Region Adaptability of XiGuan Grand House and Its Value to Ecological Architecture Design

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Abstract. In the late Qing Dynasty, XiGuan Grand House appeared as the large vernacular dwellings architecture. The so-called region adaptability is formed for the local vernacular dwellings architectures need to adapt to the changes of the local nature, society and humanism and continue the evolving way of Original Ecological architecture. This paper is divided into three parts. In the first part, the evolving process about XiGuan Grand House is analyzed; the second part discusses the relationship between the region adaptability and the architectural evolution; the last part studies the region adaptability of XiGuan Grand House to obtain its value to Ecological Architecture Design.

1. Introduction
When the city is expanding, XiGuan Grand House is spontaneously formed as a vernacular dwelling. In the late Qing Dynasty and the early Republic of China, occupied by the ZhuTong Houses and traditional arcade, Guangzhou urban area (Guangzhou ancient city) and the mature commercial streets outside the urban are under the circumstance with prosperous commerce, dense population, and stressed land use. The high intensity and capacity of this area hardly meet the vernacular dwellings demands of some rich merchants. Therefore, along Guangzhou traditional commercial area towards the western area, some new architectures with the formal characteristics of the traditional Three Room and Two Corridor residence and ZhuTong House in central Guangzhou merged at the right moment. In a very short period (around three or four decades), a high class vernacular dwellings area for over 10 square kilometres is formed in XiGuan, Guangzhou. Thus, XiGuan Grand House is formed. The typical XiGuan Grand House has three bays and over two or three yards, combining the characteristics of ZhuTong House and Three Room and Two Corridor residence. There are also some changes, including the grey bricks and stone base outside, wood carving inside, as well high and bright space.

2. XiGuan Grand House evolving from original architecture
2.1. Original ecological architecture and evolution
With the human civilization and culture development, the architecture emerged and developed. “Regarded the architecture as an active system with energy, it evolves with the interaction between human and the environment.”[1]In the early stage of human society, when our ancestor were searching the accommodations, the construction activities for harmonious coexistence between man and nature
are regarded as the “Original Ecological architecture”, namely “dwelling” by Heidegger. “The direct sensibility and functional simplicity make the original architecture the start and primary form for architectural evolution.”[2] The characteristics of the Original Ecological architecture are as follows: firstly, emphasize the climate adaptabilities of natural lighting and ventilation and adaptability to the vernacular dwellings natural environment by using the local materials and making the best use of the circumstances; then the internal organization and spatial functional division are simpler. In the process of the architectural evolution, the Original Ecological architecture continues the stable evolving processes and features for a long time:

2.1.1. The internal functions of architecture are continuously upgraded and completed, the spatial organization is diversified and the spatial structure is inclined to be complicated.

2.1.2. Keep harmony with the existing environment. Since such harmony depends on the circumstance orders and internal system of the place where the architecture locate, it involves natural environment, social environment and cultural environment.

2.1.3. Evolution is a transformation from one “homoeostasis” to the higher “homoeostasis”, creating a new architectural form or style.

2.1.4. During the development of the architecture, the phased change is not always the trend for evolution. Architectural evolution is a process of natural selection and has spontaneity and historical continuity.

2.2. Evolution of XiGuan Grand House

Figure 1. Typical “Three Room and Two Corridor” floor plan, Typical “Zhutong House” floor plan, Typical “XiGuan Grand House” floor plan(from left to right)

When the city is expanding, XiGuan Grand House is spontaneously formed as a vernacular dwelling. When it comes into being, the economy, society and culture of Guangzhou City are sharply changing, so undoubtedly XiGuan Grand House is the product of these changes. In form, XiGuan Grand House is influenced by the traditional Three Room and Two Corridor vernacular dwellings architecture and the Zhutong House of the central Guangzhou and combines the arrangement way of courtyard. The Three Room and Two Corridor residence is the typical Cantonese vernacular dwellings architecture and is the most common in Cantonese village during Ming and Qing Dynasty, which consists of three principal rooms, two wings. With the narrow and small façade and the narrow and long longitude, the Zhutong House is a local residence in Guangzhou, and looks like bamboo tube.
Compared to the earlier original residence, the Three Room and Two Corridor residence and the Zhutong House are more diverse in function and also inherit the nature – conforming and circumstance – oriented characteristics of the Original Ecological architecture, which consists with the general path and features of architectural evolution. Based on these, the XiGuan Grand House evolves again and is produced through a spontaneous folk creating activity. It reflects the continuous evolution process of the Original Ecological architecture (figure 1).

3. Region adaptability of XiGuan Grand House
Evolving from the basis of the “original ecological” architecture, XiGuan Grand House has the characteristic of spontaneous construction. Indeed, such spontaneous construction is not a totally aimless action. For the individual architecture, it is “a series of selections made in the possible reformation when changing the self - environment in purpose.”[3] The architectural selection by people reflects their aesthetic selection. While architectural aesthetic is the result of the climate, society and humanism adaptability.[4] The region adaptability of XiGuan Grand House is discussed through the climate, society and humanism.

3.1. Climate adaptability
In the case of XiGuan Grand House on Feng Yuan Northern Street, the wooden wall inside the bedroom does not reach the roof due to the longer depth, forming a semi – closed space system. It would rather sacrifice certain privacy for ventilation and transparence (figure 2). The ceiling is not the plane suspended ceiling like some traditional residences, but the exposed structure. The ups and downs roof connects with the general transparent Manchu Windows, improving the air exchange rate and the indoor illumination (figure 3). Undoubtedly, the Tanglong door (an old style security door) is the most special architectural component produced for adapting the climate. With the 10cm – diameter wooden cross – beams being vertically and parallelly arranged, the Tanglong door can be closed by sliding the guide rails. It can guard against the theft and ventilate the room and has the lighting and beauty effects (figure 4). XiGuan Grand House is equipped with the ventilation circulating system consisting of multiple patios, narrow and long gallery and cold lane, effectively improving the indoor physical environment (figure 5). The transparent enclosure structure, various combinations of virtual and real spaces and bright and elegant color tone of XiGuan Grand House directly improve the lighting and ventilation and are the result of the climate adaptability.

3.2. Social adaptability
Chinese traditional courtyard residence is arranged with all rooms centering around the yard. The plan of XiGuan Grand House is logically related to that of traditional courtyard residence, which is totally different from the spatial structure: the spatial system of the traditional courtyard

Residence (Beijing quadrangle) consists of houses, yard and courtyard wall. The courtyard space can be deemed to be formed by adding the individual architectures; while the houses and yard of XiGuan Grand House are integrated. Its patio space in the architecture actually reflects a subtraction

![Figure 2. Semi –closed space system](image)
![Figure 3. The ceiling is an exposed structure](image)
![Figure 4. The Tanglong door](image)
![Figure 5. The cold lane](image)
structure (figure 6, 7). Generally, with over two layers and developing from the horizontal sequence expansion of the traditional yard, the space of XiGuan Grand House is vertical and horizontal expansion.

Why does XiGuan Grand House expand vertically and horizontally? It may be studied from the angle of social adaptability. XiGuan locates at the cross of the new and old town. At that time mature Zhutong House and Arcade has existed in Guangzhou. While the high intensity and large capacity fails to meet the rich merchants’ demands on high quality life. To comply with the city development, the local climate characteristics and cost saving shall be considered into XiGuan Grand House. Meanwhile, in the society where the feudalism culture still exists, the rich merchants must consider to show their family reputation and their loyal family image. Hence, the new architecture must be cost saving and meet the demands in form. The architectural space is the effective method to adapt to the social changes through a new subtraction model with vertically and horizontally stereoscopic expansion. In this way, the new architectural form of XiGuan Grand House becomes popular in a very short time.

![Figure 6. The Beijing Quadrangle can be deemed to be formed by adding the individual architectures](image1)

![Figure 7. XiGuan Grand House reflects a subtraction structure](image2)

3.3. Humanism adaptability
Lingnan culture reflects a nature – admiring aesthetic ideal in music, painting and literature[5], even Lingnan architectural culture is not excluded. Generally, Lingnan yard integrated with the houses. Such integration of yard and houses is the interpretation for dwelling in Lingnan culture. How does XiGuan Grand House locating in the center of city realize the nature – admiring dwelling ideal of Lingnan architectural culture among the intensive and closed urban architectures? Take XiGuan Grand House as an example. Rather than the spatial relationship of the traditional garden architecture, which consists of courtyard wall, garden space and architecture, the space structure of XiGuan Grand House is similar to garden structure, which consists of brick wall (courtyard wall), patio (garden space) and wooden structure system (figure 8, 9). From the decoration details, it can be found that the boundary between the architecture and garden is fuzzy for the outdoor and indoor artificial hills, hollow windows and wall decoration jointly form the psychological direction – the nature – admiring dwelling ideal (figure 10). When XiGuan Grand House is under construction, there are not enough courtyard architectural conditions. The dwellers of XiGuan Grand House hide among the prosperous and complicated town. Expressing a nature – admiring and peaceful dwelling ideal in the architecture through a spiritual similar method rather than a physically similar method is just the unique of XiGuan Grand House for humanism adaptability.

4. Relationship between the region adaptability of XiGuan Grand House and architectural evolution
The region adaptability characteristic of XiGuan Grand House actually reflects an evolving result of spontaneous construction. For the region adaptability characteristic, XiGuan Grand House firstly takes advantage of the physical performance for the traditional architecture. Through rational spatial distribution, patio, hall and gallery connect together, forming the good physical environment and
biological environment; secondly, XiGuan Grand House is improved on the basis of the original traditional architecture due to the changes of existing social environment. Although the architectural land is in a shortage, the functional space demands can be met through increasing the storey height. Meanwhile the successful method of vernacular dwellings architecture is used, including the good ventilation of the “cold lane”. Through these improvements based on the original architectural system, the climate environment, social environment and economic environment exist in a harmonious relationship; Thirdly, the architecture keeps the aesthetic common characteristics of the traditional culture in materials, decoration and spatial environment and continues the spiritual ideal about human – nature harmonious coexistence, which is a coordination with the cultural environment. In deed, the three elements of the region adaptability can influence some aspects of the architecture or influence each other. For example, the climate and social adaptability jointly influence the space fully, ventilated and high storey height environment; The social adaptability and humanism adaptability produce the plan and space model with multi-floor and yards, as well inherits the decoration and aesthetic way of the traditional architecture; The humanism adaptability and climate adaptability produce the vivid spatial implication with garden image. The joint influence by the three elements results in the new architecture with the geographical characteristics. A multiple and complicated relationship will be recognized through relating the features presented by the region adaptability of XiGuan Grand House and the elements of architectural evolution. The process of the region adaptability actually is the process of the architectural evolution. This paper is organized in a simpler and clearer way by analyzing the architectural evolution from the angle of the region adaptability, which is good for making the architectural characteristics and evolution path clearer (figure 11).

5. Value to Ecological Architecture Design

Ecology is “a world outlook and natural philosophy for human to know environment, adapt to environment and change environment, as well an esthetic and technology for human to imitate the nature and design the environment.”[6] The ecological architecture is the architectural theory and practice exploration under the theoretical frame of ecology. Ecology emphasizes the esthetic feature for designing the environment through imitating the nature, so the ecological architecture “is an evolution process of newly born and old dying in the time”[7]. This process reflects the spontaneity and historical continuity.

XiGuan Grand House is produced in the age when the new system is replacing the old system and economy, policy, society and culture are changing sharply. From the region adaptability of XiGuan Grand House, we can see XiGuan Grand House is constructed spontaneously by people to conform to the changes of the time and is an esthetic result, so it has the spontaneity; evolving from the traditional vernacular dwellings architecture and well inheriting the nature – conforming feature, it has transitional function and reflects a self – healing and evolving ability. Along with the end of the old age and the coming of the new age, XiGuan Grand House exits from history. Does the new
architecture evolve from the Original Ecological architecture just like XiGuan Grand House and have the meaning of ecology? It is worth thinking deeply over. The architectural ecological crisis can be avoided in city construction by seeking the experience from the historical architecture, summarizing the rules from the geographical architecture, continuing the evolving path of folk architecture from the Original Ecological architecture, as well optimizing and changing the path.

**Figure 11.** Diagram of XiGuan Grand House regional adaptability and architecture evolution

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