

The Design Elements and Building Techniques at the Traditional Jordanian Dwellings

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Abstract

This paper sheds light on vernacular and traditional architectural in Jordan, especially the residential traditional building. They are characterized by simplicity in the construction techniques and their relevance to the location and climate. Jordan has witnessed several civilizations during the time; as a result, there are various archaeological sites that proof the human settlement on its land. Each period of time left its impact on the building style; as a result, the vernacular and traditional architecture were found. So, the key role of the paper is to study the typical design elements, which were used in the vernacular architecture to satisfy the occupant's needs. The other objective of the paper is to study the material and traditional building techniques that were used in the traditional buildings. Also, it classifies the traditional residential building into rural and urban building based on the time of emerging. The research methodology will base on the descriptive methods and on the secondary data of the traditional architecture. The result shows that the traditional residential building in Jordan can be classified into two main types are; fallhi house and urban house. Fallahi house contains the houses that constructed in the villages, where the urban houses contain the houses that constructed in the cities. Fallahi house contains several types are; Al-Qanater Houses and Al-Mastabeh houses. The urban houses contain the courtyard houses, three-bay houses and the gallery houses.

Key Words: Contemporary Architecture, Elements of Popular Design, Traditional Architecture, Vernacular Architecture.

Introduction

Architecture is an exciting experience, the best way to explore it through the challenge to do it, and as any other innovative system, the experience in architecture is achieved by observing what others have accomplished, also during the analysis of their works, and tries to understand how they have come to face the challenge (Daher,1999).

The study of architecture is one of the main entrances to identify the cultural identity of nations and peoples that produced their architecture, with its several forms and subjects. The concept of traditional architecture connected to the ideas of architectural pattern with its two dimensions; time and site. This pattern has limited ability to development; it embodies values of a time, and involves local materials and the touch of the hand, it derives toward better historical procedures and building techniques. Architectural identity is the product of architects' trails to connect the built environment with the available resources, history and culture (Alsubeh,2013).

These architects' trails are to accomplish the housing compatibility with the environment via two strategies: protection and adaptation. Protection technique is applied by limiting the impact of harsh environmental conditions. While the adaptation technique can take advantage of the potential of these harsh conditions and treat them to achieve the users comfort (Shawash, 2003).

Consequently, traditional architecture has different physical characteristics depending on its location; as it built to meet specific needs, accommodating the values, economies and ways of life of the culture that produce them. Traditional architecture used common regional forms and materials at a place and time. In contrast, the modern architecture is the architects' trails to emphasizes the concept of production mass; to avoid the past and produce architectural works which have symbolic signs, with no connection to the site or its identity; to achieve a new vision of the new age (Alsubeh,2013).

This study sheds light in the traditional residential buildings in Jordan; it will study several types that appeared in both Jordanian villages and cities. Also, it will emphasis in the architectural vocabularies that were used at those traditional houses, which are considered as design elements that were used by the dwellers to satisfy their needs.

Research Objectives

The research aims to achieve the following objectives: -

- 1- To identify the design elements that were used in the traditional residential building in Jordan.
- 2- To study the building materials and traditional techniques those were used in the traditional residential building in Jordan.
- 3- To classify the traditional residential building.
- 3- To identify the levels of communication and design relations used by the Jordanian architects to achieve communication with the heritage resources deployed in the region.

Methodology

The researcher adopted the descriptive and analytical methods to get the results of study by taking a sample of projects (case studies), which reflected the traditional architecture in Jordan. The necessary data and information of selected projects has been collected by the following methods:

- Secondary data on traditional architecture were collected from literature review.
- Going back to books, journals, websites and any references that containing any information about the selected projects to get to know their specific characteristics and design features.
- Architectural analysis and personal observation of researcher for drawings and images of projects and comparison with the original images of heritage resources that architects tried to express a communication with.

Traditional Architecture in Jordan

The importance of the traditional architecture comes from the way of building; which makes serious use of the familiar symbolic forms of a culture of a people in a place. It considers the styles that were popular to a region or area. The characteristics of traditional architecture were used by architects and builders includes a commitment to maintaining a link to the past styles of building, reuse of materials or designing homes and building to stay consistent with the overall building design of the area. This creates a sense of continuity and connection to the past, which helps the area, maintains its traditional look and feel for the residents of the community (Brunskill, 1981).

The traditional architecture is considered as a non-regular environment; because it was not subject to pre-prepared urban plans, but was developed by residents according to their environments, needs and circumstances (Khammash, 1986).

However, it is not appropriate to describe the traditional architecture with absolute spontaneity; because it was gained over time through practical experiences. The houses were built, and the materials were chosen, according to the nature of the place and the local conditions. Therefore, the experiments and environmental lessons throughout history were the main factors in the production of human assemblies (Alsubeh,2013).

The term of Vernacular Architecture is that segment of the body of traditional architecture of a people which serves the humbler purposes in their society. Traditional buildings could be called vernacular because they embody values of a time. It has a direct access to the material, landscape, social order, and economic arrangement. As a result; vernacular derives toward better historical procedures in building techniques (Khammash, 1986; Alsubeh,2013).

Nowadays, the architects adopted the traditional architecture through the rephrasing of the vocabularies that were used in the traditional architecture, within a new language and new techniques. They worked on the production of a new concept that combines the respect of heritage, and linking it to new architectural techniques (Fathy, 1986).

One of these architects is Rasem Badran. He stressed through his design idea to transfer the modern building to the future carrying its original components, and not an identical copy; through the diversity of architectural forms according to the regions where they are built in. Moreover, to produce an architecture that reflects the place and the time it lives (Rjoub, 2016).

The Elements of design in the Traditional Architecture

As the traditional architecture based on local needs, construction materials and reflecting local traditions; it has various forms based on its location. Consequently, the design elements are varying from one site to another. One of the most vital design elements that were used in the traditional residential houses in the village of Jordan is the yard which was called Housh, there are two types of Housh; the first one placed in the front of the house, used for daily activities and to store the tools. The other type is a common place for the whole houses; it intermediates the houses. Mostly, they were called by the family name; as the houses were occupied by the members from the same family (Khammash, 1986).

Al-Mastabeh is another essential part of the traditional house in the village, which is higher than the level of the Housh, and it was used as a sleeping area at night and a living space at the day (Shawash, 2003), (Khammash, 1986). Further significant elements are; Al-Rawyeh and Al-Qwarah that were used for storing the grains; since the dwellers worked with cultivation. Al-Rawyeh is found in the big traditional houses in the village (Figure 1); it was constructed from the mud, between two structural stone arcs, and it was used as a storage space for the grains. It was filled from the upper parts and the occupants can get the grains from an opening in the lower part. Above Al-Rawyeh was used to set up the blankets (Alsubeh,2013).

Also, Al-Qwarah was used as a storage place for the grains in the village houses. But, it is taller than Al-Rawyeh; it was built from mud and it was placed along the wall between the stone arcs and fill from opening in the roof (Khammash, 1986). Another design elements as Al-Qantarah, where it appeared in both the village and the city. Al-Qantarah is a structural element that supported the mud roof (Figure 2). Stone was the main building material that was used to construct Al-Qantarah (Khammash, 1986; Mcquitty 2007).

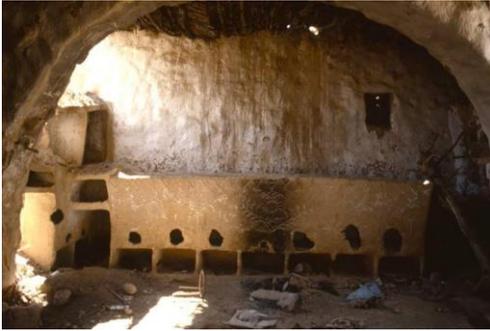


Figure 1: *Al-Rawyeh*

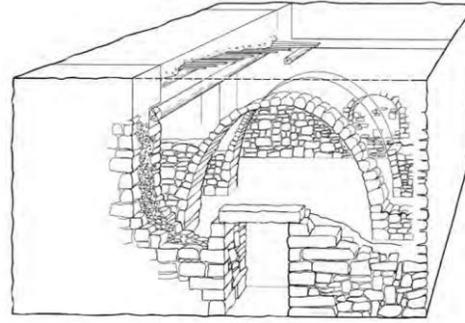


Figure2: *Al-Qantarah (stone arch)*

Most the mentioned elements of design were used in the rural houses, other elements that were used in the urban houses as; the courtyard and the Mashrabeiya. One of the courtyard's vital utilities was its social task; as it was the central area, supplementary it achieves the environmental goals. Mashrabeiya relates to the opening's high position, covered with a timber lattice screen, and the fact that it overlooks lower spaces and passers-by; it serves several functions; privacy, lighting and ventilation (Almurahhe, 2008; Aljawder, 2014). As a result, the design elements could be classified into two categories are; the design elements that serves the rural houses and that serves the urban houses.

The development of the residential building in Jordan

Based on the life style in Jordan; there are two principal cases are; nomadic shepherds (Bedouins) and settled agriculturists (fallahin). The affiliation was established along the concept of tribalism, which stands for the inhabitants are from one clan or kin. So, the villages were mostly consisted of one or two clans (Khammash, 1986; Daher,1999; Rjoub, 2016). The Bedouins form most of the population. They depended on their life style on moving from one place to another in searching for water and pasture for their sheep. Their houses were simple, easy to transport and carried. They depended on tents made of their sheep's wool (Shawash, 2003).

During the period of Ottomans, they tried to settle the Bedouins tribes to protect Al-Hajj Road; this was the emergence of the Agro-pastoral villages in Jordan since 1880 (Schriwer, 2002). Provincial Ottoman officials sought to produce a network of villages to the east and south of Salt, in proximity to a regular water supply and the fertile grain lands of the Balqa' (Rjoub, 2012). The vital project at the Ottoman time was the Hijaz Railroad Line, it was the main motivation, to create architectural buildings in Jordan; it starts with the fort's construction as, Al-Hass and Al-Qatraneh to protect the pilgrims. Moreover, the train stations such as, Amman and AlMafraq (Daher,1999; Khafajah, 2011).

The most significant city in Jordan at that time was Al-Salt. Then, the administrative center was shifted from al-Salt to Amman; it was inhabited by three to five thousand people, it was Amman village (Shawash, 2003). Most of Amman inhabitants were Circassians; they occupied the Roman ruins, as well as in the caves of Jabal al-Qala'a, in what was later known as Shapsogh quarter as they belonged to Shapsogh clan. In 1880 Circassians of Qabarday and Abzakh clans settled the area south of Shapsogh quarter around the Omari mosque; their quarter was called as Qabarday quarter (Shawash, 2003; Alsubeh,2013). In 1892 another wave of immigrants settled the area near Ras al- 'Ein, their quarter was simply called the quarter of Immigrants (Mohajireen). Furthermore, new arrivals to Amman were Akrad, Magharbeh (Moroccans) and Masarweh (Egyptians). They established in Amman the (Masarweh) quarter in Amman Mountain (Jabal Amman), near Khirfan Street, through this period the population of Amman raised from 3000 to 30000 (Shawash, 2003).

Later, the biggest event is the (Nakba); Palestinian migration in 1948 and second migration in 1967. The statistics indicate that the number of those who came to Jordan during this period about 240000 persons. Other waves of immigrants are from Iraq and Syria. As a solution to settle the immigrants; the camps were immersed as; Souf camp, Baqa'a camp for Palestinian and az-za'atri camp for the Syrian (Khammash, 1986; Shawash, 2003; Alsubeh, 2013).

Traditional Residential Building classification

The concept of traditional architecture connected to the ideas of architectural pattern with its two dimensions; time and site. Therefore, the traditional residential buildings in Jordan could be classified into several types depending on the time of appear (Shawash, 2003):

1- Village Architecture: This type includes the residential buildings that appeared before 1866, it was called the Fallahi house, and consisted of one floor only. The front yard (Hosh), was used as vital part, where the daily activities happened. The structural system was based on stone arcs (Qantarah), which carry the wooden roof and cover by mud that mixed with straw. This type was mostly, without openings except the entrance. The main building material was the irregular stone as it is from the site; it was used at the walls and the arc stone (Rjoub, 2016).

Other type emerged base on this type is Al-Mastabeh House, which means the platform house; as it consists of two levels are; the lower level that connected to the main entrance, and has the main facilities. And the upper level, which rise 20cm-70cm from the lower level, and contains the living area, which transform into a sleeping area at night.

The number of the room was based on the social and financial status of the owner, thus several forms of Fallahi house were appeared such as; separate house, consisting of one room only. This form gives the status of flexibility and capability to expand in the future; according to the increase of family demands and financial capability. Linear house is another form consists of several rooms, which are extended on the axis from south to north, and the entrances overlooking towards the east or south-east, linked by terraces at the entrances in the yard, surrounded by all sides as well. And courtyard house where the courtyard placed in the center of surrounding rooms (Rjoub, 2012).

2- Urban buildings: This type includes the residential buildings that appeared between 1866 and 1890. It outfits with the urban life and consists of two floors; the first floor contains shops and the upper floor has the living and bedroom. There was an external stair to reach the upper roof (Aljawder, 2014). This type of building adapted the courtyard system on the first floor; which was a climate treatment suitable for winter cold and summer heat. It also provides privacy to the occupants; since the rooms were oriented toward the inner courtyard, this eliminates the outside openings. The Mashrabeyah was used in the upper floor of the external elevation.; It covers with a timber "lattice screen", Consequently, female in the house can look outside without being seen from the outside (Almurahhe, 2008; Aljawder, 2014).

Courtyard house style appeared in Jordan, especially in As-salt and Jerash; as an influence of the Syrian and Palestinian builders, this affect the building material too. The main building material was the regular form of stone due to the immigration of the stone cutter from the surrounding countries, such as Nablus from Palestine to settle in Jordan. They used the cross-vault system as a structural system in this type.

3- The residential building that appeared in 1890-1918: In this period, the form of the house was changed; due to the change in the family structure; from the extended family to the nucleus family. Consequently, the people started to use a new form called the Central Hall House instead of the courtyard house (Alsubeh, 2013). In the Central Hall House, there were several rooms distributed around the central covered hall instead of the courtyard. This type has several characteristics are; The floors at this type up to three levels, the building materials were imported from the abroad, the existence of the architectural details on the elevations and the openings became wider; due to the influence of the western culture.

The facilities as the bathroom and kitchen became part of the plan, in the previous residential types; they were separated from the main plan, sometimes the bathroom located outside the house; as in the village house (Rjoub, 2012). Three-bay houses, is one of the buildings that appear at this period due to the commercial relations with the Lebanese traders from Beirut (Williamson, 1998).

4- The residential building that appeared in 1918-1935; They were mixed of the eastern and western influences, with new techniques; as the use of the concrete as a building material. The people used the iron beams; mostly they were cut from the train railroad that was built in the Ottoman period (Figure 8). The roof at this type became flat due to the use of reinforced concrete as the main building material (Williamson, 1998; Alsubeh, 2013).

5- The residential building that appeared in 1936-1950; it could be modern and international architecture. It's a concrete building, whatever the cladding material; stone, glass and steel.

Another type of houses is the Circassians houses; they bring a tradition of woodworking. The structural system in their house based on post and lintel of timbers. The beams rest on a square wooden buttress in the central of the room. The external walls were constructed of two layers of mud-brick. The porch is the main part of the Circassians house; it displays the building systems and the woodworking skills. Moreover, it defines the front entrance of the house (Alsubeh, 2013), (Khammash, 1986). A fireplace is another important part that comes with the Circassians, they used them in their house not out of need as much as out of custom (Khammash, 1986).

Their houses belonged to the archetype of the gallery house, where the gallery took the place in front of the house, as a form of a porch, with all rooms opening onto it. When the second floor was added to the house; the porch transformed into a balcony running all the length of the façade (Shawash, 2003). The Circassian houses were changed gradually; according to affecting by surrounding architecture. Later, Circassians started to build with stone, learning the procedures from their neighbors. Moreover, the Arab houses were affected by the Circassian houses, where wood emerged as a building material, and the gallery used in some houses (Williamson, 1998; Shawash, 2003).

Traditional Architecture Influence on the Contemporary Architecture

The effect of the traditional architecture in Jordan is reflected in the simulation of rural dwellings (Matrouk, 2010). The most prominent example is Zu'aitr House. It is one of the works of the architect, Ayman Zu'aitr in 1984. The building consists of four residential houses for the same family; the main point is the harmony of the building with the slop of the site. The architects use the courtyard to give possibility of social interaction among the families. The distinctive residential architectural experience seeks to root a cultural reference; which means the traditional architecture doesn't a form only, it understands the heritage as a reference of dealing with the urbanization (Matrouk, 2010).

Rasem Badran is a Jordanian architect, who designed a series of villa-type houses. His work is an attempt to mediate between the past and present. One of his projects was Villa Madi of 1974-80, that reflect the rural village dwelling by using the central courtyard (Williamson, 1998). Villa Handal of 1975-77 is another project that responds to the climate conditions and sense of privacy. The large arc that used is a memorable part in this house, it opened onto the courtyards, evocative of the structural arches used to construct rural stone houses (Williamson, 1998). June P. Williamson stated that "Villa Madi reflects the nomadic Bedouin than the Villa Handal suggests the settled fellahin", Rasem Badran defines his architecture as "a continuous dialogue between contemporary needs and inherited traditional values."

Contemporary architecture in Jordan is characterized by the attempt of architects to re-established Jordanian traditions in a modern manner and identifies the Jordanian architectural tradition (Kultemann, 1991). Jordanian architects attempt to shape the local architectural identity by linking the past with the present through the usage of heritage resources in modern architecture (Rjoub, 2016).

Discussion

As mentioned earlier, the study emphasizes on the traditional residential buildings in Jordan; they can be classified into two main types are; fallhi house and urban house (Table 1). Fallahi house contains the houses that constructed in the villages, where the urban houses contain the houses that constructed in the cities (Table 1). Fallahi house contains several types are; Al-Qanater Houses and Al-Mastabeh houses. The urban houses contain the courtyard houses, three-bay houses and the gallery houses.

Table 1 Dwellings classification in Jordan

Type		Period	Origin	Structural system	Building material	Builders
Fallahi house	Al-Qanater house	before 1866	Village	Arc	Limestone	Native
	Al-Mastabeh House	before 1866	Village	Arc	Limestone	Native
Urban houses	Court yard houses	1866-1890	City	Vaulting system	Limestone	Syrian & Palestine
	Three-bay houses	1890-1918	City	Iron Beams on bearing walls	Concrete	Lebanese
	Gallery houses	1866-1890	City	Wood beams on mud walls	Wood and mud	Circassians

Traditional architecture was built by the craftsmen; so, it satisfies the dwellers needs as the spaces and design elements. The traditional residential buildings could be classified based on the design elements that were used by the users.

Table 2 Elements of design classification

Design Element	Description	Function	site	House type
Housh	Yard placed in the front of the house	Daily activities and to store the tools	Village	Rural house
Al-Qanater	stone arc supported the mud roof	Structural element	Village & city	Rural house & urban houses
Al-Mastabeh	Platform higher than the level of the Housh	Sleeping area at night and a living space at the day	Village	Rural house
Al-Rawyeh	Space between two arcs built from mud, Above Al-Rawyeh was used to set up the blankets	Storing the grains	Village	Rural house
Al-Qwarah	it is taller than Al-Rawyeh; it was built form mud and it was placed along the wall between the stone arcs and fill from opining in the roof	Storing the grains	Village	Rural house
Al-Mashrabeiayah	Opening in high level, covered with a timber lattice screen	Privacy, lighting and ventilation	City	Urban houses
Courtyard	Open space surrounded by three or four walls	Daily activities and achieves the environmental goals	City	Urban houses

The first category includes the rural houses, and the second category is the urban houses. The design elements that used at the rural houses are; Al-Qanater, Al-Mastabeh, Rawyah and Al-Qawayer. Other design elements that used in the urban houses as; courtyard and Mashrabyah.

Conclusion

Traditional architecture has different physical characteristics depending on its location; as it built to meet specific needs, it used common regional forms and materials at a place and time. Vernacular architecture is that segment of the body of traditional architecture of a people which serves the humbler purposes in their society.

There are various factors that form the traditional architecture in Jordan are; Ottomans attempts to settle the Bedouins tribes to protect the pilgrim road (Darb Al-Hajj), and settle the Circassians in many cities in Jordan especially in Amman. Also, the established of Trans-Jordan and shift the capital from As-Salt to Amman. The last factor is the migration from the surrounding countries, to Jordan such as; Palestine, Iraq and Syria.

The study sheds light on the traditional residential buildings in Jordan. The traditional residential buildings in Jordan can be classified into two main categories are; rural dwellings and urban dwellings. Rural dwelling or village architecture includes the dwellings appeared before 1866. It was shaped into two forms as; Al-Qanater House and Al-Mastabeh House. The urban house includes, the house that appeared in the cities after 1866, such as; the courtyard houses, three-bay houses and the gallery houses.

The study categorized the design elements that were used in the traditional residential buildings in Jordan into two categories. The first category includes the design elements that were used in the rural houses such as; Housh, Al-Mastabeh, Al-Rawyeh and Al-Qwarah. The second category includes the design elements that were used in the urban houses as; Al- Mashrabeiyah and courtyard.

Contemporary architecture in Jordan is characterized by the attempt of architects to connect the present with the past; through the usage of heritage resources in modern architecture, to shape the local architectural identity.

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