

Cultural Identification and Extraction from the Perspective of Landscape Genes—Take Tanghe in Ningbo as an Example

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Abstract: In this paper, based on the perspective of landscape genes, the inherent and disappearing genetic information of Tanghe cultural genes are identified, the landscape characteristics are collected and studied, and the landscape characteristics are further deconstructed, and the identification results are obtained and visually expressed in the form of charts. The three major articles of "protection, publicity and utilization" of regional cultural genes are done well, so that Tanghe, which has gradually retired to building streets, can "flow" again and Tanghe culture has been "passed down".

1. Introduction

Tanghe River in Ningbo is very important to the formation and development of Ningbo's urban landscape system, and it is the lifeline of Ningbo's city. The regulation of Tanghe River, which began in the Tang Dynasty, has positioned the future urban development center, making the distribution mode of urban settlements gradually develop from point to strip. During the Song Dynasty, the urban population surged, the port demand increased, and the urban functions were rich. On the basis of continuing the water conservancy project in the Tang Dynasty, the Tanghe system was optimized until the main road of Liutanghe was fully formed. During the Ming and Qing Dynasties, Ningbo continued to manage small watersheds, with water systems interwoven like a net, and more and more streets and towns were born near the water, which made its agriculture and trade economy more prosperous. Looking at Ningbo's urban natural environment, artificial water system, garden landscape and farmland, they are all superimposed and promoted each other under the constant combing and utilization of water [1].

In recent years, China scholars put forward the concept of traditional settlement cultural landscape gene with reference to the biological gene theory [2], and established the traditional settlement landscape gene theory [3] combined with the geoscience information map. This has protected the culture of many regional traditional settlements. However, this landscape gene theory has never been applied to the river regional system, and the arrival of the industrial era makes the Tanghe gradually

fade out of people's sight, and the Ningbo story can no longer be told through the Tanghe. Therefore, this study uses the method of landscape gene identification and extraction to rediscover the inherent culture of Tanghe and show its cultural value, which provides a reference basis for more scholars in China to study Tanghe culture, so that they can more clearly put forward the classification system of Tanghe landscape genes and optimize the identification method of Tanghe, making this theory more systematic and scientific.

2. Research and design

2.1. Overview of the study area

Siming land, three rivers running vertically and horizontally, and Liutang River surround the southeast and west of Ningbo city, which constitutes Ningbo's unique urban pattern and water network system. Sanjiang is the product of nature, and Tanghe is a masterpiece of ancestors' use and transformation of nature in the development of Ningbo Plain. Tanghe River has played a role in the historical process of the establishment and development of Ningbo city, such as restraining salt and storing light, irrigation of farmland, flood control and drainage, transportation and so on. It is the river of life, commerce and culture in Ningbo. [4] From the scattered water conservancy construction before the construction of Zicheng in the Tang Dynasty to the harnessing of the source in the Tang Dynasty, the main stream in the Song and Yuan Dynasties, and the harnessing of small watersheds in the Ming and Qing Dynasties, the Tanghe River has been developed and used in Ningbo for more than a thousand years, and six Tanghe rivers, including Xitang River, Zhongtang River (Xixiang), Nantang River, Houtang River, Zhongtang River (Dongxiang) and Qiantang River, have gradually formed and have continued to this day. However, today's Liutang River is no longer a single function in the past. The reason is that Ningbo Tanghe can't adapt to the rapid urbanization change and the development of industrial era, which leads to the weakening of water transport function, the deterioration of water quality and environment, the decline of Tanghe culture and the replacement of its central position.

2.2. Research theoretical basis

Unique landscape gene is a potential cultural factor that distinguishes a landscape from other landscapes. As the basic unit of landscape culture "inheritance" in a region, its historical heritability creates its inherent uniqueness. [5], which is different from biological genes: as a cultural factor, landscape genes lack accurate and regular spatial structure and position that biological genes can follow; Landscape genes are the basic units of historical and cultural information, and the cultural symbols and social ethical connotations they convey will not change fundamentally; Biological genes will mutate under certain conditions; The information collected by landscape genes forms the image of a traditional group, which is inseparable [6]. Therefore, the concept of landscape genes provides a carrier for heritable landscapes with commonality.

Ningbo Tanghe landscape genes are rich and complex, and there are different cultural carriers behind each gene. The identification of landscape genes is to analyze, discover or describe these cultural factors from different carriers, and ensure that they can correctly and completely reflect the cultural characteristics of the landscape. [7] At present, the research has not put forward a clear classification system, but the identified genes can be classified into two categories: material cultural genes and intangible cultural genes according to the cultural carrier behind the landscape genes.

2.3. Research methods and data sources

2.3.1. Literature research method

On the basis of systematically collecting and sorting out the relevant literature in the previous research field, we can form a new understanding after studying it, help ourselves to improve the general impression of the research object and the clarity of the subject content, fully understand the historical evolution, current situation and development prospect of Liutang River in Ningbo, and finally refine the relevant viewpoints to assist the research and provide theoretical support for it.

2.3.2. Questionnaire survey method

Questionnaires with different online and offline designs were used to get to know the situation of the selected respondents, which were mainly filled in online, interviewed offline and asked questions. Finally, they were collected, sorted out and statistically analyzed, and a conclusion was drawn.

2.4. Questionnaire data and reliability and validity analysis

Based on the four principles of scientificity, conciseness, effectiveness and pertinence, the questionnaire has 107 questions, and each Tanghe River has about 17 questions. A total of 180 offline questionnaires, 70 online questionnaires and 25 invalid questionnaires were screened out, and finally 225 valid questionnaires were obtained, with an effective rate of 90%.

3. Research results

3.1. Overall analysis of survey results

The questions based on the questionnaire and the analysis of other documents are summarized as follows: the intangible cultural landscape image of Tanghe River formed by several Tanghe Rivers and the residential buildings, roads, water systems, bridges and production and living facilities around Tanghe River can reflect the regional cultural characteristics and leave a deep impression on the respondents, which can be considered as an important embodiment and composition of Tanghe cultural landscape. At the same time, from the questions and interviews of the questionnaire, we know that the protection of historical and cultural landscape genes is not perfect, so it is of great practical significance to identify and extract the genes of river regional cultural landscape in China for strengthening the protection, inheritance and development and utilization of river regional culture and ecology.

3.2. Identification of landscape genes in Liutanghe River

3.2.1. Liutanghe Landscape Gene Classification Basis

The cultural landscape system is huge, including material cultural landscape and intangible cultural landscape, and the research emphasis of each discipline is different. The dichotomy proposed by Liu Peilin and other scholars analyzes the cultural landscape genes from different angles [8]. However, there are also some problems in practice, such as lack of adaptability: it is easy to be confused in the specific division operation; Lack of scalability: the limitations of classification methods cannot meet the emergence of new cultural landscape genes; Lack of hierarchy: the classification in dichotomy is parallel, and the hierarchical model is vague. Therefore, Liu Peilin and other scholars put forward the deconstruction of landscape gene characteristics on the basis of

dichotomy, which further improved the deficiency of dichotomy.

3.2.2. Identification method of Liutanghe landscape genes

In the practice of traditional settlement landscape gene information map, landscape gene is defined as the basic information unit [9], which is also called the smallest unit and cannot be subdivided. Theoretically, any cultural landscape can be defined as the basic information unit, which brings great difficulties to landscape identification. Therefore, in the process of landscape gene identification in Liutanghe region, the following four basic principles should be followed, namely, "inherent uniqueness (with genetic characteristics, features that other regions do not have), external uniqueness (external landscape image is different from other elements), local uniqueness (local particularity), and overall superiority (the region forms a unique landscape style, thus reflecting the historical features of the region and the city and embodying the factional style). Based on the combination of landscape gene classification basis and recognition principle, a clear landscape gene recognition element is established, and the landscape characteristics of Tanghe region are classified, merged into similar categories, sorted and summarized into all levels of systems, so as to realize the hierarchical deconstruction of Tanghe region characteristic genes. According to the specific landscape genes of Tanghe River, the identification results are classified into urban water environment layout landscape genes, residents' (imitation) ancient building landscape genes, public building landscape genes, ancient bridge landscape genes and intangible cultural landscape genes. This method serves the specific landscape genes, and if you want to systematically identify the regional landscape characteristics, you need to use the recognition model to analyze the morphological characteristics of the landscape.

3.2.3. Liutanghe Landscape Gene Identification Process

The identification process of landscape genes is scientific, technical and comprehensive. Judging from the existing practical cases, the identification processes of landscape genes mainly include landscape gene resource management process and identification operation process. Based on these two processes, an identification process that conforms to the characteristics of Tanghe cultural landscape genes is created [10]: "Establishing identification indicators-collecting and studying landscape feature elements-deconstructing landscape features-identifying results".

3.3. Extraction of Tanghe Cultural Landscape Gene

3.3.1. Analysis of genetic characteristics of material cultural landscape

3.3.1.1 Landscape Gene of Water Environment Layout in City

The villages along the coast are built by the river and live by the pillow water. The street structure of Yugu City maintains the urban street and river system and spatial layout of "one street, one river and one city", "front street and back river", "two streets and one river" and "street and river parallel", which is a typical river texture of Jiangnan water town. In the construction and development plan of Nantang Old Street historical and cultural block, the original urban texture should be respected, and the original overall spatial layout of "street-roadway-building courtyard" and "street-roadway-river" should be fully protected and utilized, thus maintaining the historical scale of the city[11].

3.3.1.2 Residents (Imitation) Ancient Architecture Landscape Gene

Most of the existing local ancient buildings and villages are in the style of the late Qing Dynasty or the Republic of China, and most of them belong to the traditional Huizhou architecture. The plane

shape of the building is in the shape of "I", "L" and "Hui", and the architectural colors are mostly black, white, gray, red brown and wood. The building materials include masonry materials, wood structures, etc., and they are partially decorated with stone carvings, flower windows, wood carvings and door couplets.

The top part of the gable is named after the shape of a horse's head, and the wall is covered with short and exquisite hundred-word gray tiles, so it is called the horse's head wall. Some old houses have carved stone pillars, and there is a small Buddha statue on the top of the door, which is very distinctive. This style of ancient buildings is extremely rare in Ningbo.

3.3.1.3 Landscape Gene of Public Buildings

In the Ming and Qing Dynasties, the commercial center known as "South Gate and Three Cities" at that time was located along the river outside the "Changchun Gate" at the south gate of the ancient city, and people from eight neighboring towns flocked to the market day. This prosperous scene has a history of 560 years. There are "Tongmaoji Sauce Garden" and old barber shops and bamboo shops, as well as old shops such as Huiqing Hospital, Chenghuai School and Chenxiang Chenzhai built in the Republic of China. Nowadays, the pattern of shops along Nantang Old Street mostly follows the original pattern of front shops and back shops. The Yongshui Bridge and Xiangyang Bridge on the Nantang River, the quays along the river and the "Yongshan" ancient pavilion are also properly maintained. In the Ming Dynasty, Shen Mingchen wrote a poem, "There are hundreds of flowers on Nantang Road, and the spring breeze is everywhere", which vividly depicts the prosperous scenery at that time. Feng 'ao Old Street: Located in Feng 'ao Village, it is known as "the first ancient street in Yinxi". During the Qianlong period of the Qing Dynasty, Feng 'ao Village developed rapidly and gradually formed a "Feng 'ao City", which attracted surrounding residents and vendors to gather here for business exchanges, especially in the Republic of China. Nowadays, with the changes of the times, it has gradually declined and become deserted[12].

3.3.1.4 Ancient Bridge Landscape Gene

Bridge is the most distinctive element around Liutang River, and its types are also various: "Ten-mile and nine-mouth bridges, all the way to Gao Qiao", which means that there are many high-arch bridges and many ancient bridges on Xitang River; Huiming Bridge, built in the Tang Dynasty, as the earliest existing double-arch stone bridge in eastern Zhejiang, has witnessed the rise, development and development of Guzhen and Gumingzhou for more than a thousand years, and is also an important land and water transportation center. "The First Covered Bridge in East Zhejiang" refers to Bailiang Bridge, the oldest covered bridge with feldspar beams in Zhejiang Province, which has been known as "Yin Feng Tong Road" in the past and has played a great role in traffic. The Dongqiao, which was called Guangxi Dongqiao in ancient times, was built in the Northern Song Dynasty. The Dongqiao not only connects the east and south of Zhejiang by land, but also makes great contributions to flood control, drainage, irrigation, shipping and urban water supply in western Yinxi. The pier of Dongqiao Bridge is thick, which is the largest pier among the existing ancient bridges in Ningbo, and it is also the surviving double-hole wooden beam covered bridge with thick piers in Zhejiang.

3.3.2. Analysis of Genetic Characteristics of Intangible Cultural Landscape

Cultural landscape genes not only exist in material form, but also spread in traditional material sense. They are also manifested in language, customs, beliefs and spirit. Intangible cultural genes also play a very important role, because they often contain more cultural connotations that can't be directly perceived, such as drama, Yong Opera represented by "Tian Luo Girl", Yue Opera represented by "butterfly lovers" and Siming Nanci represented by "Pearl Tower"[13]. The Tang River cultural

landscape genes extracted using the above method are shown in Table 1, the extracted Tang River cultural landscape genes are shown in Table 2, and the positioning of some cultural landscape points in the South Tang River is shown in Figure 1.

Table 1: Extraction of Tanghe Cultural Landscape Genes

cultural landscape	category	recognition factor	Identification index	Recognition result	
Liutanghe River in Ningbo	Material and cultural landscape genes	Landscape genes of urban water environment layout	topography	Plains and hills	
			Village form	Scattered distribution, banded distribution	
			Space Layout	Fishbone style	
			Street river system	One street, one river and one city, front street and back river, two streets and one river, and street and river are parallel.	
		Resident (Imitation) Ancient Architecture Landscape Gene	Public building landscape gene	building material	Masonry materials, wood structure
				Architectural color	Black, white, gray, reddish brown, wood color
				Plane form	"I", "L" and "Hui"
				Local decoration	Stone carving, flower window, wood carving, door couplet
		Public building landscape gene	Religious architecture	Kang Jiangjun Temple, Guan Shengdian, Ningbo Christian Centennial Hall	
			Ancient street architecture	Nantang Old Street, Gao Qiao Old Street and Wangchun Old Street.	
			Former residence of celebrities	South gate Yuan's architectural complex and Yuan Muzhi's former residence.	
			water conservancy facilities	Tashan Weir, Shuize Monument, Daxiba	
				Double-span arch bridge	Huiming bridge
				Thick pier double-hole wooden girder bridge	Dongqiao
	Shi Jia mu Liang gu lang bridge			Bailiang bridge	
	Intangible cultural landscape gene	Belief gene	Belief object or thought	Christianity, Catholicism, Buddhism, legendary figures	
		Custom gene	Dietary customs	Red paste choking crab, glutinous rice balls and Ningbo stink	
			Entertainment custom	Festival activities, folk customs, opera performances	
		Language gene	dialect	Local language family and dialect language	
			old saying	The son wants to be his own, and Tian wants to buy Dongxiang; Roasted Onion with Carassius auratus "-Fish flavor "	
			literature and art	Opera, stories and legends	

Table 2: Extraction of Cultural Landscape Genes in Houtanghe River

Houtanghe in Ningbo	Material and cultural landscape genes	Natural environment characteristics	topography	Plains and hills
			Landscape resources	Houtang River, Baozhuang River, Xiaobaihe River and Dahanshan
		Village layout characteristics	Village form	Banded distribution, scattered distribution
			Street river system	One street, one river, one city, front street and back river
			architectural design	White wall and blue tile
		Residential building characteristics	Ancient village	Jiaoci Village, Hanyu Village, Jiaoqi He Cun
			building material	Masonry materials, wood structure
			Local decoration	Stone carving, flower window
		Characteristics of public buildings	Religious architecture	Laoshuizhuwan temple
			Traffic passage	Bridges, Old Streets, Boat Trackers's Road and Guyan Road.
			water conservancy project	Taibaihu dam
		Ancient and famous trees	Wuxiang and Dongwu	
		Intangible cultural landscape gene	Life characteristics	occupation
	vehicle			Sailing boat (early sailing boat, night sailing boat, duck egg boat, baiguan boat), bicycle.
	Dietary customs			a land of milk and honey
	language feature		riddle	Shake the boat blindly-"Bao Zhuang" (Bao Zhuang)
			old saying	Qiaotoulaosan
	humanity history		family	Shi family, Qian family
			celebrity	Yuan Zongyao, Zhang Bin
			organization	Heishuidang

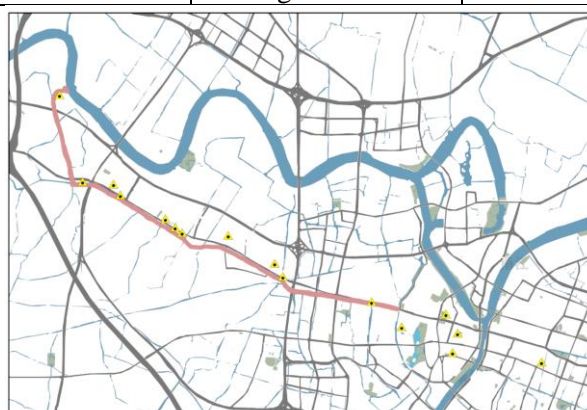


Figure 1: Location of some cultural landscape sites in Nantanghe River

4. Conclusion

Tanghe cultural landscape gene is the foundation of the inheritance and development of Tanghe

culture, and the research on the identification and extraction of Tanghe cultural landscape gene has important theoretical and practical significance. The main conclusions of this paper are as follows:

We first use reliability and effectiveness analysis tools to analyze the questionnaire and identify the problems that exist in Tanghe;

Based on the previous theoretical research, the classification basis of Liutanghe landscape genes was obtained, and combined with the specific landscape gene recognition principle of Tanghe, a clear landscape gene recognition element was established to identify and extract Tanghe cultural landscape.

The Tanghe culture in Ningbo is identified and classified by landscape gene theory, and the cultural landscape of Tanghe in Ningbo is systematically sorted out, highlighting the function and role of Tanghe in urban construction, green construction and context display. This study will play a great role in enhancing people's awareness of the protection and utilization of Tanghe cultural landscape resources, and also provide new ideas for more scholars on how to protect, publicize and carry forward the research of Tanghe culture.

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