A Study on the Relationship Between the Residential Space and the Space for Raise Livestock of Courtyard Dwellings in Ordos

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Abstract
In this paper, the courtyard that in the combination mode of agriculture and animal husbandry is the main body. Through the analysis of the relationship between residential space and the space for raise livestock, summarizes the most suitable spatial organization characteristics. Hope to provide clues for create settlement sites in accordance with the characteristics of Ordos. And explore the ways of expressing regional and cultural heritage in contemporary architectural creation.

Keywords: courtyard dwellings; Ordos; spatial organization; regional characteristics

1. Introduction

Since the Qing Dynasty, under the pressure of survival, tens of thousands of Shanxi and Shaanxi people went over to the guihua city, tumet, Chahar and Ordos etc. for a living. The famous "go west" large immigration, not only changed the social structure, economic structure and life style of Inner Mongolia, at the same time, as a carrier of cultural transmission, also a part of Shanxi and Shaanxi farming culture was take into the Ordos Region. It also lays a cultural foundation for the integration of the traditional mode of residential space of the Han people.

China is in the stage of rapid development of urbanization. In recent years, China actively promote the construction of new rural areas, making the difference between the village and the village on a small gradient, the difference between residential and residential also gradually smaller. People in the pursuit of material demand at the same time began to pay attention to the space environment of the building, as well as the architectural related aspects, such as place sense of belonging, geographical and other spiritual needs. And people also began to realize the significance of continue the Chinese people's living culture and
improve people’s living quality.

Ordos is located in the southwest of the Inner Mongolia. It is a minority area with Mongolian as the main body and Han nationality as the majority. Because of its complex geographical and cultural background, the residential buildings in this area show different spatial characteristics according to the residents’ production and lifestyle. The following will focus on the Mongolian dwelling, Shanxi courtyard dwelling, Shaanxi courtyard dwelling and Ordos courtyard dwelling. Analysis from the origin, development, cultural connotation, architectural patterns and other aspects of architecture, to explore the unique and diversified courtyard residential space model in Ordos and improve the living standard of the residents.

2. The Origin, Development, Cultural Connotation and Architectural Pattern of Mongolian dwellings

2.1 The Origin, Development and the Cultural Connotation of Mongolian Dwellings

Ordos has a long history and cultural heritage. In ancient times, people lived in caves, rely on natural caves to escape the wind and rain and the invasion of wild animals. The stone age, people began to make cavern, the early cavern called wuerwo. When the mode of production of primitive society from collection to hunting, the original animal husbandry appeared. In this case it requires a more convenient house that is easier to move, so like shack buildings came into being. The period of transition from hunting era to nomadic era, the residential form from the shack into the tent.

Fire is essential to the production and life of the Mongolian people. In the Mongolian concept, fire symbolizes cleanliness, prosperity, success and happiness. Fire is the center of the family and the symbol of the prosperity of the family.

![Fig.1. Internal Layout of Mongolian Yurt](image1)

![Fig.2. Exterior Layout of Mongolian Yurt](image2)

2.2 Features of Architecture Pattern of Mongolian Yurt

The layout of the Mongolian yurt is round, the middle is the fire that symbol of the family, and fire is the center and reference of partition of a space in the Mongolian yurt. This is the first part of the spatial hierarchy in Mongolian yurt. This layout is not only suitable for the functional needs of the Mongolian yurt, but also closely related to the spiritual worship of the fire. The area around the fire is where the family and the guests do their daily activities. People in the home, according to the level of seniority and age, sit from north to south in order. The outermost part of the Mongolian yurt is used for furniture and articles. According to the spatial orientation, it can be divided into eight areas, each region has its own functions and is in good order. (Figure 1)

2.3 Exterior Layout Features of Mongolian Yurt

The exterior layout of Mongolian yurt is unorganized, it tends to vary greatly with the terrain. In the summer,
the calf is tethered in the south of the Mongolian yurt. Because the calf needs to be taken care of, so it is closer to Mongolian yurt. There is cow dung-cart in the southwest. And a little further away is where the horse is tethered, then five lele carts used for migration and transportation. In the north there are some lasso poles and a haystack after the Mongolian yurt. Sheepfold is east of yurt, in order to prevent the sheep dung blowing into the yurt people always don't let the sheep lying in the upwind. And the night watchman's house is usually east of sheepfold. Then there is a watercart in the southeast, usually it should be a little closer to Mongolian yurt not with the dung cart together. The exterior layout of Mongolian yurt takes into account the relationship between wind direction and the zoning of pollution, it shows nomads' nomadic experience for many years. (Figure 2)

3. The Origin, Development and Cultural Connotation of Courtyard Dwelling

Archaeological and anthropological studies show that primitive ancestors experienced two different ways of solve the housing problems, one is from the air to the ground, the other is from the underground to the ground. "cave dwelling" and "nest dwelling" are the initial residential dwellings of human beings, the nest fell to the ground, and the cave rose to the ground. "Soil" and "wood" are the rational use of its performance and combined, then produced a new brick mixed structure residential courtyard, which stands on the ground. (Figure 3)

As a materialized product of social and family ethics, the courtyard is a representational spatial model of ethical norms. First about the hierarchical order, elders live in the principal room, the younger generation live in the wing room, each has its place, all need to follow the rules. Secondly, the happy spirit, Chinese culture is a "happy" culture, there are serious side of ethics, there are also happy. So-called four generations under one roof and the happiness of a family union, it is the ideal that the traditional family pursuit. Several courtyards in the courtyard group are very conducive to both collective and free ways of living.

4. Characteristics of Courtyard Dwellings in Shanxi and Shaanxi Provinces

4.1 General Situation of Courtyard Dwellings in Shanxi and Shaanxi Provinces

Shanxi courtyard house is one of the northern courtyard dwellings of great characteristics, and it is an important part of Chinese traditional dwellings. This type of building is large in scale and complex in architectural function, the combination units are mainly based on courtyard houses, commonly known as the "Shanxi courtyard". Shaanxi courtyard house has a long history, including Xi’an, Sanyuan, Hancheng residential dwellings and other places especially representative.

4.2 The Architecture Pattern and Characteristics of Courtyard Residential Buildings in Shanxi and Shaanxi Provinces
Characteristics of courtyard dwellings in Shanxi and Shaanxi provinces, which are mainly reflected in the following aspects.

(1) The layout of the building combination adopts the centripetal approach.
(2) Each building is a complex of three elements, such as interior space, outdoor space and eaves corridor.
(3) They all have the definite spatial sequences.
(4) In the courtyard layout of Shanxi and Shaanxi province, even courtyard with different functions that all have similar spatial patterns. Formally, we cannot see the difference between the living courtyard and the storage courtyard. (Figure 4)

5. Characteristics and Spatial Relationship of Courtyard Dwellings in Ordos

5.1 General Situation of Ordos Courtyard Dwellings

According to the residents’ modes of production, the residential buildings in Ordos Area can be divided into three major types. The Mongolian yurt of nomadic mode, the courtyard dwelling of agriculture mode and the courtyard dwellings with the combination mode of agriculture and animal husbandry. The latter in the Ordos region accounted for the vast majority, and production and livelihood of the residents depend on two ways, agriculture and animal husbandry. The residents who rely on this mode of production come from Shanxi and Shaanxi provinces.

![Fig.5. Space Constitution](image)

5.2 Space Constitution of the Courtyard Dwellings with the Combination Mode of Agriculture and Animal Husbandry

The overall space constitution of such dwellings can be divided into three parts: "residential space", "the space for raise livestock" and "transitional space". "Residential space" refers to the houses and courtyard space of the daily life of the residents, which does not include culture and manual labor behavior. "The space for raise livestock" refers to the space for residents to cultivate and production. As the part of the outdoor environment of the Mongolian yurt except for residential space. And "transitional space" refers to a connecting space between that two spaces. (Figure 5)

(1) The composition of the residential space
The case in Figure 6 shows the building layout plan of the two generation living together. From the
residential space of the figure, we can see three similar courtyards longitudinally extended. The layout of this courtyard is affected by Shanxi and Shaanxi courtyards. So its space is also orderly and has a definite axis relationship. The residential space is mainly composed of the following parts. Principal room, southern room, granary, courtyard, platform.

(2) The composition of the space for raise livestock
The space for raise livestock is mainly composed of the part for raise livestock and the part for farming. The part for raise livestock includes: sheepfold, pigpen, henhouse and forage area. The part for Farming include Farm tools storeroom, gardens, wells, cellar and so on. To some extent, this space is influenced by the exterior layout culture of the Mongolian yurt, and the overall space organization is relatively free and flexible. But this freedom still reveals the orderliness of the courtyard dwelling.

(3) Transitional space
The transitional space is located between the residential space and the space for raise livestock, which is the connecting space between the two. This space usually contains both human behavior and animal (livestock, poultry) behavior. What happens regularly is the behavior of residents raising livestock. Residents usually sow grain, then chicken and sheep have been released from house temporary for meal. After feeding, they will be got back into their house. (Figure 6, 7)

5.3 The Relationship between Residential Space and the Space for Raise Livestock

Generally speaking, there are several aspects of the combination relationship of the residential space and the space for raise livestock:

(1) Lateral extension
The space for raise livestock extends outward in the horizontal direction of the residential space, some are directly connected with the residential space, and the other is indirectly connected by a transitional space between the two. In Figure 6, the relationship between the residential space and the space for raise livestock in the east residence belongs to this model.

(2) Longitudinal extension
The space for raise livestock extends outward in the Longitudinal direction of the residential space. In this model, the residential space and the space for raise livestock are generally connected by transitional space. In Figure 6, the relationship between the residential space and the space for raise livestock in the middle and west residences belongs to this model.

(3) Mutual independence
This relationship is generally relatively rare. Usually because of the limitation of terrain and land area, the residential space and the space for raise livestock are arranged independently, and there is no connection between the two. (Figure 8)
6. Conclusion

Cultural diversity can appear through constant adaptation and change when it expands and spreads in another environment. The environment in which it is adapted does not simply refer to the natural environment, it also includes the relationship with the surrounding nationalities and the social environment.

The Courtyard dwelling in Ordos, it is the residence form with multi-cultural characteristics after it absorbed and fused two different regional cultures. Compared with the Shaanxi and Shaanxi courtyard dwellings, the characteristics of residential space in Ordos courtyard dwellings that is layout regularity, respect for seniority, axisymmetric, similar to Shanxi and Shaanxi dwellings. But the courtyard dwellings in Ordos it removed wing-rooms on both sides, has increased asymmetry factor of granary. Compared with the Mongolian yurt, the space for raise livestock in Ordos courtyard dwellings inherited the characteristics that the freedom and dispersion of exterior space layout of Mongolian yurt. And the proportion of the space for raise livestock in the overall construction space is much larger than the residential space. It reflects the characteristics that the local residents more inclined to the demand for productive labor than the living demand. However, the difference lies in the fact that the layout of the space for raise livestock in the Ordos courtyard still embodies the regular morphological features of "courtyard". And there is a very important transition space between the residential space and the space for raise livestock.

Today, China's modernization and urbanization are speeding up and new rural construction is being promoted step by step, and it is the key to improve the local residents' living environment level to analyze the local characteristics of the residential buildings and the living habits of the residents. This paper analyzes the relationship between the residential space and the space for raise livestock in the courtyard of Ordos, we hope it can provide clues for the creation of courtyard dwellings which conform to the regional features of Ordos, and plays a positive role in regional expression and cultural heritage in contemporary architectural creation.

References