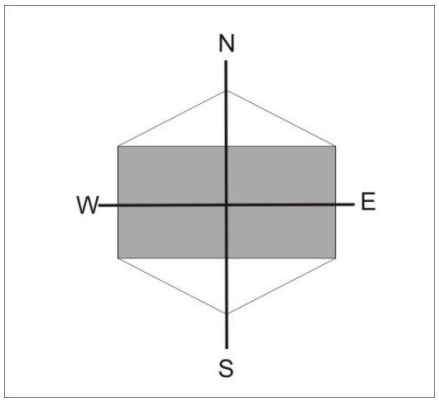


Figure 12:”Kermanian” Run (Pirnia, 1355)

There are different building systems in Iran because of different climates and buildings are constructed according to their geographical location. Using local materials, with regard to their stability against heavy load and compression, heat,

cold; and also rain and snowfalls are the factors that have impact on Iranian traditional architecture. There are some needs for protection in those spaces, which are facing the direct radiations of sunlight, such as building shades in each segment, walls, ventilation shafts, basements, central courtyards, shelters with expanded shadows, choosing suitable materials and etc.

These factors help buildings to ressist the external issues by creating the best interior space condition without using the complicated sets of energy and polluter systems. In other words, the previous generations have known about the rules and ways for how to use the sun's energy and they all have applied it. (Tavasoli, 2002)

Climate Zones of Iran

Iran is located in geographical latitude of 40º, 25' North degree; it is one of the hot countries. This area is a height plateau; and there is a few percentage of the areas with the height lower than 475 m and lower than the sea level. (Kasmai, 1980)

According to the native architectural forms and structures in different areas of Iran, there are different forms of houses , Iran has a four different climate and in the below text , there are explanation of each climate and more attention to warm and dry climate because "Kashan" city located in warm and dry climate of Iran .(Figure 13)

1) Humid & Mild Climate (Caspian Beach)

2) Cold Climate (West Mountains)

3) Warm & Dry Climate (Central Plateau)

4) Humid and Warm Climate (South Beaches)

1	Humid & Mild Climate (Caspian Beach)	
2	Cold Climate (West Mountains)	
3	Warm & Dry Climate (Central Plateau)	
4	Humid and Warm Climate (South Beaches)	

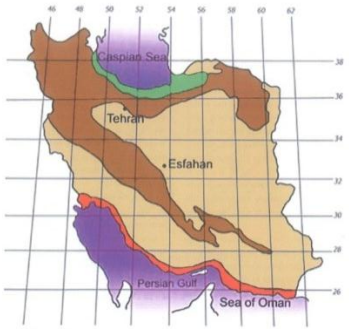


Figure 13: Climate Zones in IRAN (Developed by Author)

1) Natural Effective Parameters on Building in The Humid & Mild Climate:

- Sun , wind, humidity and rain effected to the climate of this space.

Direction of the building must be in the wind track, because making breez is very mportant in mild and humid regions to use most of the wind flow.

In these areas, the large size is not priority for the windows, because by utilizing small openings, (the ones placed in a suitable place), the building can benefit from most of the sun and wind energies. However in places where it impossible to create breeze, large windows help cooling the internal spaces especially in the evenings. (Shokohian, 2007)

Using suitable building materials is important in mild and humid climatic zones. In these regions, the western facades must be constructed with heavy materials with high thermal capacity in order to control the sun radiation and heat in the evening, whilst, the other front must be built by materials with high thermal strength. (Shokohian, 2007)

2) Natural effective factors for building design in cold climate:

- Sunshine and wind affect the climate of the space.

In cold mountainous regions, windows are larger than hot dry climatic zones' buildings, in order to get maximum advantage of sun energy. Like the humid and mild climate, in these regions, a porch is located in front of the openings to prevent the entering of rainfalls to the house.

Because dark colors attract radiation more than shiny ones, the façades are mostly made by dark materials in this zone. In order to keep the internal temperature stable in cold areas, the heat resistance of materials must be increased. Moreover the western walls and also internal sections of the building must be constructed with heavy materials. (Ghobadian, 2009)

In the areas with intensive coldness, heavy walls are essential to balance the temperature. It is also necessary to use heat insulators to block heat transmission .

3)Natural effective factors on the building design in dry and warm climate:

-the sunlight and wind effected to the climate of this space.

The local architecture in hot and dry area creates some problems as follow, for the residences:

- Hot weather
- High temperature in day and low temperature at night
- Daily temperature variation especially in summer
- Hot summers and cold winters
- Dry weather, low rain
- Dusty and hot storms and sandy.(Kasmai,1980)

The absorption of sun radiation by façades could be taken down by several ways:

- Shaping and directing the building according to the sun
- The highest part of the building is facing sun

- Shape and slope of the roof. (Kasmai, 1980)

Controlling the shadows on the façades, form of the plan, orientation and height of the buildings could decrease the heat transition.

Also creating shadows on the walls is so much easier than creating shadow on the ceilings. Generally, same building types in south side should be constructed higher than north side in order to prevent sun radiation. The ratio of the ceiling to the wall is more critical because of the essential role of coolness in the building.

The lower roof substrates are more serious than shape of the roof. The flat roofs are difficult to bind up, but for inclined roofs it is easier; a shiny surface absorbs less radiation, therefore it is not becoming much hot. Moreover the environmental temperature mostly effects the heat. But when the color is dark, the effect of the heat generated by sunlight is more than environmental heat's effect. (Shokohian, 2007)

Dome can reduce the heat, while sun is shining on the roof. During night the absorbed heat from the roof goes away faster. In Iranian architecture issue of cooling the internal spaces was more easily solved by creation of double skin domed roofs. The domed form is also good for the nights' temperature and helps to cool the space. It means that the heat returned from the building's structure is also dissapeared. (Memarian, 2008), (Figure 14)

Figure 14: “Borojerdiha Residence”, Dome, Kashan, IRAN (Photograph by Author)

In hot and dry climate of Iran, house used the basement (underground). Its roof level was 1m higher than the courtyard level, and they are usually located in southern front of houses. This space was cool during the summer. (Shokohian, 2007).(Figure 15)

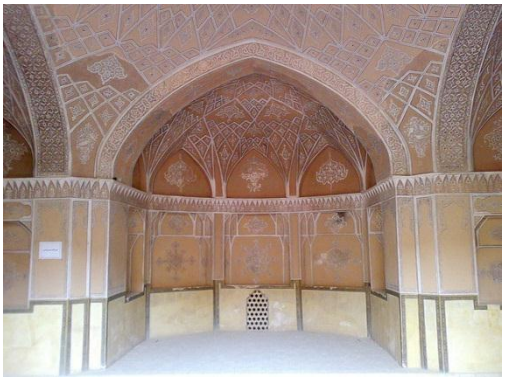


Figure 15:”Ameries Residence”, Basement, Kashan, IRAN. (Photograph by Author)

4) Natural Effective Factors on The Building Design in Humid and Warm Climate:

- Sunshine and wind effected to the climate of this space.

One of the qualities of this climate is that the weather is moderate in the winter and warm in summer. The highest temperature of this climate in summer is 35 to 40 °C This climate is highly humid all the year; so the difference between the temperature of night and day in various seasons is little.

Sweating is one of the biggest problems in the moderate zones, and is the result of high damp. Large windows are very useful and they are protecting the house from sunlight, rain penetration and insects. The most suitable height for the windows is 1.5 to 5.5 meters from the ground. While higher level is more appropriate, it is best to apply horizontal windows. (Ghobadian, 2009)

The windows and large openings in humid regions should efficiently be protected from sun. The shades of windows should protect the internal spaces not only against direct rays but also against spread rays with quite significant amount in hot climate.

2.2.4 Type of Space in Traditional Persian Residential Architecture

In traditional Persian residenceial architecture,it was used some different spaces according to function and there were 3 types of house according to period of time.

1-In first type of house: the elements of these houses consist of corridor, "Sofeh"(balcony), rooms, courtyards. (Pirnia,1976)

2-In the second type of house: the private sections and common sections of houses separated. And the elements of houses included of "Andarouni"(internal(inner) part), "Birouni"(external(outer) part), courtyard, gardens, corridor, "Hashty"(vestibule) and kitchen. (Pirnia, 1976)

3-In the third type of house: the houses were completely different and bigger than the second type and consist of "Andarouni"(internal part), "Birouni"(external part), courtyard, gardens, corridor and "Hashty"(vestibule), rooms such as " 3-doors" room, "5-doors "room , reception hall, "Tehrani", kitchen and bath. (Prinia, 2005)

Traditional building of “Qajar period “in Iran had separate parts including: entrance (voroudi), vestibule (Hashti), courtyard (hayat), backyard, Rooftop yard, Eivan (veranda), Eivancheh (small veranda) , Pillared eivan, Mahtabi (roofless space), Soffeh, Reception hall (Talar), Shah-neshin (king room), 4-Sofeh (Chahar-soffeh), Dining room, Hose-khaneh (pool room), Panj-dari (five-door room), Se-dari (three-door room), Do-dari (two-door room), Adjoining room, Tehrani, Antechamber, Ventilation shaft, Sardab (Cellar), Sardab reception hall, Bathroom (Mostarah), Kitchen (Matbakh),Stable. (Haji-Ghasemi, 1998)

Public Area Such as :

- *Entrance (voroudi):* Entrance encompassed special space with two different doorknockers, one of them for women with lower sound another for men with strong sound. exclusive doorknockers, defined distinction between the genders for the inhabitants.

-*Vestibule (Hashti):* After door, there was special waiting space. itwas designed as a stopping point and could be used as a temporary reception room for those who did not need to enter the quest room.

-*Courtyard (Hayat):* Normally, the courtyards and the porches on its each side were located in the centeral part of the house. However, in one house it was possible to see more than one courtyard, because internal private parts (andarouni) and external parts (birouni) had separate courtyards, and each courtyard had a pool and garden. (Tavasoli,2002)

-*Stable:* place for keeping animals.

- *Ventilation shaft*: Tall element located on the roof, used in order to draw fresh air into the house.

Semi-Private Area Such as :

- *veranda (Eivan):* semi-open roofed space closed on three sides and open on the fourth.

- *Small veranda (Eivancheh):* small shallow veranda.

-*Pillared veranda*: semi-open pillared space usually facing the closed spaces.

- *roofless space (Mahtabi):* it is located above the courtyard's level. Its surrounding walls are decorated. İt has 3 walls and is closed form one side, which is facing the courtyard and this gives it the appearance of a roofless "eivan". Usually, this space is closed on three sides and overlooks open space on the fourth. (pirnia, 2005)

-*Soffeh:* Roofless platform above the courtyard's level and usually located in front of the closed spaces. (pirnia,2005)

-*Reception hall (Talar):* Large formal room usually assigned to entertaining guests.

- *king room (Shah-neshin):* Space at the head of reception hall, facing the window, where dignitaries are seated.

-*Four-Sofeh (Chahar-soffeh):* Cross-shaped space comprised of a central dome-covered space and four sections roofed in the "taq-o tavizeh(roof ornamentation)" manner around it.

-*Tehrani:* Northern part of the house is placed on winter-sitter or Tehrani, this part was sunny and biggest winter room. Tehrani had two small room with sash and it's nearby had a kitchen. (Amrayi, 2004)

Private Area Such as :

-*Dining room :* Large dining room.

- *pool room (Hoz-khaneh):* Tall covered space with a central pool and usually communicating with the other spaces.

- *Cellar (Sardab):* Basement spaces which are equipped with small pool in the middle.

-*Cellar reception hall:* Hall-like space is located on the underground floor of the house.

-*Backyard:* mostly backyard is located at back of the house.

-*Rooftop yard:* small yard on the second floor of house which, together with its surrounding spaces, continues a relatively independent part in the mansion.

- *five-door room (Panj-dari):* Large room with five large adjacent window openings to the courtyard. It is known as guest room that has living room's function in the house with modular system. In five-doors room, which benefits the light from its length, golden ratio was totally applied. In two-sides of five-doors room also two aisles are placed. Lamp-stands were similar to heater or stove, but its set placed in the wall. "Hall"- stage or small platform means source of the word "Hall". (Figure 16), (Pirnia, 1992)

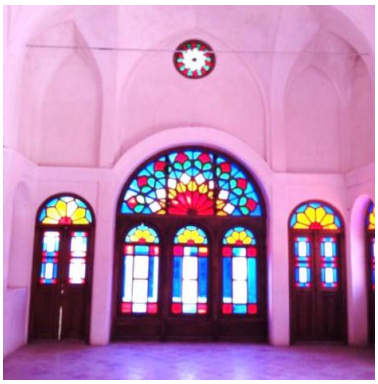


Figure 16:"Tabatabai Residence", Five – Doors Room, Kashan, IRAN (Photograph by Author)

- *Se-dari (three-door room):* Room with three large adjacent window openings to the courtyard. This room was a bedroom of the house. In order to design this room semi-golden ratio was applied (rectangle in hexangular (like to 3.40×4 meters) or 1.7×2m). (Figure 17), (Pirnia, 1992)

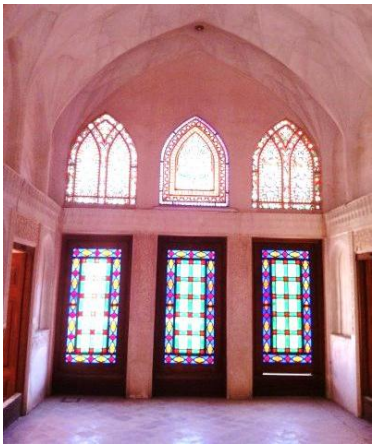


Figure 17:"Abasiha Residence", Three Doors Room, Kashan, IRAN (Photograph by Author)

-*Do-dari (two-door room):* Room with two large contiguous window openings on the courtyard.

-*Adjoining room:* Upper floor small room adjoining the reception hall and communicates with it.

-*Antechamber***:** intersection space, a small room used as an entryway or reception area to a larger room or waiting room directly connected to the reception.

-*Bathroom (Mostarah):* In these houses bath was located in lower level than the house. It was divided in two parts, one of them for changing space and the other parts as the shower.

-*Kitchen (Matbakh):* Kitchen was special part for cooking and baking and a wooden chimney was placed there for cooking.

2.2.5 Fundamental Principles and Basic Characteristic of Interior Architecture in "Qajar "Period

According to (Khorshidifar, 1965) , Iranian architecture have features including special values in comparison with other countries such as: appropriate design and accurate calculations, considering technical and scientific issues, rised porches, high columns and finally various ornamentations that introduce the glory of Iranian architecture while being so simple.

"Qajar period "has special characteristics of interior design including:

- producing two-side steps in main construction axis and huge and raised porches and balconies in entrances, Centrality of construction with Colum and use of high construction that showed power and greatness in Architecture. (Memarian, 2008)

adding central room balcony with two columns, and small simple rooms around central room and converting "three-doors rooms"(se-dari) to "two-doors-rooms"(do-dari) and entering the direction length in construction, stretched plans along one axis, producing a vast view by windows. (pirnia,2009)

-Use of colorful lattice windows, named “orosi” window, Yellow and orange color are formed in “Qajar period “architecture and use of stone, cement and iron and plaster Molding and tile-work in internal decoration and Use of wood and mirror work, painted or painting tile (painted of ancient and courtly myths) in ornamentations. (Pirnia, 2001)

İranian architecture is depicted generally in 5 issues in all valid refrences about iranian architecture and one of significant reference is for “Mohamad Karim Pirnia “. (Author of iranian islamic architecture book)

5 issues of Iranian architecture: (Pirnia,2001)

- Introversion (Daroun garayi)
- Self-sufficiency (Khod-Basandegy)
- Statics (Niyaresh)
- Anthropomorphism (Mardomvari)
- Symmetry

Introversion (Daron Garayi):

One of Iranian beliefs has been the private live and its value and recpect. Iranian architects separated their method with organization of building bodies or organs around one or several middle-homes and also by dividing these to two vestibules or eight sides. (Monshizadeh, 2009)

Introversion is an original concept of Iranian architecture and it is in great amount of variety, and understandable forms. Introverted houses in hot and dry climate are such as heaven in desert, introverted space is integrated as open brachiums.

Top of doors have two platforms and the door had two separate knockers for men and women, two corridors admitted eight-sides one of outer part (birouni) and other inner part (andaroni) of the house. Internal part (andaroni) was adjustment of the family and other people could not go in. Outer part (birouni) was for guests and other people that they become entertain separately and sometimes guests were entertained in the room in Hashti that it was nearby inner part. (Khorshidi fard, 2008)

On the other hand, it used the minor design for exterior and façade design and major design was done for interior parts. Normally, there are no ornamentations and windows on the external walls but all the ornamentations were on the internal wall. Eventually interior design was the specific characteristics of Iranian Traditional buildings. (Pirnia, 2009), (Figure 18)

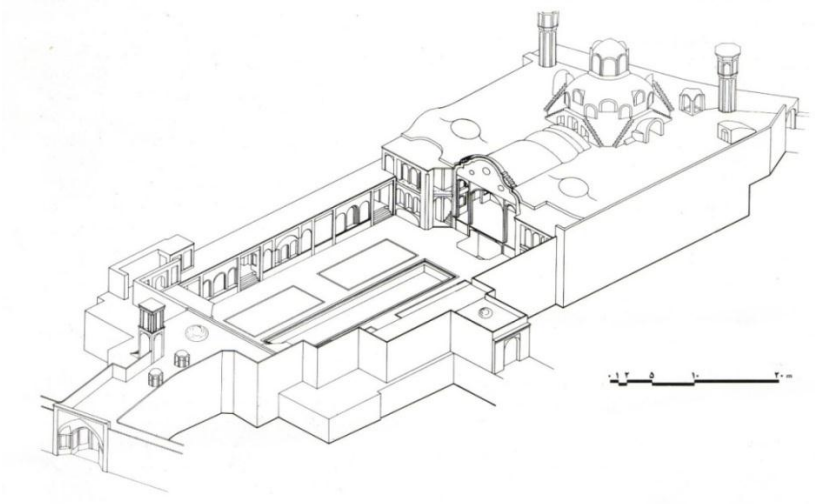


Figure 18: Introversion, "Borojerdiha Residence", Kashan, IRAN (Haji-Ghassemi, 1998)

Self-Sufficiency (Khod-Basandegy)

Iranian architects are tried to provide the construction material from the nearest spots in order to be "self-sufficient", so that process of construction would become faster

and the building was more adaptable with its surrounding nature and its renovation would be easier.

Iranian architects believed that material should be ecological or aboriginal. According to statement of manufacturing or production it is best to use local facilities as much as possible. (Behbod, 2010)

One important point is that mainly, one of main motivations for building domes and curved roofs or canopies, and their vast range of use was that suitable wood was not available, but making the brick was so simple and possible. Architects by their innovation covered big entrances with brick and mud brick. (Ghobadian, 2009), (Figure 19)

Figure 19: Self-Suffficiency (Khod-Basandegy), "Tabatabai Residence", Kashan, IRAN (Photograph by Author)

Statics (Niaresh)

Niaresh means the knowledge of statics, building technique and materiality. Recently Architects paid attention to stability of building apart from aesthetics. Homogeneous proportions (Peymoun), the measurement that was used in the building, were still used for Niaresh.

Architects make variety of buildings according to using (peymoun) and its repeatation in sizes and organs. And each building was not the same and similar the other one, it had special condition for itself. (Pirnia, 2001),(Figure 20)

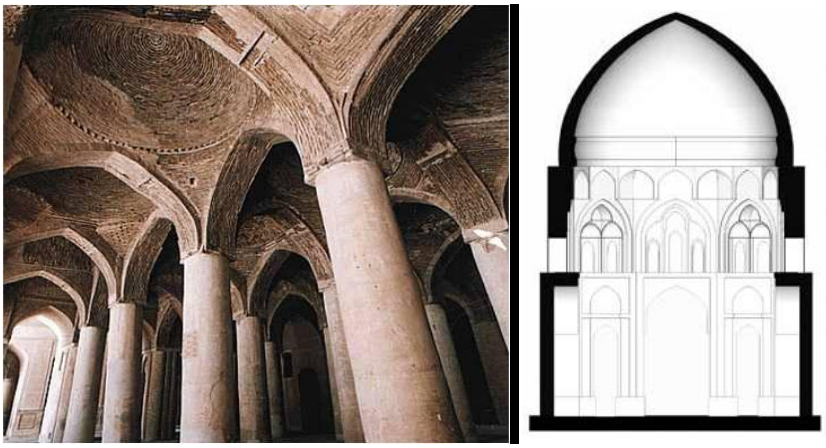


Figure 20: Statics (Niyaresh) (Pirnia, 2001)

Anthropomorphism (Mardomvary):

According to (Akhtarkhavan, 2008) architecture has been always and everywhere an art closely related to life. Therefore organization of architecture has always been dependent on life and in each time the lifestyle has been fundamental in architecture.

Anthropomorphism appears in the body or spaces of building, for example: the "three-doors-room"(se-dari), is used just for sleeping and to meet the needs of a family. Elements or components of room, such as door, window, niche and the place that used for bedding store, had suitable size (like to 3.40×4 meters or 1.7×2m). (Monshizadeh M, 2009)

Respecting the neighborhood is another type of Anthropomorphism; it means to build the house according to neighborhood's context. Because each owner had different financial situation, therefore most of the houses were built in the same level and without any decoration elements in external parts. It was another special characteristic of traditional architecture of Iran. (Eskandari, 2011), (Figure 21)

Figure 21: Anthropomorphism (Mardomvary) (Monshizadeh M, 2009)

Symmetry

Symmetric items are important features of Iranian traditional architecture. By drawing a line on the middle of the house, the symmetric elements of plan will show up and actually all the decoration elements, openings, details, etc. (Eskandari.2011), (Figure 22)

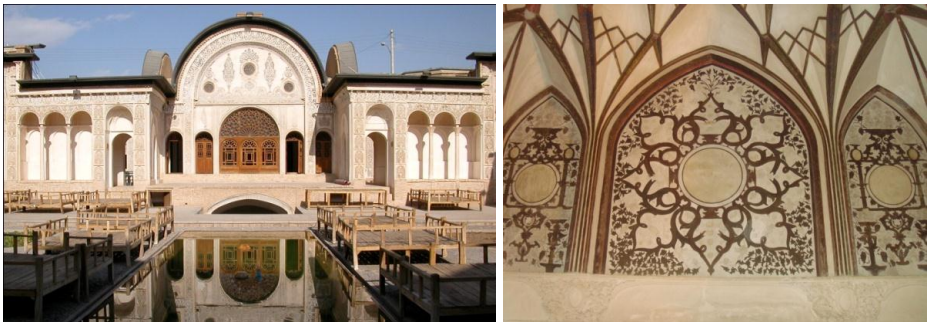


Figure 22: Symmetric, "Tabatabai Residence", Kashan, IRAN (Photograph by Author)

2.3 What is the "Four Season Houses" in Architecture of Traditional Persian Residencies?

Four season houses are located in hot and dry climate of Iran . There are many four season houseS and specially "introvarted house (darongara)" from Safavid period (1501-1736) until Qajar period (1796-1925), in hot and dry climate cities such as Esfahan, Kashan and Yazd. According to location of Kashan in hot and dry climate, many of houses are built around a central courtyard (introverted-darongara), (Figure 23) and are usually built to be used in four season of year. (Memarian, 1993)

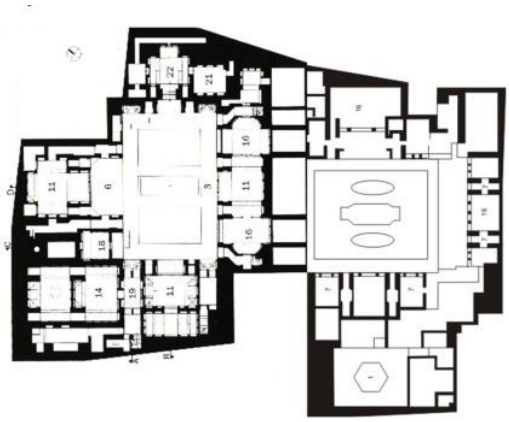


Figure 23: Central Courtyard, “Abasian Residence”, Kashan, IRAN (Haji-Ghassemi, 1998)

One of the main factors in formation of architecture of a region is climate.

In an traditional architecture, climate is one of the main effective factors on orientation of the building, space organization, form, type of structure and material and components of buildings. (Nassiri, 2008)

Four seasons house creates a legible interactive conversation of dwelling and environmental veils. It wears severely what nature wears throughout the time. The building extends along east to west in regards to climatic conditions.

In northern side of building, facing the sun, located the winter-residence part that is called “Panah” (winter residence) and almost all activities of family took place in this side of building in winter season and all the major ornamentations were in this side of room in “king room” (shahneshin). (Figure 24), (Pirnia, 2009)

Figure 24: Winter Residence in “Brojerdies Residence”, Kashan, IRAN (Photograph by Author)

In summer, the south side of building is used for all activities of family and this part is called “Nesar” (summer residence), and often the basement was located in this part. Its temperature is less than other parts of the house in hot and dry climate . These side of the house has usually half-opened balconies that they don’t expose to sunlight. (Figure 25), (Pirnia, 2009)

Figure 25: “Borojerdies Residence”, south side, summer residence, “Kashan”, IRAN (Photograph by Author)

Usually, the height of rooms in summer- residence parts is higher than other parts of the house, because the hot air goes up and the cool air stays down in the room. Usually ventilation systems are in southern side of the house. (Figure 26) (Memarian,2008)

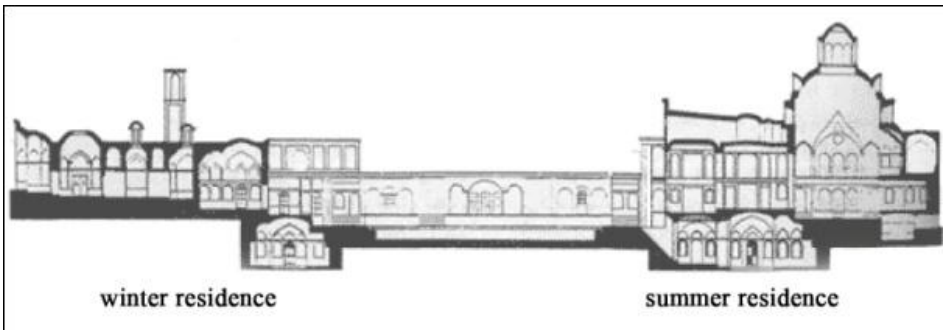


Figure 26: Section of "Boroujerdi Residence" In "Kashan", Showing the Level Difference between Summer Residence and the Ground Level (Haji-Ghassemi, 1998)

One of the main Characteristics of four season houses were wind catcher (badgir) that came from Safavid period and countinued to be used until Qajar period, that many of Qajar period house have ventilation system. (Figure 27), (Ghobadian, 2009)

Figure 27: Wind Catcher (Badgir), "Borojerdiha Residence", Kashan, IRAN (Photograph by Author)

The other characteristic of four season houses were the basement (sardab) that was used for summer because of its low tempreture in hot weather. (Figure 28)

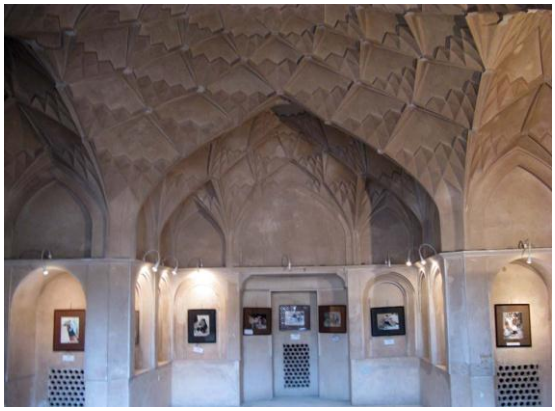


Figure 28: Basement in "Borojerdiha Residence", Kashan, IRAN (Photograph by Author)

Generally, the following features can be used for models of architecture of four season houses in Kashan : (memarian,2008)

1- the basement floor .
2- Use of three different spaces: open, Semi-open, closed (courtyard, ivan,room).
3- Constructed areas and courtyard located in the position that they are facing sun and or in opposite direction (mostly the main side of house was facing sun).
4- Spaces organization according to summer residence and winter residence,(Possible seasonal migration home) in terms of height, (summer residence: Terrace (bahar khab), pool room (Hoz-khaneh), basement (sardab), winter residence: Tehrani).
5- Different performances of skylight according to function of space (the main spaces get the direct light from courtyard and service spaces often get indirect light).
6- Use of local material such as brick and wood.
7- Combination of vaulted roof and flat roof and double skin roof.
8- Use of Materials with high thermal capacity in construction of elements such as , ivan, wind catcher (badgir), pool room (Hoz-khaneh),
9- Use of fireplace in rooms of winter residence.
10- The size of winter residence rooms is smaller than summer residence room.

2.4 Analysis of Interior Ornamentation in Architecture

2.4.1 What Is Ornamentation?

Ornamentation, in architecture, applied ornamentation in various styles that is a distinguishing characteristic of buildings, furniture, and household items. (Hamzelo, 2007)

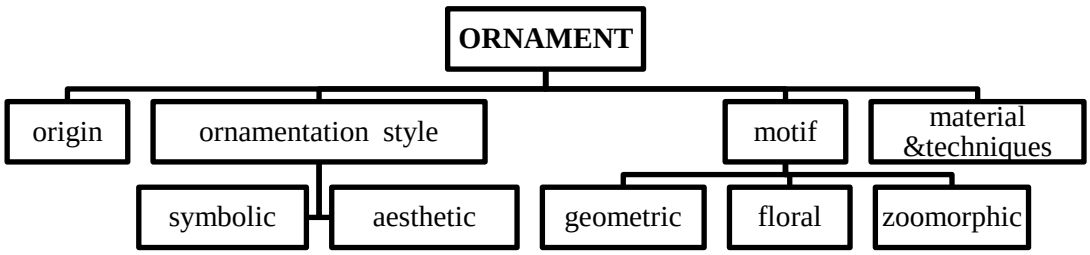
Ornamentation often occurs on entablatures, columns, and the tops of buildings and around entryways and windows, especially in the form of moldings, Throughout antiquity and into the Renaissance, and later for religious buildings, applied ornament was very important, often having symbolic meaning. (Karimi, 1964)

Ornamentation is the enhancement of an item or building with decorative and objective work of design. Ornamentation gives the impression of using one or a number of features, a motif or a combination of various motifs, which are created by applying different elements that possibly can be placed in a category amongst line, shape, color, texture, light and form. (Ongul, 1998)

Ornament

According to Dushyant Nathwani, (2006): *Decoration is a part of applied features in design, while embellishment is like ornaments on the body in design."*

Table3: Analysis of Ornament. (Developed by Author)



The origins of ornament date back to the initial historical periods, with its fundamentals have been established in the Paleolithic; Ornament accomplished a great range of forms and occupied a prevailing place in art, in the aesthetic culture of the Neolithic. Every period, every style, and every constantly settled national culture has established its own arrangement of ornamentation. (Pour Jafar, 2008), (Table 3)

"Interior is called decoration, as it has many add-on features to enhance an interior, whereas a painting on the wall in the same is ornamentation.

(Dushyant Nathwani, 2006)

It is a design in a pattern of regular elements that is applied in order to decorate various objects (utensils, weapons, textiles, furniture, and books), architectural spaces both interior and exterior, and plastic works, predominantly applied, arts . (Evans, 1950)

The history of art shows two great groups of ornamental styles, the symbolic and the aesthetic ornament is one of the necessities, which pleases the visitors' sight. There are some rules, principles, or guidelines for creating beauty in arts as well as architecture.Ornament contains abstract forms or artificial realistic motifs, which are frequently simplified differently. (Wornum, 1869)

There are three kinds of motifs used in the ornamentation, which are: geometric, floral and zoomorphic ornaments.

Geometric motifs are formed by abstract shapes such as dots, lines, broken lines, zigzags, cross-hatching, circles, rhombuses, polygons, stars, crosses, or spirals. More intricate ornamental motifs also include meanders.

Floral Ornaments are made by stylized leaves, flowers, and fruits; examples of such ornaments are the lotus, papyrus, palmetto, and acanthus designs.

Zoomorphic Ornaments are created out of stylized depictions of real or imaginary animals. Human figures, architectural elements, armaments and various signs and marks (heraldry) are also used as motifs in ornament. The stylized epigraphs on architectural monuments (for example Middle Asian medieval mosques) or in books (tourniquet), form a specific class of ornament.

Complicated compositions of various motifs are used: geometric and zoomorphic forms are mostly synthesized, the way that geometric and floral motifs (arabesques). (Pour Jafar, 2008)

Official characteristics of ornament include decorative stylization. Ornament always arranges this surface and express the structural logic of the object frequently. Not every patterned scheme can be considered as ornament. For instance, a patterned fabric with an infinitely repetitive design is not definitely ornamental. According to the combination assigned by the form of the embellished object, ornament may appear in the form of a band, a medial pattern, a frontier, or a heraldic design. Sometimes it may cover the whole surface. Several forms of ornament may create a composition. (Naser Seyed, 2001)

Technique is different for each material and the type of ornament based on the artist's idea, therefore by analyzing the motifs, a variety of them is found in ornamentations

2.4.2 Material and Techniques that are used in Ornamentation

There are different types of materials used in ornamentations of Iranian architecture by various techniques. In order to create motives and ornamentation by materials such as wood (Tongue and Groove Joining), plaster (stucco), concrete, stone

(craving, mosaic and terrazzo), gypsum, mud and clay (ceramics, bricks, tiles) and glassware. Some materials are applied in interior and some as exterior ornamentations by means of different techniques. (URL11)

Some materials are used as delicate motifs by accurate techniques, such as wood that is used as lattice ornament on the windows or covers on the walls (arabesque). There are other materials like stucco that are harder and have been used in interior and exterior decorations. By using different methods, stucco appears not as delicate as wood. (Musson, 2000)

Concrete is a useful composite material that was formerly replaced stone in many cases, which has been made a diversity of decorative forms to beautify architecture. Stone is used in many ways in the ornamentation since it was the cravings on the ancient surfaces and also it was used in the art of mosaic as the art of creating images with an assemblage of small pieces of stone, glass or other materials. The other way to use stone is Terrazzo that is a flooring technique that results a glossy and long-range floor.

Mud and clay are used in different types including a common ceramic material, which is used extensively for pottery, crockery and decorative objects. The other type is brick which is also vastly used in structures. Also there is tile in this category, a piece produced of hard-wearing material such as stone, ceramic, metal and glass. It generally is used for roof, floor and wall's coverings. Also glassware is a category which is vastly used in architecture and in some cases can be considered as ornament as well.

2.4.3 Interior Ornamentation of Iranian Traditional Houses In "Qajar" Period (19th Century)

Interior ornamentation of Iran categorized according to material. (Table 4)

2.4.3.1 Tiling Decoration

Tiles have clay fragments with certain forming in order to provide appropriate shapes for particular places and one of the most pleasant ways of architecture in all Islamic regions is architectural decoration or ornamentation. Change and development of tiles begun with coloring tiny outdoor elements in brick facades and it fulfilled the construction coating in historical works of 8th and 9th century AD.

(Pirnia, 1992)

One of the important components is glaze. The glaze is a glass layer with two roles: decorative and functional, Glazed tiles not only enriched embellished architecture, but also they act as building wall insulation against moist and water. (Farokhyar, 2006)

First tile-work signs returned to architecture around 11th century. In 6th centry AD, turquoise and azure or blue tiles or glazes' value increased and they were used in combination with un-glaze bricks vastly. By early 7th century, used material for tile making was mud, but in 6th century, a handmade material as stone paste or picking paste used in Egypt, Syria and Iran. Around the 8th century, azure or blue that was eternity color, was banned. Finally under glaze painting technique replaced of golden painting by using azure or blue, a little red and black that produced tiles with a technique called "Sultan Abad "tiles. This technique was used in the middle of eight century and then it was abolished. (Farokhyar, 2006)

a. "Septi-Color" Tile: A cheaper and quicker technique named "seven-color" became popular, fixing system at the end of Hegira ninth century. One of the important changes in usage of architectural ornamentations with small fragments or pieces of tile is named "badal-chini" (a type of Iranian tiling). (Figure 29), (Haji-Ghassemi,1998)

Figure 29:"Septi-Coloured" Tile (Haji-Ghassemi, 1998)

b. "Zarin-Pham" Tile (Golden Tile): Square tiles were placed together and their essential design was painting glazed colors on them. Each tile was fired; then all were placed again next to each other to create the main pattern. Arabesque motives were extremely popular. This method of tile decoration was popular until the end of Qajar(19^{th}) period, when the repertoire of colors were extended to include yellow and bright orange. (Figure 30), (Farokhyar, 2006)

Figure 30:"Zarin-Pham" Tile (Farokhyar, 2006)

c. "Moaragh" Tile (Mosaic Tiles): Sometimes, brick and tile styles are used integrated. Generally, this integrated forms with checkered motion and it is a certain valued to Islamic architecture. This style was developed after 7th century. One of

important and interesting ornamentations of tile workers was writing on tile in all Islamic periods. (Fıgure 31), (URL 16)

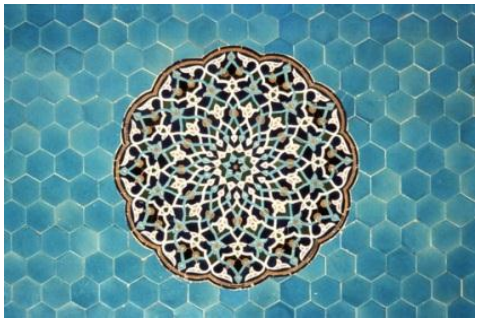


Figure 31: Mosaic Tile Pattern in "Jame Mosque" of Yazd, Central IRAN (URL16)

2.4.3.2 Brick Decoration

Brick in Iranian architecture, not only covers the pillars and cover of volumes and insulation, but it is also used as a complete element in Iran's architecture.

Brick is as a decorative element that can be combined with all composed elements of architecture, or it displays to form a decorative single element. The brick is used in dome coating. Other cases of brick decorations or ornamentations are façade it is very simple geometry but rich or affluent.

Art of applying brick layers in order to create decorative facades is called "brickwork" .

Different ways have been tested in brick work that were put in several groups: Bond, flowering, make-nodding, colored brick-work, filtered brickwork, "khovan", brickwork painting decorative bricks. Brickwork with combination of a color bricks and providing different patterns, designs and images in flat level is called "band". (Pirnia, 1992)

One of very fine and durable styles is decorative brickwork, called ‘nodding’ that performs with the help of different bricks in variety sizes. Node designs are done in simple images such as rectangle, triangle, square, lozenge and in combination with each other, they make polygonal stars and so on. Different designs provide variety of colored bricks and plane or flat style; reticular brickwork is a way of bricklaying in flat and plane compositions. Placing bricks on different surfaces to produce constrained and pitted designs that with certain display of light and shade called “Hasht-Gir”. In addition to buildings’ construction and façade, brick is used in floors coat. Brickwork style in steps is called “Belt”. (Figure 32), (Pirnia,1992)

Figure 32: Brick work (Pirnia, 1992)

2.4.3.3 Plaster Molding

Art of plaster molding and use of stucco or plaster has prolonged precedent. Including long or many centuries, plaster molding changed so far that its elements appeared in tiles design in Islamic arts era. In used works the placed on phoenix motifs are vine leaf, flower, bush plaster molding art in Islamic periods gradually. (Pirnia, 2010)

Plaster molding is used for palaces and other building decorations was changed. This style was popular until Mogul periods, even it has reached its effects on work of arts after this period and caused changes.

Plaster molding images with attractive decorations including mirrors is employed in the nobblesse' house after "Safavid" periods gradually. (Pirnia, 2010)

Some styles of plaster molding:

"*Shir O Shekari*": mural and rough surface are not so much used and it look like painting. (Figure 33), (Hamzelo, 2008)

Figure 33:"Shiro-Shekari" Plaster, "Borojerdiha Residence", Kashan, IRAN
(Photograph by Author)

"*Barjeste"*: surfaces are quiet rougher than "Shir O Shekari" style and patterns of herbals and animals and humans are more used here. (Figure 34), (Khorshidi fard, 2008)

Figure 34:"(Barjeste) Plaster", "Borojerdiha Residence", Kashan, IRAN
(Photograph by Author)

"Zebreh": Angels are 90 degrees and plaster molding is more than "knobs (barjese) plaster molding in "Zebreh" style. (Figure 35), (Hamzelo, 2008)

Figure 35:“Zebre” Plaster, “Borjerdiha Residence”, Kashan, IRAN (Photograph by Author)

“Barhashteh”: Is much more mural and sometimes it mural and rough for 10-12 centimeters. (Figure 36)

Figure 36:“Barheshteh Plaster”,” Borojerdiha Residence”, Kashan, IRAN (Photograph by Author)

Reticular “Moshabak”: This style has been used in decorations of palaces, roof, body of balconies and rooms within mural inscriptions of herbals and mythological animals, etc. (Figure 37)

Figure 37: Reticular “Moshabak”,”Tabatabai Residence”, Kashan, IRAN (Photograph by Author)

2.4.3.4 Muqarnas Work

A type of roofing that harmoniously combines concave elements of equal size. “Muqarnas” is a three-dimensional decoration of Islamic architecture. İt is commonly made of brick, stone, stucco, or wood, clad with painted tile, wood or plaster, and is typically applied to domes, cornices, and the undersides of arches and vaults. “Muqarnas” and its related architectural arts (yazdi- bandi, rasmi- bandi and kase-sazi) are called “Karbandi”. Among these arts, “Muqarnas” has a superior position because of the uniqueness of its design, the creative touch of the artists, it has distinct geometrical and mathematical basis, and complexities of its perception and presentation .(Figure 38), (Pirnia, 2001)

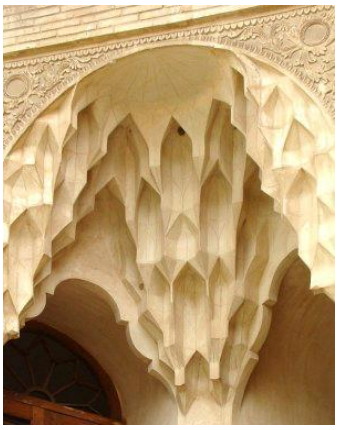


Figure 38: Moqarnas in “Borojerdiha Residence”, Kashan, IRAN (Photograph By Author)

2.4.3.5 “Yazdi-Bandi” (Geodesic Stair of Roof)

“Yazdi-Bandi” demonstrates a variety of construction methods and finishes using local materials. In Iran, the used material is brick and covered by plaster, in Turkey it is stone. The style of “Yazdi-Bandi” is “non-periodic” tiling ornamentation that have a fourfold rotational symmetry. (Feierabend, 2000)

a- Yazdi -Bandi in dome**:** A dome structure is utilized to construct the ceilings of the buildings using bricks. To place a circular brick dome on a square-plan building,” squinch arches” should be inserted into the four corners of the room,

creating an octagonal shape that approximates a circle. As a way of aesthetically unifying the horizontal layers formed by the continuation of these squinch arches, “yazdi- bandi”, which link a square room to a circular dome in this way, are thought to have developed from Persian brick architecture predating the “Seljuk (1055-1194)” Empire. (Figure 39), (Pirniea, 2001)

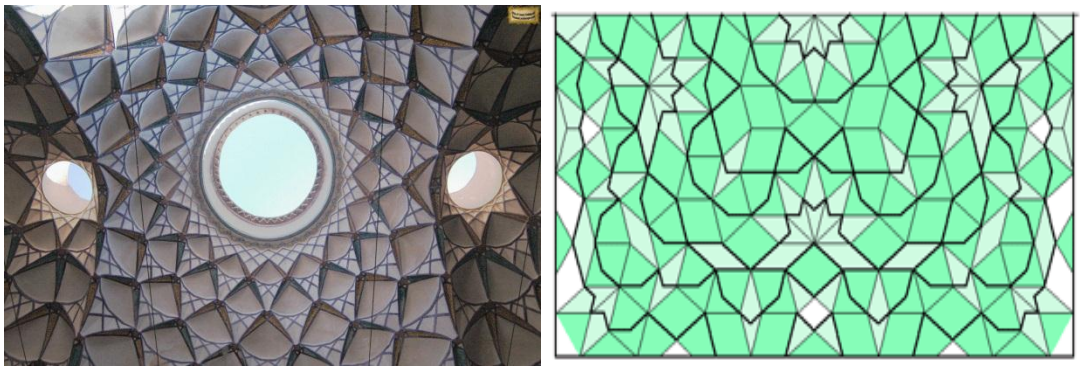


Figure 39:“Yazdi Bandi” In “Borojerdiha Residence”, Kashan, IRAN (Photograph by Author)

2.4.3.6 Painting (Material)

Art of painting was representing Christian or Buddhist art, but it is not noticed in Islamic grounds. It seems that Islam in first historical periods was against the art of painting, because beauty arts were combined with beliefs and dualist’s religious customs, painting and sculpture was appearance of dualism that Islam’s intention was toeliminate it. (Eslami. M, 1997-1998)

During “Omavid (650-833)” and “Abasid (650-833)” Islam was rarely in sample painting, even major arts or works are obtained such as picturing of books in Iranian and “Samanids (875-995)” and “Ghaznavian (963-1187)” dynasties periods and it is less including of palace wall painting. Particularly in first centuries, Islamic painting was kind of the literature. Generally, Islamic painting topic is picturing of valid literacy and religious books, but painting gradually became important in Islamic arts, in this period is affected by chineese arts and eastern and central aisan paintings. (Figure 40), (Karimi, 2004)

Islamic painting art reached its highest position in “Safavid(1501-1736)” period and it took new attractive quality in “Zand (1760-1794)” and “Qajar (1796-1925)” periods. (Figure 41), (Karimi, 2004)

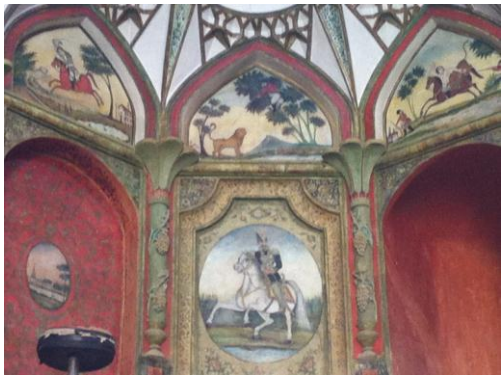


Figure 40: Painting, king Room in “Borojerdiha Residence”, Kashan, IRAN (Photograph by Author)

Figure 41: Painting, Reception Hall in “Borojerdiha Residence”, Kashan, IRAN (Photograph by Author)

2.4.3.7 Mirror Decoration (Material)

Art of decoration with mirrors or mirror-work is one of traditional arts in Iran that was applied as internal ornamentation of historical construction, particularly sacred places. Performing regular designs and different drawings by big or small fragments of mirror in internal ornamentations is called art of ornamentation with mirrors or mirror-work.

In this field, mirror-decorator artist creates beauty and brightened spaces by using glass and cutting it in various shapes that create light reflections in many fragments, brightness and beauty in ornamentation; it has appropriate beauty, durable and stable

cover for construction ornamentations. In Iranian culture, water and mirror was mentioned as two symbolic forms of clearness and brightness, truthfulness, parity, and applying mirror in architecture decorations probably derived from the same culture. (Bahreini, 2000)

Performing this art is one of Iranian artists' innovations, and the mirror has been used in interior decoration of "Safavid (1501-1736)" Shah Tahmasb's house in Qazvin for the first time. This art of "Safavid (1501-1736)" period is sometimes performed as simple mirrors and sometimes in style of flower designs. It is performed by simple mirror designs including flower (like glass and gaze) types of node designs with certain cutting, sometimes it has used Islamic types, flower and leaf and birds' images by a mirror pasted on a flat surface. (Figure 42), (Hamzelou, 1386)

Figure 42: Mirror Decoration in "Ameriha Residence", Kashan, IRAN (Photograph by Author)

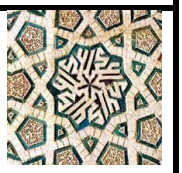
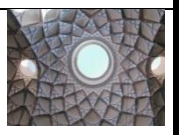
Types of decoration with mirrors or mirror-work:

1) *Ruby:* In this style the mirror is usually attached on glass.

2) *Picture mirror:* it is a famous type of painting on the mirror.

3) *Plaster molding:* usage of the mirror amongst plaster molding pieces. Art of decoration with mirror is carried out usually with node role and even it is performed in the last step. (Bahrini, 2000)

Table 4: Interior Ornamentation of Iranian Traditional Houses in "Qajar" Period (19th Century)

material		surface	Symbolic /aesthetic	motive	period	picture
Tiling	septi-color tile	Doom-wall	Aesthetic	Floral-geometric	9-10 th centery	
	Zarin-pham (golden)tile	wall	Aesthetic	Floral-zoomorphic	2-7th centery	
	Moaragh tile (mosaic tile)	Wall-doom	Aesthetic	Floral-geometric	4-9th centery	
Brick		Wall-doom	Aesthetic	geometric	5th centery until now	
Plaster molding	Plaster decoration	wall	Aesthetic-Symbolic	Floral-geometric - zoomorphic	3th centery until now	
	moqarnas	Wall-doom-vault	Aesthetic	geometric	3th centery until now	
	Yazdi-bandi	Doom-roof	Aesthethic	geometric	3th centery until now	
painting		Wall - doom	Aesthetic-Symbolic	Floral-zoomorphic	Safavid(1501-1736) until now	
Mirror		Wall-roof	aesthetic	Floral-geometric	Safavid (1501-1736) until now	

2.4.4 Windows in Iranian Architecture:

"Good standard window of balance regions between 8-10% total lateral levels are assigned it's a space. This standard can almost be good for other regions. window apart from role of light, which is to brighten inside of building, it is also very important in architecture and ornamentation. (Zomarshidi, 2001)

As an example these decorations are using the rectangular floor and walls for absorption and reflection of light using vaulted building for taking, refracting and light diffusion. Domes or arches seem rotator. According different hours of the day and amount of light, top parts of doors or portals are formed of sunlight with decorative pieces, even bright mirrors and tiles, woods or sticks and rectangular marbles all are shined and they need regulators towards the light. In Iranian traditional architecture, lighting elements are categorized in two groups: first group is as controllers of light such like sunshades and second group is the lights. (Omarai, 2009)

2.4.4.1 Types of Window in Iranian Architecture:

Different types of window divided into two categories according to function in Iranian Architecture :

1) Using windows in a wall

2) Using window in a doom

Elements that bring light in architecture are in different names as: "Rozan" (small hole), "Shabak" (type of grid window), "Moshabak" (lattice doors and windows), "Jamkhane" (colored), "Horno" (Dome Hole), "Orosi" (Sash Window), "Roshandan" (Type of Skylight), "Firiz & Khoven" (Decoration Skylight in Wall), "Goljam"

(Floral Pattern Window), “Pachaloghe” (Mix of fix & casement window), “Tehrani (Sun direct room) and in its opposite there are elements such as porch, curtain, band radiation, sunshades, or baldachin, and etc. that they have controling and regulating roles for entering to construction. (Amrayi, 2004), (Table 5)

Table 5: Type of window in Iranian Architecture

Type of window in Iranian Architecture	
Wall window	**Domewindow**
Hole window (Rozan)	colored dome glazing (Jamkhane)
Type of grid window (Shabak)	Dome hole (Horno)
Latticedoor and window (Moshabak)	Type of skylight (Roshandan)
Freez and khovan in building (Decoration skylight in wall)	
sash window (Orosi)	
Floral pattern window (Goljam)	
(mix of fix & casement window (Pacholaghe)	
Small window (Baje)	
sun direct room (Tehrani)	
Cow eye (cheshm gavi)	

1) Using window in a wall

Hole window (Rozan): It is no possible to separate small holes or cracks from categories of windows. In fact, it is the small window that is usually used on top of the door and sometimes it is used for getting light and to supply clear air for inner spaces, sometimes it is built out of wood and plaster or plaster and crockery (Badal Chini) and often is fixing . (Figure 43), (Amrayi, 2004)

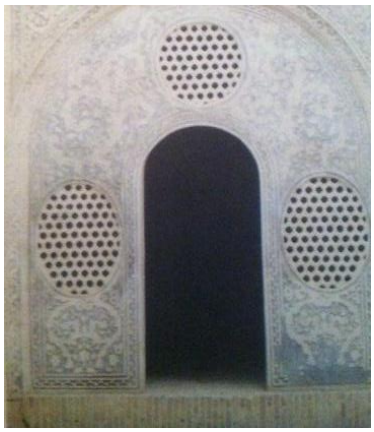


Figure 43: Hole window (Rozan) In "Abasian Residence", Kashan, IRAN
(Photograph by Author)

Type of Grid Window (Shabak): Considering various climates in Iran, with circumstances such as sun and damp, wind and rain, storm and whirlwind, also traditional and religious certain beliefs cause a need for windows and doors Grilled openings in order to support or maintaining of internal construction. Inside the building is covered with small holes and wooden windows and curtains, Crockery (Badal Chini) and lattice tiles cover exterior of building, these lattices decrease radiation or make the passing light weaker. Radiation of daylight cause diffusion of light by the lattice painted sides. (Figure 44), (Pirnia, 2001).

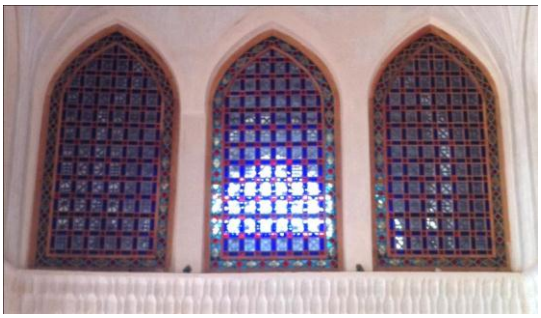


Figure 44: Type of Grid Window (Shabak), "Ameriha Residence", Kashan, Iran
(Photograph by Author)

Lattic window (Moshabak door and window): It is a latticed window and instead of circular cells, it is raised and placed on chambers' walls. (Figure 45), (Pinia, 2005).

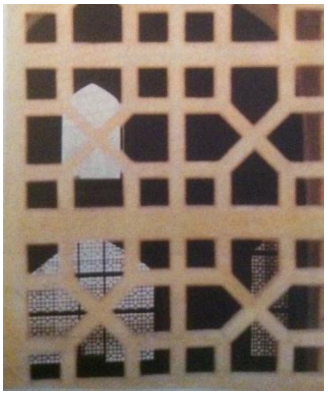


Figure 45: Lattic Window (Moshabak) Window, “Aleeghapou”, Isfahan, IRAN (Photograph by Author)

Decoration skylight in wall (Freez and khovan in building): It has a decorative role with mosaic tile pieces and it is colored with dissolved soil in water and various colors, and in front of building and pargeted tablets to drill or make a hole in order to let the light and fresh air into the rooms, they include some images and are placed on top of doors and windows. (pirnia, 2001)

Sash window (Orosi): Large wooden window with sashes and colored glass panes spanning whole side of a room. (Figure 46)

Figure 46: Sash Window (Orosi), “Tabatabai Residence”, Kashan, IRAN (Photograph by Author)

Floral pattern window (Goljam)*:* It is a small and colored glass window posited in plasterwork, which copes in the highest part of vault or ceiling. (figure 47), (Khorshidi fard, 2008)

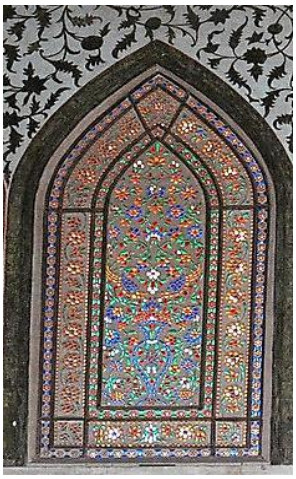


Figure 47: Floral Pattern Window Goljam, "Boroudjerdi Residence", Kashan, IRAN (Photograph by Author)

Mix of Fix & Casement Window (Pacholage): It is a combination of two windows that open from one side and become one window. (Khorshidi fard, 2008)

Small Window (Bajeh)*:* It is a small window that improves many in wall middle pieces and it is created for connecting of in and out individuals. (Amrayi, 2004)

Sun Direct Room (Tehrani): It is a hall towards the sun with a sash window(Orosi). (Figure 48)

Figure 48: Tehrani, "Ameriha Residence", Kashan, IRAN (Photograph by Author)

Cow Eye (Cheshm Gavi): It is a rounded small window that rotates on an axis. (Figure 49)

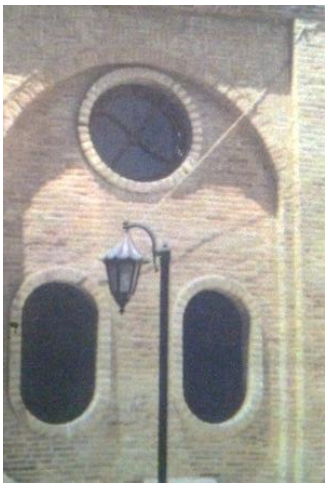


Figure 49: Caw Eye Window, in Sanandaj, IRAN (Amrai, 2004)

2) Using Window in Dome

Colored Dome Glazing (Jamkhane): they are dome ceilings with small holes, bath cottages and bazaars are of the spaces where it has been formed with several crock rings. In this part, in wintertime the rings lie aside and panes are located between work rings and one or all are removed in summer. (Fıgure 50), (Amrayi, 2004)

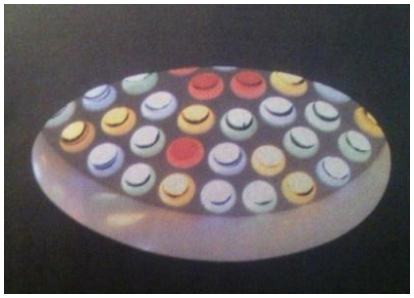


Figure 50: Jamkhane, in Yazd, IRAN (Amrai, 2004)

Dome Hole (Horno): Means lighting from the ceiling, many horno holes are open in bazaars, residence and mosque so the light can enter and also it can function as air conditioning element. (Figure 51), (Pinia, 2005)

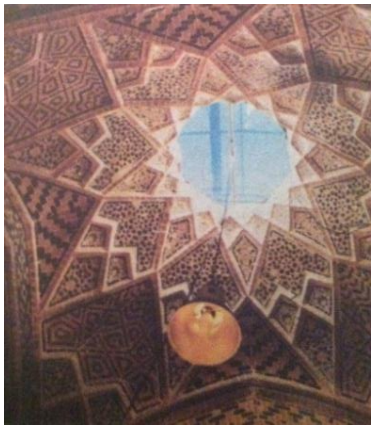


Figure 51: Dome Hole (Horno), “Shoes Bazaar” in Tehran, IRAN (Pirnia, 2005)

Type of skylight (Roshandan): In construction it is impossible to use windows and walls same as public buildings, these windows make openings in order to let the light in from top of the roof. (Figure 52), (Amrayi, 2004)

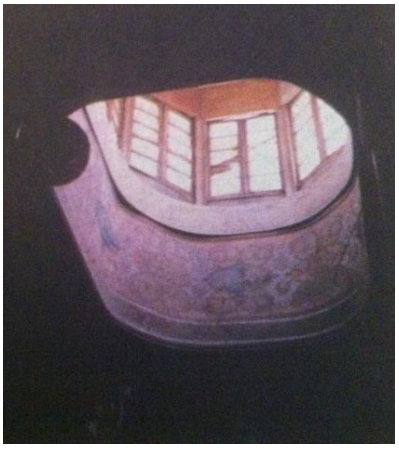


Figure 52: Type of Skylight (Roshandan), “Masodiye Residence”, Tehran, IRAN (Amrai, 2004)

Chapter 3

ANALYSES AND DATA RESULT

3.1 Methodology

The four houses have been analyzed; by their plans the courtyards and rooms. The data and official documents about each house are elaborated in specific charts. Plans and sections are also included in the charts.

Two winter and summer residences are separately investigated in terms of their applied ornamentation and the results are reflected visually in the charts. The side wards of each room are numbered as 1-1, 1-2, (Figure 53) and so on; written vertically on the charts, also ornamental elements' types are written horizontally above the chart. (Figure 54)

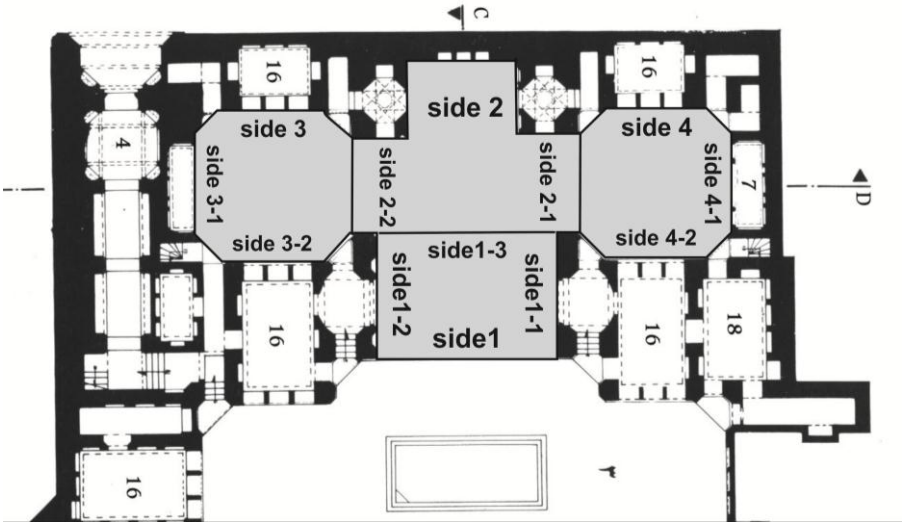


Figure 53: Sample of Side View of Plan

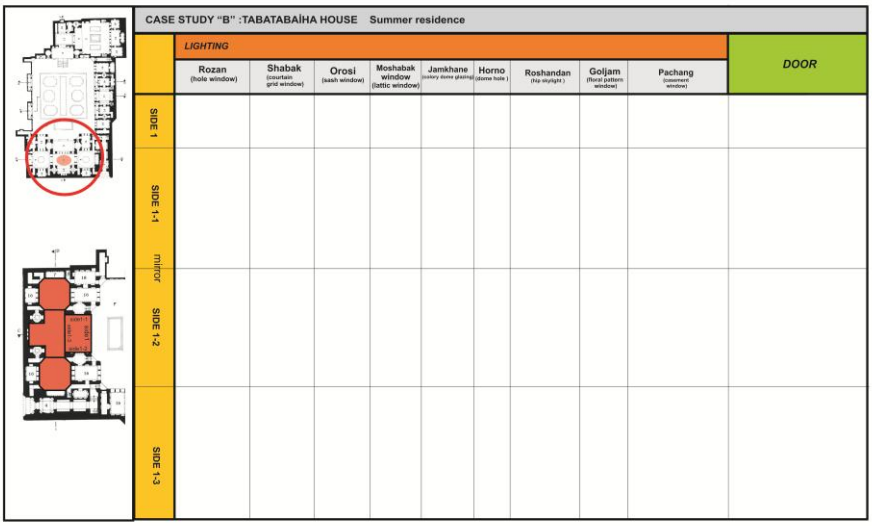


Figure 54: Sample of Analysis Table

Type of windows elements of the houses are also written horizontally same as the previous chart separately and side wards are analyzed. Finally, in conclusion it is declared that what type of lighting is used for each room and also colors of each room is elaborated in terms of each residence's decoration; also ornamentation types, light and color are mentioned separately. The final result will be the investigation about differentiation between ornamentation of winter and summer residences' reception hall and the King Room (Shah -Neshin).

3.2 Case Area: Kashan City

3.2.1 History of Kashan

According to archeological discoveries in the Sialk Hillocks, which is located 2.5 Miles (4 km) away west of Kashan, was one of the major civilized regions in pre-historic periods; and Kashan evidently dates back to the Ilamid (Ilamian) period in Iran's history. (URL 8)

Although Kashan has flourished within the Sassanid Empire; it was taken down by the Arab invasion except for only some ancient buildings that survived.

Kashan became glorious again whilst the Seljuqid era and is famous for ceramic works since then. Kashan was destroyed again when Mongols attacked Iran but it became a significant place in the Safavid times; it was the capital during the excellence of Safavid king, Shah Abbas the second. Afterwards some Safavid rulers chose Kashan to live in instead of the capital, Esfahan. (URL 17)

A local historian claimed that originally Kashan's name has its roots in the word "Key Ashian", which means place of monarchs.

3.2.2 Kashan's Location

Kashan is a city in the Isfahan province of Iran. This city is the first of the large living areas down the Qom-Kerman road on the edge of Iran's Great Desert. Therefore its demand is mainly to the difference between the dry ranges of Desert region and the vegetation of the well-inclined oasis. Markazi Province is located in west of Kashan, Ardestan on the east and its south is neighbor to Natanz and Isfahan. Although Kashan was descripted as one of the ancient cities of Iran, it has been dominated by Isfahan. (URL 8)

3.2.3 Urban development

The city of Kashan, just as other older cities of Iran, preserved its features of traditional architecture and urban design in the beginning of the 20th century.

The way of organizing the spaces and other features, which developed during the Seljuqid and Safavid eras and continued during the Qajar era, radically changed by the Pahlavi dynasty and, more particularly, during the second half of the 20th century. (Narāqi, 1969)

The pre-modern Kashan in terms of urban issues*:* The old Kashan was a walled city, attached to the cultivated lands through gates, which were its instant surrounding areas. (Figure 55)

The urban elements of the walled city was based on Islamic medieval pattern of Iranian cities including four urban areas:

1. Arg: the walled city's inner fortress.
2. Bazaar (the market place): the main area for transactions.
3. The "Mosque and "Madreseh": a building including a mosque with rooms around the courtyard for the students whom studied Islamic theology.
4. Mahalleh: the residenceial zone. (Ashraf, 1974)

During the time before 1920's Kashan was the example of harmony in the relationship between natural environment (which in this case was hot and arid) in both urban design and architectural design, in two qualities:

1. Orientation of the roads in a way that it made the desired wind blow through the city by means of narrow passages with shadings covering them.
2. Building aqueducts in order to conserve the water supplies and to transport it through the underground systems named "kāriz", to charge the public water tanks, built under ground and available for all residences in the district, called Ab-Anbar. (Frrokhyar, 1990)

Figure 55: The Old Kashan City, IRAN (Narāqi, 1969)

3.2.4 Architecture of Kashan

Traditional domestic architecture: historic houses in Kashan with the high entrances create the primary attraction and diversity in the way that floors are designed and also high ceilings are other features of attraction. The light is used in diverse range of window sizes and openings' order and also with colorful glasses (Orosi) and the quality of relation between open and closed spaces is significant.

This variety might lead to this conclusion that many such structures are more result of the creativeness while construction or afterwards. (Haeri, 1996)

Houses built before 1920s in Kashan included two main parts: public rooms for male guests called "Birouni" or the external space; and living spaces for family members and close relatives called "Andarouni" or inner space, this space belonged also to females' visits. The external public spaces included porches, spacious room with five windows (Panj-dari) and the parlor or drawing room. (Farokhyar, 1990)

Next to the entrance there is a vaulted low corridor called Hashti, leading to the external public spaces then to the internal living spaces.

Hierarchically, one first enters to the courtyard, connected to the internal living spaces by a small porch and a raised fenced terrace. Main rooms are named based on their sizes as two, three and five door rooms, are opening to the courtyard.

There are other spaces named: storage (Anbāri), parlor, back room, private pool area, basement, back basement, a retreat called (Zāwia), upper hall, two corner rooms on the upper floor (Gušvār), latrine (keryās), garden, kitchen, sore cupboard, bathroom, closet (Pastou). (Farokhyar, 1990)

Open, semi-open and closed spaces belong to the zones that created all internal and external spaces of the house; there is no space called self-contained in this type of houses. In some cases two types of spaces can serve in combination with each other in order to provide more space. Also this combination system can include more rooms and spaces such as balconies to provide a very large space. The largest space that can be provided as a result of combination includes rooms, courtyard and the porch. (Narāqi, 1969)

There are corridors, which connect rooms to one another inside the internal areas which are called “Harim”. Also by using curtains to cover the whole openings on the façade and opening the winner windows it is possible to combine the private and public parts of the house (Ashraf, 1974)

3.3 The 4 Residence of “Kashan” City in Iran

3.3.1 “Abasiha” Residence

This house was built in 1836 for the client “Haj Mohammad Ibrahim” a well-known merchant. After his death, the mansion was divided to five independent houses,

organized around five separate courtyards. It is one of the most significant examples of the existing old Residence of Kashan. (Khorshidifard, 2008), (Table 6).

Table 6: General Information about the "Abbasiha Residence" (Developed By Author)

CASE STUDY " A" Residence

Name Of The Building	Abbasiha Residence
Location	Iran, Kashan
Construction Date:	1836 -1838
Old Function:	House
New Fun-On:	The house is now a museum, protected by Iran's Cultural Heritage Organization.
Architect:	-
Building Construction:	Load – bearing wall , vaulted and dome ceilings
Area	-
Number Of Floors	2 floors
Outside Surface **Inside Surface**	brick it is stucco with plaster
Buildıng Type:	semi-detached , courtyard
Kind Of Resıdence	Summer residence and winter residence
Spaces	Courtyard, entrance, vestibule, corridor, kitchen, room, reception hall
Ventilatıon System:	openings on the dome on top of the summer residence and the
Others	Energy supply system :Wood or charcoal were used for heating and light Solar energy utilization: winter residence and summer residence and use national daylight

There is a small courtyard, widened in higher levels, In the south west and also north east of the mansion, there are reception halls with very large open space similar to a separate courtyard Also there is a combined space including a reception hall and two rooms (three door rooms), connected with Orosi doors, on the southeast in the same level with the courtyard. (Khorshidifard, 2008)

In the ground level on the western front there is a reception hall with an extended space similar to another reception hall. The facades on the northeastern and southwestern face of the building are similar but the phenomenon behind the northeastern is totally different.(Khorshidifard, 2008)

The mansion has two important entering points; one is located on the northern side. There is a southern entrance located on the corner of the courtyard and containing two corridors leading to a long, small vestibule (Hashti) and an open area. Likewise the other entrance includes an open course, a vestibule and corridor (Hajighassemi, 2004). (table 7)

This place is now a museum and is protected by Iranian Cultural Heritage Organization. (Figure 56)

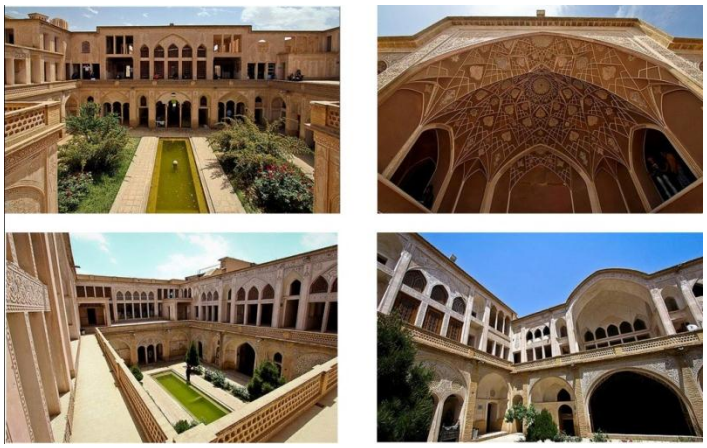


Figure 56:"Abbasiha Residence", Kashan, Iran
(Photograph by Author)

Table 7: Description of "Abbasiha Residence "Plan in Interior Architecture and Space Operation (Developed By Author)

CASE STUDY "A"

NAME OF THE BUILDING : Abasian Residence

NUMBER OF COURTYARD	5 courtyard
COURTYARD MEASUREMENT	5000 m
HOUSE DISTRIBITION	Internal (private quarters) Outdoor(external exterior) Summer residence And winter residence
NUMBER OF ENTERANCE	2 in west(ceremony) south (private)
NUMBER OF ROOMS	11 room in summer residence and winter residence

LIST OF SPACES

1	Enterance
2	vestibule
3	courtyard
4	backyard
5	rooftop
6	eivan
7	eivancheh
8	Pillared yard
9	mahtabi
10	soffeh
11	Reception hall
12	Shah-neshin
13	Chahar-soffeh
14	Dining room
15	Hose-khaneh
16	Pani-dari (5doors room)
17	See-dari (3doors room)
18	Do-dari (2doors room)
19	Adjoining room
20	room
21	antechamber
22	Ventilation shaft
23	sardab
24	Sardab reception hall
25	bathroom
26	kitchen
27	stable

(Haji -Ghassemi , 1998)

3.3.2 “Tabatabaei” Residence

This Residence was built in 1834 with 4730 square meters area, by the architect from Kashan, “Ali Maryam”. (table 8)

It includes four porches and four courtyards and the central courtyard belongs to the exterior space of the house (Birouni) and in addition to the courtyard there is a backyard, which belonged to servants.The courtyard comprises a room with five doors and two other yards around and a cellar facing the wind flow. This part served the “Tabatabai” family. (Hajighassemi, 2004)

The exterior space contains a large hall with a skylight in the center, netted colorful windows and also double wall windows, which are opening both horizontally and vertically. ornamentations of the room include painting, mirror work and netted stucco. In both sides there are rooms and in front of the king room there is porch with mirror and stucco works. (Table 9)

Document recordings confirm that “Mirza Abul Hassan Ghafari Kashani”, the great artist and painter of “Naser-e-Din Shah” nicknamed as “Sani-al-Molk” was acquaintance of the owner of the house and supervised the painting and stucco process in “Tabatabai” house. He also visualized portraits of “Qajar” royalties on the king room’s walls and in the reception hall. (Figure 57)

Figure 57:"Tabatabaie Residence” (Photograph by Author)

Table 8: General Information about The "Tabatabaie" Residence (Developed by Author)

CASE STUDY " B"

Name Of The Building	**"Tabatabaie" Residence Conservation**
Location :	IRAN - Kashan
Construction Date:	19th c., 1840s, 1834
Old Function:	house
New Function:	The museum is arranged with four sides, for reception, ceremonies, residenceial halls and rooms.
Architect:	Ali maryam
Building Construction:	Load, vaults and domes
Area	4730 square meters area
Number Of Floors	2 floors
Outside Surface **Inside Surface**	Brick and plaster molding it is stuccoes with plaster
Building Type:	semi-detached , courtyard
Kind Of Residence	Summer residence and winter residence
Spaces	Courtyard-entrance- vestible-corridor- kitchen- room(5 doors-3 doors)- reception hall(shah-neshin)-basement-
Ventilation System:	openings on the dome on top of the summer residence and the openings around the courtyard
Others	Energy Supply System: Wood or charcoal and lanterns were used for heating and light Solar Energy Utılızatıon :Winter residence and summer residence and use national daylight

Table 9: Description of "Tabatabai" Residence Plan in Interior Architecture and Space Operation (Developed by Author)

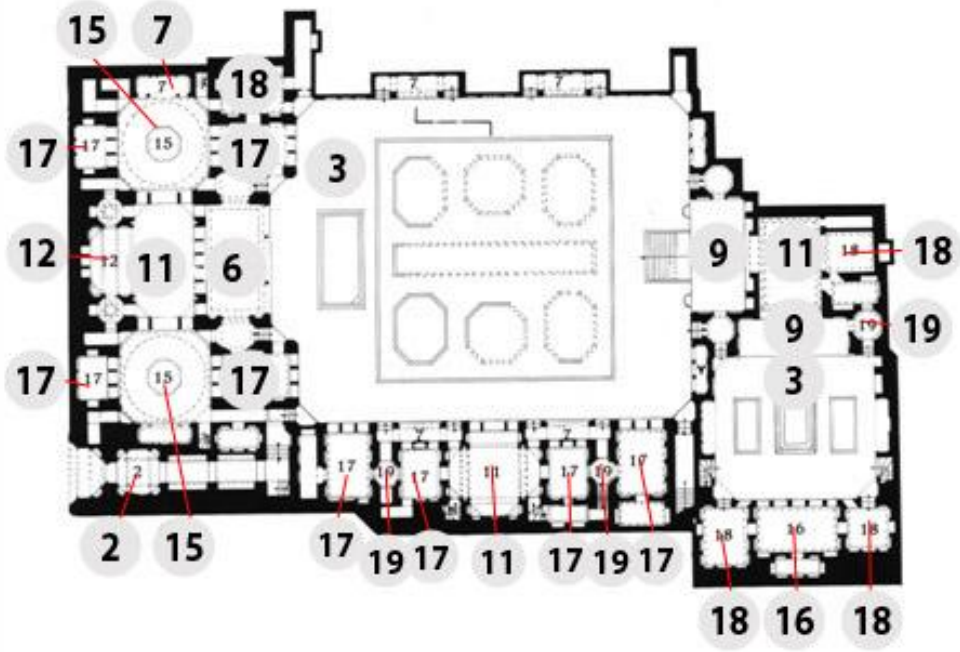
CASE STUDY "B"

NAME OF THE BUILDING:
Tabatabai Residence

NUMBER OF COURTYARD	4 courtyard
COURTYARD MEASUREMENT	-
HOUSE DISTRIBITION	Internal (private quarters) Outdoor(external exterior) Summer residence And winter residence
NUMBER OF ENTERANCE	2 in west(ceremony) south (private)
NUMBER OF ROOMS	11 room in summer residence and winer residence

LIST OF SPACES

1	**Enterance**
2	vestibule
3	courtyard
4	Backyard
5	rooftop
6	Eivan
7	Eivanche
8	Pillared yard
9	Mahtabi
10	Soffeh
11	Reception hall
12	King room
13	Chahar-soffeh
14	Dining room
15	pool room
16	(5doors room)
17	(3doors room)
18	2doors room)
19	Adjoining room
20	room
21	antechamber
22	Ventilation shaft
23	Sardab
24	Sardab reception hall
25	bathroom
26	Kitchen
27	stable



3.3.3 "Borojerdiha" Residence

This house is located in "Alavi" Street of "Kashan";and was built in the 19th century by the architect "Ostad AliMaryam Kashani", for the well-off merchant," Haj Seyed Hassan Natanzi" (who was nicknamed as "Boroujerdi" because his transactions with the city of "Boroujerd"). The "Boroujerdi" family was aiming to become relatives with the affluent "Tabatabai family, by seeking the their daughter's hand in marriage; this family was the owner of a house, which has been built by "Ostad Ali" few years earlier , known as "Tabatabai house". (Hamzeloo, 2007), (Table 10)

The condition, which the "Tabatabai" family set for the marriage for them was to build a house as glamorous as their house. It is famous by a hexagonal wind catcher and a large hall with mirrored decorations. The unique characteristics of the house has been the result of the minimum amount of renovation and change in the original arrangement. (Hamzelo, 2007)

It took eighteen years to construct, using 25 construction workers, painters, and architects, even some records mentioned the number of artists and craftsmen up to 150. It is considered a definite masterpiece of Iranian traditional residenceial architecture. It encompasses a rectangular beautiful courtyard, exquisite plaster and stucco works with fruits and flowers motifs; and wall paintings by the royal painter "Kamal-ol-Molk" and three 40 meters tall wind catchers, which help to strangely lower the temperature in the house. The House is famed for its extraordinary shaped wind towers, made by stone, brick, sun baked bricks and a composition of clay, straw and mortar. (Hajighassemi, 2004)

It has three entrances, and all the classic signs of a traditional Iranian residenceial building. The entrance is an octagonal vestibule with polygonal skylights. There is a five door chamber located near to the entrance with complex plasterwork. Next to a narrow corridor, there located an immense rectangular courtyard; including a pool and the courtyard is surrounded by trees and flowerbeds. Moreover in there is a reception area next to the corridor sand put to a space between two rooms.

These two rooms were being used during the winter because of their high penetration of sunlight. In the east and northeast fronts of the houses there is a kitchen, a number of rooms and staircase to the basement. The wind catchers let the basements to constantly benefit from cool air flow. There is a specious enclosed hall on the southern front, including lots of reliefs and cravings and reticular windows, where variety of celebrations mostly took place. The hall includes an elevated platform, which was usually reserved for special guests. (Hajighassemi, 2004), (Figure 58)

Figure 58: “Borojerdiha Residence” (Photograph by Author)

As far as special attention has been paid to all very tiny necessary architectural details for Kashan's geographical and climatic conditions, the house has drawn significant attention of architects and became recognized for Iranian and foreign technical teams. There is a reliefed tiling on a part of the house with this phrase written on: "Persian craftsmen made gold out of dust." Although this house used to be private, nowadays it serves the public as a museum. The museum is set with four parts for reception, ceremonies, residenceial halls and rooms. (Table, 11)

Table 10: General Information about The "Borojerdiha Residence" (Developed by Author)

CASE STUDY " C"	
	
Name Of The Building :	Borojerdiha Residence
Location :	IRAN - Kashan
Construction Date:	built in the 19th century. 1875 - 1893 The house took eighteen years to build using 25 workers, painters, and architects
Old Function:	house
New Function:	The museum is arranged with four sides, for reception, ceremonies, residenceial halls and rooms. and the second uses of Administration Cultural of Heritage
Architect:	Ali Maryam
Building Construction:	Load – bearing wall , vaults and domes
Area	Land area 1.700 m building area 3000 m 17/30*14/90
Number Of Floors	3 floors
Outside Surface: **Inside Surface:**	brick it is stucco with plaster
Building Type:	semi-detached , courtyard
Kind Of Residenc	Summer residence and winter residence
Spaces	Courtyard-entrance-vestibule-corridor- kitchen- room(5 doors 3 doors)- reception hall(shah-neshin)-basement-
Ventilatıon System:	openings on the dome on top of the summer residence and the openings around the courtyard
Others	Solar Energy Utilization :Winter residence and summer residence and use national daylight

Table 11: Description of "Borojerdiha Residence "Plan in Interior Architecture and Space Operation (Developed by Author)

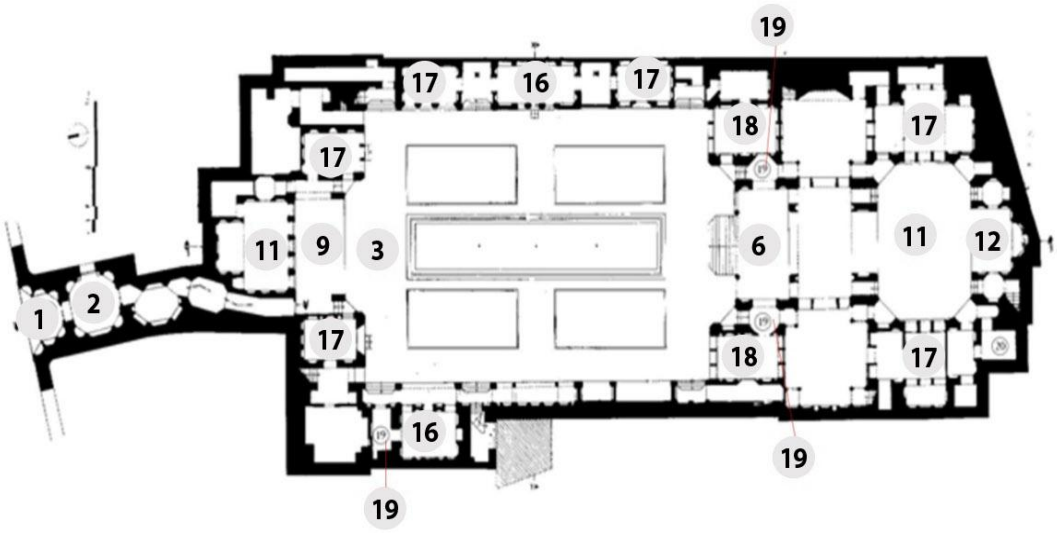
CASE STUDY "C"

NAME OF THE BUILDING :
Borojerdiha Residence

NUMBER OF COURTYARD	2 courtyard
COURTYARD MEASUREMENT	20*30 m
HOUSE DISTRIBITION	Internal (private quarters) Outdoor(external exterior) Summer residence And winter residence
NUMBER OF ENTERANCE	1 in north(main enterance).
NUMBER OF ROOMS	14 room in summer residence and winter residence

LIST OF SPACES

1	Enterance
2	vestibule
3	courtyard
4	backyard
5	rooftop
6	eivan
7	eivancheh
8	Pillared yard
9	mahtabi
10	soffeh
11	Reception hall
12	Shah-neshin
13	Chahar-soffeh
14	Dining room
15	Hose-khaneh
16	Pani-dari (5 doors room)
17	S e-dari (3 doors room)
18	Do-dari (2 doors room)
19	Adjoining room
20	room
21	antechamber
22	Ventilation shaft
23	sardab
24	Sardab reception hall
25	bathroom
26	kitchen
27	stable



3.3.4 Ameriha Residence

The “Ameriha Residence”, Ameri family’s house, built in the middle of 19th century during the “Qajar” dynasty is one of the historic houses in “Kashan”, in Isfahan Province of Iran. It is one of numerous large spectacular old houses, located in Kashan’s central district; including seven courtyards and with 9,000 square meters area. Four courtyards have been used for functions such as extroverted or introverted spaces, guest house, maids’ yard and military cavaliers; and other three courtyards were the residenceial of close relatives of “Saham-o-Saltaneh”. It is worthy to also mention that this house has separate bathhouses for male and female family members. (Ashraf, 1974), (Table 12), (Figure 59)

The most particular feature of this house is the great area of two courtyards and also the rich ornamentationts of the house within luxurious spaces. There are important spaces in the house such as cellar, the king room, the mirrored room, room with seven doors (Haft-Dari), vestibule, summer porch, winter porch, pool, terrace and two wind catchers and the bathhouse. The house is located in around 4 or 4.5 meters under the ground level and this helps the underside parts of the house to be safe from the climate extreme changes; and the ground protects the building as a thermal insulator.

On southern side of courtyards located the king rooms, which are known as the winter residence because they are facing the sun; excavated wooden doors, colored glasses and double skin walls are the reasons for such an approach. Underneath this part there is a basement that was used in order to get protection of the very hot summer sunlight. On the other front there is a room with a pool inside (Howzkhaneh), with “Yazdi bandi” ornamentations an in both sides of this room

there located “three door” rooms with their opening towards this space. There are remarkable rich ornamentations which are making the house significant; such as Moqarnas, Qataar Bandi, Rasmi Bandi, throne, Yazdi bandi and paintings on the ceiling of the cellar. This house, together with a number of historic houses in the neighborhood, performs as a big historic zone in Kashan. (Hajighassemi, 2004)

Ameriha’s House was in a neglected situation until 1999, after the restoration the house is reopened and is serving as a high quality traditional hotel. (Table 13)

Figure 59: “Borojerdiha Residence”, Kashan, IRAN (Photograph by Author)

Table12: General Information about the "Ameriha Residence" (Developed by Author)

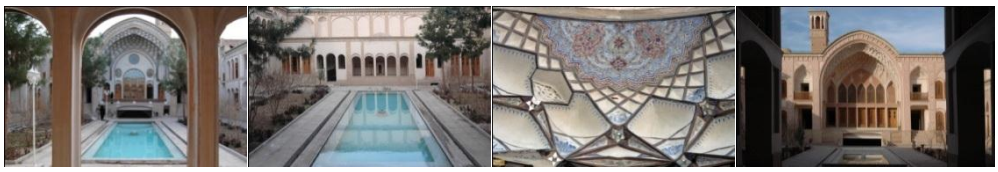
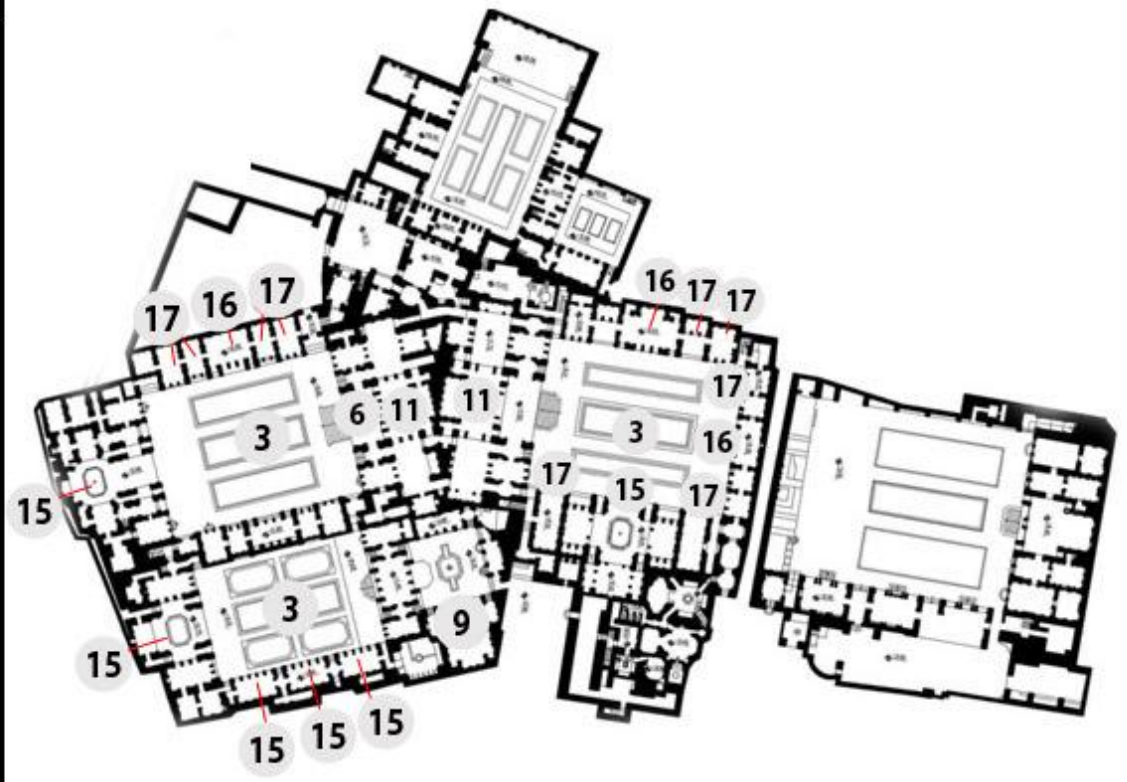
CASE STUDY " D"	
	
Name Of The Building :	Ameriha Residence
Location :	IRAN - Kashan
Construction Date:	Rebuilt in 19 century
Old Functıon:	house
New Function:	Hotel and museum .
Architect:	-
Building Construction:	vaults and domes
Area	9000m (ground) , 13000 m (construction)
Number of Floors	2 floors
Outsıde & Insıde Surface Materıal:	Brick, stucco with plaster
Building Type:	semi-detached , courtyard
Kind Of Residenc	Summer residence and winter residence
Spaces	Courtyard-entrance- vestuble-corridor- kitchen-room(5doors – 3doors)room-reception hall(shah-neshin)-basement- shower-"naghab"(hide roud)
Ventılatıon System:	openings on the dome on top of the summer residence and the openings around the courtyard
Others	Energy Supply System:Wood or charcoal and lanterns were used for heating and light. Solar Energy Utılızatıon : Winter residence and summer residence and use national daylight

Table 13: Description of "Ameriha Residence" Plan in Interior Architecture and Space Operation (Developed by Author)

CASE STUDY "C"

NAME OF THE BUILDING: Ameriha Residence	
NUMBER OF COURTYARD	7 courtyard
COURTYARD MEASUREMENT	9000 m
HOUSE DISTRIBITION	Internal (private quarters) Outdoor(external exterior) Summer residence And winter residence
NUMBER OF ENTERANCE	4 in west(ceremony) south (private)
NUMBER OF ROOMS	40 room in summer residence and winter residence

LIST OF SPACES	
1	Enterance
2	vestibule
3	courtyard
4	backyard
5	rooftop
6	eivan
7	eivancheh
8	Pillared yard
9	mahtabi
10	soffeh
11	Reception hall
12	Shah-neshin
13	Chahar-soffeh
14	Dining room
15	Hose-khaneh
16	Pani-dari (5doors room)
17	See-dari (3doors room)
18	Do-dari (2doors room)
19	Adjoining room
20	room
21	antechamber
22	Ventilation shaft
23	sardab
24	Sardab reception hall
25	bathroom
26	kitchen
27	stable



3.4 Analysis of Inner Ornamentation in Summer Residences

Analysis of summer residences/Reception halls and king rooms

This part is the analysis of the reception hall (king's room) for each house, in order to investigate the interior ornamentations such as Plaster molding, brick, tiling, mirror ork, painting ,color, yazdi bandi, Muqarnas, and type of window. ornamentations of each wall will be mentioned and analyzed in tables separately.

1) Abbasiha Residence

-Tables 14, 15, 16 are the analysis of "Abbasiha residence".

2) Tabatabaiha Residence

he reception hall in "Tabatabai residence is divided to four sections in order to be analyzed and this division is because of the area of the room.

-Tables 17, 18, 19 are analysis of the first section.

-Tables 20, 21, 22 are analysis of the second section.

-Tables 23, 24, 25 are analysis of the third and fourth section of this hall which are Symetrically located on the eastern and western side of the hall.

3) Borojerdiha Residence

-Tables 26, 27, 28, 29, 30 and 31 are related to the reception hall of "Boroujerdiha" residence, and because of the vast area of the hall and the number of walls, there are six tables about their analysis.

4) Ameriha Residence

-Tables 32, 33, 34 are analysis about "Ameriha residence".

Table 14,. “Abbasian Residence” Ornamentation in summer residence (Developed by Author)

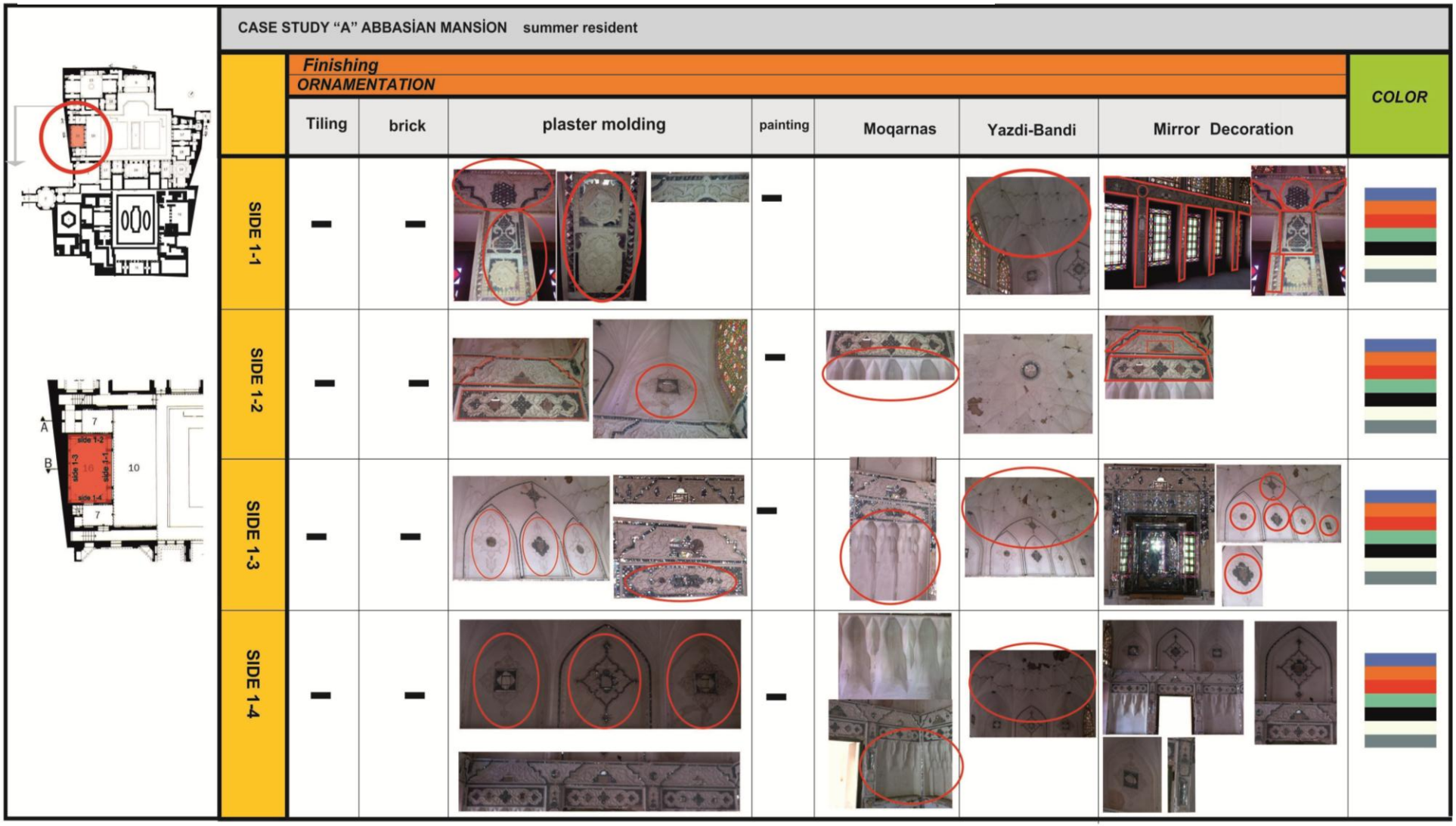
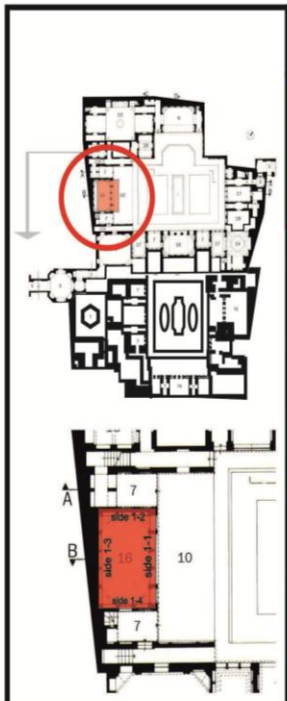


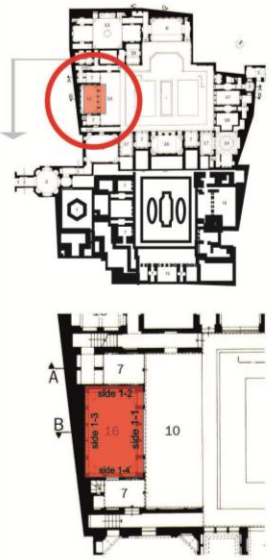
Table 15: “Abbasian Residence” Types of Windows in Summer Residence (Developed by Author)



CASE STUDY “A” ABBASİAN MANSİON summer residente

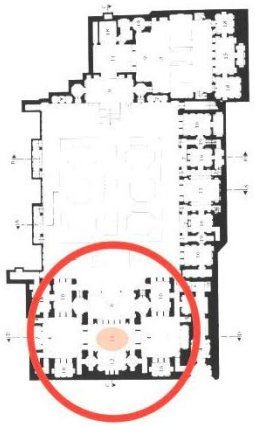
	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Moshabak window (lattic window)	Orosi (sash window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1-1	–	–	–		–	–	–			–
SIDE 1-2	–	–	–	–	–	–	–	–		–
SIDE 1-3	–	–	–	–	–	–	–	–		–
SIDE 1-4	–	–	–	–	–	–	–	–		

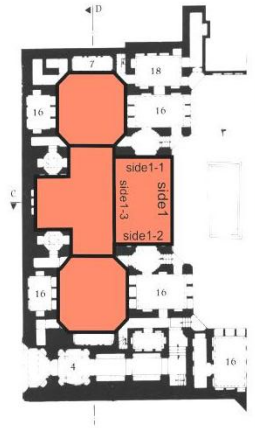
Table 16: “Abbasian Residence” Types of Windows in Summer Residence (Developed by Author)



CASE STUDY “A” ABBASİAN MANSİON summer residente					
	Types of windows				
	Pacholaghi (mix of fix & casement window)	Baje (small window)	Tehrani (sun direct room)	Cheshmgavi (cow eye)	Friz & Khoven (decoration skylight on the wall)
SIDE 1-1	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 1-3	–	–	–	–	–
SIDE 1-4	–	–	–	–	–

Table 17:“Tabatabaiha Residence “, Ornamentation, Summer Residence (Developed By Author)





CASE STUDY “B” :TABATABAİHA HOUSE Summer residence

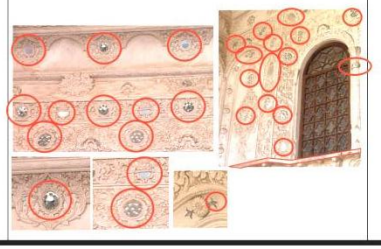
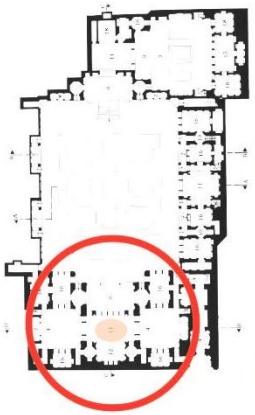
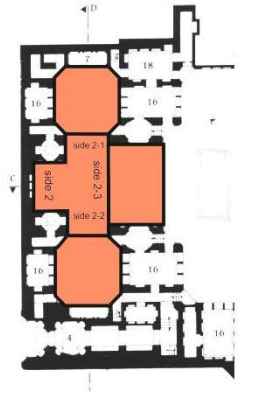
	Finishing ORNAMENTATION							COLOR
	Tiling	brick	Plaster Molding	painting & calligraphy	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1	–	–		–	–	–		white & cream
SIDE 1-1	–	–		–		–		white & cream
SIDE 1-2	–	–		–		–		white & cream
SIDE 1-3	–	–		–	–	–		white & cream

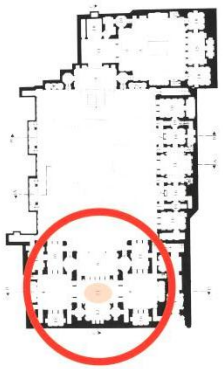
Table 18: "Tabatabaiha" Residence", Ornamentatıon, Summer Residence (Developed by Author)





CASE STUDY "B" :TABATABAİHA HOUSE Summer residence								
	ORNAMENTATION Finishing							COLOR
	Tiling	brick	Plaster Molding	painting & calligraphy	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 2	–	–					–	
SIDE 2-1	–	–					–	
SIDE 2-2	–	–			–		–	
SIDE 2-3	–	–					–	

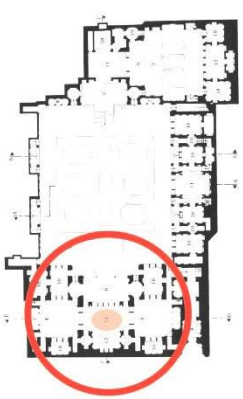
Table 19:"Tabatabaiha Residence" Types of Windows on Summer Residence (Developed by Author)

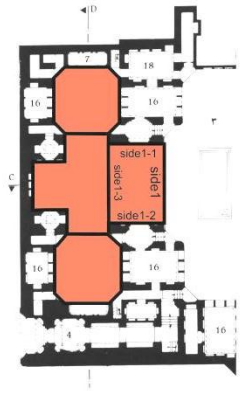


CASE STUDY "B" :TABATABAİHA HOUSE Summer residence

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 1	–	–	–	–	–
SIDE 1-1 mirror	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 1-3		–	–	–	–

Table 20: “Tabatabaiha Residence” Ornamentation in Summer Residence (Developed by Author)

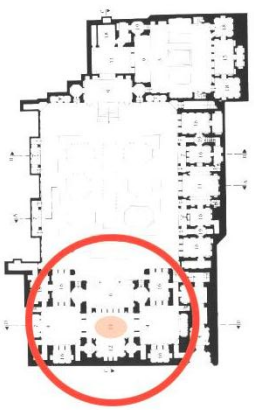


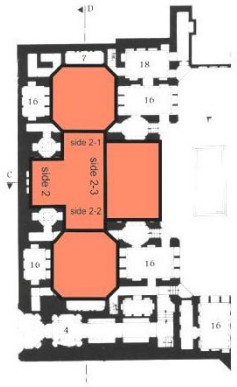


CASE STUDY “B” :TABATABAİHA HOUSE Summer residence

	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1	-	-	-	-	-	-	-	-		-
SIDE 1-1	-	-	-	-	-	-	-	-		
SIDE 1-2 mirror	-	-	-	-	-	-	-	-		
SIDE 1-3	-			-	-	-	-	-		

Table 21: “Tabatabaiha Residence” Types of Windows in Summer Residence (Developed by Author)





CASE STUDY “B” :TABATABAİHA HOUSE Summer residence

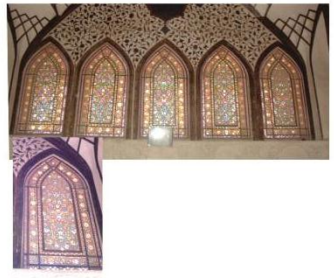
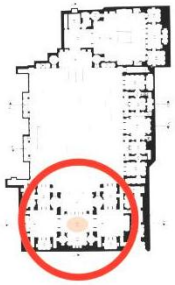
	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 2	–	–	–	–	–	–	–	–		
SIDE 2-1	–	–		–		–	–	–		
SIDE 2-2	–	–	–	–	–	–	–	–		
SIDE 2-3	–	–	–	–	–	–	–			

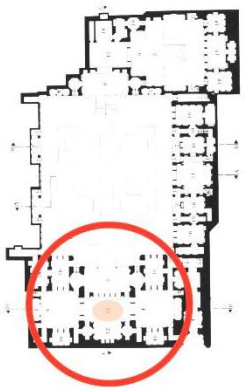
Table 22: "Tabatabaiha Residence", Types of Windows, Summer Residence (Developed by Author)

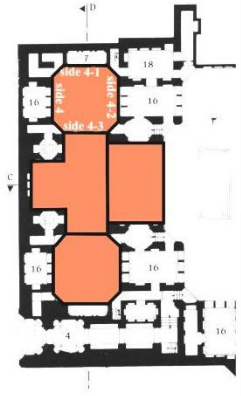


CASE STUDY "B" :TABATABAİHA HOUSE Summer residence

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 2	–	–	–	–	–
SIDE 2-1	–	–	–	–	–
SIDE 2-2	–	–	–	–	–
SIDE 2-3	–	–	–	–	–

Table 23: "Tabatabaiha Residence", Ornamentation, Summer Residence (Developed by Author)





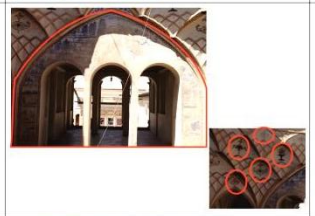
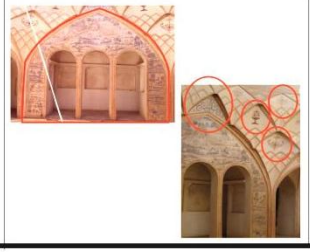
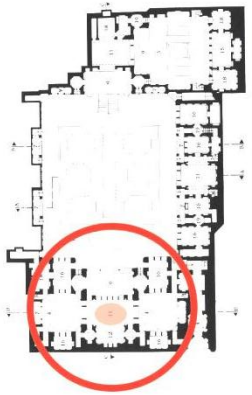
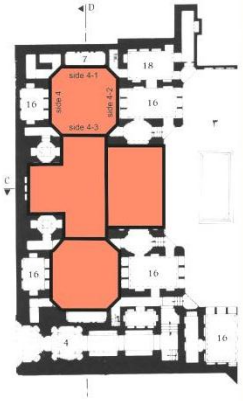
CASE STUDY "B" :TABATABAİHA HOUSE Summer residence								
	ORNAMENTATION							COLOR
	Finishing							
	Tiling	brick	Plaster Molding	painting & calligraphy	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 4	-	-	-		-		-	
SIDE 4-1	-	-	-		-		-	
SIDE 4-2	-	-			-		-	
SIDE 4-3	-	-			-		-	

Table 24:"Tabatabaiha Residence", Types of Windows, Summer Residence (Developed by Author)

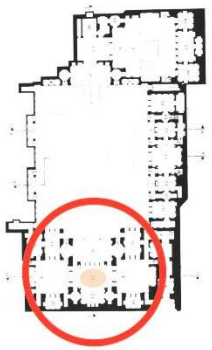


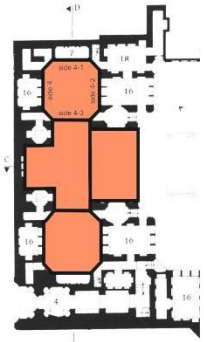


CASE STUDY "B" :TABATABAİHA HOUSE Summer residence

	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 4	-	-		-	-	-	-	-	
SIDE 4-1	-	-	-	-	-	-	-	-	
SIDE 4-2	-	-	-	-	-	-	-	-	-
SIDE 4-3	-	-	-	-	-	-	-	-	

Table 25:"Tabatabaiha Residence", Types of Windows Summer Residence (Developed by Author)





CASE STUDY "B" :TABATABAİHA HOUSE Summer residence

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 4	–	–	–		–
SIDE 4-1	–	–	–	–	–
SIDE 4-2	–	–	–	–	–
SIDE 4-3	–	–	–	–	–

Table 26:"Borojerdiha Residence", Ornamentation, Summer Residence (Developed by Author)

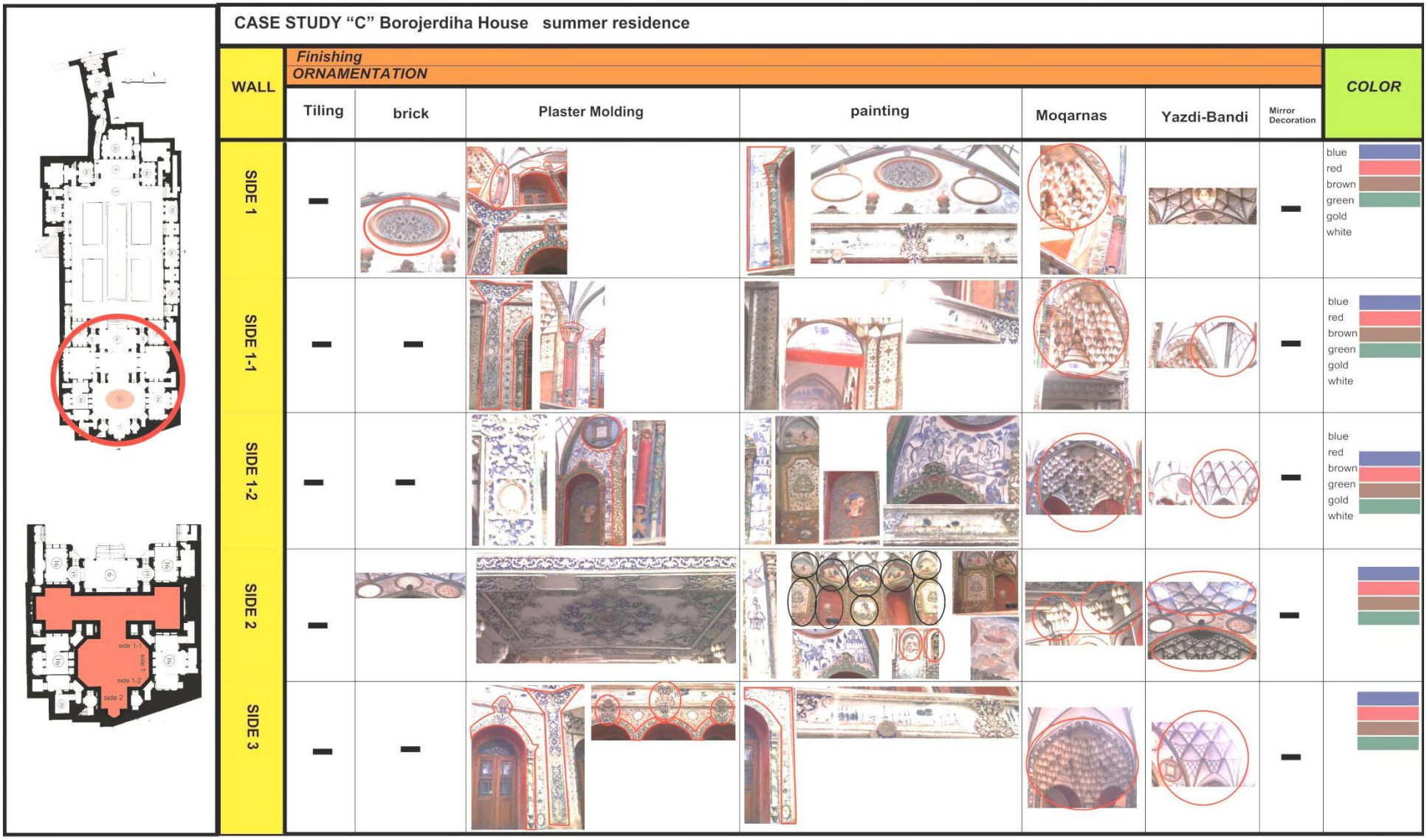
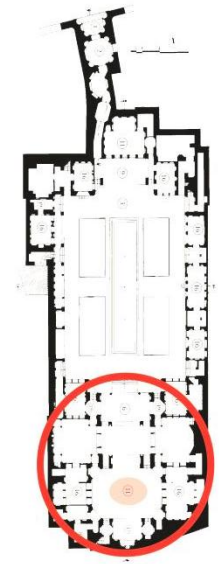
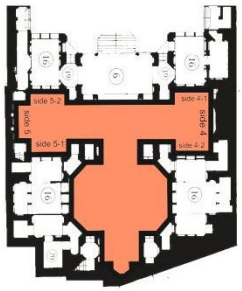


Table 27: "Borojerdiha house", ornamentation, summer residence (Developed by Author)

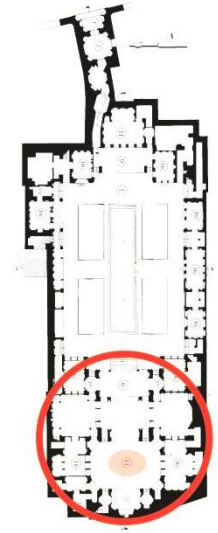


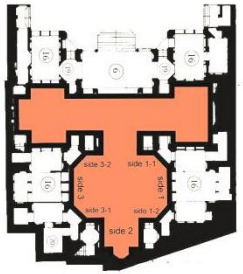


CASE STUDY "C" Borojerdiha House summer residence

WALL	Finishing / ORNAMENTATION							COLOR
	Tiling	brick	Plaster Molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 4	–			–	–		–	
SIDE 4-1	–				–		–	
SIDE 4-2	–	–			–		–	
SIDE 5	–						–	
SIDE 5-1	–	–			–		–	

Table 28: "Borojerdiha Residence", Types of Windows Summer Residence (Developed by Author)





CASE STUDY "C" Borojerdiha House summer residence

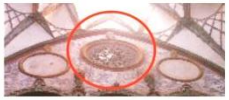
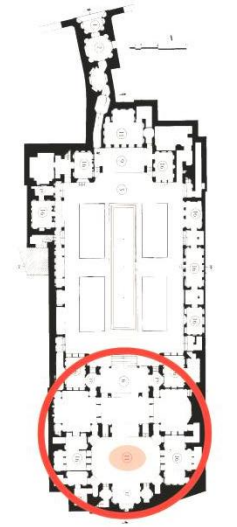
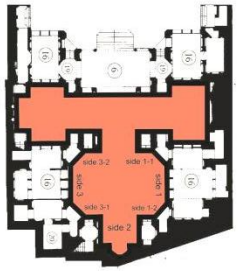
WALL	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 1		–	–	–	–			–	
SIDE 1-1	–	–	–	–	–			–	
SIDE 1-2	–	–	–	–	–	–		–	–
SIDE 2		–	–	–	–			–	
SIDE 3		–	–	–	–			–	

Table 29:"Borojerdiha Residence", Types of Windows, Summer Residence (Developed by Author)

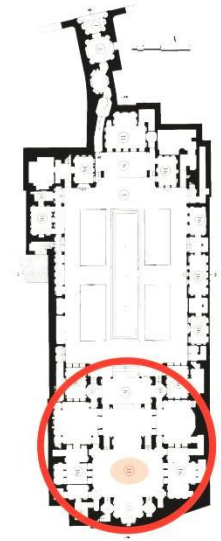


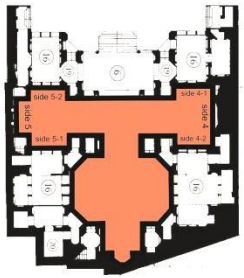


CASE STUDY "C" Borojerdiha House summer residence

WALL	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 1		–	–	–	–
SIDE 1-1	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 2	–	–	–	–	–
SIDE 3		–	–	–	–

Table 30:"Borojerdiha Residence", Types of Windows, Summer Residence (Developed by Author)





CASE STUDY "C" Borojerdiha House summer residence

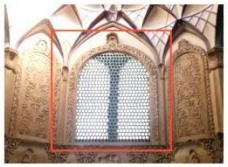
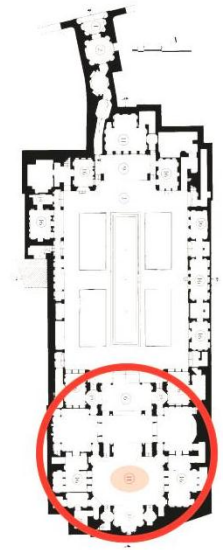
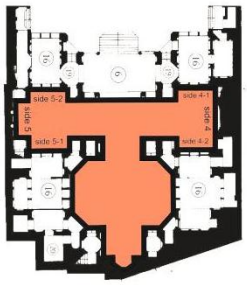
WALL	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 4	-		-	-	-		-	-	-
SIDE 4-1		-	-	-	-		-	-	
SIDE 4-2		-	-	-	-		-	-	
SIDE 5		-	-	-	-		-	-	-
SIDE 5-1		-	-	-	-		-	-	

Table 31: "Borojerdiha Residence", Types of Windows, Summer Residence (Developed by Author)

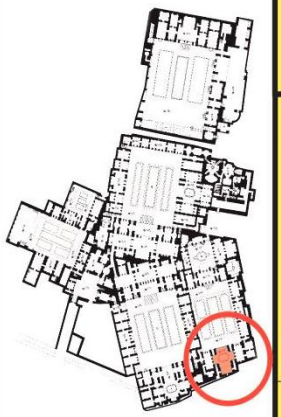


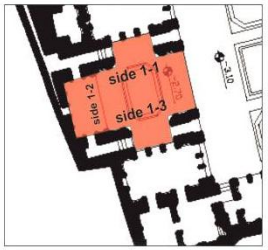


CASE STUDY "C" Borojerdiha House Summer residente

WALL	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 4	–	–	–	–	–
SIDE 4-1		–	–	–	–
SIDE 4-2		–	–	–	–
SIDE 5	–	–	–	–	–
SIDE 5-1		–	–	–	–

Table 32:"Ameriha Residence", Ornamentation, Summer Residence (Developed by Author)





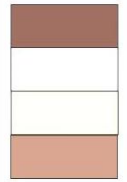
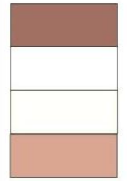
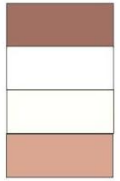
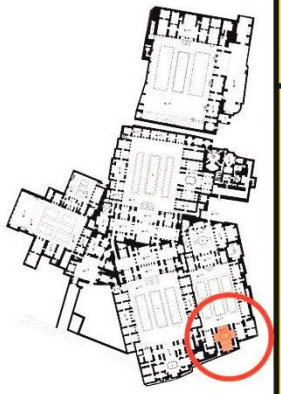
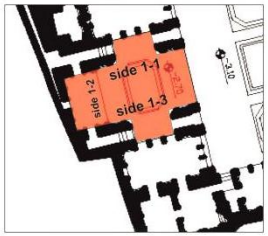
CASE STUDY "D" AMERIHA MANSİON summer residence								
	ORNAMENTATION / FINISHING							COLOR
	Tiling	brick	Plaster Molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1-1		-	-	-	-		-	
SIDE 1-2		-		-			-	
SIDE 1-3		-	-	-	-		-	

Table 33:"Ameriha Residence", Types of Windows, Summer Residence (Developed by Author)

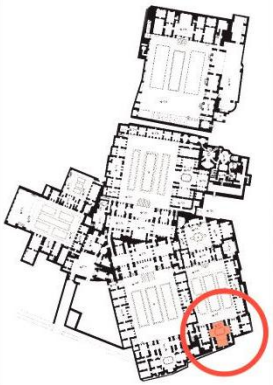




CASE STUDY "D" AMERIHA MANSİON summer residence

	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1-1	-		-		-	-	-	-		-
SIDE 1-2	-	-	-	-	-	-	-	-		-
SIDE 1-3	-		-		-	-	-	-		-

Table 34: "Ameriha Residence", Types of Windows, Summer Residence (Developed by Author)



CASE STUDY "D" AMERIHA MANSİON summer residence					
	Types of windows				
	Pacholaghi (mix of fix & casement window)	Baje (small window)	Tehrani (sun direct room)	Cheshmgavi (cow eye)	Friz & Khoven (decoration skylight on the wall)
SIDE 1-1	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 1-3	–	–	–	–	–

3.4.1 Evaluation of Summer Residence /Reception Halls and King Rooms

Abbasiha Residence (Summer Residences):

In this room there is no tiling and brick decoration. Plaster molding of this room is combination of Iranian and foreign types and method which is used is stereo metric**.**

Tabatabaiha Residence (Summer Residences):

Summer residence palace of this house contains three parts. First part is entrance "ivan(veranda)" of this palace which is full of plaster molding by "Shir o Shekari", "Barjesteh(knob)" and "Barhashteh" styles and patterns of flower and leaf, arabesque, "Shah-abasi flowers, "Lacha", "Toranj" and Persian carpet pattern can be seen on the ceiling of this house.

Another ornamentation of this house is mirroring, which by the use of pieces of mirrors made beautiful shapes which has been put on plaster molding and flower pot patterns.

The best part of mirroring of this house can be seen on the consoles near "Ivan(veranda)" and also on the roof of it. "Moqarnas" has been used on the connection part of wall and roof.

Another part of this summer residence palace is a closed room, which the most significant decorative in this room are paintings on walls and the "Yazdi bandi(geodesic stair)" on the roof which has got patterns of flower and leafs, arabesque, flower pots, "Lachak" and "Toranj"(Persian pattern/style).

The best part of these paintings can be seen above windows "Goljam (flower pattern window)" of this room which on this level calligraphy has been used.

“Moqarnas” and plaster molding are one of elements which can be seen in this room rarely and only can be seen on the columns near window and above them.
Roof of this room has a beautiful “Moqarnas” which decorated with painting and the only mirroring in this place is at the center of “Yazdi bandi” made like a beautiful “Shamse (sun shape)” which can be mentioned.

The only lighting in this room comes from “Orosi (sash window)” windows and also “Goljam’s “ faced to “ivan” of this palace. Cold colors have been used in this room for decoration.

Another part of this palace is two “Hozkhaneh (pool room)” which place in two western and eastern parts. Decorations used in this place nice paintings can be mentioned that usually their topics are hunting which drawn by blue color on a white background and other patterns of flower and leaf and flower pots and arabesques.

This place is an open space and in fact it has a huge “Horno (dome hole)”, which connects circle shaped roof of the place to the square shaped plan by the use of beautiful “Yazdi- bandi”.

Borojerdiha house (summer residences):

Netted brickwork has been used in this room that mostly works as ventilation and also keeps lighting the atmosphere.
Other decoration for this palace is plaster molding which has been done under these styles: “Shir O Shekari” (occasionally) –“knob” – “Zebreh” – “Barhashteh” and reticular and different inscription such as arabesque - animals and herbal has been used on them.

Mural patterns of flower pots full of flowers and leafs and human beings whom raised these pots upper their heads, “Ghajari” soldiers with their weapons, drawings of monsters and battles between humanity and them, Battles of animals with each other and battles between birds are obvious on these plaster molding.

Painting is one of the most used decorations in this room with a lot of different colors and which shows different content of religious and artistic. Painting material used for this room is oils and has been drawn on plaster moldings; Calligraphy has been used on them as well. The roof of this palace consists of “Yazdi –bandi (geodesic stair)”.

Warm colors mostly have been used in this room such as light yellow - brown, cobalt blue, gold and green. For lighting and ventilation issues of this room “Rozan(hole window)”, “Horno (dome hole)”, “Roshandan (type of skylight)”, and doors and windows has been used in this room.

Ameriha House (Summer Residences):

This summer residence room is a porch or “Hozkhaneh (pool room)” and includes three closed sections and has a decorative pool at the center.

Summer residence room of this house is a roofed porch which from eastern and western sides by windows connects to the side rooms and opens up to the garden from the south side.

During summer, landlords were hosting their guests in this section of the house.

Table 35: Evaluation of Summer Residence/Reception Hall and King Room

Differences and Similarities in Reception Hall /kingroom in Summer Residence					
Residence	**Summer Residence**				
	Ornamentation				**Types of Windows**
	Style/type	**motif**	**Material/technique**	**color**	
Abasiha	-Yazdi-bandi(geodesic form of roof) -Moqarnas -aesthetic	-Floral -Islamic Figure	-Plaster molding /"barjeste" and "barheshte "Technique -Painting -Mirror	-Blue -green -red -orange -white -black -gray	-Orosi(Sash window) -Goljam(Floral pattern window)
Tabatabai	-Yazdi-Bandi((geodesic form of roof) -Moqarnas -aesthetic -symbolic	-Floral -Arabesque -Geometric -Persian Carpet Form -"Shah-Abasi"flower	-Plaster molding /"shiro-shekari" and "Barjeste"and "Barheshte" Technique -Mirror/ on the plaster molding technique	-White -Cream -Dark blue -Dark red	-Orosi (Sash window) -Horno (dome hole)
Borojerdiha	Yazdi-Bandi((geodesic form of roof) -Moqarnas -Aesthetic -Symbolic	Zoomophic -Floral -Arabesque	-Plaster molding /"shiro-shekari" , "mural" ,"Zebre" and "Barhashteh" -Painting -calligraphy	-Light yellow -Brown -Cobalt blue -Gold -Green	-Rozan(Hole window) -Horno(dome hole) -Roshandan(Type of skylight)
Ameriha	- Yazdi-Bandi((geodesic form of roof) -Moqarnas -Aesthetic	-Geometric -Floral	-Plaster molding /"shiro-shekari"	-brown -white -cream -light yellow	Open space (Ivan)

3.5 Analysis of Inner Ornamentation in Winter Residences

Analysis of Winterr residences/Reception halls and king rooms

this part is the analysis of the reception halls (5 door room and the mirror room), in the winter residences' ornamentations including Plaster molding, brick, tiling, mirror ork, painting ,color, yazdi bandi, moqarnas, and type of window.

For each house there is a specific analysis table, which signifies the ornamentations separately on different walls of the room.

1) Abbasiha Residence

Tables 36, 37, 38, 39, 40 and 41 are the analysis of "Abbasiha" house's interior ornamentations.

2) Tabatabaiha Residence

Tables 42, 43 and 44are the "Tabatabai" house's interior ornamentations analysis.

3) Borojerdiha Residence

Tables 45, 46 and 47 are the "Boroujerdiha" house's interior ornamentation analysis.

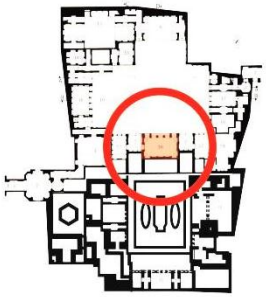
4) Ameriha Residence

In "Ameriha" house there are two mansions with separate yards in one building, therefore one included the reception hall and the other included the mirrored room, which has been used for ceremonies and gatherings in the winter.

Tables 48, 49 and 50 are the mirrored room's interior ornamentations in "Ameriha" house.

Tables 51, 52 and 53 are the reception hall's interior ornamentations in "Ameriha" house.

Table 36: "Abasiha Residence", Ornamentation, Winter Residence "A" (Developed by Author)



CASE STUDY "A" ABBASİAN MANSİON Winter residente "A"

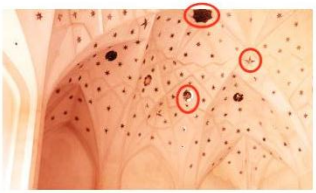
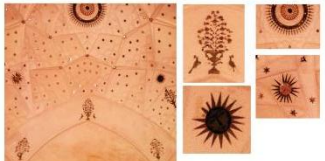
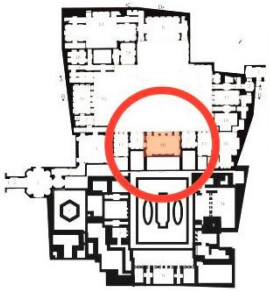
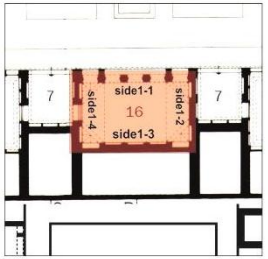
	FINISHING / ORNAMENTATION							COLOR
	Tiling	brick	plaster molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1-1	-	-	-	-	-			
SIDE 1-2	-	-	-	-	-			
SIDE 1-3	-	-	-		-			
SIDE 1-4	-	-	-	-	-			

Table 37 : "Abasiha Residence" , Types Of Windows, Winter Residence "A" (Developed by Author)

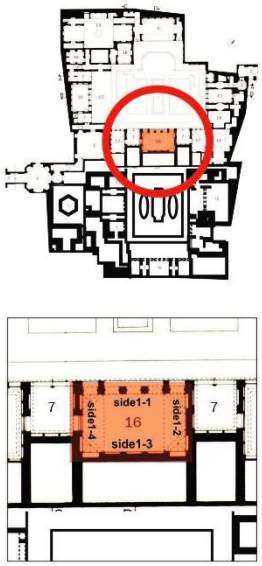




CASE STUDY "A" ABBASİAN MANSİON Winter residente "A"

WALL	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Moshabak window (lattic window)	Orosi (sash window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1-1	-	-	-	-	-	-	-	 this is the goljam places but in that time was empty		the door places was empty
SIDE 1-2	-	-	-	-	-	-	-	-		-
SIDE 1-3	-	-	-	-	-	-	-	-		-
SIDE 1-4	-	-	-	-	-	-	-	-		-

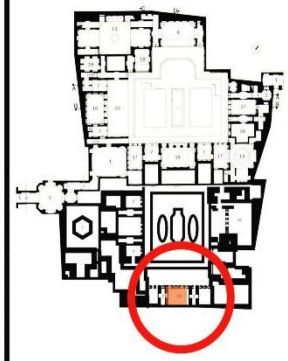
Table 38:"Abasiha Residence " , Types of Windows, Winter Residence "A" (Developed by Author)



CASE STUDY "A" ABBASİAN MANSİON Winter residente "A"

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 1-1	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 1-3	–	–	–	–	–
SIDE 1-4	–	–	–	–	–

Table 39:"Abasiha Residence" , Ornamentation , Winter Residence "B" (Developed by Author)



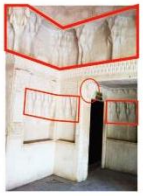
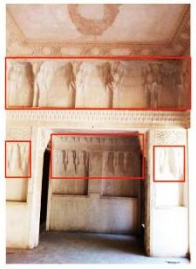
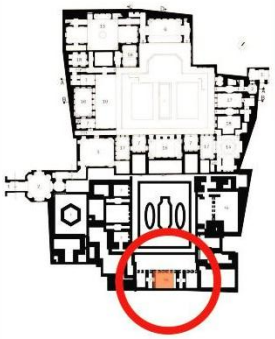
CASE STUDY "A" ABBASİAN MANSİON Winter residente "B"								
	FINISHING / ORNAMENTATION							COLOR
	Tiling	brick	plaster mulding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1-1	-	-		-		-	-	White
SIDE 1-2	-	-		-		-	-	White
SIDE 1-3	-	-		-		-	-	White
SIDE 1-4	-	-		-		-	-	White

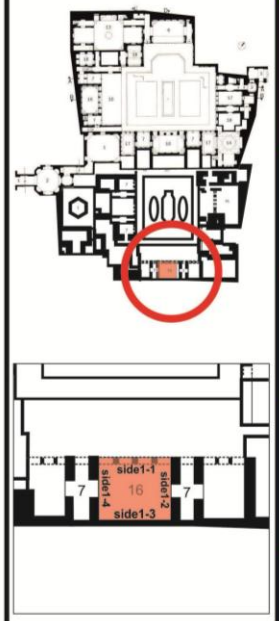
Table 40: "Abasiha Residence", Types Of Windows, Winter Residence "B" (Developed by Author)



CASE STUDY "A" ABBASİAN MANSİON Winter residence "B"

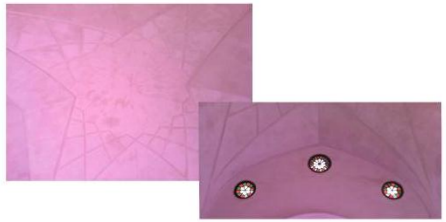
	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Moshabak window (lattic window)	Orosi (sash window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1-1	-	-	 it was empty	-	-	-	-	-		
SIDE 1-2	-	-	-	-	-	-	-	-		-
SIDE 1-3	-	-	-	-	-	-	-	-		-
SIDE 1-4	-	-	-	-	-	-	-	-		

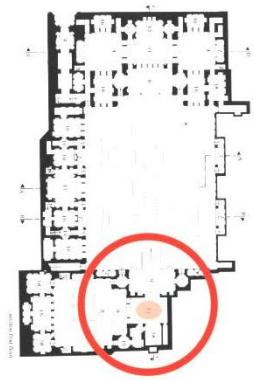
Table 41:"Abasiha Residence", Types of Windows, Winter Residence "B" (Developed by Author)



CASE STUDY "A" ABBASİAN MANSİON Winter residence "B"					
	Types of windows				
	Pacholaghi (mix of fix & casement window)	Baje (small window)	Tehrani (sun direct room)	Cheshmgavi (cow eye)	Friz & Khoven (decoration skylight on the wall)
SIDE 1-1	–	–	–	–	–
SIDE 1-2	–	–	–	–	–
SIDE 1-3	–	–	–	–	–
SIDE 1-4	–	–	–	–	–

Table 42: "Tabatabaiha Residence", Ornamentation, winter Residence (Developed by Author)

	CASE STUDY "B" :TABATABAİHA HOUSE Winter residence							
	ORNAMENTATION Finishing							COLOR
	Tiling	brick	Plaster Molding	painting & calligraphy	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1	–	–	–	–	–		–	
SIDE 2	–	–	–	–	–		–	
SIDE 3	–	–	–	–	–		–	
SIDE 4	–	–	–	–	–		–	



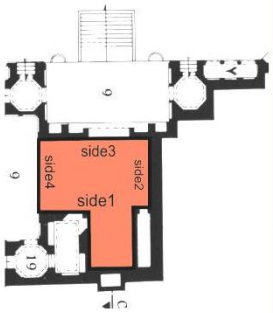
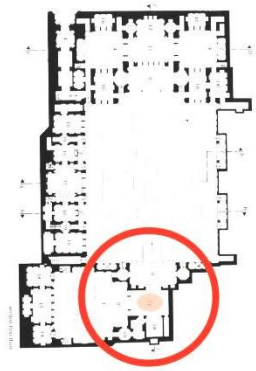
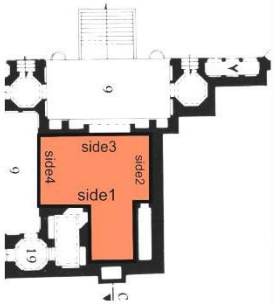


Table 43: "Tabatabaiha Residence", Types of Windows Winter Residence (Developed by Author)





CASE STUDY "B" :TABATABAİHA HOUSE Winter residence

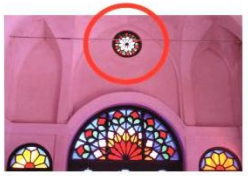
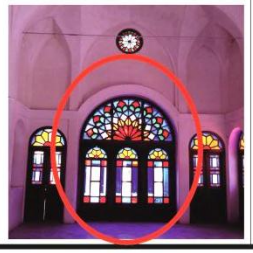
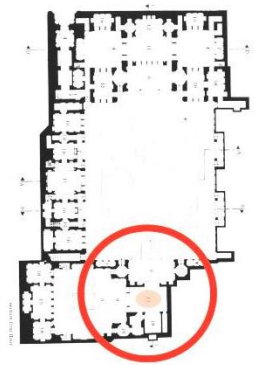
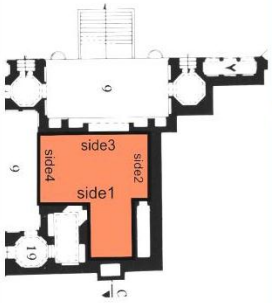
	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 1	–	–	–	–	–	–	–	–	
SIDE 2	–	–	–	–	–	–	–	–	
SIDE 3		–		–	–	–	–	–	
SIDE 4		–		–	–	–	–	–	

Table 44:"Tabatabaiha Residence", Types of Windows, Winter Residence (Developed by Author)

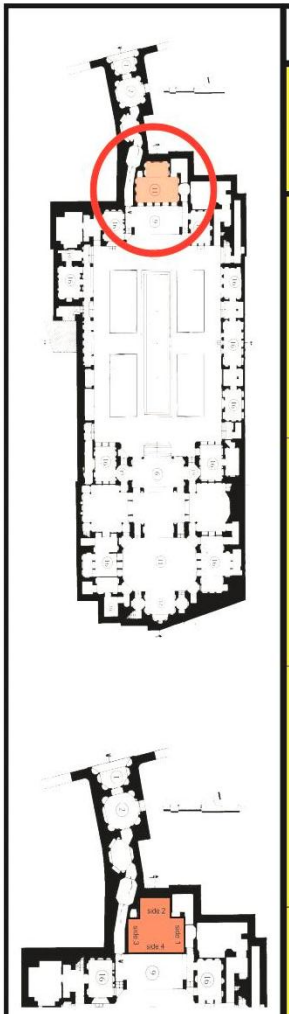




CASE STUDY "B" :TABATABAİHA HOUSE Winter residence

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 1	–	–	–	–	–
SIDE 2	–	–	–	–	–
SIDE 3	–	–		–	–
SIDE 4	–	–		–	–

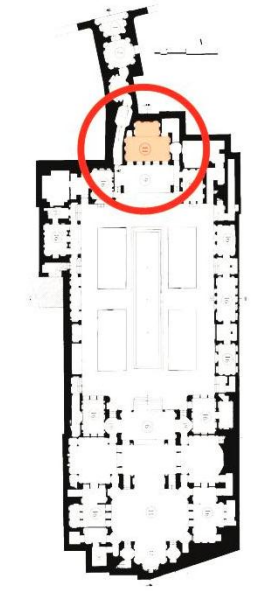
Table 45:"Borojerdiha Residence", Ornamentation, Winter Residence (Developed by Author)

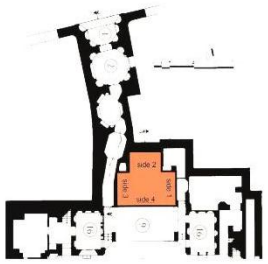


CASE STUDY "C" Borojerdiha House Winter residente

	Finishing ORNAMENTATION							COLOR
	Tiling	brick	Plaster Molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1	-	-		-	-			white
SIDE 2	-	-		-	-			white
SIDE 3	-	-		-	-			white
SIDE 4	-	-		-	-			

Table 46:"Borojerdiha Residence", Types of Windows, Winter Rsidence (Developed by Author)





CASE STUDY "C" Borojerdiha House Winter residente

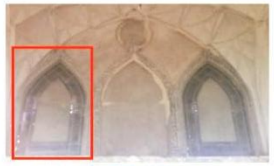
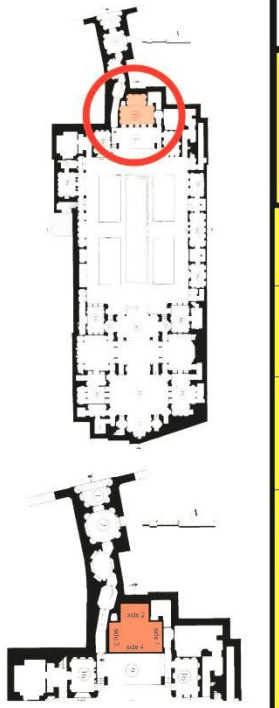
	Types of windows									DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)		
SIDE 1	-	-	-	-	-	-	-	-		
SIDE 2	-	-	-	-	-	-	-	-		
SIDE 3	-	-	-	-	-	-	-	-		-
SIDE4		-	-	-	-	-		 		

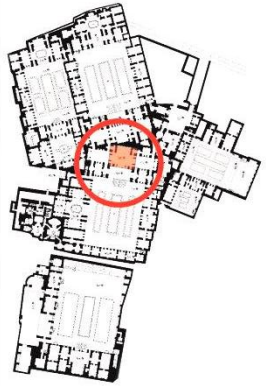
Table 47:"Borojerdiha Residence", Types of Windows, Winter Residence (Developed by Author)

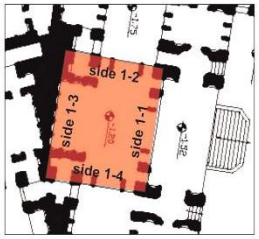


CASE STUDY "C" Borojerdiha House Winter residente

	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 1	–	–	–	–	–
SIDE 2	–	–	–	–	–
SIDE 3	–	–	–	–	–
SIDE4		–	–	–	–

Table 48:"Ameriha Residence", Ornamentation, Winter Residence, (Mirror Room) (Developed by Author)

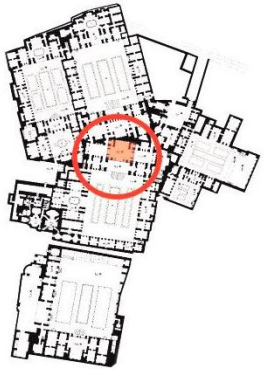


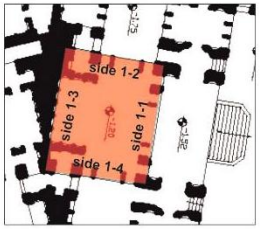


CASE STUDY "D" AMERIHA MANSİON mirror room

	ORNAMENTATION / FINISHING							COLOR
	Tiling	brick	Plaster Molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1-1	-	-		-	-			
SIDE 1-2	-	-		-	-			
SIDE 1-3	-	-			-			
SIDE 1-4	-	-		-	-			

Table 49: "Ameriha Residence", Types of Windows, Winter Residence, (Mirror Room) (Developed by Author)





CASE STUDY "D" AMERIHA MANSİON mirror room

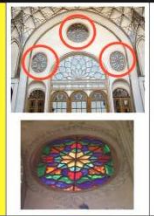
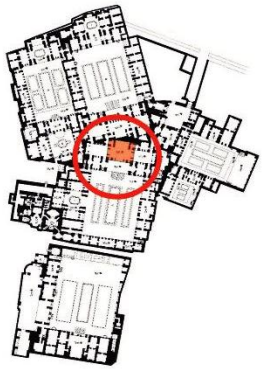
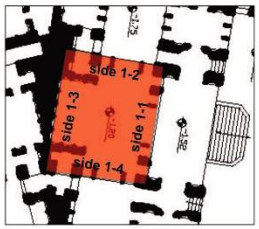
	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 1-1		-	-		-	-	-	-	
SIDE 1-2		-	-		-	-	-	-	
SIDE 1-3	-	-	-	-	-	-	-	-	
SIDE 1-4		-	-		-	-	-	-	

Table 50: "Ameriha Residence", Types of Windows, Winter Residence, (Mirror Room) (Developed by Author)





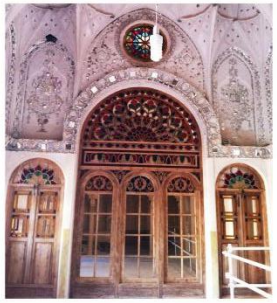
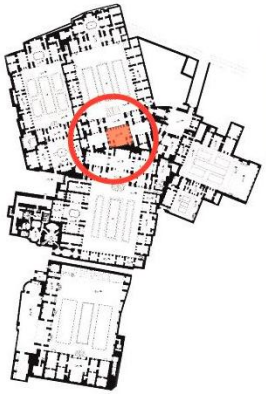
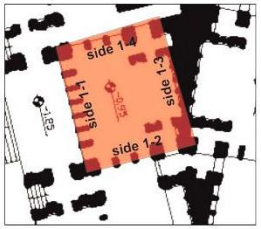
CASE STUDY "D" AMERIHA MANSİON mirror room					
	Types of windows				
	Pacholaghi (mix of fix & casement window)	**Baje** (small window)	**Tehrani** (sun direct room)	**Cheshmgavi** (cow eye)	**Friz & Khoven** (decoration skylight on the wall)
SIDE 4	-	-		-	-
SIDE 4-1	-	-		-	-
SIDE 4-2	-	-	-	-	-
SIDE 4-3	-	-		-	-

Table 51:" Ameriha Residence", Ornamentation, Winter Residence (Developed by Author)





CASE STUDY "D" AMERIHA MANSİON winter residence (shah neshin)

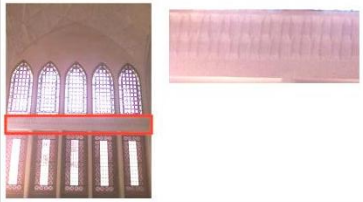
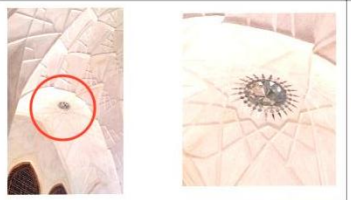
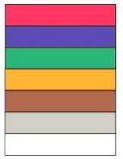
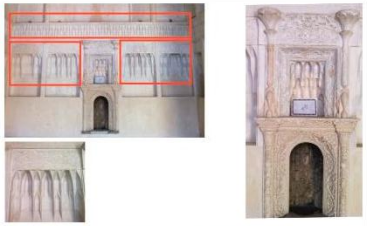
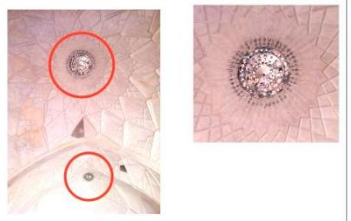
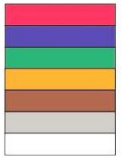
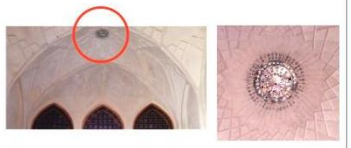
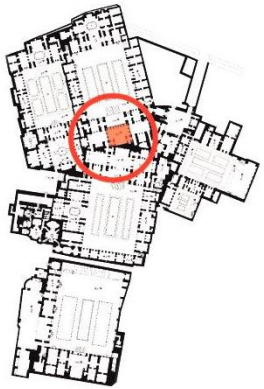
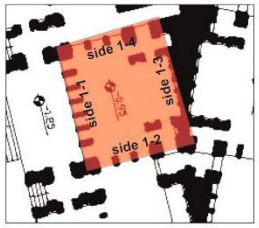
	ORNAMENTATION / FINISHING							COLOR
	Tiling	brick	Plaster Molding	painting	Moqarnas	Yazdi-Bandi	Mirror Decoration	
SIDE 1-1	–	–		–	–			
SIDE 1-2	–	–		–	–			
SIDE 1-3	–	–		–				
SIDE 1-4	–	–		–	–			

Table 52:" Ameriha Residence", Types of Windows, Winter Residence (Developed by Author)

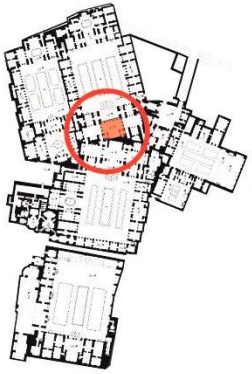


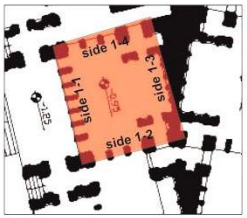


CASE STUDY "D" AMERIHA MANSİON winter residence (shah neshin)

	Types of windows								DOOR
	Rozan (hole window)	Shabak (courtain grid window)	Orosi (sash window)	Moshabak window (lattic window)	Jamkhane (colory dome glazing)	Horno (dome hole)	Roshandan (hip skylight)	Goljam (floral pattern window)	
SIDE 1-1	–				–	–	–	–	
SIDE 1-2	–				–	–	–	–	
SIDE 1-3	–	–	–	–	–	–	–	–	
SIDE 1-4	–				–	–	–	–	

Table 53:" Ameriha Resedence", Types of Windows, Winter Residence (Developed by Author)





CASE STUDY "D" AMERIHA MANSİON winter residence (shah neshin)					
	Types of windows				
	Pacholaghi (mix of fix & casement window)	Baje (small window)	Tehrani (sun direct room)	Cheshmgavi (cow eye)	Friz & Khoven (decoration skylight on the wall)
SIDE 4	-	-		-	-
SIDE 4-1	-	-		-	-
SIDE 4-2	-	-	-	-	-
SIDE 4-3	-	-		-	-

3.5.1 Evaluation of Winter Residence /Reception Halls and King Rooms

Analysis of case studies in winter residences. (Table 54)

Abbasiha Residence (Winter Residences):

Mirror- decoration in this room is one of the significant decoration element that is seen on high levels of the wall and roof of the room.

The used design of this room is one the shape of vase , flower and some birds like peacock and swallow that are shaped by putting the slides of mirror together and have the mirror like " Qatar- Bandi(Arranged in a way)" style with the flower and leaf design .

In one design of anctuary in north part of room "side1-1" and around the room in the same dimension, there are too 68 mirrors that repeated there like square shape that make more reflection of sun light inside the room .

On the roof of room mirror ornamentation can be seen on " Yazdi-Bandi (geodesic stair)" that show ski factitious and earth , sun, moon, and two planets of "Saturn" and "Mercury" .

They are simulating the sky on he ceiling . At night, by putting candle on the center of room all the room has been brighten by reflection (ability of mirror decoration on roof and wall) .

The common color of this room is white and wall papers are cream and green.

Mirrors are in gray and make there to be shiny. And also different colored glasses that each of them has their own content like the form of there in palace that shown

the life. The blue color prevents vermin to enter the palace. Yellow and red color make inside brighter and also green is the sign of life and heart some.

“Shabak (curtain grid window)” is used between windows that are decorated in three and five parts inside and from outside decoration is by “Moshabak (lattice window)” wood like the blanket that are in three sides of room .

In this room in three sides single “Orosi (sash window)” has been using that are decorated by “Moshabak (lattic)” and colorful glasses .

The plaster molding are used in “shir o shekari” style, stereo metric” barjeste(knob)”, “barheshte” And also in these rooms “Qatar-Bandi(Arranged in a way) style is used and other styles like flower, leaf, arabesque , and also “flower basket” chimney with its beauteous plaster molding in “Barjeste (type of mural)”, “Barheshte (type of mural” style in another ornamentation of this room.

In painting of room, color and oil color are used. It’s just like wall paper in space of one meter of short wall and only arabesque is used.
The common color of the room is white and only colorful glasses on window and doors would reflect the light inside the room.

Mirror ornamentation is one of the major ornamental that are seen in those rooms and are made on the walls and roof with combination of small pieces of mirror in elegant shape of vases and birds on the wall and shape of star, sun, earth and moon on the roof with the model of “Yazdi-Bandi (geodesic stair)” It makes reflection .

Tabatabaiha Residence (Winter residences):

Simplicity can be seen in decorations of this winter residence room. Generally none of ornamentation has been used in this room and the only ornamentation of this room is the “Yazdi-bandi (geodesic stair)” on the roof of this room.

this room also called “Tehrani” room because of “Orosi (kind of sash window)” style windows on two angles of the room which is the best and most remarkable element of this room are “Orosi (kind of sash window)” windows with “Rozan (hole window)” above them that in daylight by reflecting colorful light to the room gives a nice view to it.

All the beauty of this room is about types of windows of the room and “Orosi (kind of sash window)” windows used in it which is the best use of lighting art and mixture of color in this room.

Borojerdiha House (Summer Residences):

Decorations used in this room includes plaster molding made by ”mural” and “Barhashteh (Type of mural)” style and drawn with patterns of flowers and leafs - arabesque - Flower pots full of flowers and obviously the most designs has been done on fireplace of this room.

Paintings do not exist totally in anywhere of this room and color processing of the room is white or better to say that the base color of the room is white and the only different color in the room is applied on windows.

Lighting of this winter room has been done by “Rozan (hole window)” – “Shabak (courtain grid window)” - and windows that faced to the garden and leads the sunlight through the room.

In this room, there were empty spots which show that there were mirroring ornamentation in the room before repair and reconstruction.

The roof of this room is a dome “Yazdi-bandi (geodesic stair)”

Ameriha House (Summer Residences):

There are no brickworks and painting in this part of the residence.

Tiling can be seen on the sidewall. Different styles of plaster molding have been used in the room such as: “Shir O Shekari” – “mural” – “Barhashteh”.

Table 54: Evaluation of Winter Residences Parts of Houses

Differences and Similarities in Reception Hall /kingroom in WinterResidence					
Residence	**Winter Residence**				
	Ornamentation				**Types of Windows**
	Style/type	**motif**	**Material/technique**	**color**	
Abasiha	-Yazdi-bandi(geodesic form of roof) -Moqarnas -Symbolic	-Floral -Arabesque -Zoomophic	-Plaster molding /"Shiro-shekari","barjeste" and "barheshte "Technique -Mirror	-white -gray`	-Orosi(Sash window) -Shabak (Grid window)
Tabatabaiha	-Yazdi-Bandi((geodesic form of roof) -aesthetic	-	-	-White	-Orosi (Sash window) -Rozan (Hole window)
Borojerdiha	Yazdi-Bandi((geodesic form of roof) -Aesthetic	-Floral -Arabesque	-Plaster molding, "mural" and "Barhashteh"	-White	-Rozan(Hole window) - Shabak (Grid window)
Ameriha	- Yazdi-Bandi(geodesic form of roof) -Moqarnas -Aesthetic	-Floral	-Plaster molding /"shiro-shekari", "Mural" and "Barhashteh" -Mirror	-white -Gray	Orosi (Sash window) -Rozan (Hole window) -lattic window -Tehrani -Shabak (Grid window)

Chapter 4

CONCLUSION

Residenceial buildings of Iranian Islamic architecture have been designed considering culture, Religion and traditions; and they are responsive to climate and environment of each region and also their inhabitants' lifestyle. This architecture could create forms which are able to generate a correlation between all aforesaid parameters.

Culture and climate aonditions were the reason for creation of some distinctive characteristic in Iranian architecture such as introverted houses. According to the word "introversion" we can see the majority of ornamentation is on the inside of the houses, not out of it and luxury – oriented and aesthetics are the reasons for ornamentation, in the other word to explain introversion in these houses it is worthy to mention that the architect focuses on interior design and ornamentation.

In addition, for construction and ornamentation of traditional houses different materials and techniques are used according to the availability and locality of materials. It could be said that various materials, traditional styles, climate situation and geographical issues and also occasionally ornamentations are the main features which make regions' architecture.

The word “four seasons” raised by the reason of climate affect. This house based on the sun radiation contains separated segments based on the sun radiation. The four season house contains different sections according to the climatic situations. Two discussable parts of this research is divided to summer residence and winter residence.

In winter residence of four season houses, materials of ornamentations of king room and reception hall are plaster molding as the most used and mirror as the second mainly used materials. For plaster molding the techniques are “Shiro-shekari”,”barjeste” and “barheshte; and for mirror the techniques are diaphoretic, mirror pieces on plaster molding, and “ghataar bandi” (style of stucco).

Plaster molding is mostly applied on the walls more than the ceiling; but mirrors are applied on both wall and “yazdi-bandi” (Geodesic form that used in dome)ornamentations of theceiling. Moreover using mirrors as ornamentations also reflects the light and therefore the room will be brighter.

Floral motifs are the most common type of motifs that are used in king room and reception hall of the winter residence; Zoomorphic motifs are the second common type. Also in terms of style the aesthetic is the first style and symbolic is the second. In zoomorphic motifs all animal figures look as they are sleeping, and they are not dynamic at all.

Colors that are used in winter residence are mostly very light colors such as white and light yellow; also mirror is another material with a special color, which resembles to white ansd silver colors. Although it is a bright and shiny material the

reflection of other light colors of interior spaces by means of mirror makes the space even brighter. The use of windows with colorful glasses is a significant point about these spaces; yellow, red, orange, greean and blue glasses reflect the light inside the space. Colorful reflections inside the bright rooms make the space more pleasant and this can be counted as one of the ornamental elements of these interior spaces.Windows are in three types of “Orosi” (Sash windw), “Shabaak” (Grid window) and “Rozan” (Hole window). There are floral and geometric motifs used in these windows. Mainly the ceilings of these rooms in winter residence are low and the ornamentations applied on these parts are “Yazdi bandi”.

In the other zone of the four season houses, summer residence, plaster molding is the first material used in ornamentation of king room and reception hall; and painting is the second common one is painting and finally mirror is the third most common material. Techniques such as “Shiro-shekari”,”barjeste”, “barheshte” and “zebreh” are used for applying plaster molding in this part. Generally all the techniques of plater molding are used in this part’s ornamentations. Paintings are widely used in ornamentation of this section of the house. Pieces of mirrors are installed on plaster moldings; and they are mostly seen in the dome cielings of this section.

Floral motifs are the most used motifs in this part, while zoomorphic and geometric motifs come after. All motifs and images are highly dynamic, for instance there are scenes of hunting painted on the walls, which show the movement and dynamism.

Motifs are used from two aesthetic and symbolic styles. Moreover colors used in these spaces are vivid colors such as green, yellow, blue and red, which are used in combination with neutral colors such as black and white; this mixture also give the

sense of dynamism. There are “Moqarnas” and “Yazdi-bandi” ornamentations used in the ceiling of these rooms. “Orosi” (Sash window) and “Goljaam” (Floral pattern window) are the most common types of window used in these spaces; and “Horno” (Dome hole) and ‘Roshandan’ come next. It is worthy to mention that “Horno” (Dome hole) and “Roshandan” (Type of skylight) are not used in winter residence at all.

One of the common points in ornamentation of both summer and winter residence of these houses is symmetrical motifs and ornamental details.

Generally the architecture of residential units of Iran in the past was reach in terms of ornamentations, and the attention that architects paid to details was extremely high; as far as it can be seen in slight differences between ornamentations of winter and summer residence. This is one of the important differences between the architectural details of buildings from the past and the contemporary architecture of residential buildings of Iran.

REFRENCES

Ahmadi Nejad, H. (2009) "Privacy and Cover in Traditional Residenceial Architecture, Woman and Architecture ", National Conference

Akhtarkavan, A.M. (2008) "Sustainable Architecture in the H**o**t and Dry Climent of Iran". *Vol. 19* (Architect Engineering Special Issue)

Arjmandi, H. (2011) "Psychological Effect of Light and Color From Iranian Traditional House on Dwellers". Social Science and Humanities, vol 6

Asadi, M. (2012) "The social relationship of contemporary residences in Iranian housing". vol 6 (ISSN:1823-884X)

Ayatollahi, H. (2002) "The History of Iranian Art",Tehran, Center of International Cultural Studies

Amrayi, M. (2006) "Orosi the Window to the Light",Tehran , Samt

Ashraf, A. (1970) "Historical Obstacles to the Development tf A Bourgeoisie in Iran ", in M.A.Cook, Ed, Studies in the Economic History of the Middle East, London

Ballarbell,V and Rand, P. (2006) "China Material for Architectural Design", Laurence King Publishing Ltd

Behling, C. Behling, S. (1999) “Glass: Construction and Technologies in Der Architecture”, Michigan Universities

Behbood, K. (2010) “Energy Efficient Design Strategies in Hot and Dry Region of Iran”, Kkasha

Bahreini, SH. (2000) “Comparison of Traditional and Modern Painting in Iran”, Art Letter. Vol 6

Beard, G. (1975) “Plaster Work in Great Britain”. London, Michigan University

Christopher, A. (2007) “Architecture and Secret of Eternity”, Tehran, Shahid Beheshti University Publication Center

Ebrahimi, Y, R, Bolooghi, M. (2010) “Study of Spatial Models of House in Iranian Traditional Architecture and its Comparison to Contemporary Architecture”, Iranian House Regional Conference

Eslami, M. (1997) “Scrutiny of Painted Decoration of the 3 Building in the Same Period, Borojerdi House, Tabatabai House, Atarha House", Master Thesis. Art University

Eskandari, P. (2011) “Analysis of Traditional Tranian Houses of Kashan, IRAN in Terms of Space Organization and Access Design”, Unpublished Master Thesis. Eastern Meditrainian University

Farokhyar, H. (2006) “Historical Building”, Kashan, Hamgam Ba Hasti.

Feierabend, P. (2000) “Islam Art and Architecture”, English, Koneman

Fernandez, J. (2006) “ Material Architecture ”, USA published by Elsvier Ltd.

Ghobadian, V. (2009) “Sustainable Traditional Building of Iran”, Iran , Islamic Azad University-Dubai Campus

Haji -Ghassemi, K. (1998) “Ganjname”, Tehran, Shahid Beheshty University and Cultural Heritage Organization, *Vol.4 (*Mansion of Kashan)

Hamzelo, M.O. (2007) “Ornamentation of Borojerdi House in Kashan”, Tehran, Pazine Institute

Haeri Mazandarani, M. (1996) “On The Basis of Study Project Finding and Application of Architectural Principles of Traditional Houses in Design of Modern House”, Tehran Abadi Magazine, No. 23,

Hamdouni, A. M. (2001) “Al-Bayn wa LBunyan : Meaning, Poetics, and Politics in Warmly Islamic Architecture”, University of California, Berkeley.

Hatings, R. Wall,M. (2007) “Sustainable Solar Housing”, Erthscan, (vol2)

khorshidi Fard, Z. (2008) “Abbasin Historical House, Kashan”, Hamgam Ba Hasti.

Karimi, A. (1964) “Persian Miniature”, Art and People Magazine, Vol 9

Kasmai, M. (1980) “Traditional Architecture of Iran and It’s Relation to its History ,Climate and Culture “. University Idaho

Layla,D, with Ekhtiar, M. (1998) “Royal Persian Painting:The Qajar Epoch”, Brooklyn, NY, Brooklyn Museum Of Art With T.B, Touris

Moussavi, F. Lopez, D. (2009) “The Function of Form”. Denial Lopez

Moradchelleh, A. (2011) “Environmental Factors in Architecture”, Journal Of American Science, Vol7 (7).

Monshizadeh M,a. V. (2009,October 20-21) “Influences of Cultural Factors on Design of Islamic Housing of Iran”. Tehran, Sorush Danesh.

Mahmodi, K. (2009) “Fundamental of Chromatics in Architecture an Urban Design”, Tahan

Memarian, Gh. (2008) “Iranian Architecture”, Sorush Danesh

Musson, J. (2000) “Plaster Work, 100 Period Details from the Archives of Country Life”. Virginia University

Naghizadeh, M. H. (2011) “Recognition of the Roots in Islamic Architecture Formation”, *American Journal of Scientific Research(Issue 17), pp.25-34*

Nasrseyed, H. (2001) “Traditional Art Holly Art”, Tehran, Articles Published for Religious Art Conference by Organization of Cultural Heritage

Ongul, Z. (1998) “Ornamentation in Interior Spaces (Case Study Old Houses in Nicosia) ”, Unpublished Master Thesis, Eastern Mediterranean University

Petersen, A. (2002) “Dictionary of Islamic Architecture”, Taylor and Francis E-Library

Pirniea, M.K, (2001) “Architectural Styles of Iran”, Tehran , Sourosh Danesh

Pirnia, K. (2009) “(Ashnaei Ba Memari Eslami Iran) , Introduce To Islamic Iranian Architecture” ,(Cilt 14) Iran, Sourosh Danesh

Pirnia, M. (1984) “Desert Climate and Issues Related To Buildings”, Tehran, Mojarad

Pirnia, M. (1976) “Introversion in Persian Architecture”, Farhang Va Zendegy

Pirnia, M, K. (2005) “Iranian Architecture Stylistics”, Sorush Danesh Press

Pirnia, M, K. (1992) “Introduction to Iranian Islamic Architecture”, Tehran, Science and Technology Press,

Pour jafar, M. (2008) “Art & Architecture from Point of View of East & West “, Tehran, Research Center of Dwelling and Urban Design

Rabinson, B. (2000) “Iranian Painting in Qajar Period”, Tehran, Agah

Shokouhian, M. (2007, September) “Environmental Effect of Courtyard in Sustainable Architecture of Iran”, (Hot –Arid Regions, Meso-Climate Bwks). Vol 2

Tavvasoli, m. (2002) “Urban Structure and Architect True in The Hot Arid Zone of Iran

Winkler, E, M. (1994-1997) “Stone in Architecture”, Properties, Durability, Springer-verlag berlin Heidelberg

Weller, B. Unnewehr, S. Harth, K. Tasche, S .(2009) “Glassing Building”, Principles, Applications, Examples , Birkhäuser

Wornum. Nicholson, R. (1869) “Analusis of Ornament”, London, University Of Michigan

URL 1. *June 15, 2011, http://www.10.aeccafe.com/blogs/arch-showcase/2011/06/12*

URL2. *November 11, 2011, http://www.archweb.it*

URL3. *May 11, 2011, http://www.livegreenblog.com/sustainable-architecture*

URL4. *December 5 ,2011 ,http://jahanbeen.com/photogallery/Pic/18.jpg*

URL 5. *February 22,2011 http://www.flicker.com/photo/themule/5158469361/*

URL 6. *June 5, 2012, http://Qom-barax.blogfa.com*

URL 7. *December, 5, 2012, http://www.atlasy.ir*

URL 8. *December, 12, 2012, http://www.Kashancht.ir*

URL9. *December, 10,2012 http://www.anadolujet.com/aj-en/anadolujet-magazin/2011/november/articles/shaping-wood-with-patience-kundekari.aspx*

URL10 . *December ,10,2012 , http://www.axisjiku.com/en/2012/09/01*

URL11. *May, 3, 2.11, http://archnet.org/library/dictionary*

URL 12. *Oct, 8, 2011, http://www.wisegeek.com/what-is-stucco.htm*

URL13. *Oct, 8, 2011, http://www.greatbigcanvas.com*

URL14. *Oct, 8, 2011, http://www.gypsum.org*

URL15. *June, 15, 2011, http://digicoll.library.wisc.edu*

URL 15. *June, 15, 2011, http://engineeringtraining.tpub.com*

URL 16. *June, 15, 2011, http://sacredsites.com/middle_east/iran/shia_islam.html*

URL 17. *April, 5, 2012, http://www.architecture-student.com*

URL 18. *April, 5, 2012, http://www.farhangsara.com/architecture_b4_islam.htm*

URL 19. *August, 7, 2012, http://maps.google.com/*

URL 20. *August, 7, 2012, http://www.papers.com.pk*

URL 21. *July, 3, 2012, http://www.iranreview.org*

URL 22. *January, 25, 2013, http://www.looxsash.com/history-of-the-sash-window/introduction*

URL23. *January, 25, 2013, http://www.stround.gov.uk/info/troditional-casment-window.pdf*

URL24. *January, 25, 2013, http://www.wychavon.gov.uk/cms/pdf/wdc-planning-her-windowsleaflet1.pdf*

URL25. *January, 27, 2013, http://www.homebuilding.co.uk/design/choosing-products/doors-window/dormer-windows*

APPENDIX

Appendix A: List of Foreign Phrases

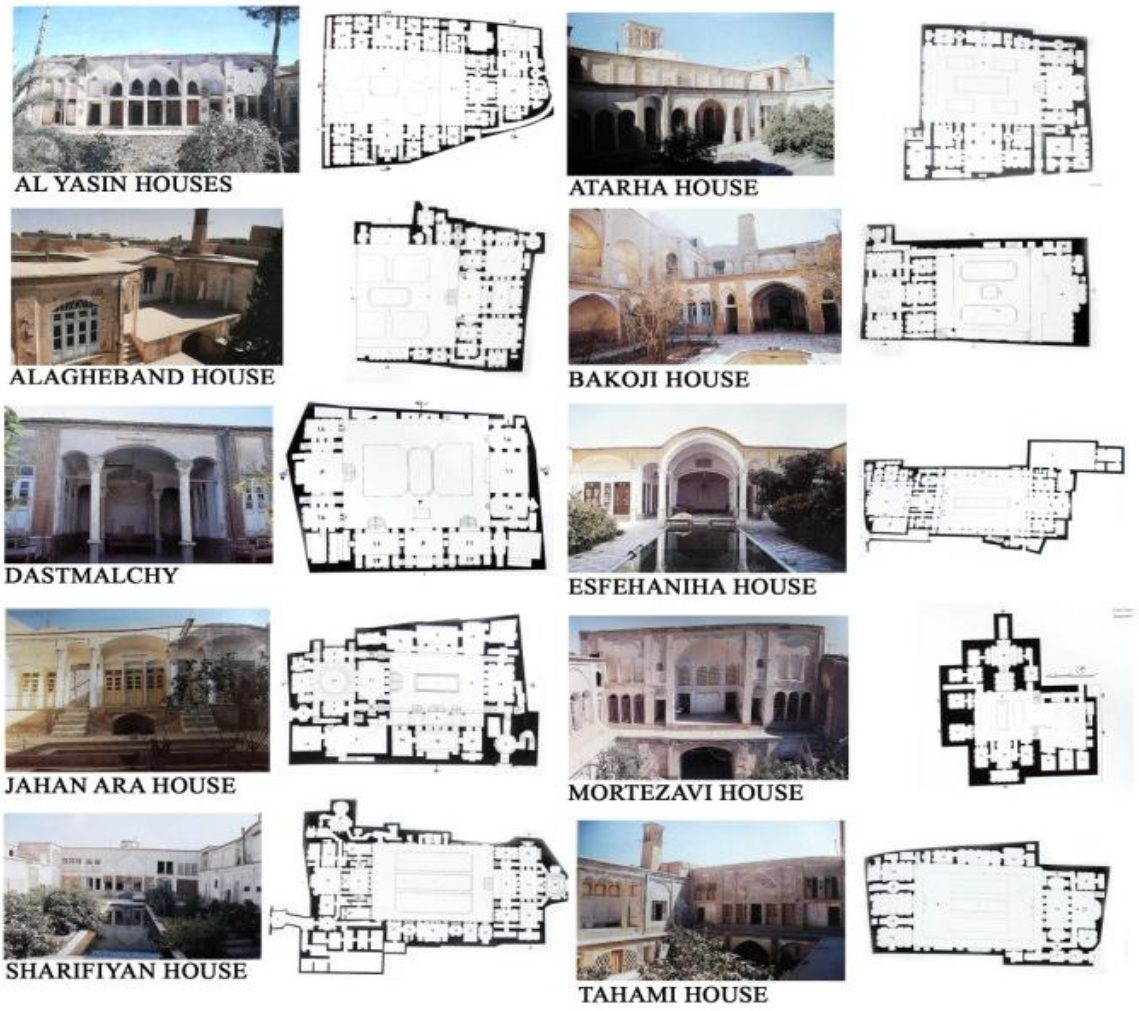
1.	**Adjoining room**	Upper floor small room adjoining the reception hall and communicates with it.
2.	**Antechamber**	Intermediary space through which the closed spaces are accessed and it is A small room used as an entryway or reception area to a larger room or Waiting room from which you can enter directly into the reception.
3.	**Andarouni**	private space for the family.
4.	**Azari Style**	Iranian Architecture style during Islam.
5.	**Baje**	Small window.
6.	**Barhashteh**	styles of plaster molding.
7.	**Bironi**	Outer part of house used for gest .
8.	**Badgir**	Ventilation shaft
9.	**Backyard**	mostly backyard is located at back of the house.
10.	**Do-dari(two-door room)**	Room with two large contiguous window openings on the courtyard.
11.	**Eyvan**	Veranda
12.	**"Esfahanian"-run (roune esfehani)**	golden proportion of Iran architecture.
13.	**Entrance (voroudi)**	Entrance had Individual doorknockers, defined distinction between the genders for the inhabitants.
14.	**Eivancheh(Small-veranda)**	small shallow Ivan.
15.	**Esfahani Style**	Iranian Architecture style during Islam.
16.	**Freez and khovan in building**	Decoration skylight in wall.

17.	**Four-Sofeh (Chahar-soffeh)**	Cross-shaped space comprised of a central dome-covered space and four sections roofed in the "taq-o tavizeh" manner around it.
18.	**Goljam**	Floral pattern window
19.	**Hashty**	vestibule
20.	**Horno(Dome hole)**	The hole on the top of dome for lighting .
21.	**Hoz-khaneh(pool room)**	Tall covered space with a central pool and usually communicating with the other spaces.
22.	**Jamkhane(colory dome glazing)**	Glazing colorful on the top of the dome
23.	**Karbandy**	Roof decorating, coffering
24.	**Orosi**	Sash window with Colorful small pieces of glass between the beautiful wood tie
25.	**Panj-dari**	Large room with five large adjoining window
26.	**Sardab**	Basement spaces which are equipped with small pool in the middle
27.	**Seh-dari**	Large room with tree large adjoining window
28.	**Yazdi-Bandi**	Geodesic form that used in dome
29.	**Moqarnas**	Stalactite work on roof (dome)
30.	**Rozan(Hole.window)**	circular shape window , with small pieces of glass between
31.	**Shabak(Courtain grid window)**	Curtain grid window
32.	**Moshabak-door and window**	Lattice window.
33.	**Roshandan(Hip.skylight)**	Skylight on the top of dome.
34.	**Pacholaghe**	mix of fix & casement window.

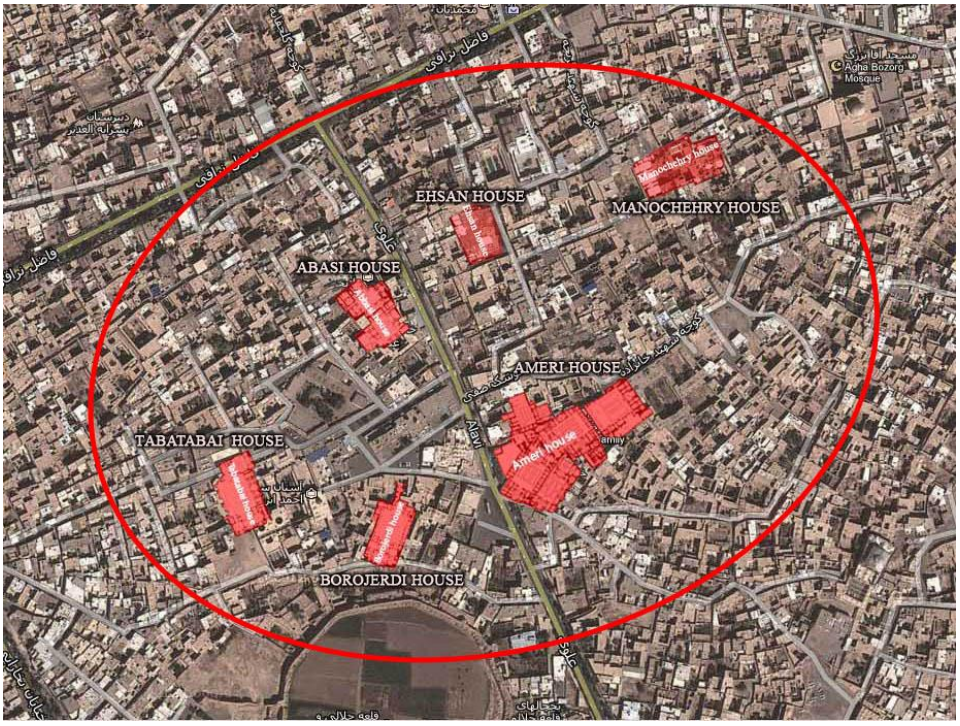
35.	**Tehrani**	Room in winter part of house in front of sun direct
36.	**Lachak -toranj**	Pattern of Persian carpet
37.	**Shah -neshing**	King room
38.	**Vestach**	The private room was called “vestach”.
39.	**Zaghe-Tappeh**	The name of place in Qazvin, Iran
40.	**Shir-Shekari**	styles of plaster molding.
41.	**Knob(Barjeste)**	styles of plaster molding.
42.	**Zebreh**	styles of plaster molding.
43.	**Karbandi**	styles of plaster molding on the roof .
44.	**Khorasani Style**	Iranian Architecture style during Islam.
45.	**Razi Style**	Iranian Architecture style during Islam.
46.	**The“Parsian”style**	Iranian Architecture style before Islam.
47.	**The“Parthian”style**	Iranian Architecture style before Islam.
48.	**Running-rung (roune rasteh)**	golden proportion of Iran architecture.
49.	**“Kermanian”-run (roune kermani)**	golden proportion of Iran architecture.
50.		
51.	**Vestibule (Hashti)**	After door, there was special waiting space.
52.	**Stable**	place for keeping animals.
53.	**Pillared Ivan**	semi-open pillared space usually facing the closed spaces
54.	**Mahtabi**	roofless-space.
55.	**Soffeh**	Roofless platform above the courtyard’s level and usually located in front of the closed spaces

56.	**Shah-neshin(king room)**	Space at the head of reception hall, facing the window, where dignitaries are seated.
57.	**Sardab (Cellar)**	Basement spaces which are equipped with small pool in the middle.
58.	**Rooftop yard**	small yard on the second floor of house which, together with its surrounding spaces, continues a relatively independent part in the mansion.
59.	**Panj-dari(five-door room)**	Large room with five large contiguous window openings to the courtyard
60.	**Se-dari (three-door room)**	Room with three large contiguous window openings to the courtyard.
61.	**Windcacher**	Tall element rising above the roof and conducting air flow into the building.

Appendix B: All Traditional House of"Kashan" City, IRAN (Haji-Ghassemi, 1998)



Appendix C: View of 6 House of "Kashan" in "Alavi "Distinct (URL 19)



Appendix D: Cultural Heritage Organization of "Kashan "(URL 8)

Appendix E: “Ehsan” and “Manochehry” House, “Kashan”, Iran (Take by Author)



Historical house of Manochehry



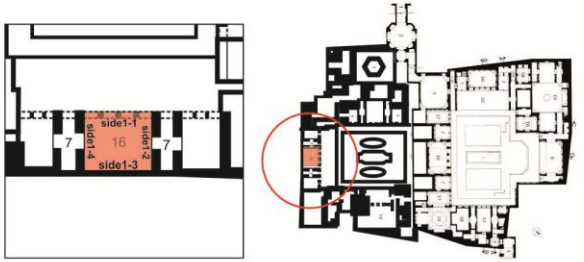
Historical house of Ehsan

Appendix F: The picture of 4 Case Studies

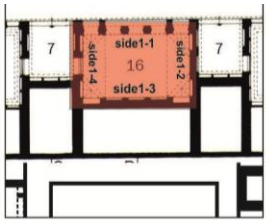
Abbasiha house reception hall

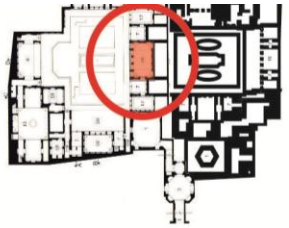
winter residence "B"

side 1-1, 1-2, 1-3, 1-4

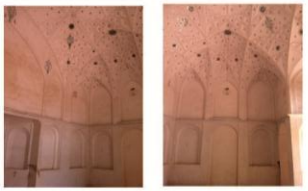


Abbasiha house reception hall





side 1-1, 1-2, 1-3, 1-4 winter residence"A"

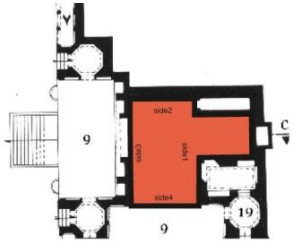


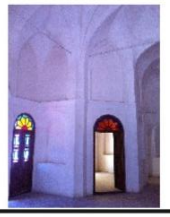
Tabatabaiha house , summer resience

side 4, 4-1, 4-2, 4-3

Tabatabaiha house , winter resience

side 1, 2, 3, 4

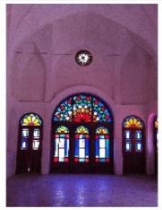




side 1

side 2

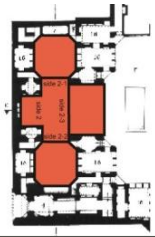
side 3



side 4

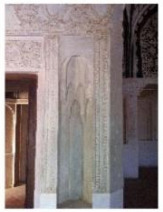
Tabatabaiha house , summer resience

side 2, 2-1, 2-2, 2-3

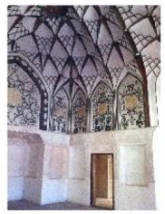






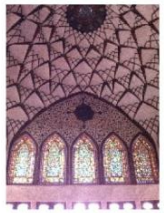




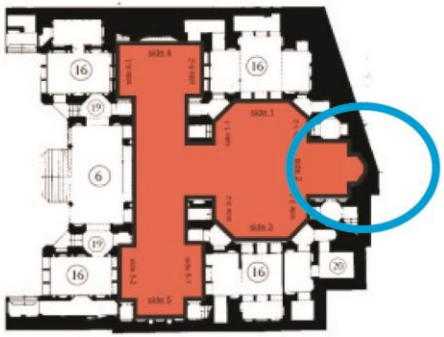




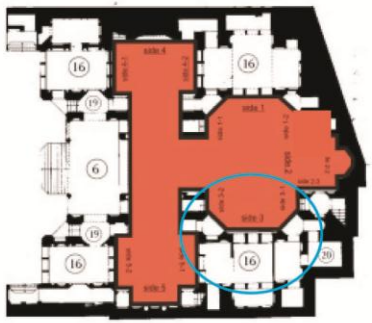






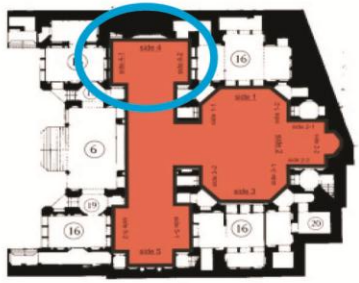
SIDE 2

Borojerdiha house, summer residence



SIDE 3

Borojerdiha house, summer residence



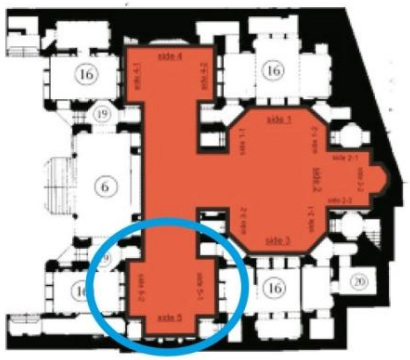
Borojerdiha house, summer residence

SIDE 4 , 4-1 , 4-2

SIDE 4-1

SIDE 4

SIDE 4-2

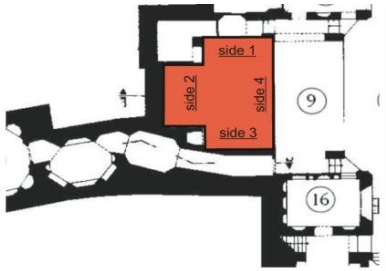


Borojerdiha house, summer residence

SIDE 5 , 5-1 , 5-2

SIDE 5

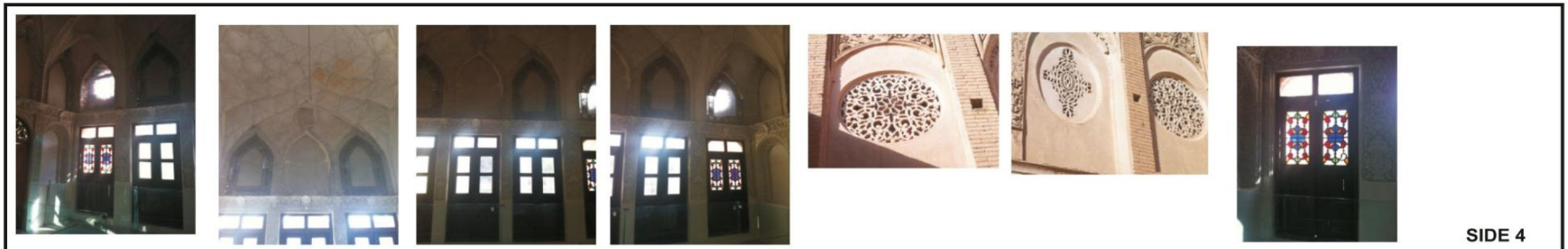
SIDE 5-1



Borojerdiha house, winter residence

SIDE 2

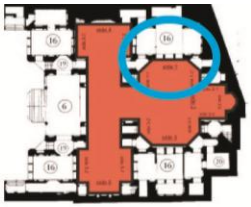
SIDE 3



SIDE 4

Borojerdiha house, summer residence

SIDE 1 , 1-1 , 1-2



SIDE 1-2

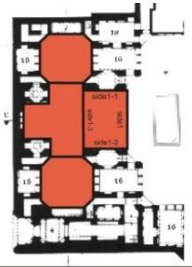
SIDE 1

SIDE 1-1

Tabatabaiha house , summer resience

side 1,1-1,1-2,1-3








side 1








side 1-1




side 1-2





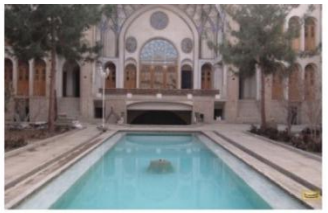


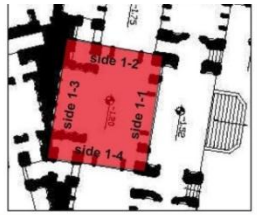
side 1-3

“AMERIHA” MANSION

Winter resident (mirror room)

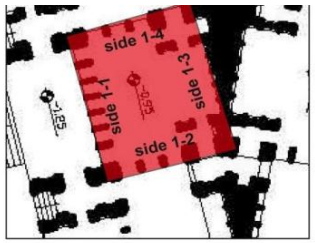
side 1-1, 1-2, 1-3, 1-4





“AMERIHA” MANSION
Winter resident (shah neshin)

side 1-1, 1-2, 1-3, 1-4



Ameriha house summer residence

side 1-1, 1-2, 1-3, 1-4