Evolution Analysis of Zhuang Residences in Longan County, Guangxi

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Abstract. Longan county, Guangxi province, China, is a region with a large population of Zhuang people, where Han culture and Zhuang culture communicate and collide frequently. A field survey was carried out in the villages of Longan county, and the architecture mapping of Zhuang residences were made. There are three types of Zhuang residences in Longan county successively: traditional timber Pile dwellings, secondary brick(stone)-timber Pile dwellings, and modern masonry structure ground houses. The characteristics of plan layout, important space, structure form and building materials of the three types of Zhuang residences are compared and analyzed, and the leading factors of the development and evolution of the three types of Zhuang dwellings are revealed.

Keywords: Longan county; Zhuang residences; Pile dwelling; Evolution analysis.

1. Introduction
Guangxi province is the largest habitation of the Zhuang people in China, the Zhuang population in the province accounts for 85% of the Zhuang population in China, it is most concentrated in Guilin, Nanning and Baise[1]. Pile dwelling is the original architectural form of traditional residence of Zhuang people in Guangxi[2], and it’s the unique creation of Zhuang ancestors to adapt to the environment. However, Zhuang residences have evolved spontaneously with the rapid changes of China's social economy, life style, technology and materials in the past 40 years.

The research team selected some representative villages as the research objects under the jurisdiction of Longan county, Guangxi province, including Nalangtun, Hehantun, Nabantun, Dongaitun, Tuntantun, Yalitun, etc., made the architecture mapping of Zhuang residences and conducted interviews with villagers and village cadres, obtained lots of first-hand data. The research team hopes to find out the current situation of the Zhuang residences, explore the evolutionary dynamics, distinguish the key characteristics of Zhuang residences of the new period, and provide reference for the inheritance and development of the Zhuang residences.

2. Overview of Longan County
Longan county is located in the northwest of Nanning, Guangxi. The landform is dominated by stone mountains and hills. It has a subtropical humid monsoon climate, hot and rainy, short winter and long summer. The population of Longan county is about 420,000, 95% of which are Zhuang people, and it’s one of the areas with the highest population density in Zhuang of Guangxi. In 2017, the total output value of Longan county was 7.32 billions RMB, and the per capita disposable income of rural residents in Longan county reached 10,720 RMB[3]. The income source of residents in Longan county is mainly traditional cultivation and Go-outside Labors, and 85% of residents are satisfied with the current living
situation.
From the cultural division of Zhuang people, Longan county belongs to the Yongjiang-Youjiang Cultural Region\footnote{4}, from the dialect division of Zhuang people, it belongs to the Southern Zhuang Dialect Area\footnote{5}, from geographical position, it’s the central of Guangxi, where Zhuang culture and Han culture mixed and merged. Because it is adjacent to Han area in the east-Guangxi, the Zhuang people there not only inherit the traditional Zhuang Pile dwelling, but also incorporate the concept of Han etiquette into it. Deeply affected by Han culture, the local Zhuang residences have been assimilated by Han dwellings.

3. Evolution of Zhuang Residences in Longan County
Residence is an important carrier to reflect rural social life, and its architectural form is a reflection of social development status, economic and technical level, and residents' life style. After a long period of evolution and development, Han and Zhuang cultures continue to infiltrate and integrate with each other. There are three types of Zhuang residences appeared in longan area. The earliest are the traditional central-Guangxi timber Pile dwellings, existing residences of this kind were built before 1970s. Then came the secondary brick(stone)-timber Pile dwellings, which was under massive construction in 1980s. Finally appeared the brick-concrete ground houses in recent 20 to 30 years, this type of residences has the largest number at present.

3.1. Traditional Timber Pile Dwellings
People rest in the upper, cattle sheep and dogs live in the lower, this description of wood structure building is Pile dwelling. At present, there are few traditional central Guangxi timber Pile dwellings in Longan area, scattered in remote rural settlements, such as Tuntantun of Pingshan town and Nalangtun of Yanjiang town (Fig.1, Fig.2), and the existing residences of this kind were built before 1970s. This situation is caused by two factors, the living standard of the residents has been gradually improved, better materials are needed and Longan county is a rocky desertification area with more mountains and less forest, timber is becoming harder to obtain. Thus after 1970s, this kind of dwellings are basically no longer being built.

Figure 1. Zhuang residence in Tuntantun. Figure 2. Zhuang residence in Nalangtun.

The traditional Pile dwelling in Longan area is wood structure(Fig.3), column and tie timber construction, double slope tile roof. By the contrast between the west facade(Fig.4) and the south facade(Fig.1) of the traditional timber Pile dwelling in Tuntantun, the ground house characteristics of the Pile dwelling in Longan are as follows: feeding space in the lower had gone in some Pile dwelling, substituted by a stone base of 50-60cm thick, the entrance staircase was replaced by stone steps, the way of entering the residence was changed from the front to the side.
The traditional Pile dwelling residences in Longan are centered on the main room, which is the manifestation of the Han culture's center is honor. The house has a bright room and two dark rooms. The bright room is located in the middle of the house, the front part of it is the hall and the back part is the kitchen. The dark rooms are bedrooms, they are arranged on two sides of the hall, distributed according to the order from the old to the young. A shrine for worship is set up in the middle hall with a full height above, which is an embodiment of the thought of Han culture. Except the space above the hall, the other upper space is paved with wood floor, usually used as the storage rooms. Before the Zhuang people had been influenced by the Han etiquette, the concept of the central hall was not prominent. At that time the fireplace was the center of family, Zhuang people were used to entertaining guests and carrying out social activities around the fireplace. With the process that Zhuang residences changed from Pile dwellings to the ground houses, the fireplace was gradually moved from the middle of the hall to the rear or one side. Stove reform led by the government promoted the change from the fireplace to the stove. But the traditional fireplace has been preserved in many areas, where the religious consciousness and ethical concept of the inner space of the Zhuang residences show the dual characters, which are not only influenced by the patriarchal system of the Han people, but also keep the original Zhuang worship of the fireplace.

3.2. Secondary Brick (stone)-Timber Pile Dwellings

The secondary brick (stone)-timber Pile dwelling is more popular in middle Guangxi, and it is more numerous than the timber Pile dwelling in Longan area. This kind of dwellings were constructed from around the founding of the People's Republic of China to 1990s, especially in 1980s. The secondary Pile dwellings were evolved from the traditional Pile dwellings, the structure, spatial layout, roof truss form and building facade still retain the characteristics of the Pile dwellings (Fig. 5, Fig. 6).

In Longan area, the common entrance of secondary brick (stone)-timber Pile dwellings have two forms, center into from the front of the house and side into from the front of the house. When the space in front of the building and the main entrance is relatively limited, the side into approach is usually adopted to save space. On the contrary, the center into approach can place more emphasis on the majesty of the main hall and entrance center.
In terms of spatial layout, the secondary brick (stone)-timber Pile dwelling is similar to the traditional timber Pile dwelling, and uses a bright room and two dark rooms layout patterns. The width of the house is usually divided into three rooms, the plan of the house is like concave shape. (Fig. 7) The bright hall is located in the middle of the house, and the kitchen is at the back of it. A shrine for worship is set up in the middle hall with a full height above. The bedrooms are arranged on two sides of the hall, distributed according to the order from the old to the young, and the upper space is paved with wood floor, usually used as the storage rooms. In some of the secondary brick (stone)-timber Pile dwellings, fireplace space has disappeared, completely replaced by the kitchen.

Because the material of stone and mud is convenient to get, and people want to save lumber, in Longan county the exterior wall of secondary Pile dwellings are usually made of freestone, rammed earth, mud brick, and appear yellow, gray, brick red. The wall is thick, the roof forms is Xuanshan or Yingshan, wood frame, but with brick column, the way of living is evolving to the ground, the rammed earth floor is raised during construction, can effectively prevent get damp. Due to the large amount of rubble, rammed earth, mud brick or clay brick used in the construction of the gable, the secondary Pile dwelling here has a mixed load-bearing character.

In the process of going to the ground, the local secondary Pile dwellings have three types: one is no space in the lower; the second is half space in the lower; the third is full space in the lower but enclosed by rubble.
3.3. Modern Masonry Structure Ground Houses
At present, the largest number of Zhuang dwellings in Longan area are brick-concrete structure houses(Fig. 8, Fig. 9), which are entirely the ground buildings. Lots of such buildings have been built since the 1990s, they occupy a dominant position in number. This modern masonry structure ground house is basically out of touch with the traditional Pile dwelling and the secondary Pile dwelling, it is a kind of leap-forward evolution. But it still has some connections with the traditional Zhuang dwellings in some ways, such as the entrance of the house, the spatial layout, and so on.

Figure 8. View of residences in Nabantun. Figure 9. Floor plan of Nabantun residence 1.

The area of the new kind of dwellings in Longan are mostly 150m²-400m², and the height of them are usually 2-4 stories, also a few 5 stories. Compared with the local traditional dwellings, they are huger. The way of entering the house is mostly center into from the front, some is side into from the front. This new type of dwellings partly inherits the layout of the traditional Pile dwellings, one bright two dark pattern, the bright hall is in the middle of the house, the bedrooms are arranged on two sides of the hall, and the stairs is at the back of the hall. In the modern masonry structure ground houses of Longan area, the fireplace has thoroughly disappeared, and completed the spatial transformation from the fireplace to the kitchen. Because the new type of Zhuang dwelling is bigger than the traditional one, there are more space in it, it is common that the old and the young live in different floors, every floor has the living room, the bed room and the store room, the privacy of the residence is better than before. The roof of the house is usually used as a deck, outdoor balcony. Due to the restriction of homestead, some new dwellings have only two rooms in width, and cannot form the symmetrical layout as the house of three rooms in width. (Fig. 10)
The facade of the modern brick-concrete dwellings in Longan inherit the roughness of the local traditional Zhuang residence. There is almost no painting in the interior space and exterior walls, directly exposing the original appearance of the clay brick wall and the concrete floor.
Figure 10. Floor plan of Nabantun residence 2.

4. Comparison of Three Kinds of Zhuang Residential Buildings in Longan County

4.1. Timber Pile Dwellings VS. Secondary Brick-Timber Pile Dwellings
The timber Pile dwelling in Longan area appeared earlier than the secondary brick-timber Pile dwelling, thus retained more traditional Pile dwelling features. The latter is a further evolution based on the former and combining with the local landform and natural resources. There is a big difference use of external wall materials, the load-bearing mode has changed from the wood structure to the wood-brick wall mixed structure. This change can reduce the load bearing burden of wood frame and increase the ability of house to resist wind and keep warm, it is an improvement of the traditional form. Because the area of middle Guangxi is deeply influenced by the Han culture, these two types of dwellings are similar in the layout, both one light and two dark pattern. The gradual disappearance of the fireplace and the continued preservation of the ancestral space reflect the inheritance relationship between the former and the latter, as well as the obvious tendency of the Zhuang people in the choice between material space and spiritual space.

4.2. Secondary Brick-Timber Pile Dwellings VS. Modern Masonry Structure Ground Houses
There is a great difference in structure and material between the modern masonry structure ground houses and the secondary brick-timber Pile dwellings, it is a leapfrog evolution. Due to the use of clay bricks and reinforced concrete, the new generation of dwellings can obtain a larger space and have more choices in the building function and space distribution, and the new structure is more durable than the traditional one. But even if the more advanced construction technology brings the free space and layout, the new generation dwellings still inherit many characteristics of the traditional dwellings, showing that the traditional layout is very suitable for the living habits of Zhuang people in Longan area. The new form of the stairs, the change of the upper space, the disappearance of the lower feeding space, these all reflect the influence of new technology and new life style on the dwellings.
5. Summarizes
Longan area in Guangxi is inhabited by the Zhuang people. Over the past century, the Zhuang residences in this area have gradually evolved from the ancient Pile dwellings into the ground houses. There are three distinct stages: the traditional timber Pile dwellings stage, the secondary brick-timber Pile dwellings stage, and the modern masonry structure ground houses stage. Many changes have taken place in plane layout, building materials and structural forms on the three stages. They are caused by a combination of factors, among them, the influences of the natural and geographical factors gradually decrease, while the influences of technological and cultural factors gradually increase. In the late evolution of the Zhuang residences, three technological and cultural factors have played a leading role: one is the traditional culture of ethnic concept, the second is the production and lifestyle changes, the third is the development of architectural technology and the improvement of economic level. It is hoped that no matter how the Zhuang residence evolves and develops, and how the material space changes, its spiritual connotation and characteristics can be inherited effectively, which is also the significance of this paper.

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