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**Outside Inside Architecture: Character and Concept of Open
Spaces in Persian Traditional House in Hot Arid Climate**

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Outside Inside Architecture: Character and Concept of Open Spaces in Persian Traditional House in Hot Arid Climate

ABSTRACT

The whole subject of architecture is acquiring a thorough overhaul as a result of concerns for today and future. Traditional houses represent the depth of awareness and capability of Persian architect to deal with hard natural condition. Its content and the approaches to it are being widened, as we explore in traditional sustainable and compatible way in Persian architecture in central hot desert. There are numerous stylistic analyses. Among them the role of open space its characters and concepts has main position. They had used various types of open spaces with different types of shape, size, depth and height and they had organized them in a unique spatial positioning system in three dimensional way. The vital role of open spaces their diversity in different level of height and positioning of them is the key. Design guidelines and preferences with various interface spaces organize indoor outdoor compilation that made their homes suitable place to live. Traditional definition of these open spaces and their role are one of the most important character in Persian desert architecture. Central court yard is the heart of Iranian traditional home. But there are different kinds of open spaces. The concepts of them from two points of view are important, functional and physical. 1-More sense of security and development of privacy are functional characters these open spaces. For example central open courtyard is the first and the nearest open space to achieve the nature in desert and direct contact with water and green plants equal for all people in home and gathering appropriate sun light for all seasons and some other functional reason depend on central open space. The function and name of each open space are different. Their orientation and position define the other part of home. 2-Organizing all rooms and spaces depend on open space and central courtyard. Design home starts from central open space and indoor and outdoor different spaces arrange around it based on various reasons. So relationship between outside and inside spaces develops when it is needed. The main façades are inside the house and a small nature comes inside from outside the house. So everything a family needs from outside comes inside that I named it Outside Inside architecture. In this way there are several principles, priorities and technics.

Keywords: open space, sustainability, traditional house, architectural character, concept, design guidelines.

Introduction

Dualism is one of the most important arguments in philosophy. It has also an essential role in architecture from the past to present. In this point of view there is a binary system that has both side and two sides against or beside each other. Most of them are famous, good and bad, subject and object, apparent and conscience, in ward and out ward face and character. But some of them become the favor of architects, so we have to care about them like the concentration on form and function interior and exterior, inside and outside, etc.

The last one, inside and outside stands on apparent and conscious in philosophy become bold in rude hot arid climate architectural, where the sun is king. In these areas in Iran sun and moon, light and shade, especially shadow protects people in hot summer and sun gives life in cold winters. This situation separates organization of spaces to northern and southern, Western and eastern spaces. Northern spaces have view to the south part so the usage of them is in winter because they prepare southern sun light and the southern spaces use northern light (or noon direct light). This system is based on this binary dualistic view.

Everything in this architectural is internal and all spaces arrange around a central enclosed courtyard which has a main essential role to organize all the spaces in Persian house architecture in hot areas.

Semi open is another point which adds to this distinction of the houses. There are various semi open spaces that flank the house on both floors.

In this configuration Eivan and the other transformed spaces from it like Soffeh, Mahtabi, and the others are located to bring outside attractions but not easily accessible to inside within reach private spaces.

The role and character of these spaces define inside outside architectural in Persian houses in hot region. Sometimes these semi open spaces found an acolyte like sunken garden that is a developed courtyard in basement level.

Figure 1. *Context of Hot Arid Regions in Center Part of Iran (Haeri 2010)*



Characters and Concepts

In case of a stronger and clearer perception of a hot-dry climate Persian house, first it is essential to consider the situation of the house in urban context in desert. To have a better vision of the house, it is necessary to start from the city where the house has been shaped based on residents' experiences.



Figure 2. *Arrangement of Urban Context (Tavassoli, 1982)*

In desert cities of Iran the patterns are very similar and close, although in general view an organic system is obvious to be shaping up the form of the city. Even the arrangement of urban context in the cities and afterwards the houses were formed based on a particular attention to climate so as it is said today, the sustainability character can be seen in the houses. Since these cities has resisted through the worst climatic conditions and drought for thousands of years, the residents should have thought of preparations.

It is not feasible to mention all the solution, but the most significant ones which have influenced the arrangement of the houses are introduced below:

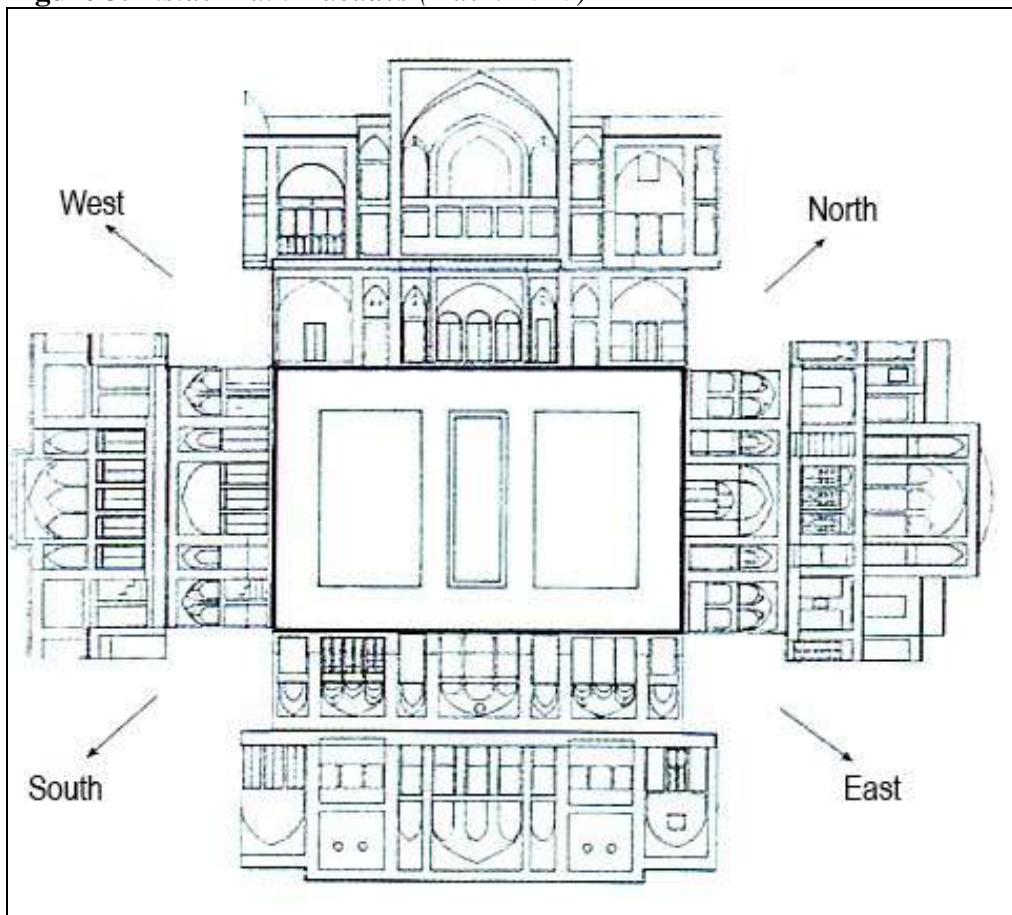
- A: High density context
- B: Strong connectivity
- C: Narrow, semi covered and irregular alley
- D: sun and wind based direction

These four factors approximately lead to less consideration toward the urban open spaces (Except for government ceremonies in major cities) as well as the façade of the buildings, therefore the people of the desert fetch their outside needs to the inside of their residential complexes and houses, meaning that most of the expenses and energy were spent on the inside, hence the government public system or today`s municipality could dedicate the least budget to public spaces in their list of expenditures.

Inside Main Facades

The first transposition is the shifting of outside to inside, thereupon at the inside a vast chain of changes must be happening in case of design so that the house contains a fully completed inside including spaces that in other architectures a large number of them belong to the outside of the building, therefore the first step in inside outside architecture is that the main facades shift from outside to inside of the building. The four main facades of the building are exposed to the four sides of the enclosed courtyard so throughout the day the facades are interacting (both in terms of beauty and function) with the inside users of the houses and not the outside, therefore the outside of the house is very simple and almost without any windows, although in entrance of the larger houses a porch was defined which indicated the main entrance of the house.

Figure 3. *Inside Main Facades (Haeri 2010)*



The enclosed court yard contains the four facades facing inside of the house so one can observe four main facades with all the details while standing in the middle of the yard, therefore the facades are available to the residents and this is the major difference between these houses and other architectures.

Inside Nature (Enclosed Courtyard + Sunken Garden)

Enclosed Courtyard (Hayat Markazi)

In a hot-dry climate Persian house the presence of outside nature shifts to the inside of the building which resolves the outside needs. These needs could not be dispelled in a dense city in which water is precious and could hardly be found. In urban context green nature is rare and out of touch, so to reach a water supply people had to go out of town therefore they had complicated issues.

Figure 4. *Enclosed Courtyard (Haeri 2010)*



Enclosed courtyard and sunken garden were the two considerable areas in the house that provided a micro climate available to the residents. The presence of water increases humidity and beauty and in this case the functional usage of water was important.

Sunken Garden (Godal Baghcheh)

Having a special position (at least three meters below the alley's level), the sunken garden has a significant role in forming an inside nature in a hot-dry climate Persian house.



Figure 5. *Sunken Garden (Haeri 2010)*

The sunken garden plays some key roles in the house:

- * Easier access to the subterranean water for usage of the residents and also for irrigation.
- * Creating a cool place with enough humidity for living in summer time in hot-dry climate.
- * Most of the time the soil of the sunken garden was used to make adobe.
- * Placing the yard in depth of the ground has provided a more stable combination and also more facilities for development of spaces and residents' activities.

Semi Open Spaces

Other than enclosed courtyard and sunken garden in architecture of hot-dry climate Persian houses there were varied semi open spaces with different characters and roles which were used in several positions and they are likely to be forgotten. To mention but a few:

Here a semi open space is defined as a place with at least one open side meaning that the walls has less important role in forming these spaces.

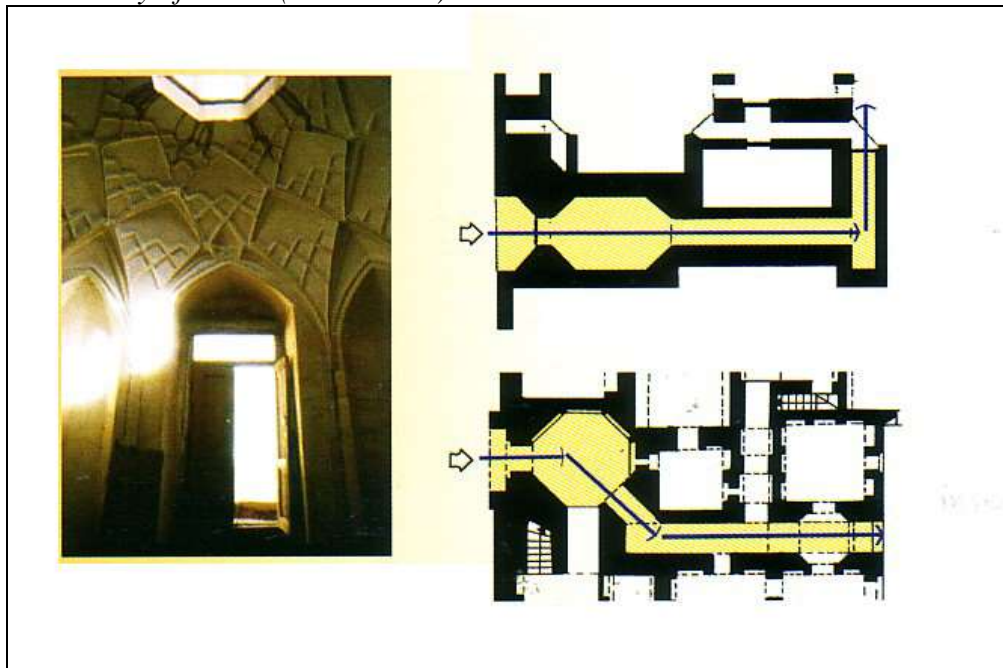
Here are different types of semi open spaces in order, starting from the entrance: Keryas, Antechamber (Jolo Khan), Vestibule (Hashti), Farvareh, Dalan (corridor), Colonnade (Ravagh), Eivan (Veranda), Soffeh, Mahtabi, Takhtgah (Throne), Sardab (Cellar), Sharemi, Hose-Khaneh, Hojreh (Chamber), passio(paashuyeh).

Vestibule (Hashti)

Vestibule is a covered space placed in the entrance of the house. It was the outside part of the house which was connected to the alley and had the role of a joint between the inside and outside.

If someone tended to enter the house, the first step was to get past the vestibule. It is a type of small yard. The first basic step is the movement from outside to inside. The vestibule is a lounge that has some platforms to sit on or to rest without entering the house and also without standing in public way. People waited in the vestibule or had their daily conversations and business talks while standing in this space.

Figure 6. *Various Types of Hashti (Vestibule) and Dalan (Corridor) to Make the Privacy of Inside (Haeri 2010)*



Role of the vestibule in defining and reinforcing the neighborhood connections was very vital. In some cases a vestibule was shared between several houses and the neighborhood residents would talk and visit without entering into the privacy of one another.

The daylight penetrates into the vestibule through an opening in the ceiling and provides the natural light in day time.

The level of luxury and decoration was dependent on financial wealth of the landlord.

Sometimes the vestibule was attached to the alley with a corridor while another corridor attaches the vestibule to the yard with a 90 degree or multiple 45 degree turns.

Corridor (Dalan)

As the name implies, it is a connection path between outside and inside of the house which was often meandrous and covered. Corridor's length and position would change toward the vestibule, based on the type of neighborhood and paths connections (Figure 5).

Farvareh

It is the Bala-Khaneh of summer room and private room at the top of some houses which was often in the southern side and was functional at summer time.

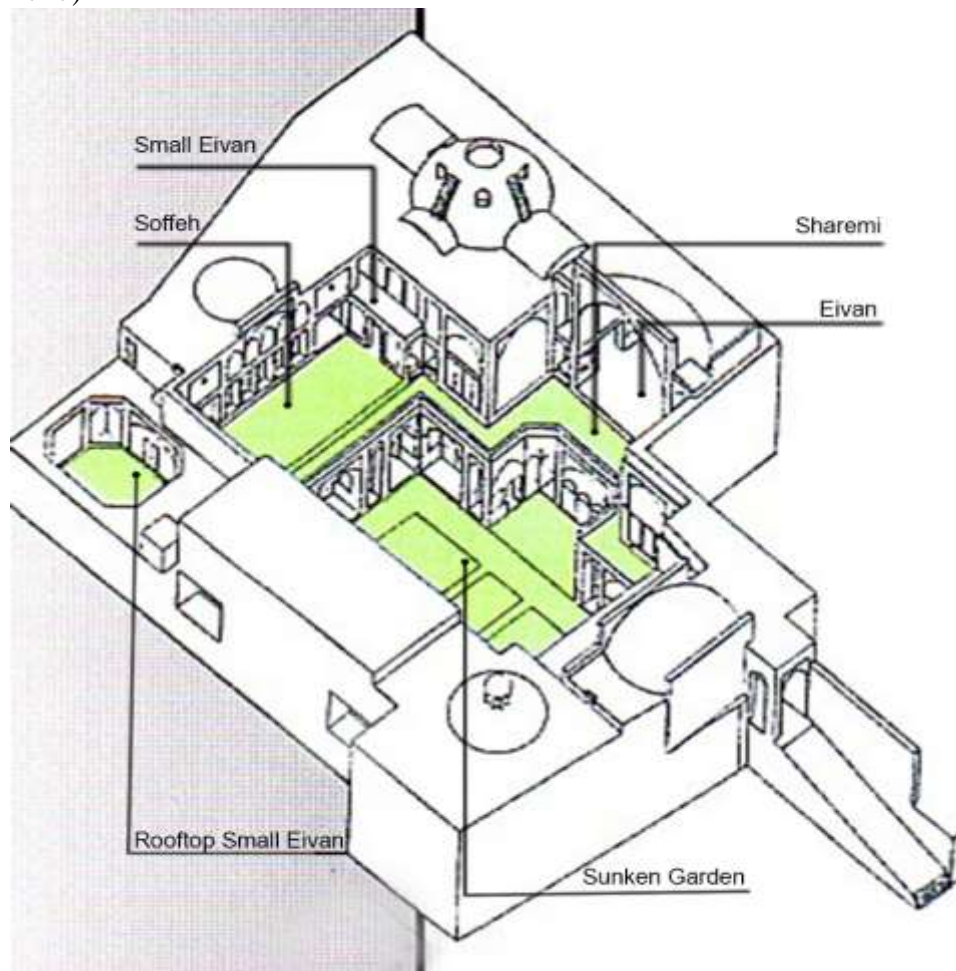
In some cases it was close to the alley and also accessible through the vestibule.

In southern regions of Iran there are similar cases of Farvareh which are built on the top of a path and the cool breeze waving in would lead to a pleasant temperature inside. These corridors contained holes and openings.

Soffeh

To access Soffeh or sleeping porch it is needed to climb a few stairs from the yard. In some cities of Iran Soffeh is called platform.

Figure 7. *Various Types of Open Spaces, Soffeh, Sharemi, Eivan, etc. (Haeri 2010)*



Soffeh is an open space which is surrounded on three sides while in the middle there are a few rooms and covered paths.

If the windows of the rooms around open up to soffeh we will be witnessing a perfect blend of open and closed spaces which develops the room. Its dimensions are vast enough for a whole family to sit in and enjoy the view and pleasant weather of the yard.

When spring or summer comes they can rest through the night in this delightful space while watching the sky and also feel safe under the protection of Soffeh's body.

Sharemi

In some areas the green courtyard was located lower than level of the alley for size of one floor, therefore to access different spaces in the same level as ground floor, an open path has been considered all around the yard which is called Sharemi. It is one of the open spaces in hot-dry climate Persian houses which While passing it, all the fronts are visible as a view.

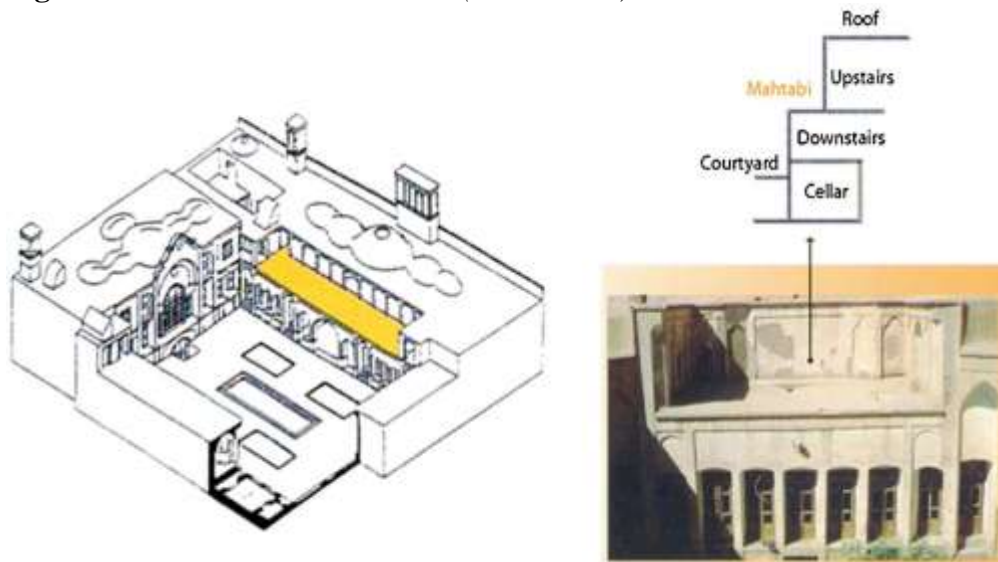
These types of houses can be found in Yazd, Kashan and Bushehr. Sharemi was often in combination with Soffeh or Mahtabi.

Mahtabi

Mahtabi is another type of open space in the house that is higher than the yard and sleeping porch while it is lower than the roof.

Mahtabi is also surrounded on three sides however not with rooms but with harmonic and symmetric walls. The other side of Mahtabi faces the yard.

Figure 8. *Mahtabi and its Position (Haeri 2010)*



Access to Mahtabi is possible through the stairs which link the yard to the roof. It is a convenient place for summer nights and also a spectacular space to

watch the sky holding the moon and stars all luminous at night. Mahtabi as a space pattern is contained of four closed sides and two open sides.

Eivan (Veranda)

Eivan is one of the important semi open spaces. It is a covered space but open in the front. In Persian houses there is always a joint between open and closed spaces that its presence has a fresh connection with nature, light and climate and has led to preparation of several facilities for activities and sociability of their residents.

Connecting the spaces to joints in a Persian house is an essential character for Persian architecture in hot and dry climate.

Figure 9. *Eivan and Mahtabi, Main Semi-Open Spaces (Haeri 2010)*



Eivan has a functional role and again it raises the quality of living as well as spaces.

Covered semi open spaces in Persian houses have various sizes and functions. The smallest one of all is called Eivancheh which is a small version of Eivan and it is also an arcade.

Eivancheh is usually between the rooms and the yard, being combined with doors and windows.

Eivan is the most popular covered semi open space which is sometimes in touch with yard, trees and a great fountain, while on the other side it connects

to the alcove and has a qualitative combination of spatial development and also allows the possibility of extensive activities.

In some cases Eivan is located in Bala-Khane and it has an independent spatial formation. These spaces which were built in Bala-khaneh were more private areas of the house they were completed in conjunction with the yard and Hose-Khaneh to help the qualitative development of outside space at the inside of the house.

Eivan's smaller sample is called Evancheh on the other hand there is a more complete sample of Eivan called pillared Eivan in which columns have been added.

Keryas

Keryas is another type of covered space that is the entrance for rooms and halls. It is a private pathway and also an entrance for the bigger rooms that from one side faces the yard. Keryas is a space inside the Sarai which generally was used for alcoves and helped to raise the quality of rooms.

In some cases entrance of the building was located on the side of alley and it was shaped like an octagonal or rectangular space and was called Keryas. It plays the role of an entrance for the house or the rooms and it counts as one of the semi open spaces.

Hose-Khaneh

In Persian houses Hose-Khane is one of the covered spaces which was sometimes open from one side while mostly in some cases it has been seen roofless. Hose-Khaneh has a special role, meeting the outside needs of the house such as presence of water in nature which was difficult to access in desert cities. Freshness, humidity and the reflection of outside nature in the house was achievable through a combination of spaces which is called Hose-Khaneh. It was functional in three levels:

- Under ground
- On the ground
- Upper floor

Figure 10. *Hose-Khane should be in 3 Level Bring Nature to inside with Water and Greens (Haeri 2010)*

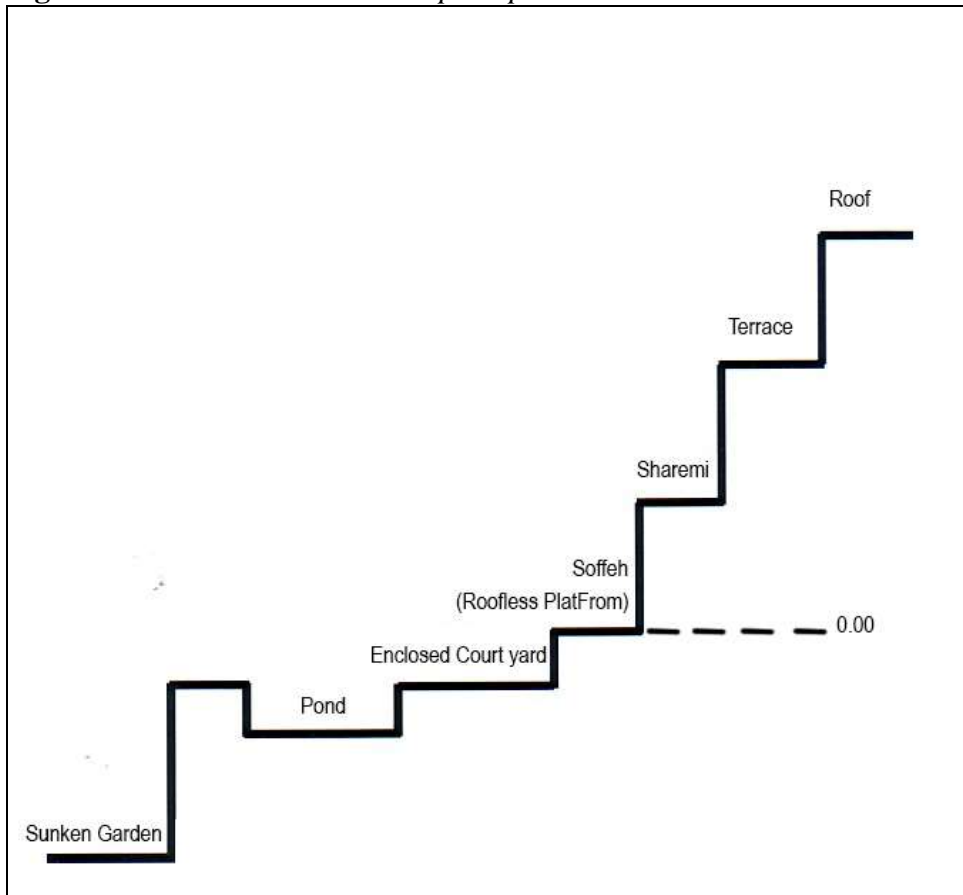


Appearance of the outside was approachable through these spaces at all three levels. On the ground floor or in the middle-level Hose-Khaneh had a more public function while in upper levels it was more private. In some cases Hose-Khaneh gets a richer look in combination Eivan or adjoining room and also it is involved in empowering other spaces.

Basement (Underground)

The level of outside penetration into basement in scorching continent architecture is different depending on water of subterranean canal (means how the mentioned property accesses the flowing basement water) and toughness and hotness of the region. In regions where the heat is more intolerable, mostly a court yard (sunken garden) is used in basement level. In other regions in basement, there are other places at houses like: Cellar, cistern and shoal. Some of these places are even attached jointly to an upper air catcher in above floors, which inhales the fresh air into basement with pleasant moisture in air dryness.

Figure 11. All Levels and Semi-Open Spaces



Chamber

Chamber is a small, semi-open porch place which acts as the temporary sitting area with three walls or the “garden’s hole” inside the open space, and it is temporarily used mostly in winter days or the spring or summer’s nights or evening. It is mainly in spaces around which a room is not necessary, or it’s not possible to construct a room around it.

Figure 12. Some Semi Open Space in a Section (Haeri 2010)



Conclusions

The spatial organization of Iranian's house is a complex composition based on the experiment and appropriate placement of the spaces with content and performance. Each part in these places is associated with the formation of other parts in a multilateral way. Various open and semi-open spaces are a skillful combination of outside activity, nature of needs inside the house. This relationship helps you have the whole different spatial sequences and stimulates your emotion and creativity.

Space flexibility is another feature here. No space is defined by itself. In summary, the specifications of spatial discipline character are given as the following:

A: outside description in three levels: beneath (under-ground or basement), middle (ground level) and upper (first floor).

Places which help the outside appearance in beneath level: Sunken garden, cellar, chamber (hojreh), spring house, the servicing places of cistern.

B: spaces in middle level: center yard, Eivan, Soffeh, Sharemi, Ravagh (colonnade), Keryas, Vestibule (hashti), springhouse, corridor (Dalan).

C: spaces at upper level of house: Springhouse, small eivan, Eivan, Mahtabi, and Farvareh. So the design guidelines are:

- The gradual penetration of outside to inside in Iranian house with different spatial hierarchy has been a succession from public area to private area with many joints, covered spaces and semi-covered spaces to open and semi open spaces.
- Seasonal movement in house spaces (mostly in surface)
- Vertical movement in spaces according to season and day.
- The placement of open and semi-open spaces in three dimensions, from basement to roof.

Figure 12. *A Complete Model of All Semi-Open and Open Spaces in Spatial Organization*

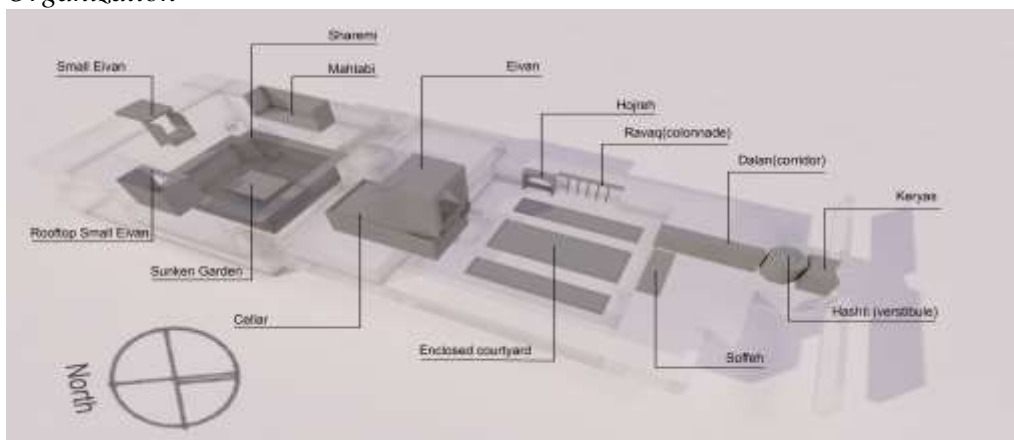


Table 1. Definition and Character of Semi-Open Spaces

Name of Space	Character	Level of Location	Orientation
Keryas	Semi open space before entrance (entry)	Grand floor	Based on alley
Hashti (vestibule)	Main octagonal entrance	Ground floor	Based on alley
Dalan (corridor)	Covered pass way	Ground floor	Based on entrance
Ravaq(colonnade)	Semi-open pillared space	Ground floor	West - east
Eivan	Semi-open roofed space closed on three side and open on the forth	Ground floor, first floor	
Enclosed courtyard	Main central yard	Ground floor	Center of house
Soffeh	Roofless platform less than 1 meter above the courtyard level , usually located in front of closed space	Ground floor, first floor	West or east
Sharemi	Main pass way above the courtyard or sunken garden	Ground floor, first floor	Ground floor
Mahtabi	terrace	upper level	North , West , East
hose khaneh	a covered space with a pond	Ground floor, basement, first floor	South
Hojreh	chamber - semi open space ,covered but open in one face	Ground floor, basement	West or east
Cellar	used in hot summer because of water and under ground level	basement	basement
Small Eivan	usually with a small pond semi - open on the first floor	upper level	West or east

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