

Study on Conservation and Renewal of Settlement Pattern Based on Cultural Genes — Taking Taoping Qiang Stockaded Village as an Example

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Abstract—Based on sorting out the current problems of the protection of traditional villages and combining with the re-understanding of the concept of cultural gene, starting from the understanding of the two characteristics of material culture gene and non-material culture gene, this paper analyses the expression forms of cultural gene and the influencing factors of settlement pattern in Taoping Qiang stockaded village, establishes the protection and update framework of material and non-material space of traditional villages based on the concept of cultural gene inheritance, and makes practical inspection by taking Taoping Qiang stockaded village as an example.

Keywords—cultural genes; settlement pattern; protection and renewal; Taoping Qiang stockaded village

I. INTRODUCTION

Taoping Qiang stockaded village is located in Li County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province. It is adjacent to 317 National Highway in the west. It is 40 kilometers away from Li County and 139 kilometers away from Chengdu City. Following the mountain shape, the Taoping Qiang architectural complex overlaps, and the Zagunao River, a tributary of the Minjiang River, flows past the village. This Qiang stockaded village was built in 111 B.C. and has a history of more than 2000 years. It is a living fossil of Qiang stockaded village's architectural culture and art at present, which has a long history, unique architecture, simple folklore and the most complete preservation in the world. The stockaded village is full of stone-built dwellings and dense buildings with castle style, underground water network and roadways extend in all directions. Its unique ancient Qiang architecture culture with castle style has a far-reaching impact on the settlement space form of stockaded village. The author tries to explore and analyze the characteristics and formation causes of Taoping stockaded village's settlement pattern through the theory of cultural gene, in order to find out the deep driving mechanism of its formation and development, so as to give us some enlightenment on protecting traditional settlements.

II. OVERVIEW OF CULTURAL GENE THEORY

A. The Meaning of Cultural Genes

Cultural gene is a concept put forward by the "gene" of sociobiology analogy biology. It is a unit of cultural transmission refers to the transmission of cultural fragments by non-genetic means such as imitation. "The patterns of cultural development, dissemination and diversification are similar to those of biological evolution. Another convincing fact is that genetic pedigree closely related to linguistic evolutionary pedigree." [1] The theory of cultural gene provides a new perspective for us to study the inheritance, development and change of culture, which has important enlightenment significance.

But there are still some controversies about how to define the unit of cultural gene in the academic circles: some scholars propose the concept of "Meme complex" [2] and think that cultural gene can be a very small cultural fragment, and many cultural genomes have formed a large-scale cultural gene complex. While other scholars believe that "the gene of the occurrence and evolution of cultural system is represented by the traditional way of thinking and psychological underlying structure of the nation", [3] which elevates the cultural gene to the level of cultural intrinsic driving factors. The deep cultural genes excavated in this paper refer to the most prominent cultural and psychological characteristics in Taoping Qiang stockaded village, which have the most obvious effect on spatial pattern and can also be called the most important cultural gene complex in Taoping Qiang stockaded village.

B. Characteristics of Cultural Genes

Compared with the genetic characteristics of the biological world, the process of inheritance of cultural genes is more complex and changeable, which is influenced by more restrictive factors. Cultural genes have the ability and characteristics of inheritance, variation, selection and self-replication. It is compared with the characteristics of biological genes in order to better understand the characteristics of cultural genes. There are many

characteristics in the process of cultural gene inheritance, which are as follows:

1) *Sociality*: The inheritance of cultural genes is social that the effect of social and cultural environment on the cultural subjects of each generation and different social characteristics are transmitted and retained in each generation under the influence of external environment.

2) *Pluralism*: Cultural genes of the same ethnic group growing in a region will be restricted and influenced by many factors in the process of reproduction and inheritance when various external conditions are ready, resulting in incomplete reproduction results. It will have variations and diversified characteristics under the influence of new conditions and means.

3) *Multidirectivity*: In the process of inheritance of cultural genes, there are many ways of transmission that one cultural gene can act on many things, and many cultural genes can also act on one thing at the same time.

4) *Selectivity*: In the process of inheritance of cultural genes, people consciously adjust and improve cultural genes that the offspring have the right to choose the cultural genes transmitted by their parents and have rich interaction with their parents because of the external sociality of cultural genes. It can make the cultural gene get more vitality and rich connotation, while it may cause the gradual disappearance of traditional cultural genes.

C. Cultural Gene Classification of Stockaded Villages Settlements

The reproduction and dissemination of cultural genes enable different cultural models to be preserved, maintained and inherited. The cultural genes of village settlements are mainly divided into material cultural genes and intangible cultural genes according to the characterization of cultural genes. Material culture gene refers to the material production process of creation and invention that people use various tools to transform nature in order to meet the needs of survival and development, and inherit and develop through generation by generation imitation. The material culture gene is the tangible form of the settlement in the village settlement, including natural elements, settlement form, architecture and details, street and lane system and so on. The intangible cultural genes mainly include the social relations, organizational forms, behavioral norms and standards, values, morals, and psychological states established between people, including clan and consanguinity, laws and regulations, religious beliefs, social customs and habits, Fengshui concept, etc.

D. The Function and Expression of Cultural Genes in Stockaded Villages

The cultural genes have the similar mode of action of biological genes that control the formation and development of physical space in towns and cities. The construction of dwellings is not only influenced by many cultural genes such as shape, local materials, and local living habits and so on, but also by residents' personal life style, experience and

personality. Therefore, it is impossible that there are two identical dwellings in traditional stockaded village settlements, but the whole shows a unified style. Nanjing is called "landscape city with forest, the ancient capital of the six dynasties", Jinan is called "the spring city", while Taoping Qiang stockaded village has the reputation of "mysterious Oriental castle" and "plateau stone city". These nicknames are the abstraction and summary of some important cultural genes of different towns and cities.

III. CULTURAL GENES AND THEIR EXPRESSIONS IN TAOPING QIANG STOCKADED VILLAGE

A. Summary of Taoping Qiang Stockaded Village

Taoping Qiang stockaded village is a mountain natural village in Taoping Country, Li County, Aba Tibetan and Qiang Autonomous Prefecture, with a history of more than 2000 years. It is a typical representative of Qiang architectural complex that its dwelling is mostly "living beside hills and built by accumulated rocks". The greatest feature of the building in Qiang stockaded village is to adapt to local conditions, which without drawing, hanging ink or drawing lines, and they are all built of flaky stone, clay and wood, so the whole houses in stockaded village are link up with each other and there is no single isolated house. It centers on the castle and constructs eight radial exits, which are connected with corridors to form a network of roads. The lanes in stockaded village are vertically and horizontally, the main channels are secret path and connect every single building in all directions, which provide favorable means for neighborhood mutual-aids in stockaded village and defend against foreign enemies.

B. The Origin of Cultural Genes in Taoping Qiang Stockaded Village

Taoping Qiang stockaded village has a profound historical and cultural accumulation in its long historical development process. The introduction, integration and dissemination of cultural genes not only forms its own unique cultural atmosphere, but also has the representative significance of Qiang culture.

In the point of view of the natural environment, the defensive function of site selection embodies the wisdom of Qiang ancestors. Taoping Qiang stockaded village is surrounded by mountains on three sides and Zagunao River on the south. Its unique natural landscape and superior geographical location create a better living environment.

In the point of view of the historical development process, Taoping Qiang stockaded village has a long history. Taoping Qiang stockaded village formed in 111 BC. Under the pressure of the Qin State, Taoping ancestors and people in other branches of Qiang fled from Gansu and Shaanxi to its south Li County which located in the upper reaches of the Minjiang River, with relatively harsh living environment and threatened by other tribes such as Tibetans and Mongolians. Taoping ancestors gathered together to defeat the indigenous people, form villages and resist foreign enemies. However, because the strength of this tribe was not strong enough,

Jiashan stockaded village and Zengtou stockaded village with more suitable topography for defense were occupied by other branches of Qiang people, Taoping ancestors had to choose Pinggu area near the Gunao River to build stockaded village. The architectural features of Taoping Qiang stockaded village along Zagunao River are different from those of the Qiang people in the mid-mountains and high mountains. Its unique stockaded village layout enriches the cultural gene bank of the Qiang people.

C. Expressions of Cultural Genes in Taoping Qiang Stockaded Village

1) Natural elements: The ancients summed up some experience about the site selection and construction of villages in the long-term practice of reconnaissance of the natural environment. The Fengshui concept is the result of long-term practice and is basically consistent with the traditional Chinese concept of "harmony between man and nature". The site selection of Taoping Qiang stockaded village was a model of the site selection of ancient stockaded village in Western Sichuan, which belonged to the typical type in Fengshui that it was surrounded by mountains and girdled by a river. Taoping Qiang stockaded village is surrounded by mountains on three sides and Zagunao River on the south, it is totally surrounded by mountains, mountain girdling village and village girdling field.

The overall site selection and layout of Taoping Qiang stockaded village continues the spatial characteristics of traditional Qiang settlement. It sits in the north and faces the south and Zagunao River according to the idea of "building beside mountain and living beside river". Taoping Qiang stockaded village is located in the plateau canyon area, its whole settlement can be divided into three terraced zones with different height differences, which ultimate height difference reaches 18 meters. The settlement morphology is greatly influenced by the terrain and landform, its overall spatial pattern is relatively concentrated, forming a geometric edge shape similar to a rectangle. Its unique geographical location is conducive to blocking the cold north wind in winter, which makes it less affected by the cold wave, obtains better sunshine and heat conditions, so that the minimum temperature of the village in winter is significantly higher than other places, conducive to the growth of crops and evergreen fruit trees overwintering, and achieve the purpose of "Harmony between people and surroundings" of Fengshui. The topography of the north is high and the south is low can not only avoid the flood disaster, but also make the dwellings in the villages get a broad vision.

2) Roads and streets and lanes: Taoping Qiang stockaded village is located near the river valley. Besides the influence of terrain, its roads and alleys are also affected by the layout of the streets and lanes in Han cities and towns. It shows the embryonic form of the overall road planning of early Qiang stockaded village. The distribution of streets and lanes in settlements is relatively dense and mostly are winding, but you can find it combines the traditional streets

and lanes form of "cross-intersection" and "T-intersection", the overall distribution is like a chessboard. The tortuous and diverse streets and lanes break the limitation of the single straight road, extend the traffic experience of the streets and lanes, and enrich the interesting of the streets and lanes. Taoping Qiang stockaded village mainly consists of four horizontal streets and lanes and three longitudinal streets and lanes. The four outer roads gather the Qiang stockaded village into an approximate rectangle, while assuming the function of connecting with the external roads. The remaining three lanes are located in the interior of the settlement to meet the traffic demand within the settlement. The streets and lanes of Taoping Qiang stockaded village are relatively narrow, most of which are about 1-2 meters wide and paved with fine gravel sand. The space organization of the streets and lanes in the stockaded village is complex that the lanes of Qiang stockaded village are integrated with roads, canals, street-across buildings, secret paths and gate entrances of the stockaded village, which characterized by semi-closed and has prominent sense of spatial sequence. Some lanes are the only way to enter the stockaded village, the people in this village familiar with it, while the outsiders are at a loss as if they are entering a maze.

3) Military culture: Whatever the initial form of residence of any nation, the purpose of construction of its ancestors is always to resist the invasion of nature and other nationalities and to seek survival and rest. Because of the strong military pressure of the Han and Tibetan and the influence of the armed struggle of their own nation in the history, the Qiang stockaded village and its architectural details with extremely defensive. The mountains enclosed on three sides form the natural barrier of the whole village, the Zagunao River in front of the stockaded village is turbulent just like its natural moat that as long as the only rope bridge leading to the village is kept, the whole village will be kept. The unique natural environment achieves a defense system with a sense of depth and hierarchy: firstly, it can resist enemies out the gate of the stockaded village, secondly, its layout of the buildings in stockaded village not only meets the needs of daily life and resists the harsh climate conditions, but also can achieve effective combat.

4) Religious beliefs: The Qiang people's religious consciousness is formed in the difficult environment and their wandering destiny. Nature is their spiritual sustenance and soul destination. The multi-god worship, ancestor worship and white stone worship that the Qiang people believe in reflect the influence of specific environment on their religious consciousness and are deeply reflected in all aspects of the construction of the Qiang stockaded village. For example, the site selection of houses and settlements should be oriented towards God, that is "door to groove, grave to hillock". The "groove" is the gap between the mountains. The site selection must avoid the shelter of the mountain body and can look the distant snow mountains.

The continuous and lofty snow mountains also fulfilled the Qiang people's worship of gods, white stones and nature, which reflect an interactive relationship in the ecological environment. The upper reaches of Minjiang River are mostly high mountains and deep valleys with changeable climate and steep mountains, many rocks and less soil. Its complex natural conditions directly affect the harvest of agriculture, forestry and animal husbandry. Therefore, the Qiang people especially respect the mountain gods and believe that the mountain gods are in charge of the products in the mountains. At the annual sacrifice of mountain, the Wizards declare the local rules and folk conventions on the pretext of the will of the mountain gods, call on the Qiang people to strictly abide by them, regulate the relationship between man and nature through primitive religious rituals, and safeguard the ecological environment of the Qiang settlement. This also reflects the strengthening effect of living environment on religious belief [4].

5) *Architecture and details:* Qiang architecture is well known for its watchtowers, houses built by stones, rope bridges, trestles and water conservancy weirs. This paper focuses on Qiang's watchtowers, houses built by stones. Qiang dwelling buildings are mainly flat-roofed houses built by flaky stone, which are square and mostly have three floors. The bottom of the roof platform is wooden or stone slabs, which extend out of the wall to form eaves. Roof platform is a place for threshing, grain drying, needlework and children and the elderly to play and rest. The street-across buildings (arcade) are built between some buildings for intercourse.

IV. EFFECTS OF CULTURAL GENES ON SETTLEMENT PATTERN OF TAOPING QIANG STOCKADED VILLAGE

A. *The Whole Settlement Pattern*

The settlement space of Taoping Qiang stockaded village has gradually formed over the past two thousand years. Because mountains and rivers restrict the overall form of villages, and they are influenced by military culture. In the process of continuous development and expansion of settlements, the changes of the overall pattern of settlement conform to the further expansion of topography and landform. The topography of Taoping Qiang stockaded village is divided into three layers according to the vertical elevation data of Taoping Qiang stockaded village obtained from field investigation: first-level platform, second-level platform and third-level platform. The three process sketches of the formation and development stages of Taoping Qiang stockaded village settlement are completed by visiting and investigating. By comparing the two, we can see that the phased development of Taoping Qiang stockaded village settlement is influenced by the topography and landform, thus showing the change of the platform characteristics of settlement pattern.

B. *Defensiveness of Settlement Space*

Taoping Qiang stockaded village seems to have obvious advantages as a defense on the horizontal level. Settlement is built beside the hill and connected by street-across buildings, which makes the whole defensive surface form a defensive whole which is spread along the hill and extends in all directions. The gaps between the defensive whole are small-scale streets and lanes, which are not conducive to the life and production of stockaded village actually, but it can effectively prevent the instantaneous influx of a large number of enemy soldiers, and convenient for our soldiers to break down the enemy troops from the roof level defense layer and the watchtower area. This defense system of Taoping Qiang stockaded village combines street linearity, roof layer and point-shape defense of watchtower, which is three-dimensional intersection and almost perfect. We can find the strong belief of Qiang people in resisting invasion by foreign enemies and maintaining their own culture and life by ignoring the internal structure of convenience of life and the location of inaccessible settlements. These military strategies and their composition make the Qiang stockaded village settlement cold and dangerous, relaxed, and highly hierarchical in the plane layout and spatial form. While protecting people's reproduction and livelihood, it also expresses the adaptation and full utilization of the data environment.

C. *Architectural Style*

Qiang people think that the residential space is the common dwelling space of people and gods, so when the Qiang ancestors built their dwellings, they consciously divided the dwelling buildings into three floors. Qiang people hope that they can construct a complex and close communication between themselves and gods through the layout structure of the buildings. Most of Qiang dwellings maintain the pattern of "bottom-floor is for livestock living, second-floor is for people living and third-floor is used as dry platform". The Qiang people will analogize their dwelling buildings to one person that the bottom-floor is like human legs and look after cattle and sheep and other livestock, the second-floor is like human body and fire pond as the heart, the third-floor is like human head and consecrated white stone on the top as the incarnation of the gods. It is not difficult to see that the architectural pattern of the watchtower is the extension of Qiang's religious culture.

The residential monomer of Taoping Qiang stockaded village is mainly supported by wood structure, while the exterior wall built by stone only plays a maintenance role but does not play a supporting role. When the exterior wall built by stone is seriously damaged, the main body of the monomer building is still not affected. This kind of space structure system, which uses some stone walls up to one meter thick as a hard "shell" and encloses the vulnerable main structure inside, is plays an important role in the defense of monomer house [5]. The defense system of Taoping Qiang stockaded village in residential units is extends well beyond the above, which more important is the pattern combination of "house connecting house" in settlements. Taoping Qiang stockaded village has less space

to use, so the housing construction of settlement needs to reduce the gap between houses as much as possible, especially in the areas where land is scarce in the settlement center. Most of the residential buildings are "adherent" to each other, even there are two watchtowers sharing a stone wall, the interface between the buildings is interpenetrating with free penetration, and there is no regular demarcation line. This kind of architectural relationship is very rare. The form of wall insertion and combination promotes the communication between buildings and residents to a certain extent, because most residential buildings can be interoperable internally. When foreign enemies invade, residents in the building can easily evacuate to higher ground without fleeing outside the building, and it is difficult for the enemy to enter after closing the gate of watchtower.

V. TRADITIONAL STOCKADED VILLAGE INHERITANCE AND RENEWAL IDEA FROM THE PERSPECTIVE OF CULTURAL GENE

A. Significance of Protecting Qiang Stockaded Village Culture Genes

The survival of the fittest is the most basic rule in the process of biological gene transmission in nature, just as the process of cultural gene transmission. Cultural genes that do not meet the requirements of the times will gradually disappear, which is the deep reason for the current difficult situation of traditional settlements and cultural protection. However, these cultural genes are not worthless, because the cultural gene bank is more enriched and can provide material for future generations to draw inspiration through the accumulation of history. "As long as these distinctive types exist, cultural innovation and revival are possible. From this point of view, the function of human culture is just as the use of gene banks." [1]

Certainly, the protection of traditional settlements should not stagnate the development of traditional settlements and become a "cultural fossil". Traditional settlements should constantly adapt to the change of people's life style, develop continuously and be full of vitality. In addition, attention should be paid to the protection of the intangible culture of settlements, because only by understanding the deep cultural background, can we better understand the tangible material space; only by paying attention to each valuable cultural gene, so that it can be retained and presented in the material space, can we continue the features of traditional settlements really, and achieve the consistency of external and internal.

B. Spatial Protection of Settlement Patterns

Sorting out the architectural texture of villages is to protect the settlement pattern in space. The combination of the relationship between architecture and streets forms the spatial texture of traditional villages, which is a memory fragment containing the changes of times and historical and cultural connotations. The long river of history has washed many ancient buildings out of sight. The collapse of old buildings and the construction of new buildings have made the texture of traditional villages very mixed and chaotic. Therefore, the integration of village texture is the first task.

We should analyze and sort out the characteristics of the original spatial layout, find out the basic units of the building courtyard, and then protect and restore the spatial pattern from point to line to surface. We should collect and sort out the status of existing buildings, and make statistical analysis of them in the process.

C. Preservation of the Style and Features of Traditional Buildings

A comprehensive assessment is conducted focus on the historical value of external space, preservation status, space characteristics and other aspects of each historical building, in order to identify the cultural genes which need to be strengthened and highlighted. We extract the architectural features of traditional villages, pay attention to the restoration of architectural essential features, and reflect the original architectural features. It can also be said that architectural restoration should be based on the protection and restoration of authenticity and integrity. We focus on protecting historic buildings and restoring the historic environment, take improving infrastructure as guarantee, and aim at continuing the historic styles and features of blocks and improving the human settlements environment. Building restoration can be divided into four types: protection, restoration, rectification and reconstruction. Architectural restoration should achieve the coordination and unification of features, functions, shapes and group composition.

D. Node Protection and Renewal in Public Space

The inheriting the advance and retreat of Taoping Qiang stockaded village street space, the enclosure of public space and the orderly courtyard space to continue the public space of streets, sorting out its boundary and streamline layout, appropriately expanding the scale of part of public space, increasing the three-sided enclosure of important squares, and combing the gap space of the building, are important steps in the process of protection, renewal and transformation of traditional villages, rebuilding the layout order of streets, buildings and courtyards in the space, and reasonably protecting the important square and node space.

VI. CONCLUSION

Taoping Qiang stockaded village has millennium history and has produced a special historical background and cultural context. Its exterior are natural environment, streets and lanes, Fengshui pattern, village texture and architectural style and feature of the traditional stockaded village, while under the unique exterior is the historical evolution, military culture, religious beliefs and national character. Based on the concept of cultural gene, this paper analyses the material and intangible cultural genes of Taoping Qiang stockaded village, and puts forward some suggestions on the protection and renewal of traditional buildings and public space nodes. Its traditional cultural value is immeasurable, and further research and discussion should be made.

REFERENCES

- [1] Shi Zhouren. Chinese Culture Gene Bank [M]. Beijing: Peking University Press, 2002.11.
- [2] Written by Susan Blackmore, Translated by Gao Shenchun, Wu Youjun, et al. The Meme Machine-"Genetics" in the Process of Social Transmission of Transformation [M]. Changchun: Jilin People's Press, 2001.
- [3] Liu Changlin. Chinese Systematic Thinking-Cultural Gene Perspective [M]. Beijing: China Social Science Press, 1990.
- [4] Tian Kai. The Influence of Religious Consciousness on Architecture: Interpretation of Qiang Architecture [J]. Journal of Yanbei Normal University(Shanxi Datong University), 2007 (01): 49-51.
- [5] Wang Zaibo. Qiang in "Shell"- A Brief Analysis of the Defense System of Taoping Qiang Stockaded Village [J]. Sichuan Architecture, 2000, (2): 18-19.