

Study on the Spatial Characteristics and Protection of Streets and Alleys in Ancient Towns in Southern Anhui

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Abstract

This study takes the typical ancient towns in southern Anhui Province as an example, and applies the quantitative research method of space syntax to analyze the spatial patterns of streets and alleys in Hongcun Town, Xidi Town and Sanhe Ancient Town. First, it analyzes the symbiotic relationship between a series of ecological laws, social culture and material space formed in the formation and development of ancient towns. This paper analyzes the general characteristics of street space in ancient towns from the aspects of street structure, communication mode with people and space scale, and discusses the optimization path and strategy of street space in historical towns. It provides new ideas for the renewal and protection of street space in ancient towns in southern Anhui, and reflects the concept of cultural self-confidence in the new era and the concept of comprehensive, coordinated and sustainable development.

Keywords

Ancient Towns in Southern Anhui; Street Space; Syntax; Form.

1. Introduction

Ancient villages and towns are an important part of the historical and cultural heritage and the needs of the people. Protecting the historical and cultural heritage of villages and towns is a comprehensive, coordinated and sustainable development that truly reflects the basic rights and interests of children in the long-term interests of the people and promotes economic and social development. The protection and utilization of historical and cultural heritage of ancient towns is an important part of modern urban construction. The ancient city is the product of human civilization, with rich cultural heritage. Through the changes of the times, we can witness the changes of history, reflect the uniqueness of folk customs, and inherit the continuity of culture. It is a non-renewable and irreplaceable historical and cultural heritage that must be protected, strengthened and inherited. In addition to the in-depth study of the old city, the protection and utilization of historical and cultural heritage such as the old city is an important part of modern rural construction. With the rapid development, urban-rural integration and rural tourism, in recent years, the tourism planning of most expansion projects in the old city is a spontaneous expansion of some ancient cities, lacking systematicness and scientificity. A typical historical block of the old city. The style of the street is very different from that of the new street, and the internal problems of the old street are getting worse. The street space is the most intuitive embodiment of the traditional appearance of the historic city, and the carrier of various functional activities of the ancient city. Therefore, by analyzing the relationship between the spatial morphological characteristics of the old city, we can deepen its intrinsic value. The ancient villages in southern Anhui are located between Huangshan Mountain, Jiu Hua Mountain and Tianmu Mountain. With undulating peaks and deep valleys, they belong to typical hilly and mountainous landforms. Most of the ancient villages in southern Anhui are hidden in the mountains and surrounded by mountains. The traffic is inconvenient

and they are relatively closed. This makes the village base, architectural environment, and street style of the village remain unchanged after thousands of years of changes, retaining unique customs and habits, and still being the habitat of local residents. As an important cultural tourism area in Anhui Province, southern Anhui has unique historical and cultural features, and has not lost its traditional characteristics due to historical changes. Now, southern Anhui has become a representative special cultural region. Many ancient villages in southern Anhui have formed a natural layout form of "pillow mountain, ring water and face screen", creating a living environment that is harmonious with nature. This paper selects three ancient villages in southern Anhui as examples. The overall layout of each ancient town has its own characteristics. Through the field survey of these three ancient towns, the overall layout, street shape, natural features and other characteristics of the ancient villages in southern Anhui can be reflected to a certain extent.

2. Space Syntax Theory

2.1. Syntax Variables

Spatial syntax is a theory and research method proposed by Bill Hillier. The starting point of this theory is to "return to space itself", study space as an independent element, accurately abstract space structure from space relations, and then analyze the relationship between space organization and human activities. This paper mainly analyzes four spatial syntactic variables. (1) Degree of control. The degree of control studies the degree of control between spaces. The control value of a single node is the sum of the reciprocal connection values of the node and the connected node. The larger the control value, the stronger the control ability of the spatial node. Explore the area, status and influence of the control advantages of ancient towns. (2) Average depth value. The average value of the shortest distance (i.e., the minimum steps) from a node to all other nodes in the space system is the average depth of the node. The lower the value, the more convenient the topological accessibility of nodes. Therefore, the calculation of the average spatial depth of an ancient town is to measure its topological depth in the entire spatial system. space Limiting factor. Spatial constraint coefficient is a variable value in the field of spatial syntax. The higher the value, the stronger the space shading, and the stronger the restriction on the surrounding space boundary. (4) Degree of integration. The degree of integration represents the degree of aggregation and dispersion between one node and other nodes in the spatial system. The higher the degree of integration, the better the space penetration, and the higher the frequency of use, the easier the flow of people to gather. Therefore, the in-depth interpretation of its form can clearly reflect the characteristics of fabrics. On this basis, we can better understand the profound impact of space itself on human life.

2.2. Spatial Description Form

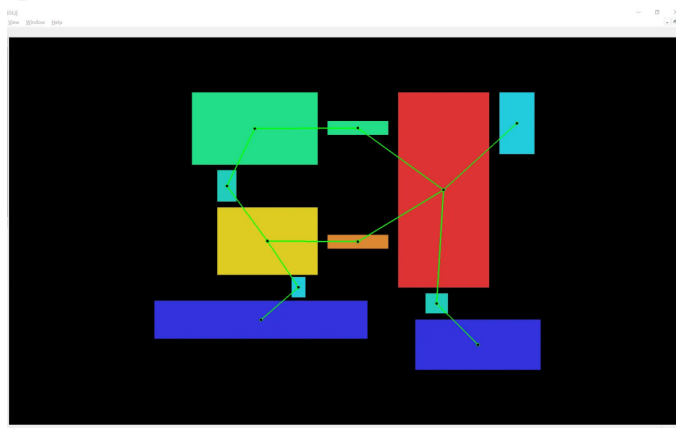


Figure 1. Spatial syntax software

In China, many achievements have been made in the study of rural street space based on spatial syntax. The main research method is axis method, and the research content mainly involves spatial form cognition and spatial structure analysis. Streets and alleys are the skeleton and support of the whole village space, not only bearing the villagers' public life, but also the material carrier of regional culture. For the study of its structural characteristics, this paper will adopt the axis method widely used in China. As the spatial characteristics of streets and alleys are mainly reflected in the overall spatial structure and spatial layout, this paper will use the global integration degree, local integration degree, average depth, solvability and other variables in spatial syntax for quantitative analysis (as shown in Figure 1). To analyze spatial syntax, we must first know the configuration of space. The first step of configuration analysis is to convert the space system into a graph of nodes and their connections, where each node represents a constituent unit of the space system. In the space syntax theory, the description of space can be divided into three forms: one is "convex", the other is Axis ", the three types are " constant voltage ". This paper uses the first two forms for specific analysis. Convex space refers to the space with internal angle less than 180° . The segments connected by any two points in the space are still in the whole space. Therefore, the line of sight in convex space is wide. If there are more than one person in the space, mutual vision can be achieved. In the village, "The convex shape of the external space is formed by the continuous superposition of several irregular spaces with an internal angle of less than 180° formed by the external boundary of the building and the natural boundary; the convex shape of the internal space is the internal space formed by the walls of the building (the longest extension line between convex spaces is not blocked by the building, nor is it blocked by walking as the axis, and the smallest and longest axis covers the entire space, forming the axis model of the space). Each segment of a convex space or axis is a node in the spatial topology. By transforming the connection relationship between them into a relationship graph, the variable relationship between nodes, local and global can be calculated. All variable relationships Are reflected by values and colors. Values range from low to high, and colors range from cold to warm. The value is positively correlated with the color.

3. Overview of Ancient Town and Street Shape

3.1. Hongcun Town



Figure 2. Hongcun Town

Hongcun is a very representative Anhui architectural village. In 2000, it was officially listed as a world cultural heritage, filling the gap of "world heritage" without villages and towns. Hongcun is located in the northeast of Yixian County, Huangshan City. It was founded in the

Southern Song Dynasty and has a history of more than 800 years. There are 137 ancient buildings of the Ming and Qing Dynasties in the park, which are rich in cultural relics. The walls and tiles of the whole village are white, simple and elegant. The planning and layout of ancient villages in Huizhou are influenced by ancient Confucianism and geomantic omen theory, emphasizing the integration of nature and man, and the perfect integration of artificial environment and natural environment (as shown in Figure 1).

The plan of Hongcun is drawn in the form of an axis map. The street space represented by the axis makes the spatial trend clearer the angle of the whole street is relatively continuous, which fully reflects the tauren shape. The village pattern of Hongcun takes Yuannuma as the core area. Wang's Ancestral Hall and Leshu Hall in the north of Yuannuma are the sustenance and dependence of the clan spirit, so the surrounding areas of Yuannuma become the most frequent crowd gathering and distribution space of Hongcun. The canal in the village is usually used for public activities and space, so the street is naturally formed by the canal. While the east-west front street (main street) is the axis, passing through the prosperous business circle and east-west exits, so the monthly pattern of Hongcun is centered on the month, connecting the front street and the back street, mainly through the streets of Shanggou Line, North South and Xixi River Line, Chaxiang, Zhongshan Road, etc., forming the street space pattern of the road network. The details can be summarized as follows: 1. Due to the high terrain, the village water system is one of the sources of Xin'an River; 2. The main streets and driveways are spatially distributed in the northeast of the village, and the water system is mainly distributed in the southwest of the village; 3. In the streets and alleys, the buildings in the ancient town are dilapidated Well, it's dilapidated. 4. There is a strong business atmosphere here. Many open spaces in the village are used for business activities such as barbecue, and shop signs that are incompatible with ancient buildings can be seen everywhere.

3.2. Xidi Town



Figure 3. Xidi Town

Xidi is located 8 kilometers east of Yixian County, Huizhou City, Anhui Province (Yixian County, Huangshan City, Anhui Province). It was first built during the Youdi period of the Northern Song Dynasty and has a history of nearly a thousand years. Yixian was originally an ancient Huizhou, and Xidi is located in the west of Huizhou Prefecture. It got its name from the Nine Posts. Hongcun Village, located 10 kilometers north of Yixian County, was built in Shaoxing in the first year of the Southern Song Dynasty. It has a history of more than 800 years of Xidi. With its long and brilliant traditional culture, it has been honored to register the customs of the Ming and Qing dynasties. It is simple and unsophisticated, and it has been honored to register wood, brick, and stone carvings, which are famous throughout the country. The most distinctive houses are Dr. Di, Yingfu Hall, Dunren Hall, Xiyuan, Ruiyu Pavilion, etc. "Hu Wenguang Memorial Archway",

also known as "Xidi Memorial Archway", is the representative of the Hui style stone memorial archway of the Ming Dynasty and the symbol of Xidi. Xidi Village has cultivated a number of national pillars and Confucian businessmen, such as Hu Wenguang, Prime Minister of Mingjing Fan, Hu Shangli, the second official of the Qing Dynasty, and Hu Guansan, a rich businessman.

Xidi Town is a hilly landform with an average altitude of 260 meters. Xidi Town is surrounded by mountains on all sides. Two streams flow through the north of the village and meet through the source bridge in the south of the village. The village takes one longitudinal street and two riverside roads as the main skeleton, forming a village street system facing east and extending south-north. It is composed of narrow streets and alleys, in which the courtyard ancient town flexibly forms an irregular street network according to the combination of extension and rotation of the axis. In the center of the village, especially in the block with ancestral temples, the houses and streets are organized in an orderly manner. The main street in the village is usually parallel to the main facade of the building. Although it is a little winding, it basically maintains a continuous linear extension. This feature of street space is probably related to the local tradition of building houses: the houses built in the back should be roughly aligned with the houses built in the front, that is, the buildings cannot block the extension of the road (the extension of the line of sight), especially in the direction of the main road. This makes the street a very important direction recognition indicators, and it is easy to walk directly along the main street, rarely led to the secondary alley. On the other hand, due to the constraints of spontaneous construction and irregular homestead, there are few neat alignments between houses, and the external space formed is always in constant convex and concave changes. This is a continuous stack. In most cases, the buildings and their closed external "convex" spaces penetrate each other, and the external doors directly lead to them.

3.3. Sanhe Ancient Town



Figure 4. Sanhe Ancient Town

Sanhe Town is located in Feixi County, Hefei City, a famous city in central Anhui Province, China. Feixi County is located on the west bank of Chaohu Lake, at the junction of Lu'an and Chaohu in Hefei, about 30 kilometers away from the urban area of Hefei. Since Sanhe was named after Fengle River, Hangbu River and Xiaonan River that run through the three rivers, it has a civilization history of more than 2500 years. As early as the Spring and Autumn Period and the Warring States Period, the ancient town had taken shape. In Chinese history, the Battle of Wu and Chu broke out here, and the Taiping Army also fought here, leaving many cultural relics, such as the city wall and the courtyard of the Heavenly King's Mansion. Sanhe Town is a typical

old water area, and its landscape attraction is no less than that of Zhouzhuang in southern Jiangsu. But at the same time, there are a lot of historical and cultural landscapes here, which constitute a unique "eight ancient" cultural scenic spots group in the Jianghuai region, namely, the old river, the old bridge, the old Wei River, the old street, the ancient folk houses, the old teahouse, and the ancient battlefield. Sanchuan Road mainly consists of two parts, north and south (with the main street gate as the boundary). The North Street has been basically completely modernized, while the South Street still retains the original ancient buildings.

There are four main forms of Sanhe street buildings, namely, front warehouse back house, front warehouse middle house and back house, lower warehouse and upper house, and mixed house. The layout is mainly Sanheyuan and Siheyuan, in the north and south. The courtyard extends longitudinally along the central axis of the building, with two less courtyards and six more courtyards. These courtyards sit in the center of the main house and are called the main house. On both sides of the main house are the left wing and the right wing. In larger ancient towns, the second floor is always surrounded by circular corridors around the patio, commonly known as "Zhuanma" building, which has become a unique spatial form of ancient towns in the Yangtze Huaihe region. In some ancient towns, there is a hip roof above the building, which is very similar to the atrium of modern buildings. Through the quantitative analysis of the street space of the ancient town, the following conclusions are drawn: (1) The core of the global integration of the ancient town coincides with the geometric center of the ancient town; (2) The degree of globalization is closely related to the functional layout and road traffic organization; This shows that the streets and alleys of the ancient town have obvious hierarchy.

4. Analysis of Street Space Form

The streets and alleys of Hongcun can be roughly divided into three levels, namely, traffic-oriented streets and alleys, life-oriented streets and alleys, and preparation alleys. Streets and alleys have various scales and rich sense of spatial hierarchy, which are the main places for local residents' daily communication activities. The streets and alleys of the ancient villages in southern Anhui are mainly Huizhou ancient town buildings, which are an important part of the streets and alleys. Most of the street buildings are ancient buildings left over from the Ming and Qing Dynasties, which are of historical and ornamental value. The building has a simple appearance and is closed by a high wall. In addition to the gate and entrance, there are only a few high windows on the facade. Visual elements of architecture: doors and windows, building entrances, wall colors and materials, stair treads, horsehead walls, roof tiles, brick carvings, wood carvings, stone carvings and detailed glass decorations on building doors, various decorative patterns and appearances, building contour skylines, etc. These elements can be found in their use through field investigation when protecting new designs.

Since Xidi Town has been a world cultural heritage, with the increase of tourists year by year, the streets in the village are too commercialized. For example, in ancient times, as long as the streets and alleys at the entrance of buildings were used, commercial activities could be carried out in their own houses, and a new window was opened or the original facade window was expanded in some convenient places; The excessive commercial activities in front of the ancient buildings in the streets and lanes of Xidi Village have destroyed the strong historical and cultural atmosphere of the local area. These are all damages to the facade form of street buildings. The low index and green mountains are villages. The survey found that more than two ancient villages are located in ancient construction waste. Through communication with local residents to the edge of collapse, the repair cost of ancient buildings is far higher than that of new houses. Many local residents choose to give up the repair of ancient buildings, or the owners of the houses have moved to the city. The oldest buildings are abandoned and ignored. The local government does not have special funds for the repair of ancient buildings, as a result, the

ancient buildings in Bishan Village were seriously damaged. Zhongduo built new buildings, which made the original streets and alleys no longer exist. In the protection of pavement, water system, skyline and other aspects of street space, the water system design in Hongcun has always been a great feature of the village. The use function of the water channel in the village has been continued to this day. At the same time, the construction skyline in the main streets and lanes of the village is highly supervised.

The main street of Sanhe Ancient Town, which is composed of West Street, Middle Street and East Street, is the core axis of the network of Fish Bone Street, the historical and cultural block of Sanhe Ancient Town. The fusion degree of secondary streets is higher than that of secondary streets on both sides, and the fusion degree of secondary streets decreases from the center to both sides. As the east side of the block is adjacent to the river, and there is a waterfront road connecting the north and south between the west side of the block and the river, the integration degree of the auxiliary street and lane on the east side of the main street is lower than that on the west side of the main street. In addition to the main road, the west side of the community close to the waterfront road has a high degree of integration. Compared with the integration of West Street, Middle Street and East Street, it can be seen that Middle Street is located in the core area of Sanhe Ancient Town, and the integration of the north section is the highest in the whole block. This means that this section of road has good accessibility, good spatial location and great development potential. It is the most commercially valuable section of the entire historical block. There are few streets and alleys in the north section of West Street and the south section of East Street, and the connection with the central area is weak, with the lowest degree of integration. This also limits the development of this section of the street to a certain extent.

5. Conclusion

Today, when we study ancient towns in Anhui, we mainly think of ancient towns in southern Anhui. The colorful and exquisite Anhui architecture in the south of Anhui has a high research value. Few people will study the ancient towns in central and northern Anhui. There are not many ancient towns in Anhui, but the laws in the system structure of Hongcun, Xidi Town and Sanhe Ancient Town are explored. The protection and renewal of the street space of ancient villages in southern Anhui involves many aspects. From the material elements of the street space to the humanistic connotation, from macro to micro, it is a comprehensive and coordinated development process. Through the research on the protection theory and method of historic and cultural cities and villages, some mature protection design principles have been formed in the research content, and some principles also apply to the streets and lanes of ancient villages in southern Anhui. Through the spatial syntax theory and calculation method, and through the case study of the traditional ancient towns in southern Anhui, it is found that different spatial forms have certain regularity in topological structure: people, spatial forms and culture are closely related the internal logical relationship of the "three dimensions", the mutual infiltration and influence of functional spaces, and the mutual adaptation of space forms and living environment. The common and individual characteristics of different ancient towns are analyzed. It is understood that due to the unique geographical environment and human history of Anhui, different types of ancient towns have different spatial patterns, and each type of spatial pattern is caused by the differences in the evolution mechanism of ancient towns. Understanding the difference of this evolution mechanism can provide effective ways and planning strategies for the subsequent exploration of the protection of the spatial form of ancient towns in Anhui. Finally, it summarizes the general characteristics of the spatial form of Anhui traditional ancient towns, and clarifies the traditional features and spatial development impetus of Anhui ancient towns of various spatial texture types.

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