

**Sitting on the Ground as an Important Factor in
Formation of Traditional Houses in Hot Arid Region of
Iran**

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ABSTRACT

House as a shelter, has been a meaningful place owing to the fact that all cultures have developed beneath this shelter from the early days of humankind. House is one of the key subjects in Iranian Architecture.

The oldest remained houses in Iran are related to the Safavid Period (1501 to 1722). The traditional way of designing the houses continued from that period until the middle of Qajar Period (1781-1858) when the relationships with European countries increased and its effects on Iranian culture, life styles, architecture and art began to be felt. These changes in life styles eventually changed the design of houses in several ways. In this respect entering of furniture to the Iranian residential spaces seems to have had the most radical impact. Until then people in Iran used to sit on the ground and the spaces were designed accordingly. Together with furnishing the spaces in western manners, the house environments began to change.

There have been many researches about Iranian traditional house. These studies are generally descriptive works about organization of spaces, the climatic issues, role of privacy, etc. Although the habit of sitting on the ground has been one of the important features of Iranian traditional culture; there exist no specific discussion about its impact on the layout and organization of interior spaces in Iranian traditional houses.

This study aims to investigate Iranian traditional architecture in general and continues with the primary features involved in design of Iranian traditional houses. This research also tries to trace the possible impacts of sitting on the ground on organization of spaces as well as the formation of elements within interior spaces in Iranian traditional houses. It is believed that the fact that Iranians used to sit on the ground has been the reason behind many principles applied in the design of these spaces.

On the other hand, modularity appears to be a fundamental tool for order in organizing spaces in traditional architecture of Iran. Using this modular system in traditional houses, interior spaces were designed based on different patterns. As it is believed that this approach to design of residential spaces has a close relationship with the fact that Iranians did their daily activities on the ground, this subject has also been studied in detail in the context of this research.

Keywords: Iranian Architecture, Iranian traditional Houses, Modular System, Sitting on the Ground, Interior Space Design, Space Organization

ÖZ

Konut, insanlık tarihindeki tüm kültürlerin geliştiđi bir barınak olarak, insanlık tarihinde her zaman özel bir yere sahip olmuştur. Konut, İran Mimarisi'nde de ayrı bir yere sahiptir.

İran'da günümüze gelebilen en eski konutlar Safavi dönemine (1501-1722) aittir. Geleneksel konut yapımı, o zamandan Avrupa ülkeleri ile ilişkilerin çok geliştiđi ve etkisinin İran kültür, yaşam biçimi, mimari ve sanatta açıkça hissedilmeye başlandıđı Qajar döneminin (1781-1858) ortasına kadar sürdü. Bu yaşam biçimindeki deđişimler, konutların tasarımında da farklı biçimlerde deđişimlere neden oldu. Bu bağlamda, İran'daki konutlara en önemli etkiyi mobilyanın girmesi yapmıştır. O zamana kadar, İran'da insanlar yerde oturmaktaydılar; ve mekânlar da bu gerçeđe göre tasarlanmaktaydı. Mekânların Batı tarzında döşenmesi ile beraber, konut mekânları da deđişmeye başladı.

İran geleneksel konutları konusunda birçok araştırma yapılmıştır. Bu araştırmalar genellikle mekânların örgütlenmesi, çevresel konular, mahremiyetin rolü vb. konuları ele alan tanımlayıcı çalışmalardır. Yerde oturma, İran kültürünün çok önemli bir öđesi olduđu halde, bunun, İran konutlarının organizasyonu ve iç mekân düzeni üstündeki etkisi konusunda özel bir çalışma mevcut deđildir.

Bu alıřma, İnan mimarisini genel olarak tanımlamakla başlar ve geleneksel konut tasarımında ele alınan birincil konularla devam eder. Bu araştırma aynı zamanda, yerde oturmanın İnan geleneksel konut mimarisinin mekân organizasyonuna ve iç mekânlardaki elemanların tasarımına olası etkilerini irdelemeyi amaçlar. İnanlıların yerde oturması gerçeğinin, bu konutlardaki birçok tasarım ilkesinin arkasındaki neden olduğuna inanılmaktadır.

Diğer yandan, modülerlik, İnan Mimarisi'nin mekân organizasyonunda önemli bir düzen aracı olarak görülmektedir. Geleneksel konutlarda, bu modüler sistem kullanılarak iç mekânlar değişik kalıplara göre tasarlanmıştır. Konut mekânlarının tasarımındaki bu yaklaşımın İnanlıların günlük eylemlerini yerde gerçekleştirdiği gerçeği ile yakın ilişkisi olduğu düşünüldüğünden, bu konu da alıřma kapsamında detaylı olarak incelenmiştir.

Anahtar Kelimeler: İnan Mimarisi, İnan geleneksel konutu, Geleneksel Modüler Sistem, Yerde Oturmak, İç Mekân Tasarımı, Mekân organizasyonu

I dedicate this manuscript to my parents who support me all the time

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Chapter 1

INTRODUCTION

Architecture is one of the components of culture and a demonstration of the way of living in a society; this fact is also applicable in case of Iran. Iran is one of the oldest countries in the world and its architecture has been an authentic representative of life and culture of the people in this region since ancient times. Traditions, religious rituals, the way of life, thoughts and beliefs of different generations are vibrantly portrayed by Iranian Architecture (Yavari, 2010). Vice versa architecture can be one of the most significant parts of tradition. In this respect Naghizadeh (2011) also claims that one of primary factors in formation of any country's architecture is the historical tradition. In order to form a correct vision of Iranian culture, the principal phases of architecture's evolution should be described.

The ancient history of the architecture of Iran has not been investigated competently. Although it has the background of several millennia, according to Khoei (2005), researchers began to review Iranian architecture's achievements only a few decades ago, to clearly reveal the face of this precious token.

Iran is a country in Middle East. Iran has different major climatic zones and different parts of the country are located in various climatic situations. One of the most featured

characteristics of Iran is that it is a four season country. The temperature, humidity and rainfall are different in each region and they are changeable from seasons to season. According to Soflaee (2005) Iran has very changeable climatic conditions; to have a comfortable condition for the users; traditional architecture has developed in each region accordingly (Soflaee, 2005).

Generally there are four climate categories in different parts of Iran and a large region located in the central part of the country has the hot and dry climate; and this category encompasses most of the area of Iran. Apart from the central desert, there are coastal lines on its southern and northern boundaries. As Ghobadian (2009) states Iran's climate can be classified as following (see figure 1):

- The Northern mild-coastal climate
- The mountainous and high plateau region-cold climate
- The central plateau region-hot and dry climate
- The Southern coastal region humid and hot climate (Ghobadian, 2009).

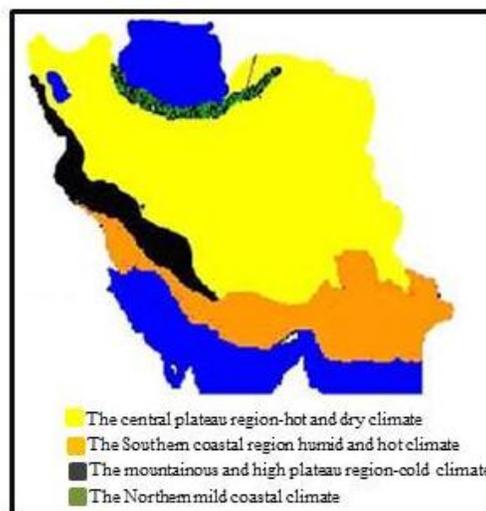


Figure 1. Four Climate Categories in Different Parts of Iran (URL 1)

According to division of climatic zones, there is a wide range of various types of houses in Iran. For example, the houses of hot and dry climate region have different characteristics than houses in other climates, although they have many similar and common features, which come from the common culture of people. In general, architecture of traditional houses can be considered as one of the most significant achievements in Iranian traditional architecture, which needs to be introduced and discussed. In order to study these houses, a general discussion about the Iranian traditional architecture is necessary in first step.

Iranian traditional houses have been evolved based on the users' life styles, their culture and different conditions of environment during thousands of years. In the design of traditional houses the habits and culture of residents have been considered significantly. In the past, designers were familiar with logical and simple solutions. These were the tools to match the living spaces to the environmental, cultural and ecological conditions of the time.

During the passage of time, cultures have given meaning to surrounding environment. According to Rapoport (1995), although cultural needs of user, climate, economic conditions, topography, and available materials are several factors that all affect the architecture in an area; among these, the ones which have the deepest effect on formation of spaces and interior/exterior relationship of a house are living condition, needs of users and habits in the region and culture.

Infantes (2009) states that since humans are the only holders of properties for creating and situating culture, they are assumed as the single carriers of culture. Therefore there isn't any human without a culture and also wherever there is culture, there exist humans. Culture is transferred from one generation to the other by means of their socialization. "The term 'culture' refers to the language, beliefs, values and norms, customs, dress, diet, roles, knowledge and skills, and all the other things that people learn that make up the 'way of life' of any society" (Infantes, 2009, p. 3).

Also Asadi et al (2009) suggest that culture is of civilization and in general using this word alone implies human mind's cultivation. Architecture as an important component of culture can be considered as the manifestation of societies' ideas and beliefs. Therefore since the lifestyle of people is influenced by their ideas and beliefs, dwellings' architecture have been considerably influenced by the lifestyle, beliefs and culture through the whole history. House has been valued in terms of being a shelter in the first place. From the early days of humankind's history, they have built houses to protect themselves from environmental phenomenon such as wind, sun, rain and snow. Sociologist and economist Douglas (1996) believes that house is thus an early form of social organization.

According to Shabani et al (2011), house dedicates comfort, privacy and sense of belonging to a residing space cluster. From many years ago, the relation of the spaces in the building with their users has been considered as one of the most important issues of Iranian architecture. Considering space, there are other elements with important roles in organization of designed human space; and they also have their effect indirectly on

human life. As Rapoport (1980) states, four elements should be organized while designing a space, which are: space, meaning, communication and time; and these four elements play important roles in design. He also specifies that without considering the scale, space design and planning refers to organizing the activities, standards and goals. Meaning transfers simply by clear powerful motives and it is possible to repeat it for many times.

Culture, activities and values of each society affect their way of organizing spaces; in case of Iran factors such as religion and traditions are effective in terms of privacy divisions. But there are other factors that also might have affected the space organization in these houses such as habit of sitting on the ground. Iranians used to sit on the floor and lean to the wall while resting and in gatherings. They performed all the other everyday routines such as eating or sleeping on the floor too. It is possible to say that Iranians used to live on the ground. There were no furniture such as tables and chairs in the houses (Mahdavi, 2012). It is proven that the creation of buildings are based on the culture, thus, one of the factors that can have an influence on the formation of Iranian traditional residential spaces might be the habit of sitting on the ground as an important part of Iranian culture. Although there are so many researches done about the Iranian traditional houses there is no study available about the effects of sitting on the ground on the design of interior spaces.

Nowadays, most of Iranians use furniture in interior spaces, but still in some private uses and gatherings, many of them prefer to sit on the ground. According to Kateb (2006) living on the ground might be a continuation of nomadic life style (Kateb, 2006) which

the minimum amount of stuffs used for living such as pillows and blankets. The habit of sitting on the ground is not special to Iranians; it can also be seen in many other Middle and Far East countries. But the effect of this on use of the space is different. In this study it is tried to find the effects of living on the ground in general and sitting on the ground specifically in design of interior spaces of traditional Iranian residential spaces.



Figure 2. Sketch of a Person Sitting on the Ground

Sitting on the ground was a habit of Iranians and despite modernization and changes in their way of living; this habit still can be seen clearly in many families. Even in some cases the families still do not furnish their rooms and extend blankets and place pillows around the room and sit on them. Although Iranians used to sit on the ground, by entering of furniture their sitting habits changed in time. These changes started by the Safavid era (1501-1722) and continued in Qajar period (1781-1858), while Iranians' travels to Europe increased. The increased relationships with the western countries caused some changes in the living customs of the people (Esfandiari, 1997). Furniture entered to the Iranian palaces in accordance with the interest of the kings in western

culture and life style. The nobles and wealthy families were the first group of Iranians who started using furniture in their mansions and palaces; and other classes of the society started using the furniture as a result of their connections with those families. But still it can be seen that the habit of sitting on the ground was the dominant form of sitting for a long time even if there exist furniture in the houses. Still many people sit on the ground in the houses in many occasions.



Figure 3. Habit of Sitting on the Ground in Qajar Period (URL 2)

1.1 Aim of the Research

The main aim of this study is to find the unwritten and hidden impacts of the habit of sitting on the ground in formation of spaces in Iranian traditional houses. It is proposed that the habit of sitting on the ground most probably has made an effect on design of spaces in Iranian architecture in general and specifically on residential spaces. In this research, for investigating the effect of sitting on the ground in Iranian residential spaces, it is suggested that this issue might have some effects, first on the functional layout of the spaces and secondly it might have affected dimensions of spaces and arrangement of elements in interior spaces. The survey focuses on the houses located in the hot and dry climate, and begins with a general survey on the characteristics of traditional Iranian houses to create a sufficient background for discussing the mentioned impacts.

On the other hand, one of the most basic features in design of traditional spaces in Iran is usage of module (Peymoon). Iranian traditional houses have been constructed based on a module (Peymoon) and using a strong pattern system. To get more familiar with modularity system, many books, articles and other references have been reviewed, but enough studies on the subject were not found. Therefore, as it is believed that this approach to design has also a close relationship with the way of living in Iranian residential spaces, thus living and sitting on the ground, a part of this study has been devoted to define the Iranian traditional modular system and its dimensions based on limited available materials in hand.

1.2 Methodology and Limitations

This research used two methods to collect information in order to reach the satisfying results, including document survey and case studies.

To collect data and information, in literature review, written documents such as books, articles, papers, thesis and conferences on various aspects related to Iranian architecture are studied. The visual documents on the houses including plans, sections, and photographs which are used in the study are mainly collected from the archived documents of Cultural Heritage Organization of Iran. In the literature survey part first Iranian Architecture in general is studied with a focus on the modular system which is used in Iranian traditional houses; also different spaces of these houses are discussed. Then, sitting on the ground and its derivatives and their role in Iranian traditional residential spaces are studied. Afterwards, the descriptive analysis of sample spaces based on the findings of the study investigates the relation of these spaces and their

elements with sitting on the ground. In this part, twenty sample houses from Isfahan province are analyzed briefly in order to examine the ideas that have been proposed in this study.

These houses are chosen randomly among Iranian traditional houses registered by Cultural Heritage Organization of Iran. The important consideration has been the availability of necessary documents to be used in the analysis process. As was mentioned before, all the chosen traditional houses are located in Isfahan province, in hot and dry climatic zone in the central part of Iran. As hot and dry climatic zone covers a big area of the country, the samples are chosen from this area. It is worthy to say that since sitting on the ground is a part of Iranian culture, it can be proposed that it has affected the architecture of houses of all the regions in the country but as investigating these effects in all over the country goes beyond the boundaries of this thesis, the study limits itself to search on effects of sitting on the ground on formation of traditional houses in hot arid region of Iran.

Among these twenty houses, five houses are selected to be studied in detail in the following chapter. Three of these houses were constructed before the middle of the Qajar period (which ruled Persia from 1785 to 1925) and two were constructed after mid Qajar period. The selected houses are listed as:

- Khoshnevis house in Isfahan city (Safavid period 1501 to 1722)
- Sokias (Sokiasian) house in Isfahan city (Safavid period 1501 to 1722)
- Haj Rasuli-ha house in Isfahan city (Zand period 1750–1794)

- Tabatabaei house in Kashan city (Qajar period 1781-1858)
- Jahan-Ara'i house in Kashan city (Qajar period 1781-1858)

At the end of the process, the results of the literature review, observation and analysis is discussed and the role of the sitting on the ground in formation of Iranian traditional houses is addressed as the conclusion.

Chapter 2

IRANIAN TRADITIONAL HOUSES

House as a shelter, has been a meaningful place owing to the fact that all cultures have developed beneath this shelter from the early days of humankind. The traditional architecture in Iran, like other vernacular examples in the world, is developed based on the people's needs and living conditions in their region. Geography-topography, climatic conditions, available materials and culture are the main factors that have influence on architecture of a region. Among these, the most important factors are culture and needs of users (Rapoport 1980 & Eldemery 2000).

Architecture is always and everywhere dependent to life. Since ancient times, one of the main factors for Iranian architects was to relate their design with user's needs. The spaces in traditional Iranian architecture are entirely formed based on the needs and dimensions of the human body (Pirnia, 2005).

House is one of the key subjects in Iranian Architecture. The word "Khaneh" (House) which we use today, was used to be the name of one room, private room was "Oustakh, Gostakh". The word "Saray" was what today we call a house (Pirnia, 2005).

Family is the foundation of all cultural and social structures and is an institution which guarantees cultural stability. One of the factors that have a great effect on Iranian culture is Islam. Also, in Iranian culture family and regard to that have been an important issue.

Design of traditional houses was based on Iranian values and they thought of the house as the most pleasant place in the world. They believed that house is a symbol of paradise on the earth and courtyard (Hayat) is the center of that (Tahir et al, 2010). Iranian traditional houses are chiefly introverted. All rooms are situated around a courtyard (Hayat) which is an open rectangular space and joints diverse sections of the house. Specific geometrical rules regulate the arrangement of areas. The geometry determines both general body and each single detail of spaces as well as dictating hierarchy to diverse parts of the house. Iranian traditional houses had a kind of internal structure shaped based on religious beliefs, social life, relationships of people and traditional family structure (Asadi and Tahir, 2012 & Nosratpour, 2012). Locations of diverse parts of the house are specified regarding their significance and role. While the spaces/ parts/ sections of the house are completely independent and distinct from each other, via intermediary spaces, they are linked properly (Shayan & Gharipour, 2005 & Soltanzadeh, 1998).

In a more specific discussion about the Iranian residential architecture, it is important to go through the details of spaces, their organization and methods of creating the efficient architecture. In this respect there are different elements to be discussed; first the principles and important factors in construction, which accordingly became a kind of regulating agenda for traditional architecture of Iran, should be described. Second the

spaces, which create a residential building, should be defined. In order to reach the suitable space and spatial organization, and apart from the aesthetics there were rules to be followed to create all parts of the building in a sensible manner. These regulations became the essential factors, which could be found in almost all of the significant samples of traditional architecture in Iran. Pirnia (2005) classifies these factors as the design principles of Iranian traditional architecture. These are described in the following section.

2.1 Basic Design Principles in Iranian Traditional Architecture

According to Pirnia (2005), Iranian traditional architecture has been shaped based on some essential factors. These factors have important role to reach the goal of efficient design in Iranian architecture including design of the houses. These factors are the followings:

- Being in accordance with the people's needs (Mardomvari)
- Avoiding un-necessities (Parhiz az Bihoudegi)
- Having structural rigidity (Niyareh)
- Usage of modular units (Peymoon)
- Self-efficiency (Khodbasandegi)
- Being introverted (respecting habitants' privacy) (Daroungaraei)

i) Being in Accordance with people's needs (Mardomvari): Architecture emerges when there is a demand, and people's needs comprise the major element of the formation and realization of architecture. Two important responsibilities of an Iranian

architect in construction are paying attention to people and knowing their needs. It is the way of life, which has always directed architecture.

"To be in accordance with people's needs" (Mardomvari), means paying attention to people's needs whilst constructing a building (Moradchelleh, 2011). This issue relates to functionality in a building; according to Vakili Ardebili and Boussabaine (2006) it means that without considering the social level of the user, all their demands should be responded.

ii) Avoiding Un-Necessities (Parhiz az Bihoudegi): Our predecessors were familiar with logical and simple solutions. There were instruments and solutions which regarded as factors to match with the environmental, cultural and ecological issues of the time. It can be said that architecture was in harmony with the production and dynamics of the society of its time. Architects never tried to build something without having a rational reason. If we observe some buildings thoroughly, we notice that every element has been built based on an incentive and a reason and nothing is wasted (Sarraf Nik & Hadafi, 2011). In Iranian Architecture it was tried to avoid un-necessities as much as possible, either before and after Islam this was a rule, as in holy Quran it is said that "Believers is he who avoids uselessness and waste" (Pirnia, 2006).

iii) Having Structural Rigidity (Niyareh): In Iranian traditional architecture a great deal of attention was paid to structural rigidity (Niyareh) and the study of materials. "Strength rigidity refers to static knowledge, construction technique and materials science in terms of static aspect and construction" (Pirnia 2006 quoted in Sarraf Nik & Hadafi 2011, p: 429).

Architects in Iran didn't separate structural rigidity (Niyareh) from beauty and after many years of experience they had achieved a set of measurements based on this knowledge and they used it everywhere.

iv) Usage of Modular Units (Peymoon): Modular unit which is called Peymoon in Persian is the basic unit of measurement in Iranian traditional building. Modular unit was a reference for the other measurements and proportions (Monshizadeh, 2009). This factor plays influential role in Iranian traditional architecture and in this research, therefore it will be discussed and explained in more detail in the following sections.

v) Self-efficiency (Khodbasandegi): Having self-sufficiency was another golden Iranian rule; Iranian architects believed that using local and vernacular materials is always one of the important features in Persian architecture. Also, Architects tried to build their buildings with the materials which were accessible at the site, in order to be self-sufficient and independent. Therefore the construction was performed in a quicker pace, and the building was in harmony with its surroundings, and when it was going to be repaired the materials were easily accessible (Pirnia, 2006, Vakili Ardabili and Boussabaine 2006).

vi) Being Introverted (Respecting Habitants' Privacy) (Daroungaraei): Being introvert (Daroungaraei) is a general characteristic of Iranians architecture; as people highly respected private life. Sarrafi Nik & Hadafi (2011) claim that appreciating the privacy is a belief of Iranians; and this made the Iranian architecture introverted.

Iranian traditional house is divided to more public and more private sections. Organizations of the houses are done to protect privacy (Mahramiat) for users of the house.

2.2 Description of Spaces in Iranian Traditional House

Iranian traditional houses included two main sections: inner part (Andarouni) and external part (Birouni) and courtyard (Hayat) had an important role in separating of these zones (Haeri, 2010). According to (Pirnia, 2006) Birouni is the external parts which were located near the entrance; and Andarouni is the part of the house that belonged to the family members and the priority for specification of this part was the female members. The female visitors were also served in inner part (Andarouni). The house was built in order to separate inhabitants from the outside world and the only gateway between these two worlds was the courtyard (Pirnia, 2006).

Generally, inner part (Andarouni) was used for family life and was larger than external part (Birouni). The external part (Birouni) was for greeting the guests and conducting some religious ceremonies and social tasks. In some cases, each part had its own spaces and inner (Andarouni) and external (Birouni) parts could be seen as two relatively independent buildings, which were related to each other. In some cases external part (Birouni) was very small in comparison to the inner one and had only a few rooms (Kateb, 2006) (Figure 4).

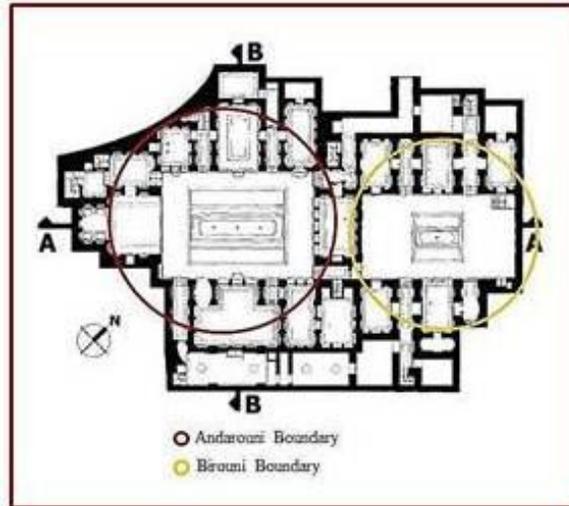


Figure 4. The Plan of Fatemi House in City of Yazd with inner part (Andarouni) and external part (Birouni) as Two Separated Boundaries (Nosratpour, 2012)

Traditional Iranian houses generally encompass the following parts:

- Main Entrance and gate (Voroodi)
- Vestibule (Hashti)
- Corridor (Dalan)
- Porch (Eivan)
- Courtyard (Hayat)
- Rooms (Hall (Talar), Three doors room (Seh-dari), Five doors room (Panj-dari) and seven doors room (Haft-dari)).
- Services such as kitchen (Matbakh), Toilet (Mostarah) and Bathroom (Hammam) (Pirnia, 1995).

Figure 5 shows a typical plan of an Iranian traditional house (Tabatabaeiha house in Kashan, province of Isfahan).

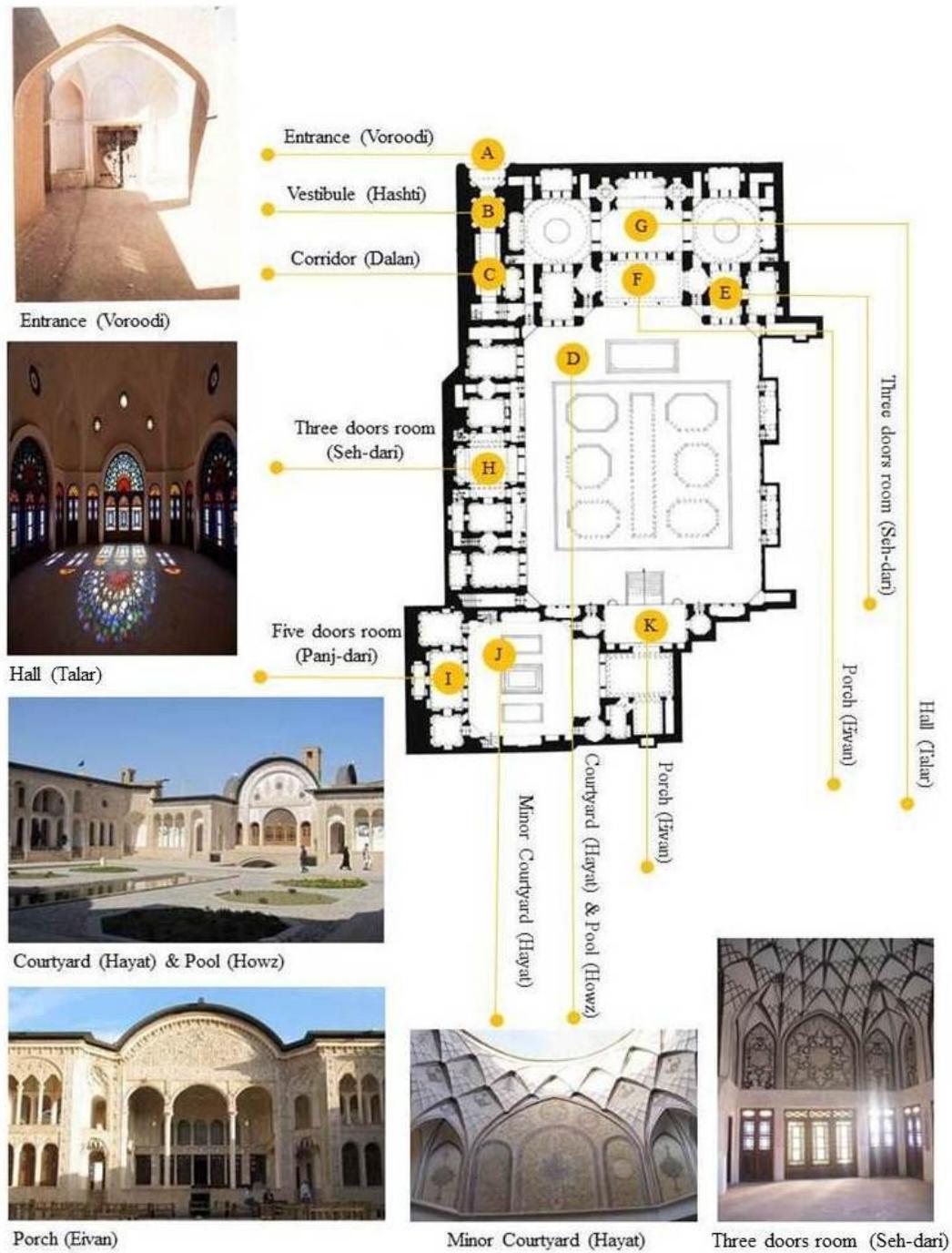


Figure 5. Different Parts of Tabatabaeiha House (URL 3)

Main Entrance and Gate (Voroodi): It consisted of a portal (Sardari) that had a simple design generally decorated with sentences from Quran verses on it and a platform (Sakoo) that according to (Nosratpour, 2012), were two stone benches on both sides of

the entrance, used for sitting, and communicating with neighbors and also for resting . In most of traditional Iranian houses, entrance doors were wooden and paired with two knockers. "The hummer knocker with high sound was used by men, and the other one was with low voice used by women" (Nosratpour, 2012, p: 2205).

Vestibule (Hashti): Iranian traditional houses had only one main entrance and immediately after the entrance; one person reached to the vestibule (Hashti) area. This area had a low ceiling (sometimes it is in dome shape). Vestibule was the part of the house that could be connected to both private and public spaces (Andarouni and Birouni) of the house and was generally built in an octagon or semi octagon shape or sometimes square.

Corridor (Dalan): The vestibule (Hashti) was linked to the courtyard throughout corridor (Dalan) which was a narrow area that provided privacy to the house (Memarian, 2009). In Iranian architecture, corridor (Dalan) was the main space for linking interior spaces to exterior spaces. Another function of corridor (Dalan) in Iranian architecture was to provide accessibility of rooms from the courtyard (Hayat) to connect them together. Another wider type of corridor (Dalan) was also sometimes used between the spaces in Iranian traditional houses and that was called "Takhtgah".



Figure 6. Vestibule (Hashti) and Corridor (Dalan) of Boroujerdiha House (URL 4)

Courtyard (Hayat): Courtyard in Iranian traditional houses was the heart and center of the building. Rooms (Seh-dari, Panj-dari, Haft-dari and etc.) chambers, halls (Reception hall or Talar) and porch (Eivan) which will be discussed later were placed around the courtyard (Hayat) that had embraced the surrounding spaces like a mother hugging her child. In some Iranian traditional houses further than one family was living; therefore this courtyard (Hayat) was used for the family gatherings and varied events such as weddings and religious ceremonies. Pirnia accentuates that these features of courtyard are neither eastern nor western but are Iranian. In Iranian houses a large pool was in the middle of the courtyard and there were gardens on both sides of the pool, and rooms were all around the courtyard. From one window, grandfather could see his grandchild who lived in another room, and mother could see her daughter from another window and this was only happening in Iranian houses (Pirnia, 1995). Courtyard (Hayat) was the main core of spatial unity and collected functional elements while connecting them. In some of the Iranians traditional houses (in hot and dry region) one wooden bed (Rohowzi) had been placed on the pool (Howz) to sit on it and it had been used for gathering the dwellers for eating and speaking around each other in summer nights (Figure 7).



Figure 7. The Lariha House in Yazd city (URL 5)

Courtyards that were accompanied with gardens and included a pool provided a fantastic view from porch (Eivan), rooms or hall (Talar). Courtyard was the most prominent place in organization of house plans and its plan was dependent on economic condition and the number of family members (Kateb, 2006).

Level of courtyard was always lower than the main residence and houses usually had more than one floor. Surface of house floor was mostly in a higher level than street, and the level of street was higher than that of courtyard. Therefore, courtyard was in the lowest level that was easy to use (Shayan & Gharipour, 2005 & Kheirabadi, 2002) (Figure 8).

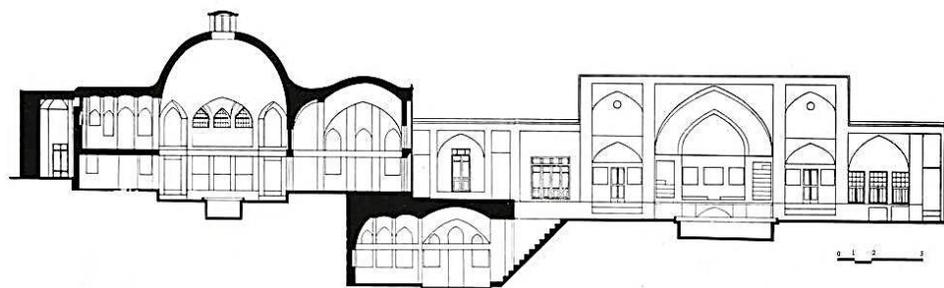


Figure 8. Section of Al-Yassin House in Yazd Showing the Lower Level of Courtyard in Relation to the Rooms

One of the most significant issues in the courtyard is the combination of Pool and Garden (Howz va Baghcheh) in Iranian traditional houses; This combination depends on different conditions such as local climate (Figure 9). Some Iranian traditional houses have got two courtyards (Major and Minor Courtyards), but some of them have got just one courtyard.



Figure 9. The House of Ameriha in Kashan. Photo by: Ali Mirghaderi (URL 6)

Nature is an inseparable part of Iranian traditional architecture. Garden as a combination of natural elements in a handmade form has always been of great importance in Iranian architecture because it is a symbol of nature (Shayan & Gharipour, 2005).

"Human being is considered to be a symbol of God and everything is considered as the symbol of another thing to him and his valuable. Human being lives on the ground, his shelter, and he is the center of everything on the earth, because he is the God's symbol. Human has used his around environment, which is a symbol of the God for him, and has applied it in his architecture so that this nature may lead him to the God" (Nikpour et al, 2012, p: 227).

In Iranian traditional houses, it can be said that water in the pool (Howz) is a symbol of cleanliness and purity.

Porch (Eivan): Was constructed as a part of a building next to the courtyard. Porch (Eivan) was like a half-roofed area which was regarded as an intermediate area between courtyard (Hayat) and building (Nikpour et al 2012) (Figure 10).



Figure 10. The View of Courtyard of Brojerdiha House. Photo by: Roham Sheikholeslami (URL 7)

Room: Rooms in traditional houses of Iran were mostly built around the courtyard in direct contact with light, water, plant and ventilated air in yard. These rooms were:

- Two doors room (Do-dari)
- Three doors room (Seh-dari)
- Five doors room (Panj-dari)
- Seven doors room (Haft-dari)
- Hall (Talar)
- Howz Khaneh (Room with inner pool)

In design of Iranian traditional house most of the rooms had openings to the courtyard, it was always desired that the inside of the rooms have a view to the flourishing courtyard outside. Having a spacious room with a free view to the outside was accompanied with Iranians (Pirnia, 2000).

i) Two doors room (Do-dari): Was a space that linked to the courtyard with two doors and mostly used for family gathering, and in fact it was mostly used in Qajar period and was rare (Parsi, 2012).

ii) Three doors room (Seh-dari): That was the room of the house mostly used for gathering of the users of the houses and their close relatives. Its measurements were

completely based on human dimensions; their size was in a way that it accommodated all family members who slept and ate in it. Inside this room everything was in an order to avoid waste and everything was in its due place (Pirnia, 2005). This room could be used in all of the seasons in a year, especially in winter. They were constructed in north or south section and sometimes in other sections too, and they were chiefly used as seating space (Pirnia, 1995).



Figure 11. The View of Three Doors Room (Seh-dari) in Iranian Traditional House (Forouzmand, 2009)

iii) Five doors room (Panj-dari): It was the room that was used as guest room and for gathering with family and closed relatives which at times contained a "Shah-Neshin" or Seat of the king which was a recess in the wall for the setting of guests. According to Pirnia (2005), hall (Talar) was more important than Shah-neshin, which had less ornamentation; and it was more important than three doors room (Seh-dari). Generally, the situation of the entrance door of Seh-dari or Panj-dari was in the middle of one section of the room and there were two or four niches "Taghche" on the opposite sides of entrance (Soltanzadeh, 1998). In some cases there was a small room behind the rooms (Pastoo), which containing a Jameh-dan (used to put clothes), a "Doulab" and a "Ganjeh" (closet).



Figure 12. The View of Five Doors Room (Panj-dari) in Iranian traditional House (Forouzmand, 2009)

iv) Hall (Talar): Was a huge and high place constructed in the middle of one or two sides of the courtyard (Hayat) and was the most prominent place of houses. Generally, hall (Talar) was built as five doors room (Panj-dari) or seven doors room (Haft-dari) and was decorated with window-doors (called Orosi in Persian) that was a wooden door with geometrical shapes and colorful glasses which sometimes was also used in three doors room (Seh-dari), five doors room (Panj-dari) and seven doors room (Haft-dari). These window-doors (Orosi) had several functions, color glasses were used for purposes other than aesthetic, and they allowed dwellers to see the persons that enter to the house from outside. They also helped to decrease incoming light to the room. Dwellers could see easily the arrivals to the house but outside persons could not see inside of the house. Sometimes windows were designed with uncolored glasses. In this case, the access to the outside's view was more important. Sometimes these kinds of windows were designed with color glasses around and on top of the normal glasses. Having a visual connection to outside (courtyard) was so valuable that Iranian houses were designed in accordance with it. These doors were not used for entrance and exit; each door was like a window-door that reached to the floor of the room.

Most of the time in Iranian traditional house, hall (Talar) was near the entrance. Having a space for entertaining guests played a major role in traditional houses, and this characteristic is due to the vitality of continuing strong relationship with members of society such as friends, distant relatives and neighbors (Pirnia, 2000).

v) Howz Khaneh: This was another type of room which was mostly used in the summer part of the buildings, but not in all houses. It was a room containing a pool inside and sometimes it had rich ornamentations.

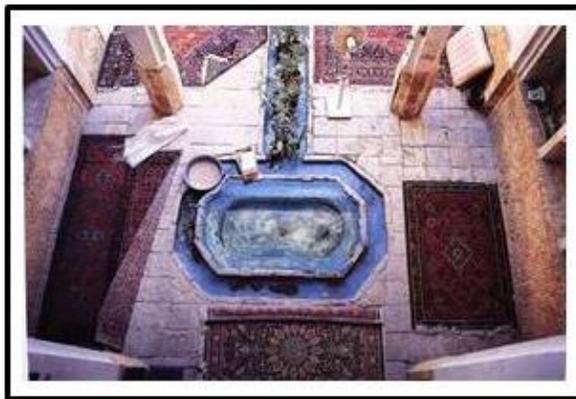


Figure 13. The House of Sajadi in Kashan City (Hajighasemi, 1996)

The second group of the rooms was more private ones and had less importance and benefited from natural light through a hole in the roof. Rooms that were around the yard (Hayat) were in a higher position than the surface of ground and in order to get to them from the courtyard there were corridors leading to the courtyard (Hayat) beside each room (Pirnia, 2000).

Service areas: Another group of spaces in Iranian traditional houses was service area. All service activities such as cooking, cleaning and storage of goods were conducted in these spaces. Service spaces which had got lower design quality than main spaces were in the back of main places (Kateb, 2006). These spaces include:

- Kitchen (Matbakh)
- Toilet (Mostarah) and Bathroom (Hammam)
- Storage (Anbar)

i) Kitchen (Matbakh): It was the part of house for preparing meal and washing dishes. Kitchen (Matbakh) was located in the back of the main body and was usually designed in square or rectangle form (Memarian, 2009).



Figure 14. Kitchen (Matbakh) in Iranian Traditional House (URL 8)

ii) Toilet (Mostarah) and Bathroom (Hammam): Usually, they were designed in lower surface or basement of the house. Bathroom (Hammam) was not a part of the house traditionally but in the last decades it began to be seen in some of the houses. Bathroom (Hamam) included two parts: "one part for changing dress and another one for showering" (Pirnia, 2006 cited in Nosratpour, 2012, p. 2207).

iii) Storage (Anbar): It was another space where different types of tools and necessities such as wheat were kept (Moradchelleh, 2008 cited in Moradcheleh, 2011).

In addition to main parts of the houses, which were discussed above, another noteworthy issue in Iranian traditional houses is the interconnection between the rooms and other

spaces. In Iranian traditional houses there were two accesses to rooms. First, in many small or average-size houses, courtyard (Hayat) was directly connected to rooms without any intermediate space. In another approach which is more common, a corridor (Dalan) was built between rooms. This approach was suitable for rooms which were higher than the surface of courtyard (Hayat). The users could get access to corridor (Dalan) through a few steps and then into the neighbor rooms via corridor (Dalan) (Pirnia, 1995).

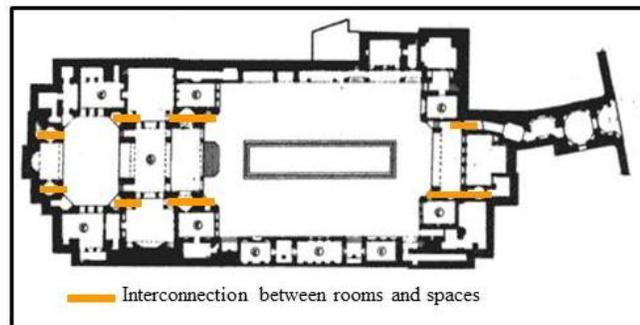


Figure 15. Corridors Connecting the Rooms and Courtyard in Boroujerdiha House

Each house had a section suitable to live in summer season (the direction of the summer section was towards the north) (Pirnia, 2006). Nosratpour (2012) states that in summer quarter, decorative elements and various types of plaster and tile works made this part of the building more elegant. There was generally a section for accommodation in cold season or winter too. (The direction of the winter section was toward south for absorbing maximum sunlight _"Aftab-gir" (Pirnia, 2006) (Figure 16). Most of Iranian traditional houses had been designed in a way that winter section (Zemestan-Neshin) was located in north section in order to benefit from sun in winter, and summer section (Tabestan-Neshin) was situated in front of it. There was generally a large porch (Eivan) or hall in the center of summer section (Tabestan-Neshin) and there was a five doors room (Panj-dari) or seven doors room (Haft-dari) in the middle of winter section (Zemestan-Neshin) part. In most small and medium size houses, users used all spaces in every season owing

to shortage of space and low number of rooms (Pirnia, 1995). Below figure shows summer part "Tabestan-Neshin" and winter part "Zemestan-Neshin" of Boroujerdiha house.

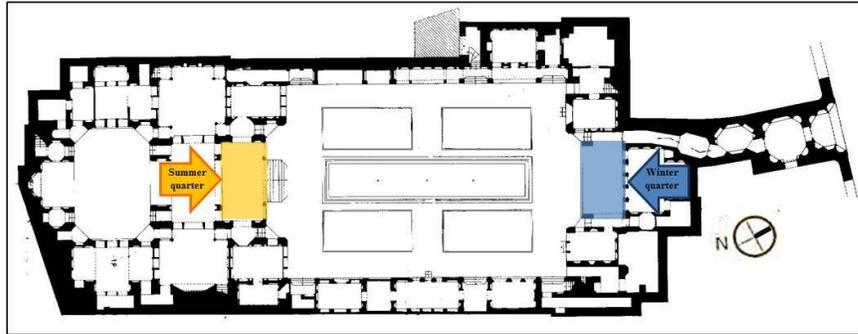


Figure 16. The plan of Boroujerdiha House in Kashan (Nosratpour, 2012)

Decoration in Traditional Iranian Space: Most of the Iranian traditional buildings were decorated in many various ways such as painting on plaster, painting on wood, mirror work, Karbandi or Rasmibandi and Yazdibandi which were specific decorations of ceiling and were elegant and miniature arches within greater arch (Hamzehlo, 2005). Karbandi or Rasmibandi and Yazdibandi were the most important decorations mostly used in halls (Talar) because of their high ceiling and in the longer rooms such as five doors room (Panj-dari) and seven doors room (Haft-dari).

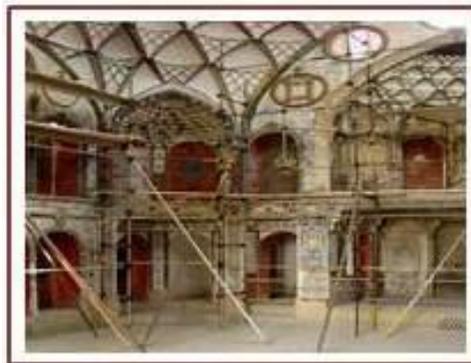


Figure 18. Broujerdiha's hall (Talar) in Kashan. Photo by: Roham Sheikholeslami (URL 9)

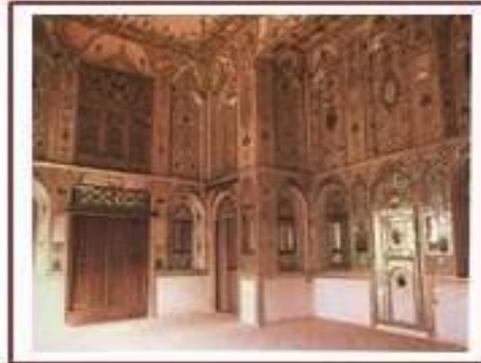


Figure 17. Hall (Talar) ornamented with mirror work in Iranian traditional house. Photo by: Negar Kiani (URL 10)

Karbandi is a set of diagonal arch beams that cross each other and their intersection (joint point) is used in order to create the ceiling (Figure 19). Yazdibandi is another type of decoration in the traditional building which uses the same formula as Karbandi but different in design of the details. In principle, Yazdibandi was the subset of Karbandi (Pirnia, 2005) (Figure 20).



Figure 19. The Ceiling in Ahmad Khan (Pirnia) House Has a Good Example of Twelve Karbandi (URL 11)



Figure 20. Yazdibandi Decoration in Boroujerdiha house. Photo by: Roham Sheikholeslami (URL 12)

The variety of parts and their special organization in these houses is a result of culture and lifestyle of Iranians, in the following part some important issues related to Iranian culture will be discussed.

2.2.1 Role of Iranian Family and Social Structure on Formation of Iranian House

A definition for the culture of a country is the identification of people of that country. As a result, Iranian culture which is chiefly formed by Islamic religion has a direct bearing on Iranians' lifestyles and attitudes (Asadi & Tahir, 2012).

According to Rapoport (1995), culture in the first place preserves the identity of a group, of the human beings. Secondly by transferring information, that navigates the creation of behavior and artifacts; is a control mechanism.

According to aforementioned statements, it can be concluded that the main factor forming the traditional Iranian house is culture. Tavassoli (1998) states that in Iran traditional house was divided to several parts and family members of extended family lived in diverse sections. He also mentioned that extended family was the traditional form of Iranian families with a great number of members (Tavassoli, 1998). Similar to other Middle East families, in Iranian traditional society, the regular family type was patriarchal extended family; basically comprised by parents and kids and grandchildren.

Moreover, Mirmoghtadaee (2009) points to extended family as the predominant form of Iranian families which were made up of three generations and lived together. After the marriage of a son, they tried to make a separate place for his family in the house. Therefore, it can be said that the house was similar to a living organism which was able to grow and adjust to new conditions (Mirmoghtadaee, 2009).

In Iran, in traditional families, father was responsible for working out and mother worked inside the house in order to take care of kids, do tailoring, clean the house, do washing of the clothes and dishes, cook, produce handicrafts such as carpets and prepare their daughters as prospect housewives. It shows that women had a significant role in household economic activities (Safari 1992, Soltanzadeh 2005).

In popular culture of Iran, guests are perfectly welcomed in people's houses. So, guests have great importance to Iranians, as they are often called dearer than life "Aziztar-Az-Jaan". The most prominent features of social life are family gatherings and hospitality. Hospitality plays an important role in both conducting different rituals and entertaining in a safe mode.

Iranian families intended to enhance the communication between society members in practice; they tried to visit each other at their homes. Based on religious beliefs, to welcome guests is a sacred action due to the fact that Allah (God) loves guests. Thus, esteeming guests is a conventional expression among Iranians. Then, guests should be accommodated in the best section of room which is the upside of room (Balaye otagh) although they deny because of humility. Upside of the room was located in the further place from the entrance.

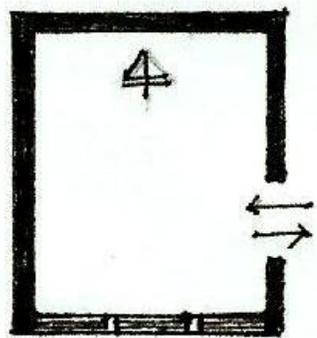


Figure 21. Diagram Showing Upper Part of the Room

Family members were trying to live together. Not only family members benefited from each other in this way, but also it generated relief, assistance, love, compassion, confidence kindness and mercy. It was prevalent in Iranian traditional families that the members lived together and when one of them got married, he was able to live with his family in the same place. After marriage, sons stayed with their families but daughters

went to their husbands' houses. If spaces of house were adequate for the young couple they could live there, otherwise they were required to build new rooms in that house. As a consequence, this tradition had contributed to sorting out each other's problems at home (Vakili Ardabili & Boussabaine, 2006).

Meaning of privacy is directly related to the culture of a country. At home it can be defined as the control of relation of residents of a house and administering the relation of the outside with users who are living in the house (Gazze, 2009 cited in Eskandari, 2011).

Privacy is the main factor which affects architecture of housing. Culture and religion are two challenging subjects in architecture of Iran that have concerned the users (Tahir M & Shabani & Arjmandi, 2010). In this respect Nosratpour (2012) also explains that culture had significant effects on the formation of traditional Iranian houses.

In Iran, relationship between men and women was defined as "Mahram" and "Non-Mahram". The relationship between men and women via close blood bond or marriage is defined as Mahram and the other people outside of these relationships are expressed as Non-Mahram (Shabani et al, 2011). This kind of relation forced females not to work out of the house and focus on home activities.

In traditional houses, division of the house has been organized to create privacy by arrangement of the open and closed spaces. Traditional Iranian house was divided into three areas:

- Public area
- In-between spaces or Semi-private (semi-public) area
- Private area (Tahir& Shabani & Arjmandi, 2010) (Figure 22).

Public area: These spaces were often for gathering of guests which were designed to be close to the entrance door.

In-between spaces or Semi-private (semi-public area): These spaces were for family gatherings and close relatives. These spaces were very suitable for patriarchal families where all the close relatives lived together in one house. These patriarchal houses had a wide range of variety in spaces with lots of functions (Pirnia, 2000). Father, mother, children and the brides lived together and they shared one kitchen and part of the house like living room. In each part of the house a small family lived, these houses were like an apartment complex and one single family couldn't use whole of it easily (Pirnia, 2000).

Private area: This area used as more individual place and for family gatherings included all of the privacy boundaries that were needed to create an individual place (Tahir & Shabani & Arjmandi, 2010). For example three doors room (Seh-dari) was mostly the sleeping and living room of the house and was used as private room.

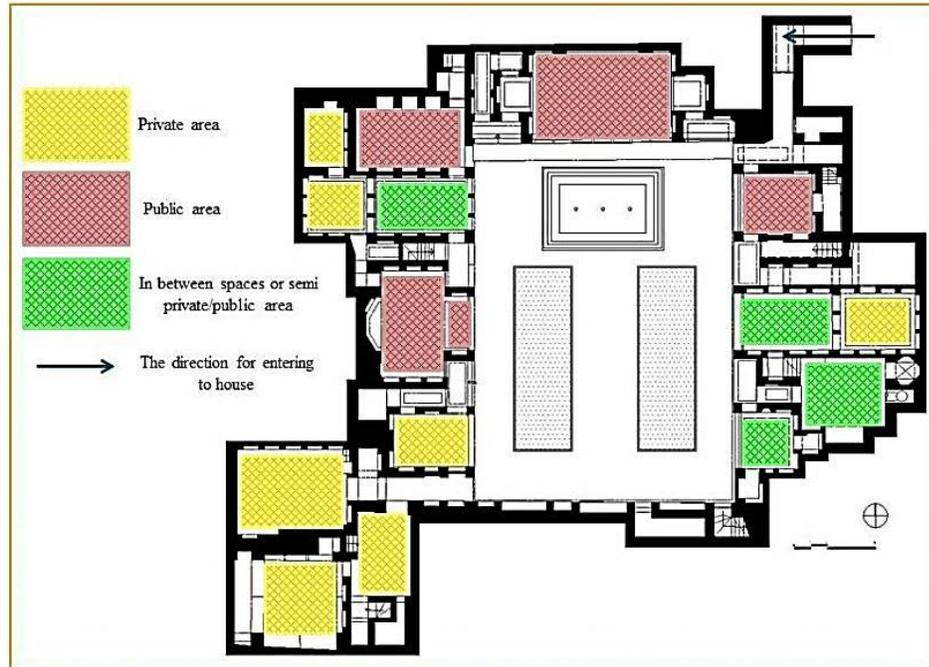


Figure 22. The Plan of Khoshnevis House in Isfahan City

The possible access to various parts of the house and level of privacy are in relation with each other.

2.3 Modularity in Iranian Traditional House

Vakili Ardabili & Boussabaine (2006) believe that taking advantage of geometry in design is one of the key features of Persian architecture. Geometrical regulations of design help professionals to have better understanding of aesthetic, size and ratio. Moreover, it helps them in structure of the building, considering the forces which deal with each other during the construction of the building. By means of modules and geometry in Iranian architecture, the structural issues were resolved in an adequate manner (Vakili Ardabili & Boussabaine, 2006). Undoubtedly; geometry is the language of architecture all over the world and plays an essential role in Iranian architecture as well. Architects repeated and used this system in different parts of the buildings, in a

way that the buildings could afford both resistant and aesthetic. So, they created unique buildings different from each other, although they were built based on similar modules, every building was unique (Pirnia, 2006).

"Though the same module was used, each building had its own characteristics. In fact, while or before thinking about creation a piece of work, the Iranian architect used to find its coating. The coating needs some elements, such as opening, volume, weight and structure to transfer its force to the ground. The coating force determined the size and thickness of those elements moreover; module was used to sort them out" (Omranipour, 2005, P. 28).

Iranian traditional houses encompass different parts to meet the needs of their inhabitants. In order to be sufficient in terms of size of spaces, design patterns were formed accordingly. Generally, dimensions of the spaces and openings were designed based on modules. Modular system in traditional architecture was a tool which guided architects to create proportional and harmonious buildings. The modular system, which is used in Iranian traditional architecture, works in a special manner. This architecture had incepted a unit of measurement and some appropriate sizes for openings, doors and walls which titled as "Peymoon". In Iranian architecture, module was the tool for adjusting dimensions. Asadi (2009) defines Peymoon as "the basic unit of measurement in Iranian buildings" (p: 5). this modular system was diverse, flexible and compatible with human dimensions (Asadi, 2009, Pirnia 2005, Shayan & Gharipour, 2005).

On the other hand, the design of traditional buildings in general was based on patterns, and these patterns and their fundamental elements were created based on specific dimensions. Accordingly in order to understand the modular system, in the following parts first the ways of sorting the patterns are demonstrated, then the dimensions of module are described. Although the focus of this study is not on modular system in

Iranian architecture, but as the module is a fundamental factor in the layout design of Iranian traditional buildings, it is essential to discuss it more broadly.

The usage of module or pattern is not limited to Iranian architecture and has been seen and used in many other countries as well. For example modules such as "Tatami" in Japanese architecture enabled prefabrication of architectural elements. A Tatami is a kind of mat used in traditional Japanese-style rooms as a flooring material and its size differs between regions in Japan. Generally the size of Tatami is 91cm by 182 cm. According to Tazaki (2012) "Tatami is made in standard sizes, with the length exactly twice the width, an aspect ratio of 2:1. Usually, on the long sides, they have edging (Heri) of brocade or plain cloth, although some tatami have no edging" (Tazaki, 2012, p: 89). On the other hand, as Parsi states (2012) "Iranian patterned architecture is a language of architecture allowing architects to construct meaningful sentences once the grammar for that language is learnt" (p. 70). Therefore modular system in Iranian traditional architecture has affected the layout system and divisions of these patterns were made based on certain rules.

Parsi (2012) claims that there were six patterns used in Iranian Architecture: binary division (that is used rarely), ternary division, pentamorous division, Shekam-darideh, Chalipa (rood, cross) and finally "Hashti" (Parsi, 2012). According to Parsi (2012) "in the hierarchical system of patterns, the space with highest value was placed on the main axis and other patterns with lower levels of priority were placed symmetrically on both sides mediated by spaces spanning one or two modules" (p: 70). These patterns are

mainly based on rectangles and squares which are briefly explained in the following part.

The most basic shape in Iranian pattern language is a square with three modules in its each side which is called "ternary division". All other patterns for spaces come into existence through the evolution and change of this ternary division. The other pattern is "binary division" that is called two-door room (Do-dari). By excluding one unit from the base pattern, ternary division, the binary division is created (Parsi, 2012). There is also another pattern which is called "pentamerous division". This pattern consists of a rectangle with the width of five modules. Five door room (Panj-dari) is one of the types of pentamerous division pattern. In other words, two modules are added to the basic pattern and create the new pattern (Parsi, 2012).

"Shekam-darideh" is another pattern used which is a rectangle with the width of five modules which one module from each side of one of its long edges has been retreated from inside. These two created corners are not the problems of this space rather they are taken as the reason of this formation. If the indentation is located towards the courtyard (Hayat), these two spaces can be the entrance to the room and if these spaces are located in the opposite side, the outcome can an appropriate place to locate the wind-catcher (Badgir) or a small room that is called "Pastoo", and was used as a closet (Figure 23) (Parsi, 2012).

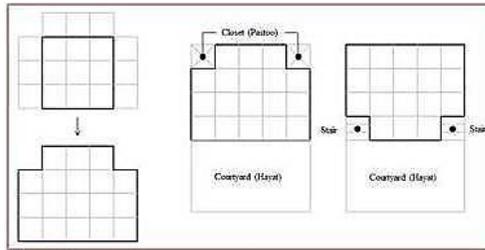


Figure 23. The Relation of Shekam-darideh with Courtyard (Hayat) and the Process of Converting Pentamerous Division to Shekam-darideh (Parsi, 2012)

In the following figure plan of Mavaddat house in Yazd is shown. It was constructed during the Safavid dynasty. "Shekam-darideh" pattern in this house is facing to the courtyard. Two staircases are designed in both sides of the room as entrances.

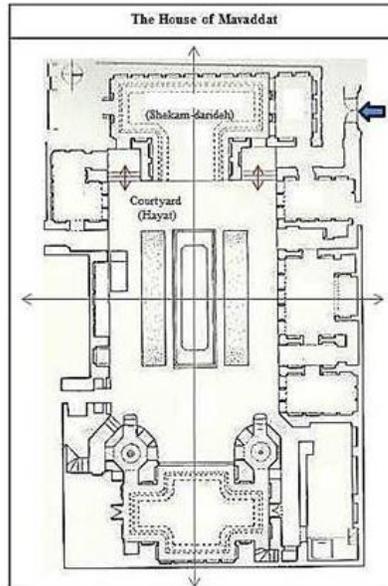


Figure 24. The Relation of Shekam-darideh room with Courtyard (Hayat) in Mavaddat House (Ghazbanpour 2001)

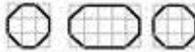
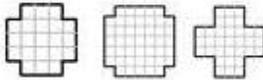
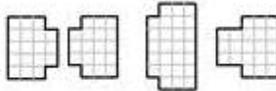
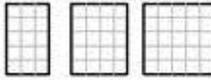
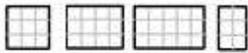
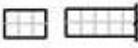
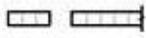
All the features that led to creation of Shekam-darideh pattern, at the same time could lead to creation of a more perfect space, which is named Chalipa (rood).

The last pattern which is vestibule (Hashti) has two different meanings according to Parsi (2012); one of the meanings of vestibule (Hashti) is related to the shape of this pattern. Vestibule (Hashti) in Iranian language, Farsi, refers to octagon. A square which

is divided to nine smaller equal squares with beveled corners is called "Hashti". This pattern is used for entrance spaces. On the other hand, vestibule (Hashti) can be the name of a space that is after the entrance door as a divider space. It can be in square or rectangle form too but since most of these spaces have octagonal shape, a space with this function is also called "Hashti" (means related to eight) (Parsi, 2012).

The following table shows the different patterns for spaces used in Iranian traditional houses (Table 1).

Table 1. Different Types of Modules in Iranian Traditional Spaces (Parsi, 2012)

Vestibule (Hashti)	
Chalipa	
Shekam-darideh	
Pentamorous divisions	
Ternary divisions	
Binary divisions like (Takhtgah)	
Corridor (Dalan)	

Moreover, the rules for allocation and hierarchy of patterns are important as well. The main axis of the courtyard (Hayat) is used for allocation of the main spaces, the

subsidiary axis is used for a group of spaces with equal level of importance or spaces with less priorities. This is important to know which patterns are used in construction of different sections of a house. As an example, Parsi (2012) says if Chalipa pattern (rood) is used for the most important space, all other patterns can be used for other spaces (Figure 25) (Parsi, 2012).

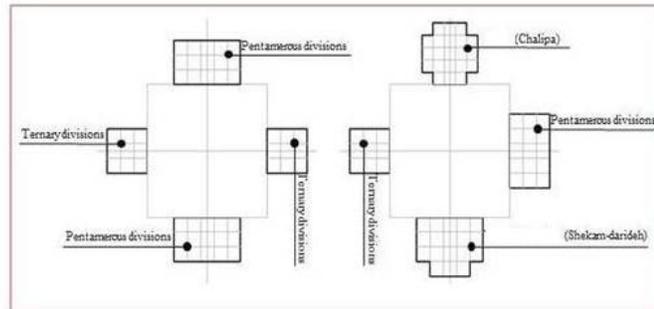


Figure 25. A Location of Spaces around of the Courtyard (Parsi, 2012)

The other issue is the location of patterns on sides of the courtyard (Hayat). Parsi (2012) noted that each spatial pattern that is located based on aforesaid discipline on the axis of that side should have patterns with equal or lower order in its both sides. But, the equal order is common only in ternary division; and three cross patterns or three "Shekarn-darideh" patterns cannot be placed next to each other in one side.

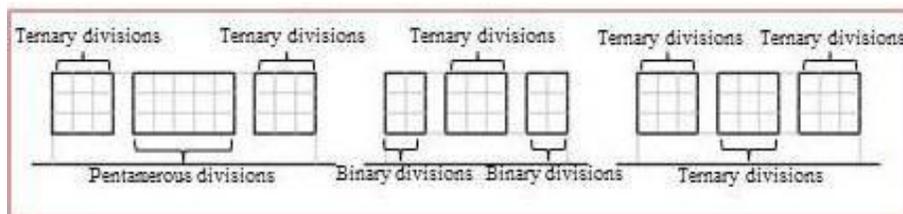


Figure 26. A Location of Patterns in One Side of the Courtyard (Hayat) (Parsi, 2012)

"Connecting spaces" (corridors) are usually created by spaces with the width of one module, but sometimes there are corridors created by two modules which are called "Takhtgah". As Parsi (2012) explains, the best locations for connective spaces are the

corners or the places between central spaces. In some cases two spaces are linked to each other without any connective space, which are called "Tou-dar-Tou" and the rooms are linked to each other through middle doors (Figure 27) (Parsi, 2012).

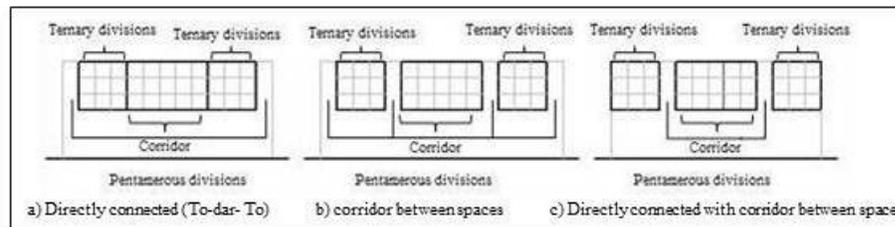


Figure 27. The Connection Spaces (Parsi, 2012)

As is seen in figure 28, when the "Shekam-darideh" and rood room (Chalipa) are located on the plan's main axis, the pentamerous division is used in the opposite side. As it was said, the main axis of the house cannot be used for connective spaces (Corridor). In this plan there are two ternary divisions situated on both sides of the pentamerous division in the secondary axis and two corridors are used between them to connect these spaces.

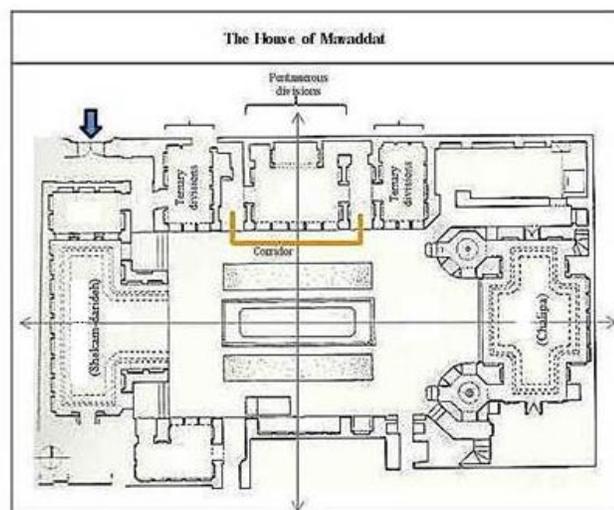


Figure 28. A Location of Various Patterns around of the Courtyard (Hayat) in Mavaddat House

In layout of the houses with more than one courtyard, the method of design for the second courtyard was similar to method of design for the first one, however, the location

of the axis should be considered accordingly. There are three models for locating the axis, shown in figure 33. According to Parsi (2012) the best layout was to use one axis for both courtyards. The second layout used was that the main axis of the second courtyard (smaller courtyard) was equivalent to the subsidiary axis of the first courtyard (bigger courtyard) and the third layout is that the main axis of first courtyard is parallel to the main axis of second courtyard (Parsi, 2012).

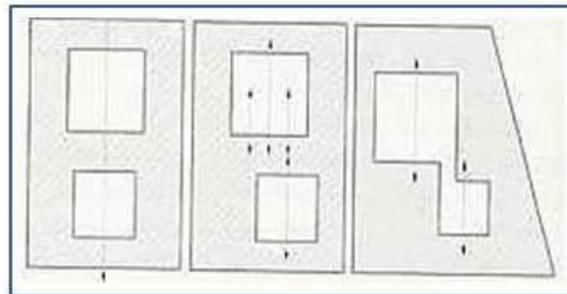


Figure 29. Three Models for Design of Houses That Had More than One Courtyard (Parsi, 2012)

Also there are different dimensions used in modular system in Iranian traditional architecture. The previous parts where about patterns in this architecture, but what were the dimensions used in this system? The coming section includes an investigation about this important issue.

Proportions and sizes play important role in Iranian architecture. Therefore, use of Peymoon is considered as an important principle in Iranian architecture (Vakili Ardabili, 1993). In the process of making a building, the close relation of module (Peymoon), geometry, having structural rigidity (Niyarehsh), and needs of the users play an important role (Bemanian, 2002). These factors end to reasonable dimensions and sizes for the architectural spaces.

The aforementioned pattern categories were used in order to create different spaces in Iranian traditional houses. As it is shown in figure 30 various patterns have been applied to create the plan of Tabatabaei house. This house is a good example for variety of patterns used in one plan.

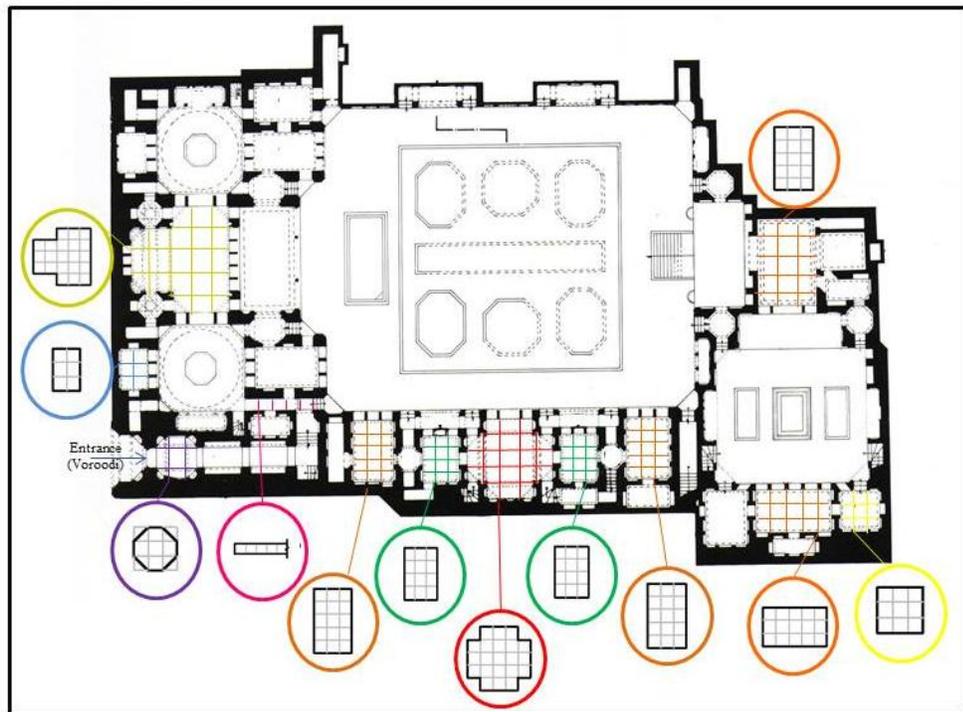


Figure 30 .Various patters used in layout of different spaces of Tabatabaei house in Kashan

As was mentioned in the structure of Iranian traditional architecture, the most basic module is a square. The smallest unit of architectural structure in Iranian houses is a brick with the dimensions between 20 to 25 centimeters. Different combination of these bricks determined the size of windows and doors openings, for instance five bricks coming together made a dimension between 100 to 125 centimeters to be used for openings as window or door. Pirnia (2005) stated that, Peymoon is adjusted by width of door, or a part of the wall which supported a window or a door with the width of 100 to

130 centimeters. The investigation about module (Peymoon) in historical Iranian buildings shows that the number of module is varied between 90 to 140 centimeters and mostly is used around 110 centimeters (Parsi, 2012).

In an additional attachment to Kiani's book "Iranian Architecture", there is a lecture by Abolghasemi which states that in traditional Iranian architecture three types of modules are utilized:

- Large module
- Small module
- Sub module (Kiani, 2000) (Figure 31).

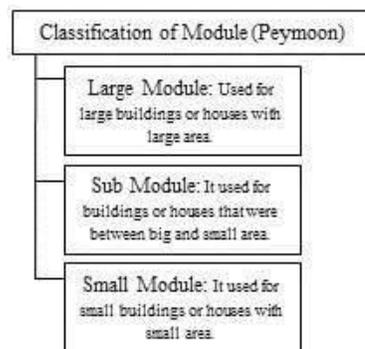


Figure 31. Classification of Module (Peymoon) in Traditional Iranian Architecture

In order to be able to classify different types of modules or patterns it is essential to give information about the dimension units and measurement systems in Iranian traditional architecture. Since the scale of measurement in Iran was different in the past, all dimensions were based on scale named "Gaz"; and there were also other scales that were all based on "Gaz", called "Nim Gaz", "Charak", "Gereh" and "Bahr". "Gaz" was equal to 1.0666 meter and it was divided to sixteen Gereh. Moreover half Gaz which was called Nim-Gaz was equivalent to 53.33 centimeters. In addition, "Charak" was equal to

four Gereh and was 26.66 centimeters. Gereh was about 6.66 centimeters and divided into two Bahr (3.33 centimeters), which are extensively used in architecture (Kiani, 2000). The following table explains the dimensions of different interior elements width and height of rooms in Iranian traditional houses (Table 2). The dimensions of these elements which are available in table 2 have been extracted from various references that were in the unit of 'Gaz', 'Nim-gaz' and 'Gereh'. The aforesaid numbers have been converted to Gereh and again they have been converted from Gereh to centimeter.

Table 2. Dimensions in Small and Big Module (Base on Kiani, 2000 & Pirnia, 2006)

Elements and Components	Small Module (Peymoon)		Big Module (Peymoon)	
	Dimensions in Gereh	Dimensions in Cm	Dimensions in Gereh	Dimensions in Cm
Width of a door	14	93	18	120
Width of wall	9	60	11	73
Height of a door	28	187	30	200
Width of two doors room (Do-Dari)	32	213	44	293
Width of three doors room (Seh-Dari)	48	320	66	440
Width of five doors room (Panj-Dari)	80	533	110	733

Peymoon is an effective factor in design and construction of Iranian traditional architecture, as it is clearly observable in all parts of buildings. It was a tool for architects to control the simultaneity of design and construction and a good way of proving accurateness of the building. Therefore it is possible to find Peymoon in numerous Iranian traditional buildings, such as perfectly designed traditional houses.

The order of implementation in Iranian architecture was in a way that architect started the construction after receiving the approval by the owner. The design and construction by the use of Peymoon are visible in the whole components of the building. Not only the design and construction which were simultaneous, but also the accuracy of building was under the control of the architect. They avoided similarity and uniformity due to different solutions for different climates or availability of material.

The use of pattern and Peymoon in building led to a different and special way of designing and constructing the Iranian house. This way of designing the house was a completely different approach when compared with the contemporary one, as Iranian traditional houses were not designed based on functions as we have today (bedroom, living room, etc.) It is believed that this approach to design of the residential spaces is directly related to the fact that Iranians used to sit on the ground and there was no furniture in the houses, hence, the spaces were not limited in term of functions. Modular system in Iranian traditional houses is in direct relation with the Iranian lifestyle and sitting habits. Spaces were multifunctional and this gave opportunity to adapt the spaces to the needs of the family. These issues and the relationship of sitting on the ground and organization of the houses are going to be discussed in detail in the next chapter.

Chapter 3

THE ROLE OF SITTING ON THE GROUND IN IRANIAN TRADITIONAL HOUSES

In Iranian traditional spaces like other Middle East and some other Eastern countries, people used to spend a lot of time sitting on the ground and leaning to the wall. In Iran's traditional way of using the space, some blankets and some pillows were placed around the room, and they did their everyday routines such as sitting, sleeping, eating on the ground surface with shoes taken off outside the room. According to Kateb (2006) the routine formation and living on the surface of ground may have been originated from the Nomadic culture.



Figure 32. Sketch of a Person Sitting on the Blanket and Leaning to the Wall

According to Mahdavi claimed in 2007:

"Qajar society was a pluralistic hierarchical society in which different groups with different social statuses existed. It was also a society in which the kinship system was strong, the extended family system operated, and kin groups encompassed individuals from different categories, bypassing social status and economic standing"(Mahdavi, 2007, p. 483).

Naseredin-Shah, the Qajar king was the person who began to travel to the Europe regularly and his connections to Western countries led to importing their cultural features and lifestyle. Hence, furniture entered to Iranian palaces as part of lifestyle transformations ending to changes in sitting habits. Here it is noteworthy to give a brief background about the history of using furniture in Iran. According to Ghaeini (2006) & Esfandiari, (1997) in the beginning, Western furniture entered to the mansions and houses of nobbles and the people who were close to the royal family, afterwards other levels of the society started using furniture in their houses, following the upper classes. At first, furniture was used in the existing houses which were not designed to be furnished with furniture since the evolution of house design according to the new life style was a slower process.



Figure 33. Naseredin Shah Sitting on the Chair (URL 13)

It is assumed that sitting on the ground was the most important sitting position in Iranian lifestyle. Therefore here the most important concern is to investigate the possibility of effectiveness of sitting on the ground in spatial organization of Iranian traditional houses. In this chapter, the effects of sitting on the ground in Iranian traditional spaces; its possible effects on organization of spaces, interior elements and their position in residential buildings will be discussed.

3.1 Sitting on the Ground in Iranian traditional Spaces

Evidently as proves for sitting on the ground in Iranian culture, there exist some documents such as painting (miniatures) and carvings in some cities of Iran. As it is shown in the pictures below, Iranians were sitting on the ground while doing different activities; no matter in which social class they were. They could sit on the ground while playing musical instruments as it is shown in figure 34, or as it is shown in figure 35 even grandees could sit in this position. Figure 36 is the statue known as Hercules, although it was an imaginary figure of a Greek God, Iranians made it as a human figure sitting on the ground. The famous traditional Iranian paintings known as "miniature" also depicted people within stories, as sitting on the ground (Figure 37).

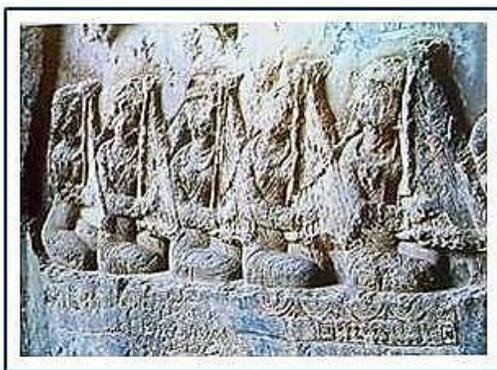


Figure 35. Women are Sitting on the Ground and Playing Harp. Stone carving, "Taq-e Bostan". (6th century AD) Kermanshah (URL 15)

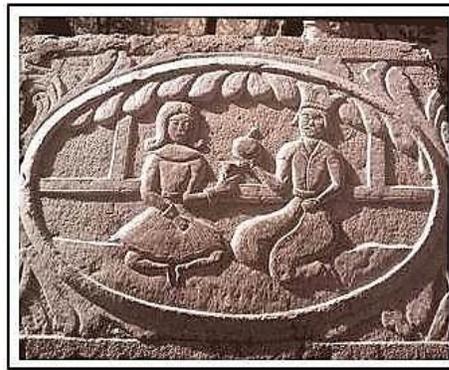


Figure 34. Stone Carving, Ghasre-Shirin, Kermanshah (URL 16)

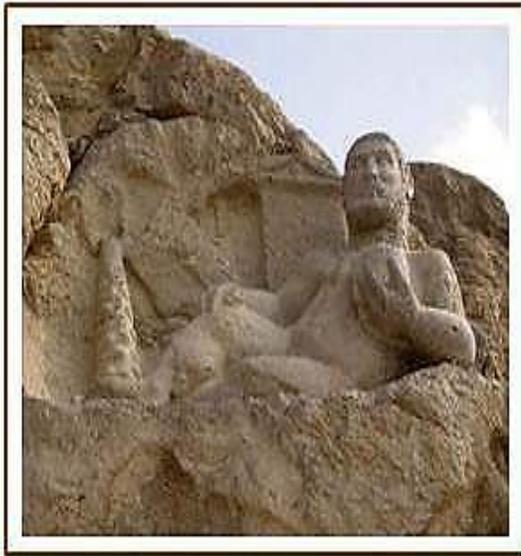


Figure 37. Mount Bistoun (153 B.C.) Iran, Kermanshah. Photo by: Nicola Pina, 2008 (URL 17)

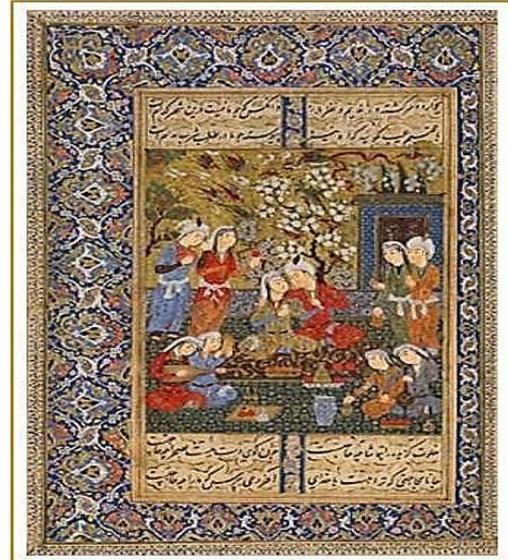


Figure 36. Ancient miniature painting. Persian Prince and Princess Feasting (URL 18)

Moreover, since the activities of inhabitants inside the houses occurred in different rooms, these spaces had diverse functions in Iranian dwellings; the daily meals and the other routine activities took place on the ground. One of the elements that was and still is used in the interior spaces in Iran is carpet which has important functional roles. Carpet in Iranian culture has had a special place from past until now. Carpet was also a decorative element in the Iranian houses. According to Naghizadeh (2011) "The layers of surface decoration are increased and the complexity of visual effects enriched by the use of carpets and cushions which often reflect the same decorative schemes as those found on walls and ceilings" (Naghizadeh, 2011).

The word carpet is used for anything which is spread on the ground (Daneshgar, 1998). Carpet is the most common and useful furnishing which is spread on the floor; all of the Iranian people use it in their houses. Beside the aesthetic and decorative role of this

handicraft (carpet), it also has important functional roles in the daily life, everyday activities such as sitting, sleeping and eating, are done on the ground, and of course the ground is covered by carpet. Therefore it is clear that the types of objects utilized in the room were suitable for sitting on the ground, which itself had different types of arrangements. According to Mahdavi (2012) "carpets were the only items of decoration. It was not customary to cover the floor with a full sized carpet. The sides of the rooms were bordered with runners; the upper part of the room was covered with a head carpet and the middle with another carpet" (p. 361) (Figure 38).

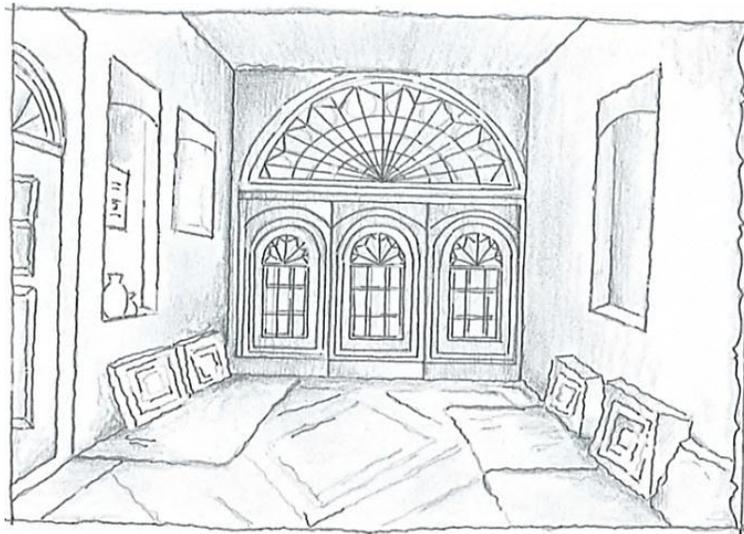


Figure 38. The Interior Design of a Traditional Room

Sitting arrangement in Iranian traditional spaces can be divided in two kinds:

- Peripheral
- Central

Room is a place for gatherings and resting in Iranian traditional house. Typical rooms in Iranian traditional house could contain stuffs such as pillows, blankets, carpets, Korsi (a special arrangement for heating) and so on; and the floor was covered with carpet. In one manner, the blankets were spread around the room on the ground and pillows were

allocated on them, so that the users could sit comfortably and lean to the wall. This arrangement in sitting on the ground around the room can be named as peripheral arrangement (Figure 39). In many of the houses; it is possible to recognize the peripheral arrangement from the decoration on the walls. For instance, the upper parts of the walls were decorated by painting and stucco, while lower parts of the walls were plain and no decorations on these parts of the walls were applied, which were used for leaning; and this can be an evidence for arrangement of space for the purpose of sitting on the ground.

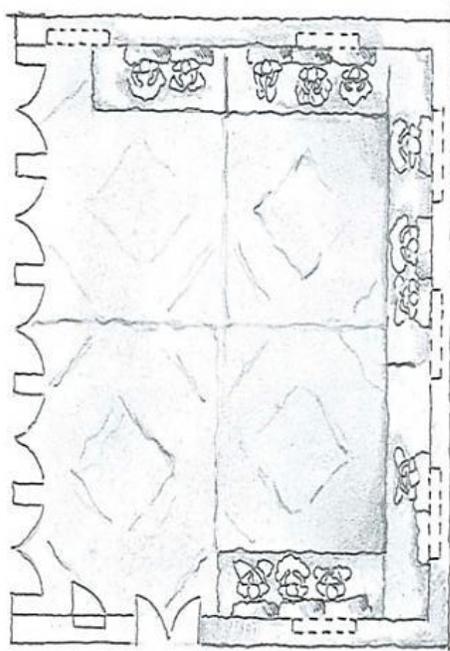


Figure 39. Schematic Sketch of an Iranian Traditional Room

About the peripheral organization it is worthy to mention that it was not only seen as an Iranian attitude. Other examples for this arrangement can be found in Yemeni and Turkish houses and some other Middle Eastern and Far Eastern countries. For example in Yemen, the furniture used in the houses are not much; similar to Iranian examples, there are blankets or mattresses placed around the rooms with cushions on them, but put

aside during the daytime. Also the floors are covered with mattresses woven by palm leaf and goat hair carpets (URL 19).

Another example can be houses in Turkey. In Turkish traditional houses, there was peripheral organization like Iranian houses; while they sat on a sitting unit called "Sedir" that was allocated all around the room as a built furniture (Figure 40).



Figure 40. Traditional Turkish House Interiors (Ayalp a, 2011)

"The sedir is the main sitting unit in the room. Mostly these units are located under windows. They continuously surround the room and are elevated from the ground. The ground cover is also an important element in the interior environment. The importance is derived from its function. Most of the functions take place on the ground" (Mazuli, 2010 cited in Ayalp & Bozdayi, 2012)

In the design of rooms in Turkish traditional houses, different from Iranian rooms, windows could be placed on more than one side of the room. Sedir was designed in a way that their edges were exactly under the edges of the windows. So, they could put their elbows on the edges of Sedir and turn their body to see outside the room easier (Ayalp a, 2011).

The other type of arrangement for sitting on the ground was central arrangement; and it was mostly used for sitting while eating. As explained above, generally sitting had peripheral arrangement but for eating, Iranians used to gather on the ground and place "Sofreh" (a cover similar to table clothes) on the ground in center of the room and eat their meal together. Figure 41 shows plan of a traditional room with occupants around "Sofreh", which shows central organization. It was common that they put the meals on the Sofreh and everybody ate his/her meal in their own plates. Sofreh was generally narrow and long so that the meal could be available for everyone easily.

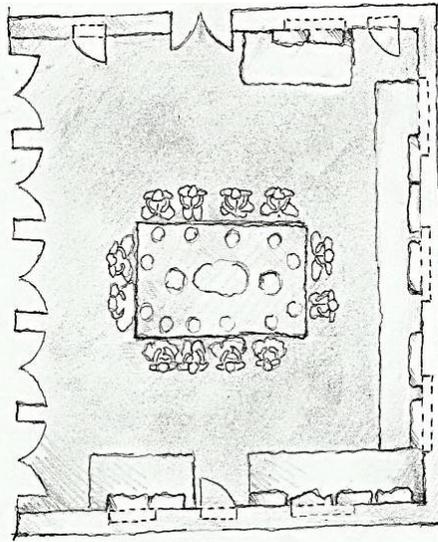


Figure 41. Schematic Sketch of Eating Around Sofreh in Iranian Traditional Room

As it is shown in figure 42 still sometimes the families prefer to eat dinner or lunch on the ground around Sofreh in their gatherings, although they have dining table. This fact shows that old habits are still popular in contemporary era.



Figure 42. The Traditional Model of Eating in Iran (Shabani et al, 2011)

Among other examples for central arrangement of sitting while eating on the ground from Middle Eastern and Far Eastern countries is Kuwait, that the members of a family sat on the ground and ate food together with this difference that they ate meal in a shared plate as it can be seen in the figure 48. Therefore, the reception hall and living area were utilized for dining by covering with woven pieces and carpets (Hajeej, 2007).



Figure 43. Eating Organization in Kuwait (Hajeej, 2007)

Also, Iranians had gatherings on the ground in center of the room around a small and low table, which was covered with matters, quilt or blanket, called "Korsi" and was used for heating the room in winter. There was usually a pit or container full of coal under the table and family members were sleeping around it and also they used to sit around the Korsi and talk with each other while putting their feet under the table to get warm (Figure 44).



Figure 44. Korsi Was Used for Heating the Room in Winter (URL 19)

Sleeping was another activity which took place on the ground. It is notable that bedding in Iranian traditional spaces included mattress or quilt that was laid on the ground, and when bedding was not needed, it was folded and put into the closet (Pastoo) or against a wall. So that the inhabitants could use all the facilities inside the rooms in day and night time.

3.2 Impacts of Sitting on the Ground on Organization of Spaces

As it was described formerly in detail, the fundamental factor for creating space in Iranian traditional houses is modular system. Therefore spaces in Iranian traditional houses were constructed based on patterns. Since spatial organization of these houses was based on the patterns in addition to cultural factors, using the same patterns in these houses created similar proportional orders. Therefore it is possible to claim that Iranian traditional houses consist of multi-functional spaces; and this assertion can be proved by many features found in Iranian houses. As Iranians used to sit on the ground they did not have any furniture in their spaces and these spaces did not belong to specific functions; this issue led to multi-functionality of the rooms.



Figure 45. Daily Activities in Traditional Residential Spaces (Hatami, 2011)

In Iranian traditional spaces, the room is the primary unit that contains various functions. Diversity and multi-functionality are the main features of these houses which are in harmony with daily routine of people. The rooms were multi-functional and they were used for more than one purpose, so, they were not named based on their functions, but were named according to their pattern such as five door rooms (Panj-dari) and three door rooms (Seh-dari). This approach of naming rooms was different from the western countries' or contemporary approaches. They named the rooms of their houses by considering their functions such as bedroom, dining room, living room etc. In Iran for example "Seh-dari" rooms were mostly used for all the personal and daily activities or "Panj-dari" rooms were used for welcoming friends and the gathering around table linen (Sofreh) for eating breakfast, lunch and dinner but when necessary they could hold other functions such as sleeping. In Iranian culture, rooms with minimum furniture had multifunctional usages and carpets were used to compensate the shortage of furniture.

It is worthy to mention about the design of the carpet and its similarities to arrangements of sitting on the ground. As it is shown in figure 48, carpets generally are designed according to a layout, which includes a central medallion and edge borders. These two

factors are fundamental in most of the carpets; and it can create background for sitting on the ground. Because the carpet is used to cover the ground and it can give a sort of visual division on the surface that is suitable for sitting.

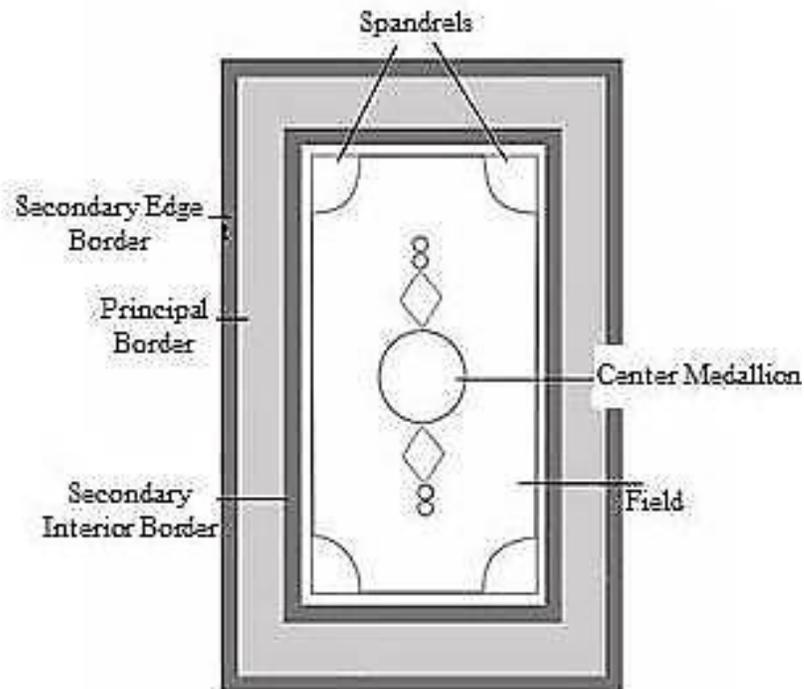


Figure 46. Schematic Shape of a Carpet (URL 20)

As it was mentioned in previous chapter, Iranian traditional houses generally had two separate parts for summer and winter. Because they did not use furniture in these two parts, it was easy to move from one part to the other. The inhabitants only moved their carpets (if necessary) and some bedding staff from winter quarter part "Zemestan-Neshin" to summer quarter part "Tabestan-Neshin" when they had to change their rooms (generally they were not furnished). This is because of the other prominent point and character of flexibility of living spaces that rooms could hold different functions. In fact it is possible to say that a kind of nomadic life existed in Iranian houses by moving between summer and winter quarters. Therefore habit of the sitting on the ground made it possible to move between two parts of the house in different seasons.

A similar approach can be seen in traditional Japanese houses. In Japan, most routine activities were done by sitting on the ground (on the tatami), so when they wanted to change the place they rolled the tatami and carried it to be used in another space.

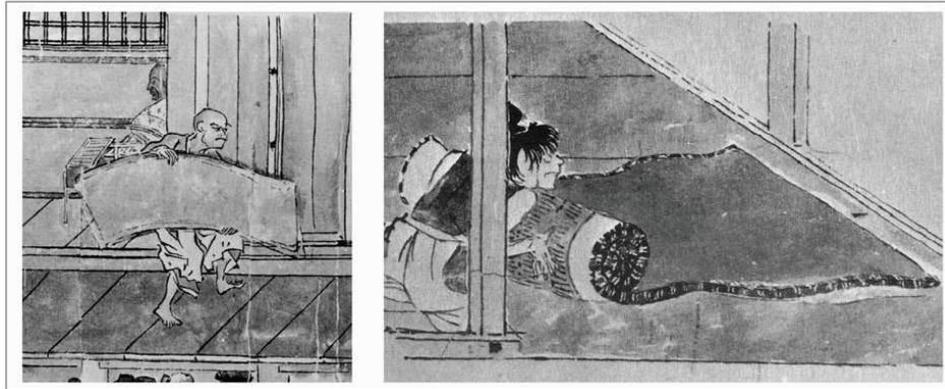


Figure 47. Carrying and Rolling up Tatami (Tazaki, 2012)

As Leupen et al (1997) claim, in the process of facing unpredictable situation, key words are flexibility and changeability. Iranian interior spaces were changing function in family gatherings, ceremonies and special events such as the religious ceremonies, and weddings and funerals. Iranian traditional houses were capable of changing.

On the other hand, in some cases there was no corridor between the rooms and the doors between spaces could be opened when necessary. This linked room was called (Tou-dar-Tou). But generally the flexibility in Iranian traditional houses is not about changeable spaces. Spaces of traditional Iranian houses are the same but inhabitants used those spaces for different purposes. Different from the Iranian houses, flexibility in Japanese houses was in a way that the sliding doors which were between the rooms could be opened and rooms could be joined together (Figure 48) whereas the rooms in Iranian traditional houses were constructed in two ways. Either they could be constructed side by side (Tou-dar-Tou) and could link to each other through middle doors, or they could

be constructed separately with corridors placed between them. The second type was more common.



Figure 48. The Interior Images of Traditional Japanese House (URL 21, 22 & 23)

According to aforementioned discussions about flexible spaces and their capability of being multi-functional; the most important reason of being flexible and also multi-functionality of these spaces was that people have done their daily routines on the ground and they were not using furniture, so all kinds of activities could be done in one space. Various activities were done specially in five-door rooms and three-door rooms. Therefore, this factor led to flexibility in usage of spaces in Iranian traditional houses.

As it was mentioned in the section related to modularity in Iranian spaces, the size and form of the spaces were decided according to geometric rules which are not related to specific functions (as we know today). For example, there were no special rooms for sleeping as bedrooms or special rooms for gathering as living rooms; however the rooms were constructed based on their functions related to privacy or publicity which had influences on the size of the rooms. Generally, in the definition of patterns, the forms have been accumulated together and create a house as a whole. This house has been used by users according to the size of the families and their routine needs and all these show

the flexibility of the spaces. After entering furniture in today's houses in Iran, spaces have been occupied by them and flexibility has been declined.

The size of rooms in Iranian traditional houses has been depended on the level and importance of communication between the users. For example, seven doors room which did not exist in all houses, were appropriate for crowded families and other gatherings with acquaintances but the three door rooms (Seh-dari) was generally used for private purposes. Therefore it can be said that the dimensions of rooms in Iranian traditional house were based on social relations and the rooms' functions; and it was considered that people can easily have eye contact with each other while sitting even in the biggest room. As far as there is no such evidence to prove this assertion, it is going to be analyzed in the case study tables in chapter 4.

As far as sitting on the ground was one of the aspects of Iranian traditional lifestyle, it had a specific place in design, construction and spatial relations of spaces in traditional Iranian houses. Generally, interior spaces of Iranian traditional houses sound corresponding to the physical aspects of Iranian lifestyle. In order to provide a pleasant space for the Iranian inhabitant, there is always space to lean on the wall while sitting on the ground.

3.3 Impacts of Sitting on the Ground on Organization of Interior

Elements in Iranian Traditional Spaces

In most of the Iranian interior spaces, as there is no other furniture existing in the interior space, the typical elements include windows, doors and niches. Another important issue

about Iranian spaces is the special use of interior decoration or ornamentation. According to Ayalp (2011 b), interior space consists of elements, which give meaning to these spaces; and these elements play important roles in defining spaces and creating boundaries. They define spaces by giving identity and validity to interior spaces. While elements of interior space define it, they also express the features of space that are related to a certain culture.

To be able to discuss about the relation of the interior elements with a person sitting on the ground, first, the dimensions of a person sitting on the ground should be determined. Although no study about the dimensions of a sitting person on the ground were found, the dimensions for a sitting person on the chair has been used to estimate the dimensions for a person sitting on the ground. In order to find this dimension length of the leg in the position of sitting on a chair is excluded from the whole sitting height (Figure 49).

According to Panero & Zelnik (1979) the height between head and hip of a sitting human for men is between 76.2 – 86.1 cm and for women is between 71.4 – 80.5cm; for the purpose of this study the maximum height for a sitting man (95 percentile male), which is 86.1 centimeters, can be used as the height of a sitting human body.

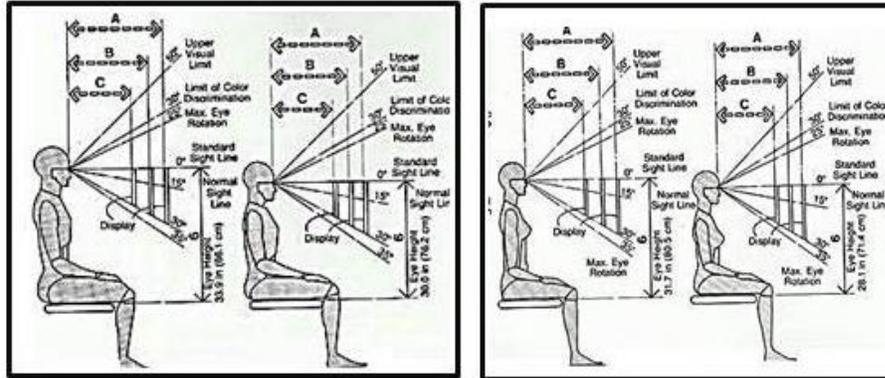


Figure 49. The Seated Male and Female Viewer (Panero & Zelnik, 1979)

It is also worthy to mention that, although anthropometric dimensions differ with the age, gender, race and ethnicity of the people (Jeong & Park, 1990) as Hosseini Nasab & Abarghouey (2008) also mention, all anthropometric dimensions of Iranian society are still not well defined, so the more international dimensions have been used in this study.

The first interior elements to study in the Iranian houses are windows. In interior spaces, windows were generally located in one side of the room and received daylight from that side. The windows were installed in an appropriate place for observing the courtyard and were always based on higher levels than the ground surface and the person could easily have view to the courtyard while sitting on the ground (Figure 50). Moreover courtyard (Hayat) can be defined as a space that became a part of the rooms when users opened doors (Orosi) and users enjoyed the view from inside the rooms in a sitting position. According to Tahir & Shabani & Arjmandi (2010), the reason of making use of window-door room (Orosi) was an extension of space (for joining interior space to courtyard) (Tahir & Shabani & Arjmandi, 2010). A point to be mentioned is that the windows in these spaces were generally extended to the ground which can also be related to the eye level of a person sitting on the ground. Therefore, it can be claimed that Iranian

traditional spaces and their elements were constructed according to dwellers that used to sit on the ground.



Figure 50. Qavam House in Shiraz City (URL 24)

The windows in Iranian traditional houses were designed in ways that sometimes they were placed on the walls in the width of the room and sometimes on the other walls. In fact, it seems that if the windows or doors were placed on the shorter walls, these rooms were private/semi private rooms and used by closer members of the family. The rooms with windows on the longer wall were more public and were formally used for gathering such as five door room (Panj-dari) and three door room (Seh-dari) (Figure 51).

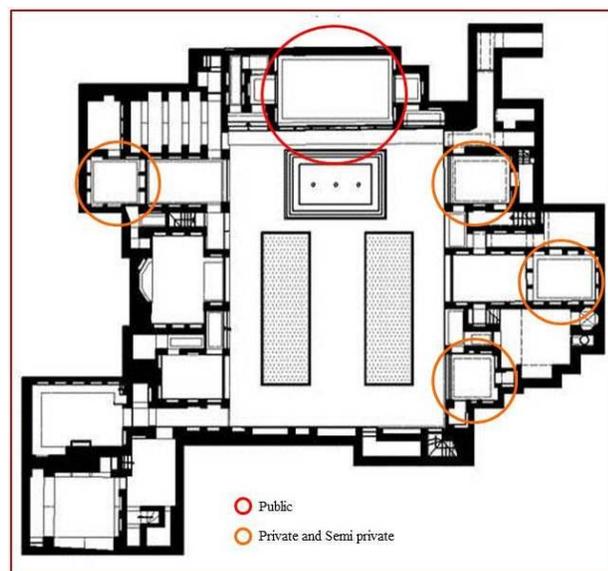


Figure 51. The Khoshnevis House in Isfahan City

Another issue which needs to be considered is the decorations within the living spaces. Various types of ornamentations and decorations were used in Iranian traditional houses; such as stucco work, painting and mirror work. Some of the decorative elements had also functional role in the interior space, such as window-doors (Orosi) and niches. It seems that the heights of the niches were designed in way that it was just above the head of a sitting person (Figure 52). This principle can be observed in design of all interior elements of Iranian traditional houses. The stucco works, plaster moldings and other ornamental elements covering the interior walls were arranged in a way that not to interfere the person sitting on the ground and leaning on the wall. In Iranian traditional architecture, human scale has always been considered; even in minor details and decorative elements.



Figure 52. This Figure Shows the Height of the Niches in Traditional Iranian Houses from Safavid Period and Qajar Period (Saati, 2011 & URL 25)

Qavam house is an example of houses built in the Qajar period in Shiraz city. As it can be seen in some of the rooms decoration have been applied from ceiling to the niches' lower edges because users used to lean on the walls in these rooms in a peripheral arrangement (Table 3).

Table 3. Qavam House in Shiraz City (URL 28-30)

Qavam House		
 <p>a) The view of courtyard (Hayat)</p>	 <p>b) Three door room (Seh-dari)</p>	 <p>c) Five door room (Panj-dari)</p>
 <p>d) Five door room (Panj-dari)</p>	 <p>e) Ceiling and niches ornamentals</p>	 <p>f) The view of porch (Eivan)</p>

In other rooms of Qavam house decorations on the walls were mostly applied from ceiling to the ground, this is assumed to be a reason of entering furniture to Iran during that time. The effect of western culture and costumes are even seen in the painted decorations of this house (Table 4). In these paintings characters from Iranian mythology are sitting on Baroque chairs (m). This house was furnished since it was built and original furniture's still exist there moreover the niches' lower edge in this house is located above the furniture which evidently show that they are designed, based on furniture. It is worthy to mention that this kind of houses show the transitions in Iranian architecture, in different phases such as interior ornamentals and decoration from traditional to modern. For instance in the five doors room which is shown in picture (h) to separate men and women gatherings a balcony has been designed in the room. In this

room men were gathered in ground floor by sitting on chairs while woman were sitting on the ground in the first floor listening to their discussions. In the painted ceiling of this house shown in table 4 (Picture k and l) motives from French postcards are used.

Table 4. Qavam House in Shiraz City (URL 31-34)

Qavam House		
		
g) Furniture of Qavam house	h) The view of five door room (Panj-dari)	
		
i) Five doors room (Panj-dari)	j) Ceiling, wall and ledges ornamentations	
		
k) Ceiling ornamentations	l) Ceiling and wall ornamentations	m) Entrance ornamentation toward the courtyard

As it was mentioned above, Iranian houses were not designed on use of furniture; however there are a few, examples based on furniture usage such as Qavam house. According to Ghaeini (2006) & Esfandiari (1997), the fashion of using furniture which comes from western society started to increase in Iranian traditional house after middle of Qajar period. Since the bilateral relation between Iran and Europe increased. However since houses were designed and built for sitting on the ground, not for using furniture this created a paradox between furniture's dimensions and dimensions of interior elements. Figure 53 and 54 demonstrate examples where furniture covered half of the windows which clarify that in these houses windows were designed in a way that the users sit on the ground.



Figure 53. The View of furnished Three Door Room (Seh-dari) in Iranian Traditional House (Ghazbanpour, 1992)

It is interesting to stay that although the furniture entered to the Iranian houses gradually with changes in lifestyles, still in many houses Iranians used the peripheral arrangement in interior spaces and push the furniture to the walls similar to peripheral sitting arrangement on the ground.



Figure 54. A Traditional Furnished House in Qajar period (Ghazbanpour, 2001)

Since there is not enough investigation and studies done in this area, the need for further investigation seems to be clear. To be able to clarify and examine the mentioned issues considering the relationship of interior elements in the rooms and the organization of spaces in traditional Iranian houses with sitting on the ground, 20 houses were chosen in order to be examined based on their drawings, documents and available photographs. These houses are located in Isfahan and Kashan cities, in Isfahan province with the hot and dry climate. The selected houses belong to the era from Safavid (1501-1722) to Qajar Period (1781-1858). Examination of these samples can be evidential to the presumptions of this study.

Table 5. Analysis of Traditional Houses in Kashan

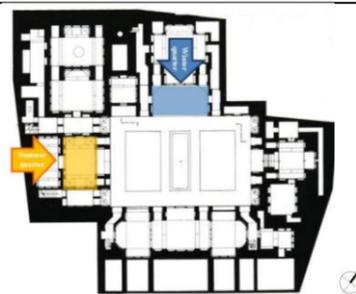
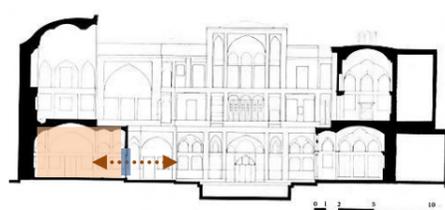
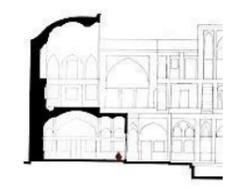
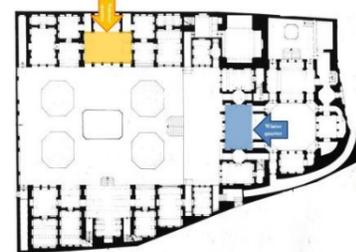
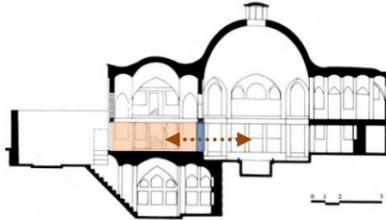
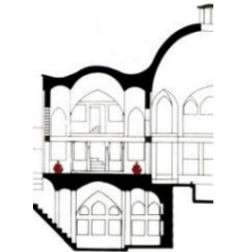
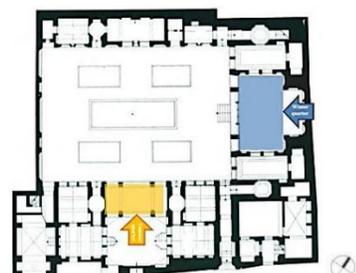
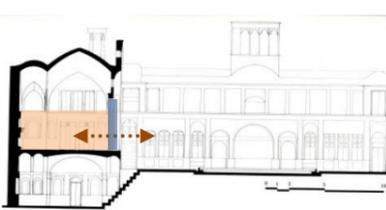
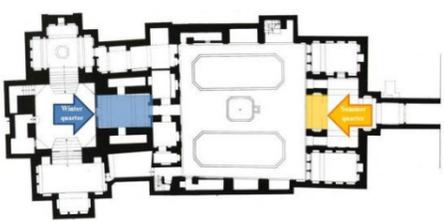
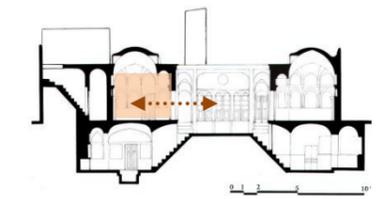
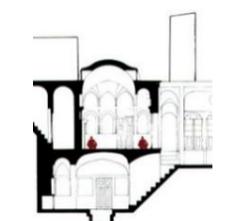
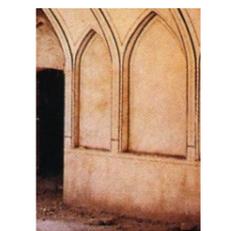
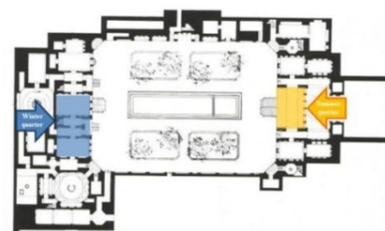
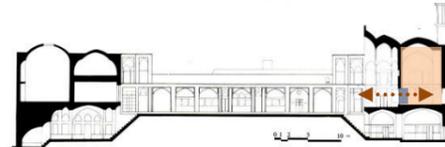
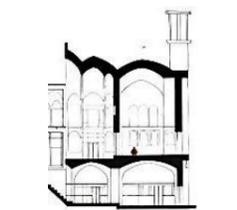
Investigation of Houses in Kashan					
House	Summer and Winter Part	The View of Rooms	Height of the Lower Edge of the Niche	Niche	Comments
Abbasian House					<ul style="list-style-type: none"> • Construction era: Before the middle Qajar period. • The analyzed space: Hall (Talar) • Lower edge of the niche: 88cm. • Windows started from the floor level. • It has direct view to the courtyard. • The walls were decorated with painting and stucco work.
Al-e-Yassin House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Hall (Talar). • Lower edge of the niche: 92cm. • Windows started from the floor level. • This room has direct view to the courtyard. • The walls were decorated with stucco work.
Attarha House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Hall (Talar) • Lower edge of the niche: 96cm. • Windows started from the floor level. • This room has direct view to the courtyard. • The walls were decorated with stucco work.
Bakochi House					<ul style="list-style-type: none"> • Construction era: Zand period. • The analyzed space: Hall (Talar). • Lower edge of the niche: 100cm. • This room does not have any window. • The room has direct view to the courtyard. • The walls were decorated with stucco work.
Bani Kazemi House				Unfortunately, doesn't have any picture to this room.	<ul style="list-style-type: none"> • Construction era: Zand period. • The analyzed space: Three door room (Seh-dari). • Lower edge of the niche: 105cm. • Windows started from the floor level. • The room has direct view to the porch (Eivan).
Legend: View to the Courtyard   Location of the Windows/ Doors   Winter Quarter  Summer Quarter					

Table 6. Analysis of Traditional Houses in Kashan

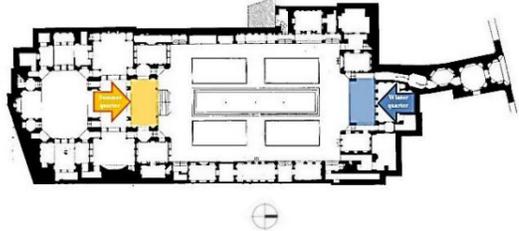
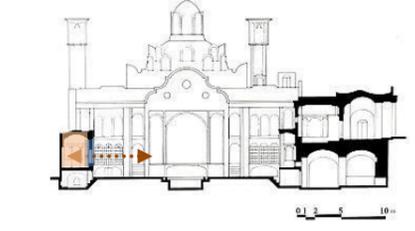
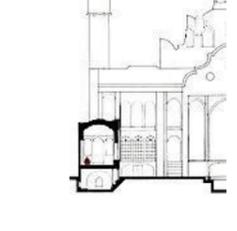
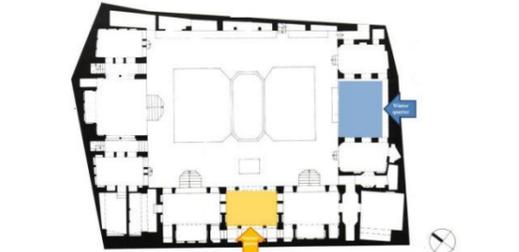
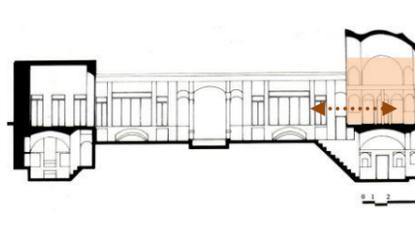
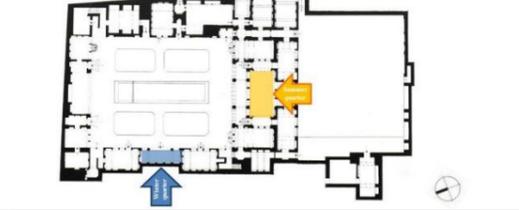
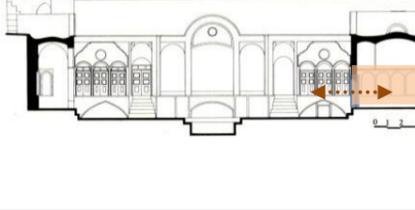
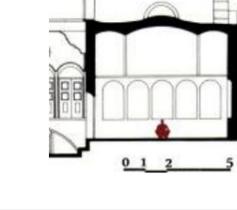
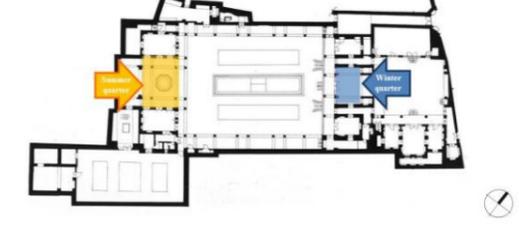
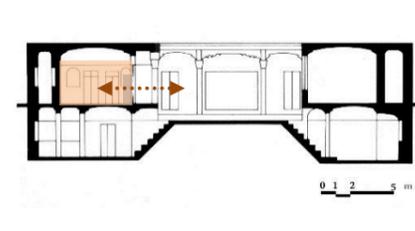
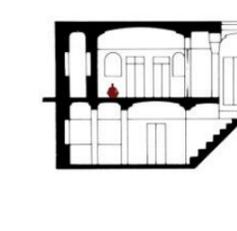
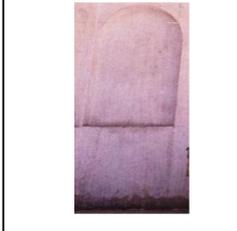
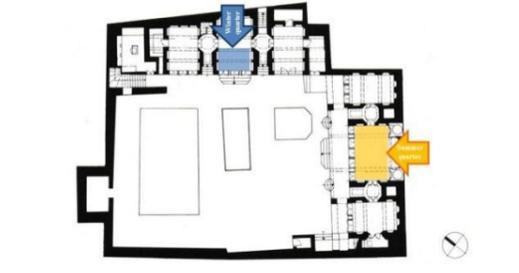
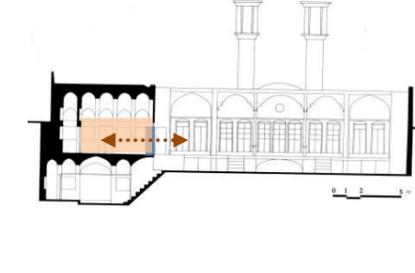
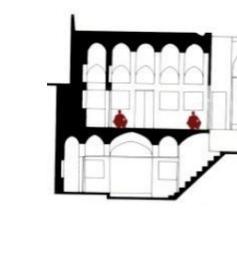
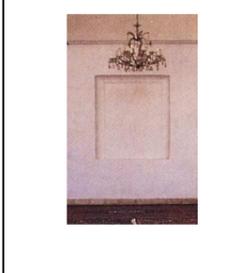
Investigation of Houses in Kashan					
House	Summer and Winter Part	The View of Rooms	Height of the Lower Edge of the Niche	Niche	Comments
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Dastmalchi House					<ul style="list-style-type: none"> • Construction era: After the middle Qajar period. • The analyzed space: Porch (Eivan) • Lower edge of the niche: 98cm. • This room does not have any window. • This room has direct view to the courtyard.
Hosseini House				Unfortunately, doesn't have any picture to this room.	<ul style="list-style-type: none"> • Construction era: Zand/Qajar period. • The analyzed space: Two door room (Do-dari). • Lower edge of the niche: 90cm. • Windows started from the floor level. • This room has direct view to the courtyard.
Isfahanian House					<ul style="list-style-type: none"> • Construction era: After the middle Qajar period. • The analyzed space: Two door room (Do-dari). • Lower edge of the niche: 115cm. • Windows started from the floor level. • This room has direct view to the porch (Eivan).
Karkhanechi House					<ul style="list-style-type: none"> • Construction era: After the middle Qajar period. • The analyzed space: Three door room (Seh-dari). • Lower edge of the niche: 99cm. • Windows started from the floor level. • This room has direct view to the courtyard.
<p>Legend:</p> <p>View to the Courtyard  Winter Quarter </p> <p>Location of the Windows/ Doors  Summer Quarter </p>					

Table 7. Analysis of Traditional Houses in Kashan

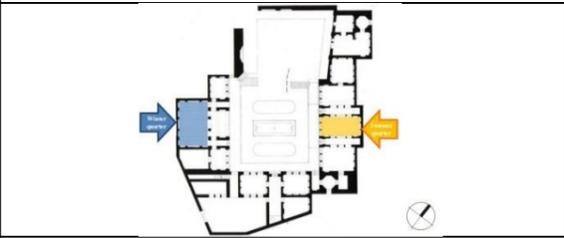
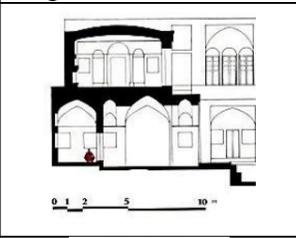
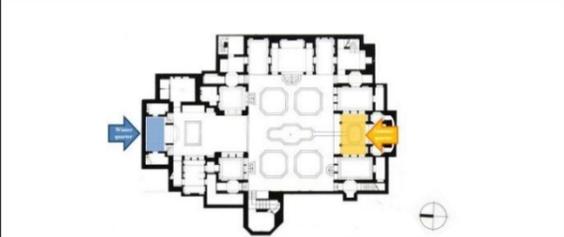
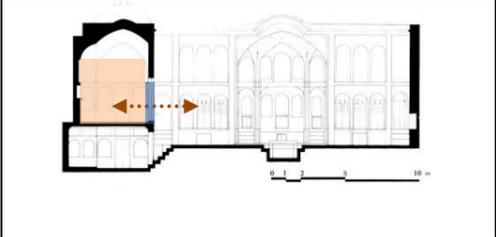
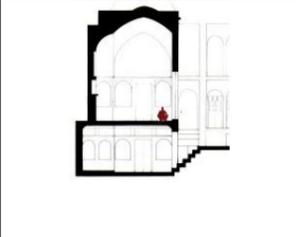
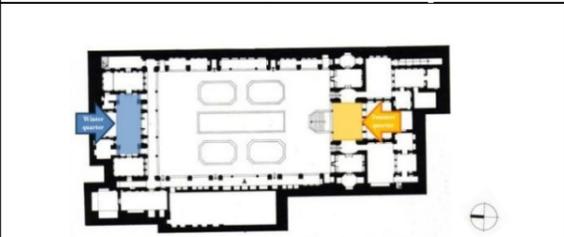
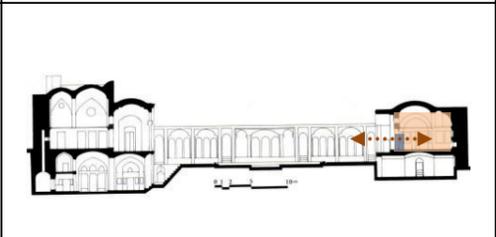
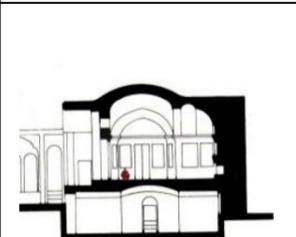
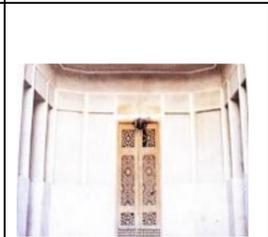
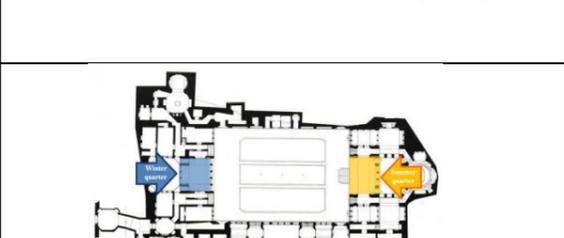
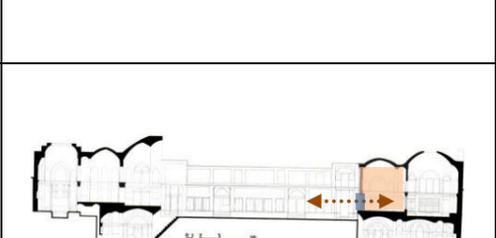
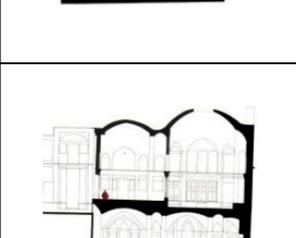
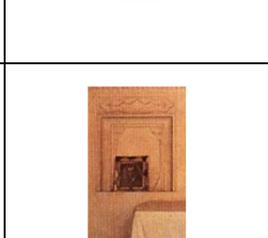
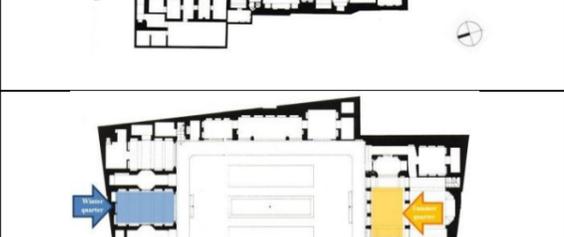
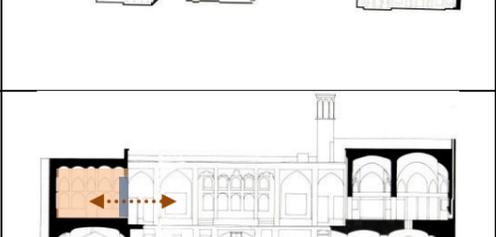
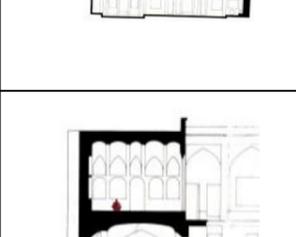
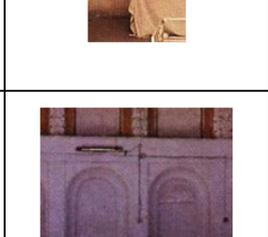
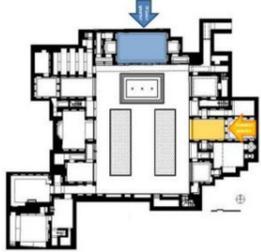
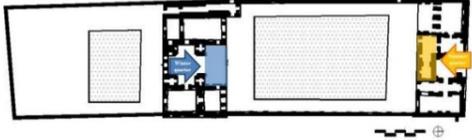
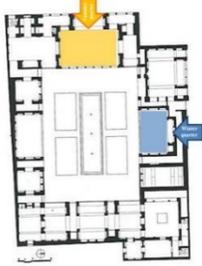
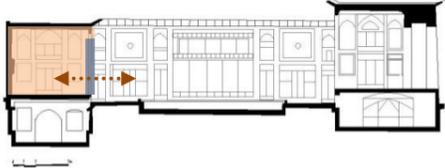
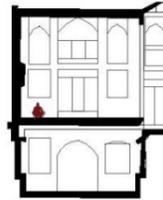
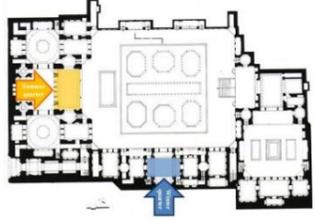
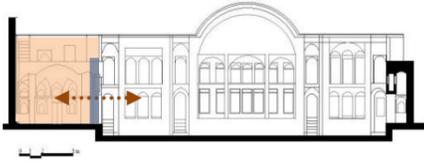
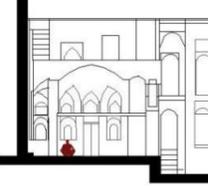
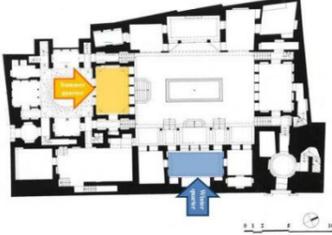
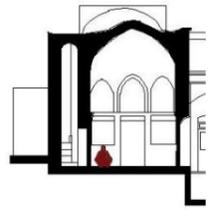
Investigation of Houses in Kashan					
House	Summer and Winter Part	The View of Rooms	Height of the lower Edge of the Niche	Niche	Comments
Mortazavi House					<ul style="list-style-type: none"> • Construction era: Qajar period • The analyzed space: Three door room (Seh-dari) • Lower edge of the niche: 90cm. • It does not have any window. • This room has direct view to the porch (Eivan).
Sajadi House					<ul style="list-style-type: none"> • Construction era: Qajar period • The analyzed space: Hall (Talar). • Lower edge of the niche: 88cm. • Windows started from the floor. • It has direct view to the courtyard. • The walls were decorated with stucco work.
Saleh House					<ul style="list-style-type: none"> • Construction era: After the middle Qajar period. • The analyzed space: Hall (Talar) • Lower edge of the niche: 88cm. • Windows started from the floor level. • This room has direct view to the porch (Eivan). • The walls were decorated with stucco work.
Sharifian House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Hall (Talar). • Lower edge of the niche: 100cm. • Windows started from the floor level. • This room has direct view to the courtyard. • The walls were decorated with stucco work.
Tahami House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Three door room (Seh-dari). • Lower edge of the niche: 86cm and decorated with stucco work • Windows started from the floor level. • This room has direct view to the courtyard.
Legend: 					

Table 8. Analysis of Traditional Houses in Kashan

Investigation of Houses in Kashan					
House	Summer and Winter Part	The View of Rooms	Height of the lower Edge of the Niche	Niche	Comments
Khoshnevis House					<ul style="list-style-type: none"> • Construction era: Safavid period • The analyzed space: Seven door room (Haft-dari). • Lower edge of the niche: 92cm. • Windows started from the floor and this room has direct view to the courtyard. • The walls were decorated with stucco and mirror work.
Sokiasian (Sokias) House					<ul style="list-style-type: none"> • Construction era: Safavid period • The analyzed space: Howz-khaneh. • Lower edge of the niche: 135cm. • Windows started from the floor. • The room has direct view to the courtyard and the walls of this room were decorated with painting.
Haj Rasuli-ha House					<ul style="list-style-type: none"> • Construction era: Zand period. • The analyzed space: Hall (Talar) • Lower edge of the niche: 130cm. • Windows started from the floor level. • This room has direct view to the courtyard. • The walls were decorated with stucco work and painting.
Tabatabaeiha House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Hall (Talar). • Lower edge of the niche: 90cm. • Windows started from the floor level. • This room has direct view to the courtyard. • The walls were decorated with stucco work.
Jahan-Arai House					<ul style="list-style-type: none"> • Construction era: Qajar period. • The analyzed space: Five door room (Panj-dari). • Lower edge of the niche: 90cm and decorated with stucco work • Windows started from the floor level. • This room has direct view to the courtyard.
Legend: View to the Courtyard  Winter Quarter  Location of the Windows/ Doors  Summer Quarter 					

After observations and analysis of the above examples of Iranian houses, it is possible to claim that sitting on the ground is one of the most important factors in the design of the spaces and spatial organization of traditional Iranian houses. According to analysis of 20 houses mentioned in the above tables, these houses include two summer quarter and winter quarter; and layout of all spaces are designed based on modular system. Spaces are located on the main axis according to their degree of importance. Another feature seen in the space organization of these houses is multi-functionality. This issue is directly in relation with the habit of sitting on the ground as a tradition. The possibility of being multi-functional is a sequence of sitting on the ground and having no furniture to bind the space in to one single function in these houses. On the other hand, the interior spaces in Iranian traditional houses were formed by taking sitting on the ground in consideration; this feature had its own effects on organization of decorative elements and ornamentations. As it is obvious in the sections, windows were located on one side of the room, which was facing the courtyard and also they are extended to or very close to the ground. Moreover niches as functional and decorative elements were under the influence of the fact that sitting on the ground was the main sitting habit; therefore the height of the lower edge of niches were designed according to the dimensions of a person sitting on the ground. The lower edge of the niche in 18 houses is between 86-115 centimeters, which is suitable for the sitting on the ground position. But the lower edge of the niches in two houses (Sokiasian and Haj Rasuli-ha house) are 130 and 135 centimeters, which seems to be suitable level for a person who is sitting on a furniture. The reasons for this exception will be discussed in detail in the coming part where 5 of these houses are analyzed with much more detail.

Also there were other elements affected by this sitting habit; studies on above samples show that ornamentations in the more private rooms are generally simple stucco works but in more public spaces more elaborated forms of decoration exist. The ornamentations on the walls also are situated in the same level with niches' lower edges and the lower part of the wall is blank with generally a border line to separate the upper section and lower part which was used for leaning to the wall. In general all the aforementioned signs evidently show that the arrangement of spatial details was adequate for the habit of sitting on the ground.

As was mentioned before, in the following chapter five houses from the above tables were selected to be analyzed in more details in relation to the role of sitting on the ground in the formation of their spaces.

Chapter 4

INVESTIGATING EFFECTS OF SITTING ON THE GROUND IN SELECTED IRANIAN TRADITIONAL HOUSES

Undoubtedly house can be called as the most important unit in architectural design. House takes an important place in Iranian architecture as well. Zand Karimi & Hosseini (2012) note that traditional Iranian residential architecture "has a continuous history from at least 6000 B.C. to the present" (p.47). Following these descriptions, for Haeri (2010), the term traditional Iranian house is used for the houses which were built until the middle of Qajar period in Iran (Haeri, 2010).

In the middle of Qajar period by extension of the relation between Iran and western countries, some changes in buildings occurred. Affected by Western countries, noblesse and rich families traveled to these places and accordingly changed their houses and brought samples of furniture and stuffs for their houses and palaces. Afterwards other social classes started using modern furniture influenced by high-income level of society.

In this chapter the plans and sections of 5 houses which were discussed in the previous tables are examined in detail according to the key factors discussed in the previous chapters.

The houses which were chosen as case studies all encompass the following items:

- All have a Courtyard
- All contain private, semi-private and public spaces
- All have rich interior ornamentations and decorative elements in more public rooms
- All of them are located in hot and arid climatic zone of the country
- All are registered in the list of cultural historical heritage of Iran, are all of them restored
- All documents of the house are available such as plans and sections



Figure 55. The Location of Isfahan and Kashan in Iran (URL 36)

In order to analyze the houses, the main issue is the relationship between interior elements such as windows, niches, doors and their locations with sitting on the ground.

The collected information about these houses is classified in tables including plans, sections and some photos. These tables show the analysis of the position of the interior elements and decoration in relation to a person sitting on the ground. Those parts of each

case study that are analyzed by sections are also shown on their plans. The tables help the reader to perceive the result easier.

Based on aforesaid statements in current research, residential buildings were chosen among those belonging to the Safavid (1501 to 1722) and Zand period. Also one example from the era of after the middle of Qajar period is chosen in order to trace the possible changes after this time. All houses, which are introduced in this research, have been restored by Iranian Cultural Heritage Organization; because each of these buildings is a treasure that represents the artistic and cultural heritage of the people of this area.

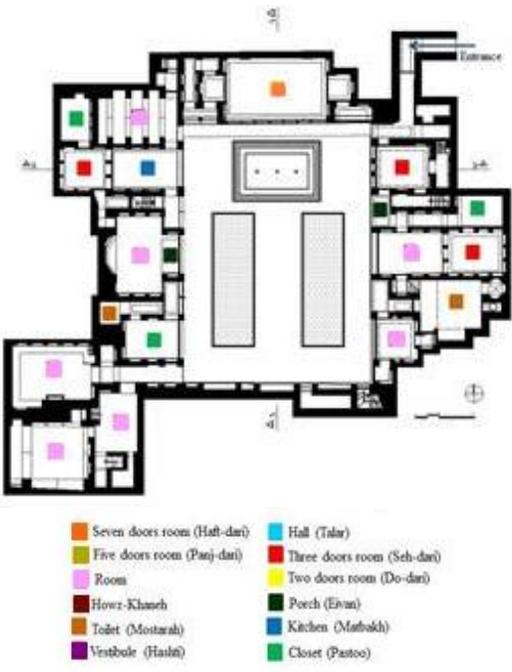
Isfahan is a province with magnificent architectural monuments and buildings, several houses have remained from historic periods, some of which have been restored and renovated by the Cultural Heritage Organization of Iran. Among more than 700 houses which 50 of them are registered by Iranian Cultural Heritage Organization, five were selected, two from Safavid period, one from Zand era and two buildings as suitable examples of houses of Qajar period. These five houses have been chosen because they can be accepted as typical examples of houses in their own construction date from different periods (Safavid, Zand and Qajar) with different ornamentations to be studied in detail. It is worthy to mention that the aim of this research is not to investigate the evolution of the house design in time, rather to find the influence of sitting on the ground on spatial organization and the interior elements in these houses. There have been various analyses and investigations done about traditional Iranian houses, which studied different parts and features of these houses, but this is the first study that has focused on sitting on the ground and its effects on interior spaces and their decorative elements.

In this part the five houses are going to be analyzed based on their plans and sections; and also observations, which are presented by some images. After a general introductory section for each house, it is analyzed by mentioning certain features, such as the decorative elements and position of openings, in table formats.

4.1 House of Khoshnevis

Khoshnevis house is a good example of traditional Iranian house. According to Hajighasemi (1997), this building was built in Safavid period in Isfahan.

Table 9. Khoshnevis House Information

The House of Khoshnevis	
Construction era	Safavid
Area of the building	1100 Square Meters
Location	Isfahan city
Present Function	Residential
	
	
	

General description

- This house is listed in the group of traditional houses in cultural heritage organization of Iran. It remained unchanged across years from Safavid period until now.
- Khoshnevis house has one central courtyard. The house like other examples of Iranian traditional house was built on a level higher than courtyard.
- There is no designed vestibule (Hashti) in this house and for this reasons this house is one of the exceptions in general design layout for houses in this region.
- This house has just one opening to the outside and is constructed in two levels, ground and first floor.
- According to the shown plan layout; there is no specific function assigned for a specific room, such as dining, sleeping or other functions, except for kitchen and toilet. (It is readable from the labels that are shown on the plan).

There are two sections available in this house, which pass the seven doors room (Haft-dari), and two three doors rooms (Seh-dari).

Table 10. Khoshnevis House Sections



Table 11. Analysis of Section A-A of Khoshnevis House

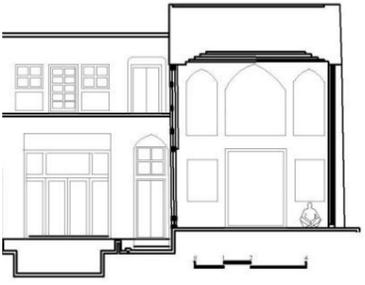
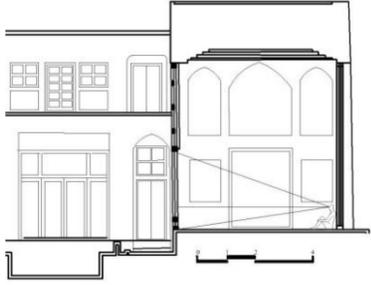
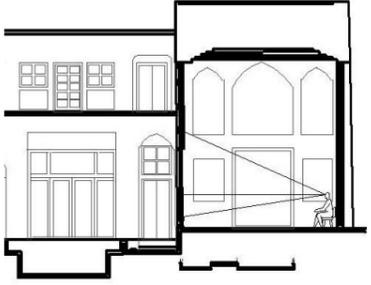
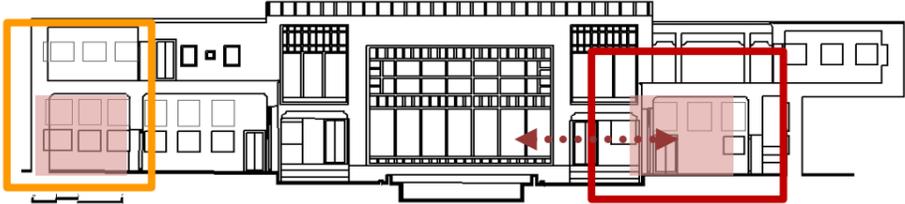
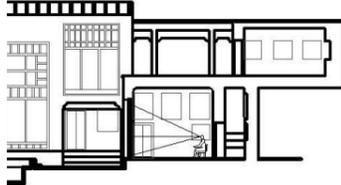
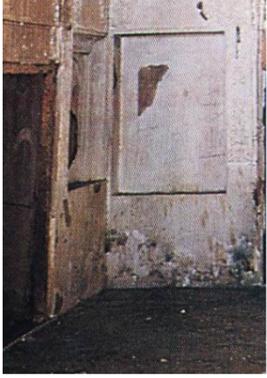
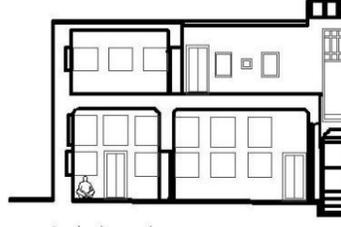
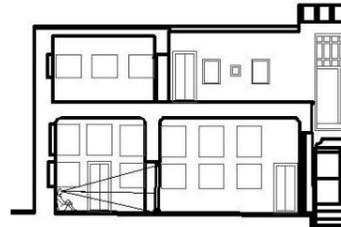
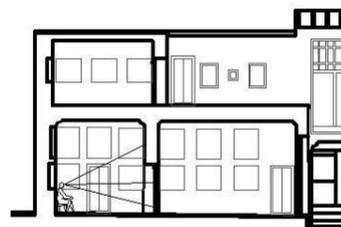
The Section of Khoshnevis House (A_A)	Analysis of Ornamentations and Space Elements	Height of Niches	Height and position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As it is obvious in the plan of this house, it has one seven-door room (Haft-dari) which is the nearest space to the main entrance, and indicates the more public area of this room. (Haft dari) is the biggest room in this house. As can be seen in the section, this room has direct view to the courtyard that has a garden (Baghcheh) and includes a pool (Howz). 	 <ul style="list-style-type: none"> The applied ornamentation in this room is stucco work. There is no decoration under the niche. The windows are placed only on one side of the room. The windows are located in the longer walls of this room. 	 <ul style="list-style-type: none"> The height of the niches from ground is 92 centimeters. When a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> The windows are extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> This figure shows if the room with current situation is furnished with furniture, then dimensions of the niche will not be suitable. The niche's lower edge is not according to the furniture.

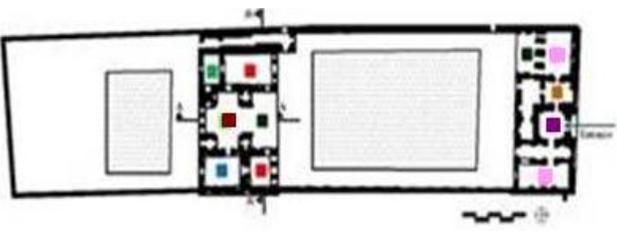
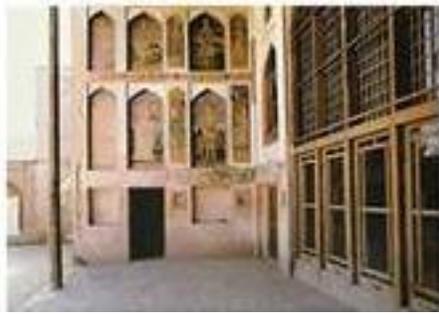
Table 12. The Analysis of Section B-B of Khoshnevis House

The Section of Khoshnevis House (B_B)	Analysis of Ornamentations and Space Elements	Height of Niches	Height and position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 1 (Seven door room)</p>  <ul style="list-style-type: none"> ▪ The applied ornamentation in this room is stucco work. ▪ There is no decoration under the niche. ▪ The windows are placed only on one side of the room (the shorter side). 	 <ul style="list-style-type: none"> ▪ The height of the niches from ground is 90 centimeters. ▪ When a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> ▪ The windows are extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> ▪ This figure shows if the room with current situation is furnished, then dimensions of the niche will not be suitable. ▪ The niche's lower edge is not designed according to the furniture.
<ul style="list-style-type: none"> ▪ In section (B-B) two three door rooms (Seh-dari) are shown; one of them does not have any window and its main door open to the kitchen (Matbakh). It has a door opening to closet (Pastoo); this indicates the privacy of this room. But, another three door room has direct view to the courtyard. 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 2 (Three door room)</p>  <ul style="list-style-type: none"> ▪ There is no decoration under the niche. ▪ The windows are located in the shorter walls of this room. 	 <ul style="list-style-type: none"> ▪ The height of the niches from ground is 90 centimeters. ▪ When a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> ▪ The windows are extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> ▪ This figure shows if the room with current situation is furnished, then dimensions of the niche will not be suitable. ▪ The niche's lower edge is not designed according to the furniture.

4.2 The House of Sokiasian (Sokias) in Isfahan City

Abraham Gorgonian (2006) Armenian painter stated that this house was built in 1655 AD in Jolfa district in Isfahan city by Translator of ambassador of England and most of the paintings of this house belonged to Queen Elizabeth. Sokiasian (Sokias) house was built in Shah Abbas Safavid period which has Artistic and historical values.

Table 13. Sokiasian (Sokias) House Information.

The House of Khoshnevis	
Construction period	Safavid period
Area of the building	2750 Square Meters
Location	Isfahan city
Present Function	Restoration Faculty the University of Art
	
<div style="display: flex; justify-content: space-around;"> <ul style="list-style-type: none"> ■ Seven doors room (Haft-dari) ■ Five doors room (Panj-dari) ■ Room ■ Howz-Khaneh ■ Toilet (Mostarah) ■ Vestibule (Hashi) <ul style="list-style-type: none"> ■ Hall (Talar) ■ Three doors room (Seh-dari) ■ Two doors room (Do-dari) ■ Poeh (Eivan) ■ Kitchen (Matbaki) ■ Closet (Pastoo) </div>	
  	

General description

- The organization of rooms and other spaces in this house is a bit different.
- This house has just one opening to the outside.
- This house like other examples of Iranian traditional houses was built a little higher than both courtyards.
- This house was built in two floors, ground and first floor.
- The building includes two large elongated courtyards and these spaces are located in its southern and northern sides.
- The southern side, which consists of more important spaces, has access to other courtyard. At the center of the building, courtyard (Hayat) is covered with large garden (Baghcheh). The southern side includes a pillared eivan (Porch) standing in front of an elegant room (Howz-khaneh) with the pool (Howz) in the center (Ghazbanpour, 1992 & Hajighasemi, 1997).
- There is one pool in the middle of hall (Talar) that can be seen in below section.
- Spaces are used for different activities.
- This house with rich ornamentations and European paintings is one of phenomenal works of Safavid period.
- Paintings on the wall are inspired from European painting styles and there are more than 50 paintings in various parts of the house.

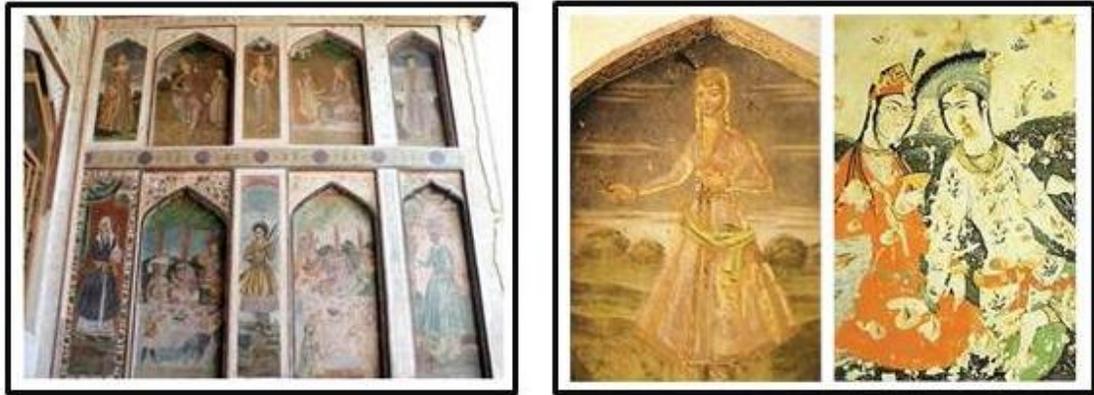


Figure 56. The European and Iranian Paintings of Sokiasian (Sokias) House

- Although the basic design of Sokiasian house is traditional, the interior decoration and ornamentation of this house was affected by Western decorations and ornamentation styles.
- It encompasses two parts of summer quarter and winter quarter.

Table 14. The Sections of Sokiasian (Sokias) House.

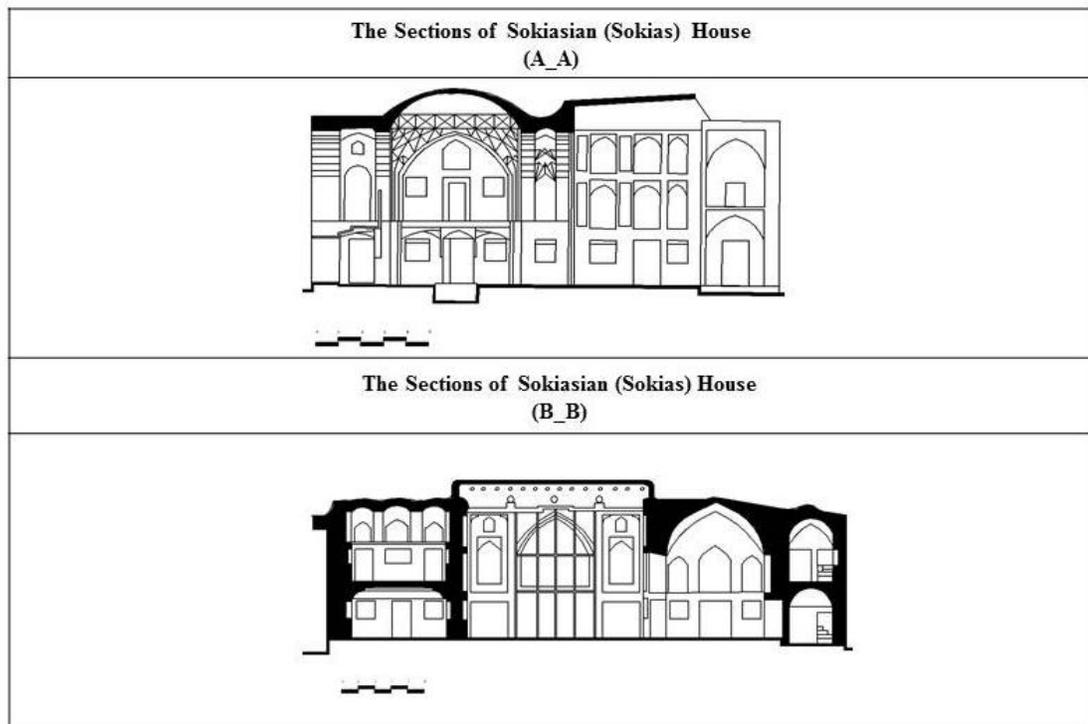


Table 15. The Analysis of Section A-A Sokiasian (Sokias) House.

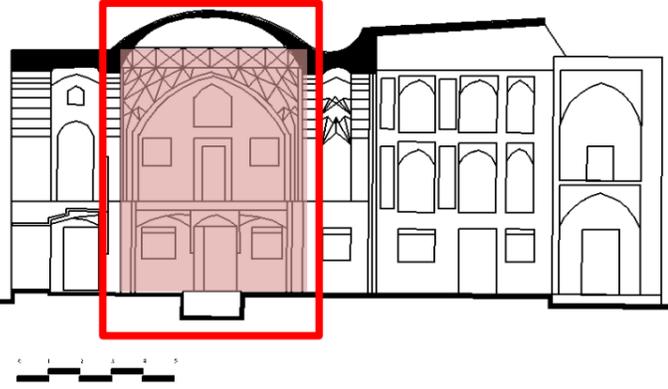
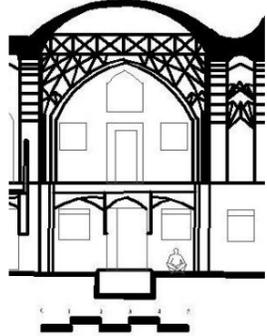
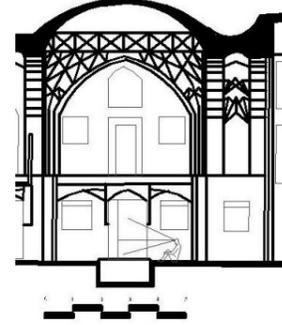
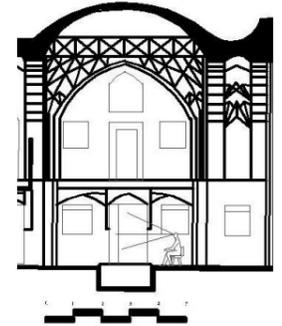
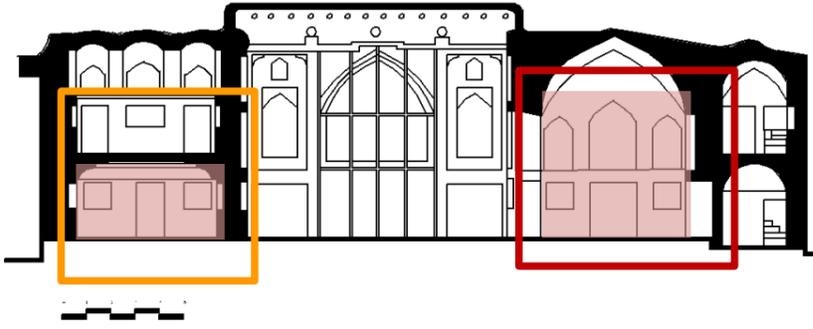
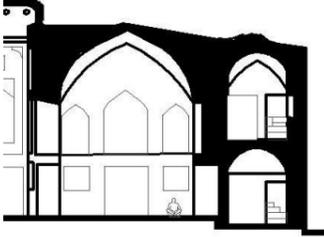
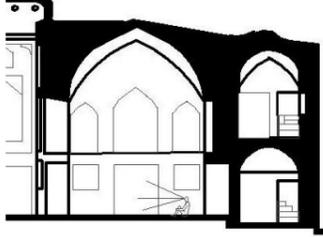
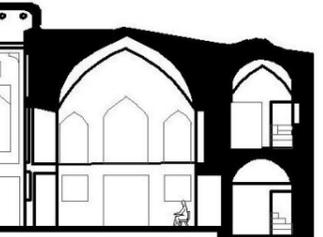
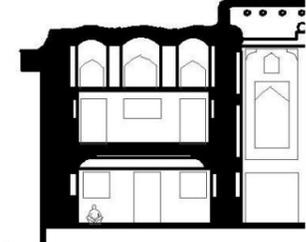
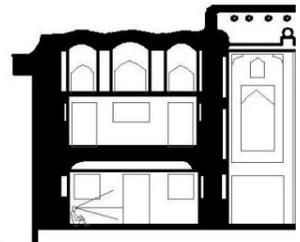
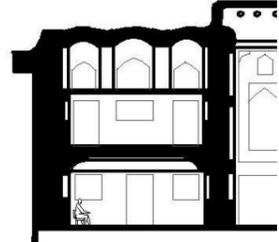
The Section of Sokiasian (Sokias) House (A-A)	Analysis of Ornamentations and Space Elements	Height of Niches	Location and position of the Windows/ Doors	In relation to Furniture
 <p>view to the courtyard </p> <ul style="list-style-type: none"> ▪ Howz-khaneh in this house has direct view to the both southern and northern courtyards. ▪ Howz-khaneh (with pentamerous division) was the biggest room in this house. ▪ Windows are placed on one side of the room. 	 <ul style="list-style-type: none"> ▪ The ornamentation of this room is painting and Karbandi. ▪ The windows are located in the longer walls of room. 	 <ul style="list-style-type: none"> ▪ The height of the lower edge niches from ground is 135 centimeters. 	 <ul style="list-style-type: none"> ▪ The windows were extended in the room (toward the courtyard) and also were extended to the floor. 	 <ul style="list-style-type: none"> ▪ It shows the position of the niches in this room is arranged according to the dimensions of furniture. ▪ When a person sits on the chair or sofa the niche is exactly above his /her head.

Table 16. The Analysis of Section B-B Sokiasian (Sokias) House

The Section of Sokiasian (Sokias) House (B_B)	Analysis of Ornamentations and Space Elements	Height of Niches	Location and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As it is obvious in the plan, it has two three doors room that both of them have direct view to the biggest courtyard. These two three –doors-rooms are in two opposite sides of Howz-khaneh. In this house there are two three doors rooms (Seh-dari) with different sizes and behind each of these spaces stands another room linked with other courtyard. 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 1 (Three door room)</p>  <ul style="list-style-type: none"> There is no decoration under the niche. The Windows are placed only on one side of the room. The windows are located in the shorter walls of this room. 	 <ul style="list-style-type: none"> The height of the niches from ground is 135 centimeters. 	 <ul style="list-style-type: none"> This room has direct view to the courtyard. The windows are extended to the floor and this made it possible for a person to view the courtyard while sitting on the ground. 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 2 (Three door room)</p> <ul style="list-style-type: none"> Unfortunately, no picture of this room is available. According to plan of this house windows are placed only one side of the room. The windows are located in the shorter walls of this room. 	 <ul style="list-style-type: none"> Height of the niches from ground is 135 centimeters. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. The windows are extended to the floor and this made it possible for a person to view the courtyard while sitting on the ground (In this section windows are not seen in this section). 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.

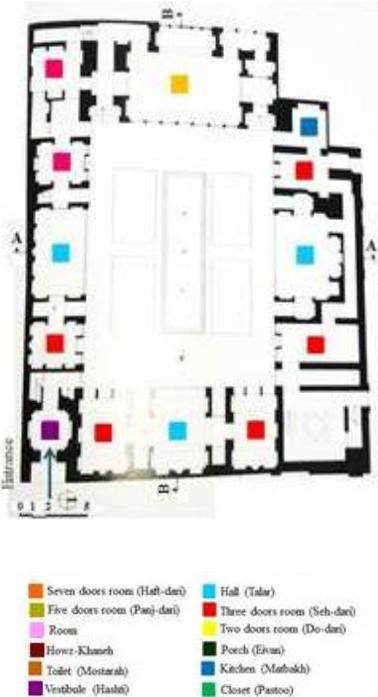
Generally this house was constructed on an Iranian traditional house layout, but the ornamentations and decorative details are showing the difference in culture of the owner which is Armenian with Muslims' culture. Most of the ornamentations and paintings are in a western manner and the lower edges of the niches are situated on a suitable level for a person who is sitting on the furniture.

According to Babaeian (2006), many historians described elegant houses of Armenian in Jolfa district of Isfahan as houses full of beautiful carpets, golden and silver painted chairs and rooms with elegant painted walls. Also, Sharden (1964) states this house was one of the fine examples of well decorated, fully ornamented and elegant houses in Isfahan constructed after the forced immigration of Armenians to Iran in 11th century A.D. In addition Minasian (2004) mentions that they became residents of the houses with basic layout of the other houses but by keeping their cultural features their houses became different than the original Iranian traditional houses.

4.3 The House of Haj Rasuli-ha in Isfahan City

This house is listed in the group of traditional houses of cultural heritage organization of Iran. It is remained unchanged since the late Zand period until now. Founder of this house was the eldest of the "Haj Rasouli-ha" family who was one of the most famous merchants of Isfahan (Hajighasemi, 1997).

Table 17. Haj Rasuli-ha House Information

The House of Haj Rasuli-ha	
Construction era	Zand
Area of the building	-
Location	Isfahan city
Present Function	Abandoned
	
	

General description

- Haj Rasuli-ha house has one central courtyard. The house like other examples of Iranian traditional house was built a level higher than courtyard.
- Spaces are located on four sides of a rectangular courtyard.
- This house has just one opening to the outside and is constructed in two levels, ground and first floor.
- As it is said before, there is no room defined for purposes such as dining, sleeping or other functions, except the kitchen and toilet. (These spaces are shown by the labels on the plan.
- There are two sections, which pass throughout halls (Talar) of this house. Therefore these sections are used for analysis of interior spaces.
- The spaces of this house are based on Iranian patterns.
- The halls (Talar) are covered with various decorations such as painting on the stucco and gilding, and the sides, which are facing the courtyard, contain window- doors (Orosis). Some segments of this mansion have been severely damaged; also the decorations have not survived much.
- Design of the courtyard (Hayat), which has provided an appropriate view for the two main reception halls, encompasses a rectangular pool (Howz) at the center of the courtyard, with four flower beds around it.
- The halls (Talar) have large and tall window-door (Orosi).
- There are many latticed doors embellished with poly chrome glass and wooden craft, which were mostly demolished (Ghazbanpour, 1992).

Table 18. The Sections of Haj Rasuli-ha House



Table 19. The Analysis of Section A-A of Haj Rasuli-ha House

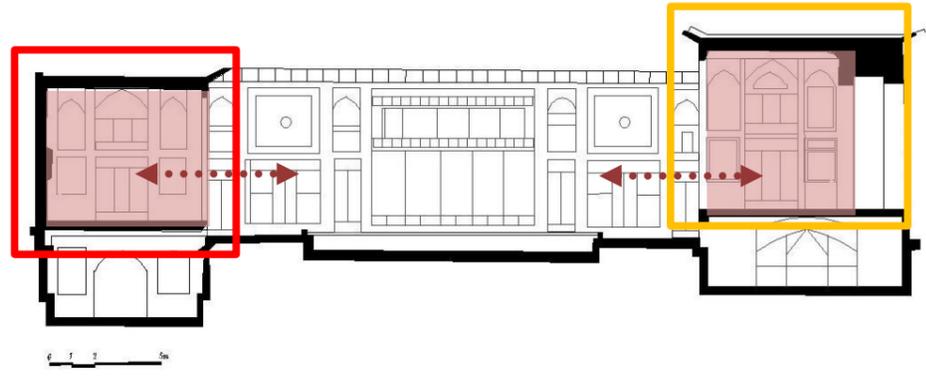
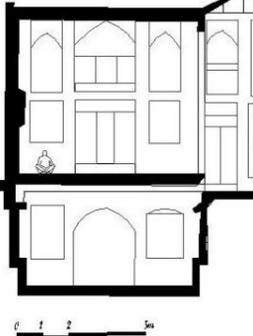
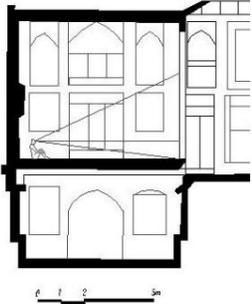
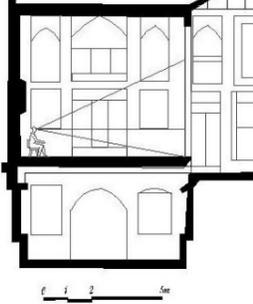
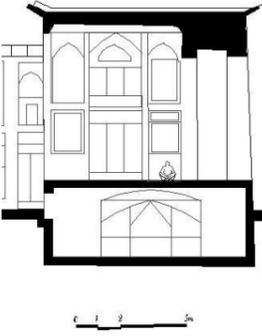
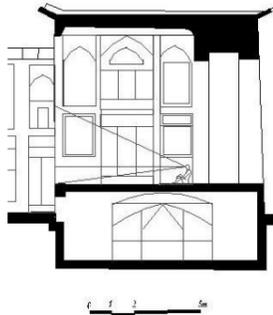
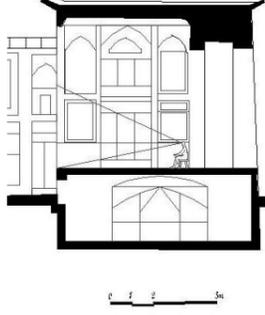
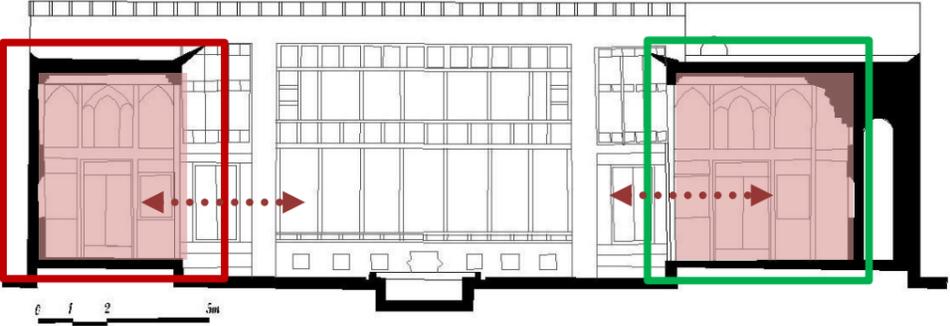
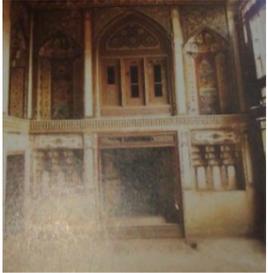
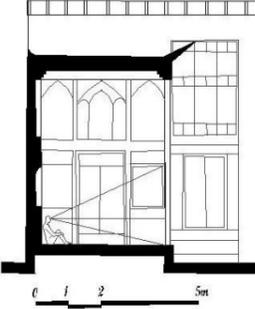
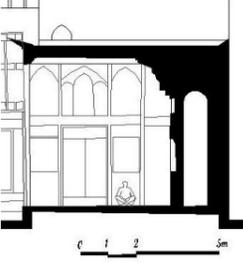
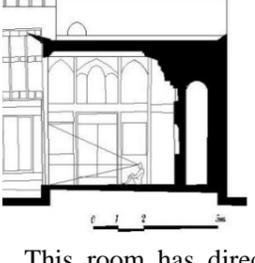
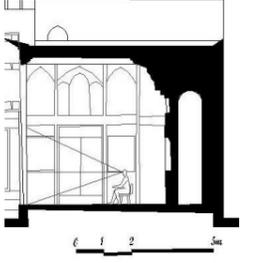
The Section of Haj Rasuli-ha House (A-A)	Analysis of Ornamentations and Space Elements	Height of Niches	Height and position of the Windows/ Doors	In relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As it obvious in the plan of this house, it has two halls (Talar) that both of them have direct view to the biggest courtyard. These halls (Talar) are opposite to each other. 	<p>Room 1 (Hall)</p>  <ul style="list-style-type: none"> The applied ornamentation in this room is stucco work and painting. The windows are placed only on one side of the room (The longer side) 	 <ul style="list-style-type: none"> Height of the niches is 130 centimeters from the floor. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.
	<p>Room 2 (Hall)</p> <ul style="list-style-type: none"> Unfortunately, no picture of this room is available. The windows are placed only in one side of the room and the windows are located in the longer walls of this room. 	 <ul style="list-style-type: none"> Height of the niches in hall (Talar) is 130 centimeters from floor. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.

Table 20. The Analysis of Section B-B of Haj Rasuli-Ha House

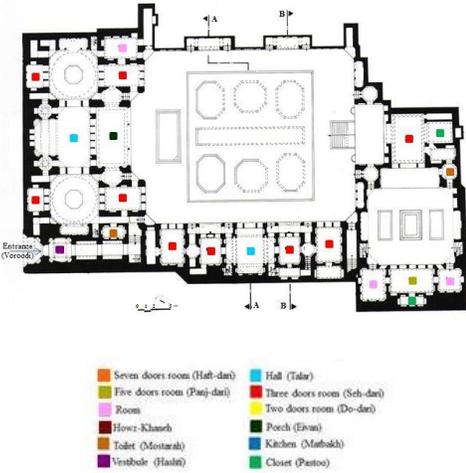
The Section of Haj Rasuli-ha House (B-B)[Analysis of Ornamentations and Space Elements	Height of Niches	Location and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As it is seen in this section, it has a seven doors rooms (Haft-dari) and a hall (Talar) both of them have direct view to the courtyard. These rooms are located in two opposite sides of the courtyard. There are a couple of two-door rooms in both sides of hall (Talar). Behind the seven doors rooms (Haft-dari) there is a Shah-neshin. 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 1 (Hall)</p>  <ul style="list-style-type: none"> The applied ornamentations in this room are stucco work and painting. There is no decoration under the niche. The windows are placed only on one side of the room (the shorter side). 	 <ul style="list-style-type: none"> Height of the niches is 137 centimeters from floor. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. The windows are placed only in one side of the room and the windows are located in the shorter walls of this room. 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 2 (Hall)</p>  <ul style="list-style-type: none"> The ornamentations in this room are stucco work and painting. There is no decoration under the niche and the windows are placed on one side of the room (The longer side) 	 <ul style="list-style-type: none"> Height of the niches is 137 centimeters from floor. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. 	 <ul style="list-style-type: none"> It shows the position of the niches in this room is arranged according to the dimensions of furniture. When a person sits on the chair or sofa the niche is exactly above his/her head.

As this house belonged to the rich family of Rasouli, who was a famous carpet merchant, that had good relations with Western countries, it was arranged in order to be furnished. According to analyzes the interior spaces of this house were designed in accordance with proportions and dimensions of furniture.

4.4 The House of Tabatabaeiha

According to the inscription that is existing in the Shah-neshin of this house, its construction dates back to 1777 A.D. (1298 A. H) (Ranjbar, 2009). This house is listed in the group of traditional houses of cultural heritage organization of Iran. This house is remained unchanged since the Qajar period until now. This house was the masterwork of the Iranian artist Ostad Ali Maryam; and the owner was Haj Jafar Tabatabaei, which was a merchant originally from Natanz who lived in Kashan (Hajighasemi, 1996).

Table 21. Tabatabaeiha House Information

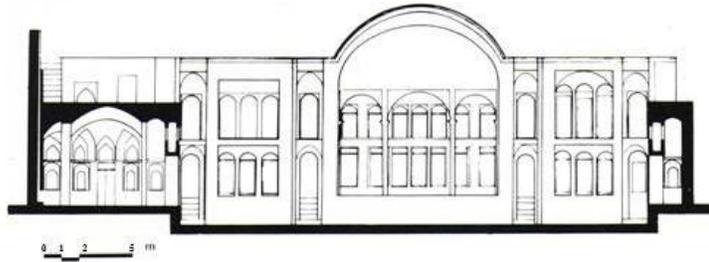
The House of Tabatabaeiha	
Construction era	Qajar
Area of the building	4730
Location	Kashan city
Present Function	Sightseeing place
	
	
	
	

General Description

- Tabatabaeiha house included two main sections.
- The most important part of the building was located in the southern side.
- Both sections of this house pass through the external part (Birouni).
- External part (Birouni) is bigger and was the public part of the building, which encompasses a large courtyard.
- This house like other examples of Iranian traditional house was little higher than courtyard's level.
- Its main entrance (Voroodi) is situated on its southeastern side.
- There exists only one opening to the outside; and the house is constructed in two levels, ground and first floor.
- As it is said before, no room was assigned as dining, sleeping or other functions, except for kitchen and toilet in this house.
- The spaces of this room are designed based on Iranian patterns.
- There are two sections passing through two three-doors rooms (Seh-dari), used for analysis of interior spaces.
- The eastern section includes a hall (Talar) and four three door rooms (Seh-dari), which all of them are connected together by a door between them (Tou-dar-Tou).
- The hall (Talar) is a cross shaped space located in the center and there are two small porches (Eivan) in front of the three doors room (Seh-dari).

Table 22. The Sections of Tabatabaeiha House

**The Section of Tabatabaeiha House
(A_A)**



**The Section of Tabatabaeiha House
(B_B)**

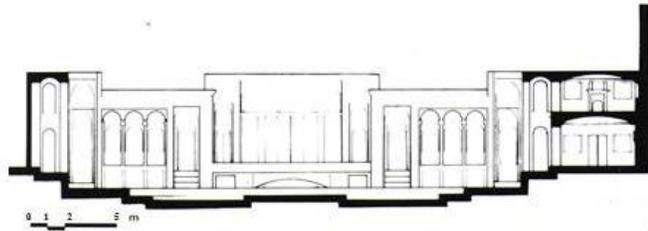


Table 23. The Analysis of Section A-A of Tabatabaeiha

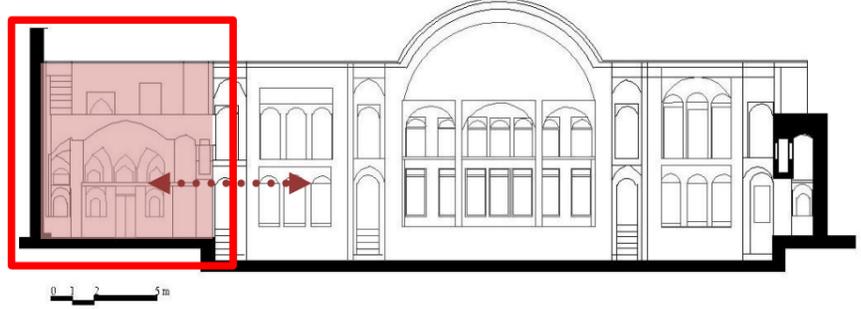
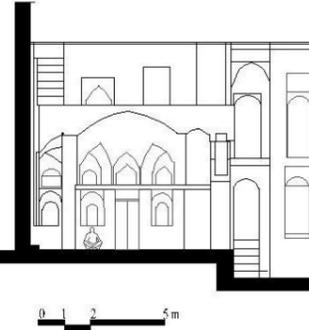
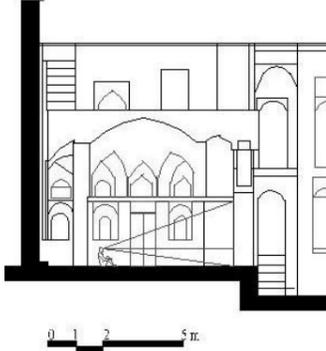
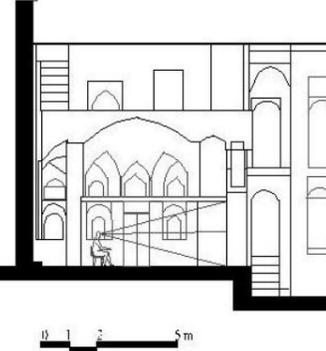
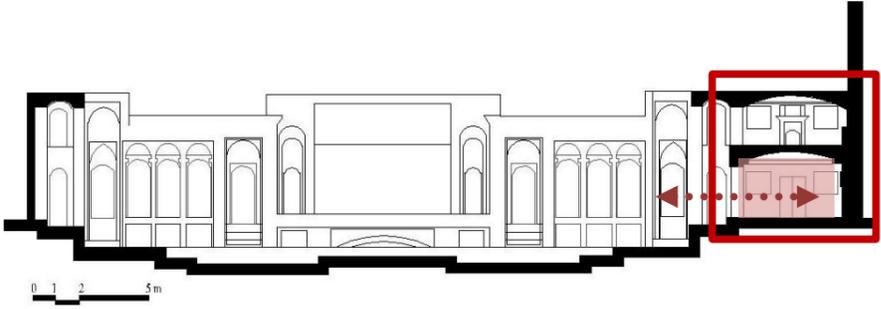
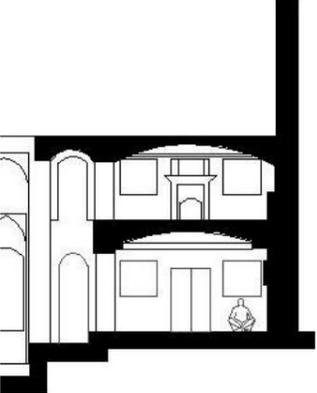
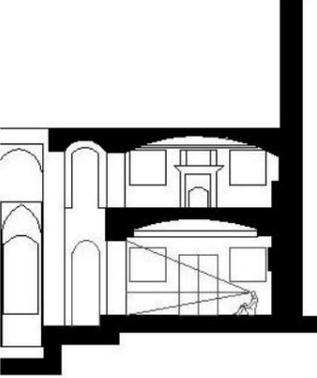
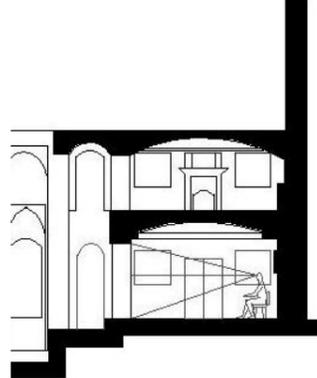
The Section of Tabatabaei House (A-A)	Analysis of Ornamentations and Space Elements	Height of Niches	Height and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As the section shows, this room is the hall (Talar) of this house, which is the nearest space to the main entrance of this house, and indicates the semi-public nature of this part. There are a couple of two-door rooms in both sides of this room. This room is one of the biggest rooms of this house. This room has direct view to the courtyard that encompasses a very large garden and a linear pool (Howz) that provides a pleasant view for the room. 	 <ul style="list-style-type: none"> The applied ornamentations in this room are stucco work and mirror work. The decorations of this room, start from the ceiling and continue to the lower edge of niches. The windows are placed only on one side of the room (the shorter side). 	 <ul style="list-style-type: none"> The height of the niches from ground is 90 centimeters. The niches of hall (Talar) can be seen in this figure, which shows that when a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> The windows were widened (towards the courtyard) and also were extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. The windows are located on one of the shorter walls of hall (Talar). 	 <ul style="list-style-type: none"> This figure shows if the room with current situation is furnished, then dimensions of the niche will not be suitable.

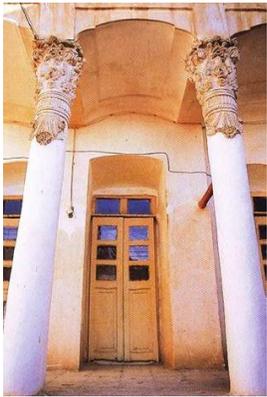
Table 24. The Analysis of Section B-B of Tabatabaeiha House

The Section of Tabatabaei House (B-B)	Analysis of Ornamentations and space Elements	Height of Niches	Height and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> ▪ According to this section, this part has one three door room (Seh-dari) which is the nearest space to the main entrance of this house, and indicates the semi-public area of this room. ▪ This room has direct view to the courtyard that encompasses a very large garden and a linear pool (Howz) that provides a pleasant view for the room. 	 <ul style="list-style-type: none"> ▪ There is no decoration under the niche. ▪ The windows are placed only one side of the room (the shorter side). 	 <ul style="list-style-type: none"> ▪ The height of the niches from ground is 90 centimeters. ▪ The niches of three door room (Seh-dari) can be seen in this figure it shows that when a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> ▪ The windows were widened (towards the courtyard) and also were extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> ▪ This figure shows if the room with current situation is furnished, then dimensions of the niche will not be suitable.

4.5 House of Jahan-Arai

The construction dates of Jahan-Arai house back to Qajar period (1822 A.D.); constructed by Ali Mohandes for the owner Haj Seyed Hossein.

Table 25. Jahan-Arai House Information.

The House of Jahan-Arai		
Construction era	Qajar	  
Area of the building	-	
Location	Kashan city	
Present Function	Residential	
		

General description

- This house is listed in the group of traditional houses of cultural heritage organization of Iran.
- Jahan-Ara'i house has one central courtyard. It was also built a little higher than courtyard.
- It has two openings to the outside which are situated at northeastern and southern sides.
- As it is said before, there is no specific room considered as dining, sleeping or other functions, except for kitchen and toilet.
- There are two sections used for the analysis of interior spaces.
- The houses spaces are based on the Iranian patterns.
- The important spatial ensemble of this house is located on its southern side.
- As it is obvious in the plan, it has two kitchens that the smaller one is near the southern segment of this house which it used for particular ceremonies.
- The two sections pass throughout two five door rooms (Panj-dari), porch (eivan), hall (Talar) and three doors room (Seh-dari). So, the interior spaces of these rooms are analyzed.
- The spaces of this room are designed according to Iranian patterns.
- This house has just one opening to the outside and is constructed in two levels, ground and first floor.

Table 26. The Sections of Jahan-Arai House

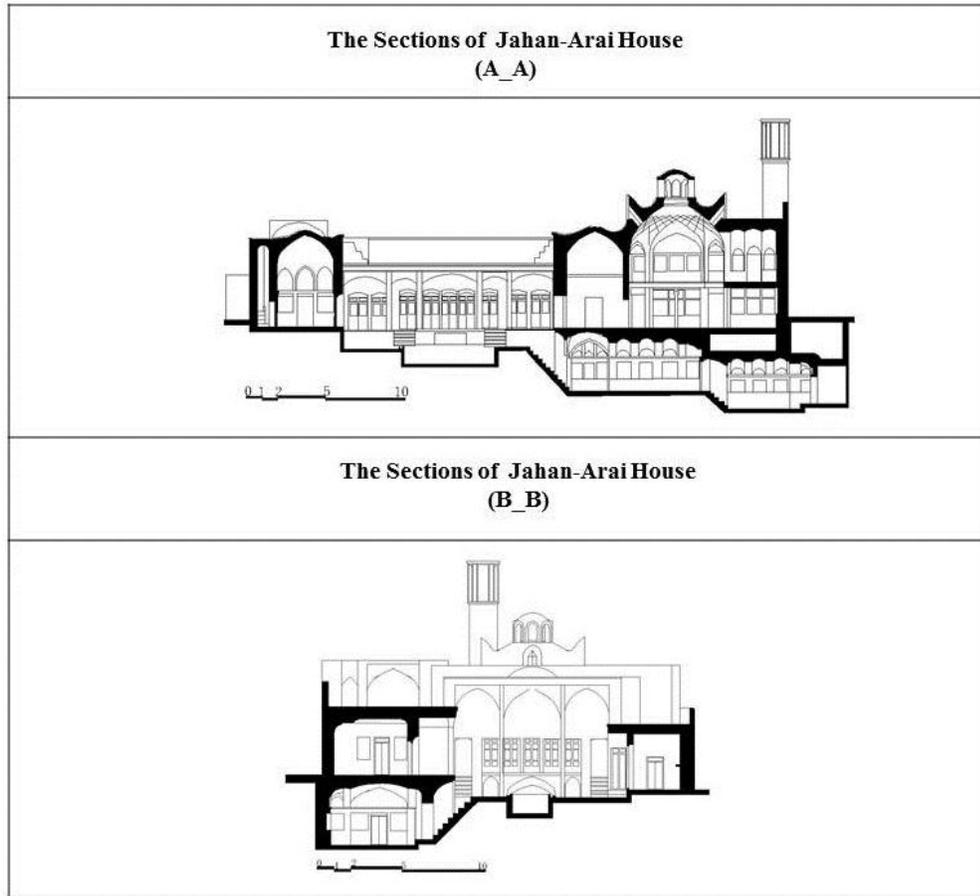


Table 27. The Analysis of Section A-A Jahan-Arai House

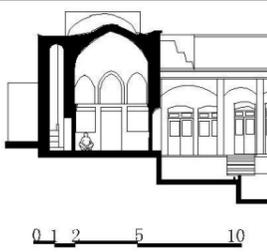
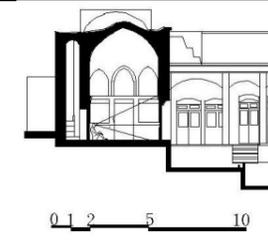
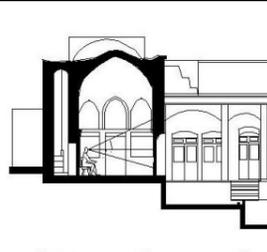
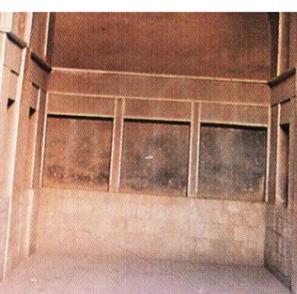
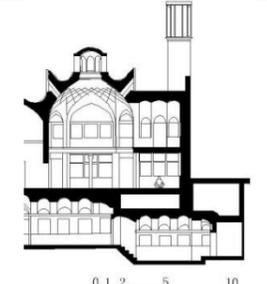
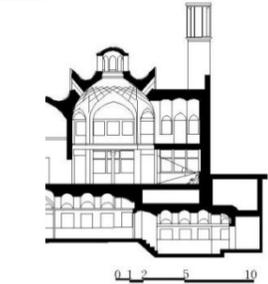
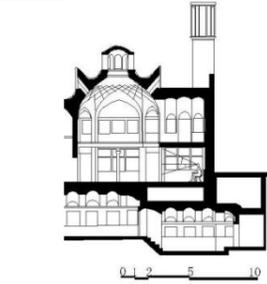
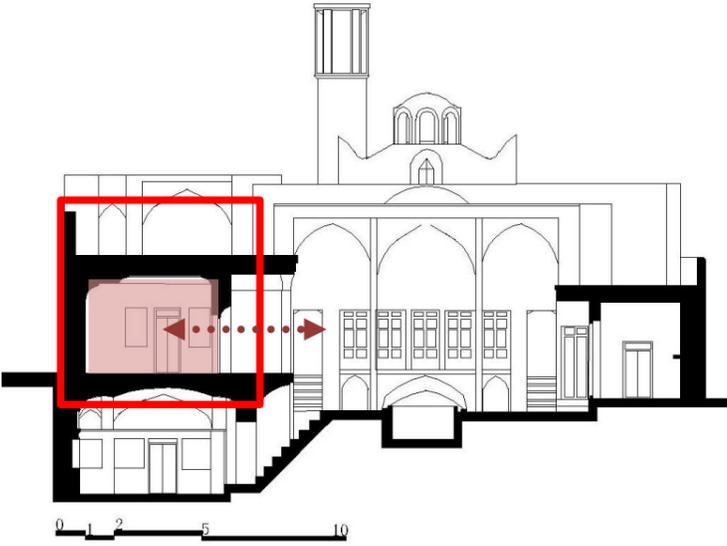
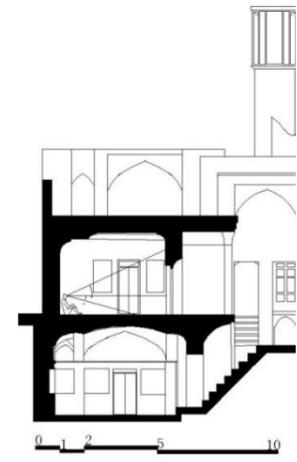
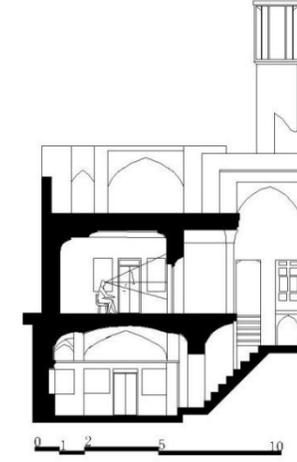
The Section of Jahan-Arai House (A_A)	Analysis of Ornamentations and Space Elements	Height of Niches	Height and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> As it is seen in this section, it has a five doors rooms (Panj-dari) and a three door room (seh-dari). These rooms are located in two opposite sides of the courtyard. Behind the five doors room (Panj-dari) there is a corridor (Dalan) which links this room to vestibule (Hashti). 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 1 (Five door room)</p>  <ul style="list-style-type: none"> There is no decoration under the niche. The windows are placed only on one side of the room (the longer sides). 	 <ul style="list-style-type: none"> Height of the niches is 90 centimeters from floor. 	 <ul style="list-style-type: none"> This room has direct view to courtyard. The windows were widened (towards the courtyard) and also were extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> This figure shows if the room with current situation is furnished, dimensions of the niche will not be suitable.
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Room 2 (Porch)</p>  <ul style="list-style-type: none"> There is no decoration under the niche. The windows are located in the longer walls of this room. 	 <ul style="list-style-type: none"> The niches of this room show that when a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> This space has direct view to the hall (Talar). 	 <ul style="list-style-type: none"> If this space was furnished, the dimension of the niche would not be suitable that means the niche would be behind the sofa/chair.

Table 28. The Analysis of Section B-B of Jahan-Arai House

The Section of Jahan-Arai House (B-B)	Analysis of Ornamentations and space Elements	Height of Niches	Height and Position of the Windows/ Doors	In Relation to Furniture
 <p>view to the courtyard ←.....→</p> <ul style="list-style-type: none"> This section shows one three doors room (Seh-dari) which is the nearest space to the main entrance of this house (as it can be seen in the plan). There is a couple of two-door rooms in both sides of this room. This room is one of the biggest rooms of this house. This room has direct view to courtyard that has a garden (Baghcheh) and includes a pool (Howz) that provides a fantastic view for the room. 	<ul style="list-style-type: none"> Unfortunately, no picture of this room is available. The windows are located on the longer walls of this room. 	 <ul style="list-style-type: none"> The height of the niches from the floor is 90 centimeters. The niches of three door room (Seh-dari) can be seen in this figure; and it shows that when a person sits under the niche, the lower edge starts just on the level of person's head. 	 <ul style="list-style-type: none"> The windows are widened (towards the courtyard) and also are extended to the floor and this made it possible for a person to view the courtyard easily while sitting on the ground. 	 <ul style="list-style-type: none"> This figure shows if the room with current situation is furnished, then dimensions of the niche will not be suitable.

According to analyzes done in this chapter, three of the houses were designed in accordance with the sitting on the ground habit. It is observable in details of their interior spaces such as ornamentations, decorative elements and location of windows. On the other hand there are two houses among five analyzed cases, which obviously were not designed upon the position of sitting on the ground. Although most of the interior elements are designed in a different manner in these two houses, still the total layout of the building and the location of the openings (windows) are similar with the other examples which is the proof of that they are made according to the same traditional approach. It can be concluded that the changes in building layout was much slower and the traditional forms continued to be used even when some people began to use furniture in their houses.

Chapter 5

CONCLUSION

Houses are significant constructed spaces which have a representative role because of their close relations with family as the fundamental structure of the society. Iranian traditional houses are not an exception in this course; these spaces were basically formed with a direct connection to the cultural habits and lifestyle of Iranian society. Iranian traditional architecture, like other types of architecture, consists of various features. Divisions of houses in this type of architecture were based on public and private uses of spaces by the habitants. The most important reason for this division is the impact of culture and specifically privacy; which has great effect on organization of spaces in these houses. The most public spaces in these houses which are called "Birouni" were placed in a location which is accessible easily. These spaces generally have rich ornamentation. On the other hand, regarding to privacy, spaces that belonged to the family members and their routine activities were located in private parts of the house. These parts were not easily accessible; since they were planned in a hierarchical order, which separated the public and semipublic spaces from the private area.

According to the Iranian lifestyle, many activities of inhabitants occurred during family gatherings; which all were usually done while sitting on the ground. Sitting on the ground generally realized in two different arrangements which changed mostly according to the

type of activities that the members were involved in. The first type "Peripheral setting" was the arrangement of sitting in the family gatherings, celebrations, ceremonies and some daily activities where people sat around the room leaning to the wall. The second arrangement of sitting was central, and inhabitants were sitting in this manner mostly while eating and when they were using "Korsi" for the winter time.

Moreover, sitting on the ground had its specific impacts on characteristics of the space and their components. One of the impacts of sitting on the ground on spatial organization in Iranian traditional houses, as it is proposed in this study can be named "multi functionality" of the spaces. In the traditional houses the rooms were not furnished and all of them worked as multi-functional spaces which did not belong to a specific function, event or position. In fact it could be assumed that a kind of nomadic life continued in Iranian house by changing place from one part of the house to the other in different seasons. As it has been discussed module, proportions, geometry, forms and pattern were the fundamental features of Iranian traditional houses. The usage of these features shows the formation system of spaces based on assemblage of geometric forms in a modular order that applied patterns in specific proportions.

Additionally it is possible to say that sitting on the ground can be an essential reason for flexibility of spaces in traditional Iranian houses. It could be said that since there was no furniture used in these houses, accordingly spaces were not limited in terms of functions. In other words, because the inhabitants were always sitting on the ground, therefore there were no definitions of spaces based on furnishing the room or type of the furniture

which is used in each space. In the traditional houses of Iran there were two separate parts for summer and winter and not using furniture can be taken as a point which brings possibility of changing location easily by inhabitant in different seasons. Therefore, this made spaces of the houses more flexible. Despite the western countries, spaces in Iranian houses did not entitle specifically for certain functions so inhabitants used the spaces based on their immediate needs. In some cases some of the rooms were connected to each other by means of common doors, the main aim of putting these doors was maximizing the possibility of using all the rooms at the same time. This means that spaces were flexible so inhabitants could define different functions for each space based on their needs and desires temporarily or permanently. Although sometimes there were common doors between adjacent rooms, different parts of the house were connected through corridors. The fact that specific functions were not defined for each room, allowed the families to extend and live in the same house, because they were able to change the function of any room; and this resulted in multi functionality and flexibility in Iranian traditional houses.

Sitting on the ground can be considered also as an effective factor on size of the rooms. In the houses family members were prior for occupying smaller rooms; and depending on how close was the relation of the guest relatives, they were assigned to rooms with different sizes while they were staying in the house for visits.

Generally people were sitting in three sides of the room and windows were located on the fourth side, facing the courtyard. According to analysis, windows were always extended to the floor. Moreover in the rooms that mostly assigned to the guests' visits or

public events, windows were generally located on the longer side of the room; however in other cases they were located on shorter walls of the room, due to the privacy issue.

Another interior element in the rooms was niche (Taghche), which was decorative and functional at the same time. Most of the niches were positioned in a manner that their lower edges were in the same height as the level of a sitting person's head. Decorations on the walls were also done from the ceiling to the lower edge of the niche; and the lower part of the wall remained plain in order to be suitable for sitting on the ground and leaning to the wall.

Furniture entered to Iran during the Safavid period and its usage was increased in mid Qajar period. After this period in some cases decorations on the walls were applied from ceiling to the ground. This can be the evidence that in these houses the owners used furniture in some rooms. It is noteworthy to mention that, furniture was used first in the houses of owners whom had relations with western countries; and it was not very common amongst other social classes. In several cases owners of these houses belonged to the minor ethnicities of Iran. Applying furniture did not cause major changes in fundamental features of space organization and design of Iranian houses immediately. However the first changes that happened in most of the cases were limited to decorative elements and ornamentations.

According to the sample studies, observations and surveys done in 20 houses in Isfahan province, the interior spaces in most of these houses have been organized suitable for sitting on the ground. But in two houses (Sokiasian (Sokias) house and Haj Rasuli-ha

house) the height of the lower edge of the niches (Taghche) from ground seems to be suitable for using furniture. The reason for this fact can be that Sokiasian (Sokias) house is the house of the Armenian ambassador of England, whom had close relations with Europe. Also it is known that the use of furniture in Armenian houses has been very common. The plan and the position of windows in this house basically were based on Iranian architecture but paintings and niches were turned into a more European manner. The other exception which is Haj Rasuli-ha house has been constructed and oriented based on an Iranian traditional house layout too, but the lower edges of niches are considered based of height of furniture. This can also be related to the fact that the owner of this house has been a well-known carpet tradesman who has had foreigner customers and guests and also had traveled to European countries and possibly could have used some furniture imported from there in his house.

In conclusion the habit of sitting on the ground, as a feature of Iranian traditional culture, appears to have important effects on the organization of interior spaces, and their elements, dimensions, etc. Since there is no other available document that investigate the effects of sitting on the ground on Iranian traditional architecture, the present study can open a fresh new discussion on the role of this feature of traditional Culture of Iran on traditional architecture.

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