

# Constructing Conception of Ancient Chinese Building Group Space

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**Abstract**—The traditional ancient Chinese building group is composed of individual buildings laid in accordance with the azimuth, orientation, axis and hierarchical order. The plane features of the group space are characterized by axis extension, multi-path expansion, and layer-by-layer progression; the three-dimensional form is distinct in levels and orderly in priority; the space concept embodies the philosophical thoughts of "harmony between heaven and man" and "combination of ritual and music" and "The philosophy of "accompanying of benevolence and righteousness". In the development course of ancient Chinese architectures, "harmony between heaven and man" and "combination of ritual and music" promoted the mutual coordination and integration between architecture and nature, and made the building group space form an aesthetic space of alternated virtual and real things, co-existed static and dynamic states, and compatible internal and external spaces.

**Keywords**—building group; azimuth; orientation; axis; space concept

## I. INTRODUCTION

The formation and development of traditional Chinese architecture has a long history. Although China has a vast geographical area, different regions have different climates, humanities and landforms, and there are many types of buildings, such as residential buildings, palace buildings, religious buildings, worship buildings, mausoleums and so on. Those buildings have different forms, but all of them are expanded along the axis without exception in the space arrangement of the building group. Each group of traditional Chinese architectures is basically a group or many groups of buildings arranged around an atrium space. This principle of construction has continued for thousands of years and become the main planar composition of ancient Chinese building groups. At the same time, the idea of "Harmony between Heaven and Man" was also reflected in the development course of ancient Chinese building groups, and promoted the mutual coordination and integration of architecture and nature. Such building group paid attention to the selection of site; and the construction might consider the local conditions and geomantic omen. Those features have not only become a unique architectural phenomenon in ancient China, but also have a profound impact on the layout of building groups of the surrounding ancient countries.

## II. SPACE CONCEPT OF ANCIENT CHINESE BUILDING GROUP

When it comes to ancient Chinese building group, the most famous group is nothing but the Forbidden City. It is the largest ancient palace building group existing in the world. The entire building group covers an area of 720,000 square meters and a floor area of 150,000 square meters, and has 8728 existing houses. How can such a large number of individual buildings be combined together in an orderly manner and form a complete palace building group? This involves the space concept in ancient China, namely "the center represents the most respected position", a courtyard space oriented to the center.

In traditional Chinese architecture, each unit is basically a group or many groups of buildings arranged in a form surrounding a central space. This principle of composition has been used for thousands of years. When tracing the origins, it will be found that it has a very long history, and it can even be said that it is accompanied by the emergence of residence. As early as the Yangshao culture period of the Neolithic times, there had been the layout conception of concentric residential settlements. The Jiangzhai village site in Lintong, Shaanxi Province, for about 6000-7000 years ago is an example. The entire settlement is surrounded by five groups of more than 100 houses around a central square, but those houses are not randomly arranged, but each group of houses are centered on a large house surrounded by several cottages. All the houses in the settlement face the central square. From this point of view, the building groups in Neolithic times had adopted a concentric construction form. In Xia Dynasty and Shang Dynasty, there were ancient documents which had recorded that a four-way system was adopted in architecture. What is the four-way system? It is centered on a courtyard and surrounded by houses to the east, west, south and north directions to form a concentric space. There had also been records such as "east room", "south room", "east bedroom", "west bedroom" in Oracle. All of those records indicate that in China, the ancestors had early arranged houses in the four directions; the purpose was to form a closed concentric space, courtyard. In the subsequent dynasties, the general layout of building groups continued and further developed this space concept.

### III. AZIMUTH CONSCIOUSNESS IN ANCIENT CHINESE BUILDING GROUPS

There is an old saying that "the center represents the most respected position". This shows that Chinese ancients had early established their azimuth consciousness.

Speaking of the Chinese ancients' understanding of the five azimuths on the ground, it actually stems from the ancient people's observation of the astronomical phenomena. Ancient Chinese philosophy regarded people as part of the universe and believed that heaven and earth constitute a complete organism. And astronomical phenomena was reflected on the ground, and attached to people and things.

In ancient China, the groups of stars were called the authorities of stars which were somewhat similar to the Western constellation theory. In ancient Chinese astrometry, it is believed that the sky in the north hemisphere where the Big Dipper is located is taken as the center, and the stars around the Big Dipper are arranged around the Big Dipper.

Ancient Chinese divided the surrounding constellations into 28 constellations which were further divided into 4 groups (7 constellations for each group). The 4 groups were further represented by four mythical creatures, namely south rosette (the God in the south sky), north tortoise (the God in the north sky), east dragon (the God in the east sky worshipped by the Taoists), and west white tiger (the God in the west sky), also known as the four emblematic symbols. Hence, the constellations were connected to the four azimuths of mythical creatures, forming a distinct space concept between the East, the West, the South and the North. The ancients divided the plane sky into five azimuths, namely the East, the West, the South, the North and the Central, and projected astronomical phenomena on the ground. It also established coordinates for the azimuths of the ground according to the azimuths in the East, the West, the South, the North and the Central in astrometry. The concentric "Atrium" plane layout system is also established on the basis of the five azimuths (as shown in "Fig. 1").

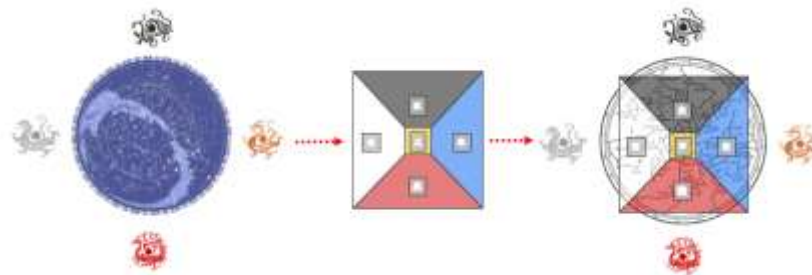


Fig. 1. Ancient Chinese map of azimuths.

### IV. THE SPACE NATURE AND FUNCTION OF COURTYARD

Courtyard is the inner connection space of ancient Chinese building groups. In large space with complicated functions, many individual buildings are arranged on the basis of the courtyard. The traditional Chinese individual building has simple plane and adopts standardized design. In the formal building, the plane is mostly rectangular. From ancient times to 21st century, "several rooms and frames" often appeared in speaking and even in official literature. For example, the "Dream of Red Mansions" often has the description of "three rooms with animal-head gate". "Room" or "open room" is used for expressing the size of a single building. In individual building, the "room" is a unit representing area, and the area between the two columns is called a "room". The number of "room(s)" in individual building will no longer be expanded when it is increased to certain extent, usually up to 11 open rooms. The small-scale, single-function building plane surely cannot meet the complex architectural functions; so, it is necessary to take a courtyard as the center, and get the scattered individual buildings well arranged to constitute a complete organism.

The building group is represented by "yard", and "several yards and rooms" are often used to describe the scale of the entire architecture. The focus of architectural design in ancient China was on the "rooms" and "yards", while today's architectural design focuses on the functional division and

volume expansion within the interior of individual building. Why does ancient Chinese individual building must rely on the combination with courtyard to complete the functional integrity? The difference between individual building and courtyard is that, the former is building space with roof, while the latter is a building space without roof. It can be imagined that if moving the roof on the original top of a building onto a courtyard, then the inner and outer spaces would be reversed, the original inner space would become the outer space, the original outer space would become the inner space; the inner and outer spaces is convertible. It can be said that the courtyard is actually a hall without roof; it is an extension of the function of indoor space.

In ancient architectures, courtyard was used very much and was used for holding some etiquette activities, treating friends, catering and so on. Those activities are more suitable to be conducted outdoor than indoor. For example: The courtyard space enclosed by the "bridge frame" shaped wall in front of the Meridian Gate of the Palace Museum is an open auditorium for holding ceremonies. When victorious soldiers came back, there will be a meeting of offering captured personnel held here. The "Painting about calming down Hui people and offering captured personnel" properly depicts the ritual that Emperor Qianlong accepted the ceremony of offering captured personnel at war on building of the Meridian Gate. At the same time, it was also a place where the emperor's imperial edict was issued. On the first

day of the lunar month December of every year, the "announcement ceremony" for the almanac of the next year was held here (as shown in "Fig. 2").



Fig. 2. Painting about calming down Hui people and offering captured personnel.

## V. POSITIONING PRINCIPLE

### A. Azimuths

In *Zhou Li Tianguan*, there is a saying that "when the king establish a state, he should firstly determine the azimuths of the capital and palace". Chinese have early established the principle that takes direction as the basis of positioning for a building plane. Most regions of China are located within the Tropic of Cancer; hence, the houses facing the south can obtain the most ideal indoor climate. In order to make most houses obtain the ideal orientation, building sitting in the north and facing the south has become a system. In this principle of positioning, no matter whether buildings are developed with or without plan, they can easily form a harmonious and unified composition. The Old Summer Palace was merged by Yuanming Park, Changchun Park and Wanchun Park. The construction lasted for two centuries. If the construction did not follow a common positioning principle, it is difficult to connect them into a whole.

### B. North-south Medial Axis

The sky that can be seen in most parts of China is the sky in the northern hemisphere. North Star points to the North celestial pole, almost properly facing the Earth's axis. Its position is almost unchanged when being seen from the north hemisphere. It is located in the center of the sky of the north hemisphere. In ancient China, astronomical phenomena were associated with the people and things on the ground, so it was determined that "the North is the most respectful position" and "the Center is the most respectful position". In architecture, this concept is mainly reflected on the principle of plane composition. It emphasizes being symmetrical with reference to the north-south medial axis; main buildings are arranged on the north-south medial axis to enhance the importance of the middle layout.

## VI. THE WAY TO EXPANDING A BUILDING GROUP — "QUANTITY" AND "VOLUME"

In the historical construction experience of building groups, it can be seen that there once were two different ways to expanding the scale of the building. One way is the expansion in volume. In this way, the building space with

complicated functions is arranged in the space of single building. The volume of building is changed from small to large and expanded along the vertical direction of the space. Western classical architecture and modern architecture basically adopt this way, such as, Palace buildings in Europe and Louvre Museum in Paris, France.

The other way is the increase in quantity. In this way, the spaces of different functions are set in separate individual buildings, from one building to more buildings, from small building group to large building group, and buildings are arranged level by level in a plane space based on building group, constituting an organized two-dimensional artificial environment on the ground. Chinese classical building group basically adopts this way; thus a series of building groups composed of multiple buildings were generated and the closed open space and natural scenery were simultaneously organized into the composition of the building group. At present, the volume of modern architecture has greatly surpassed that of any era in history, and the greatest buildings of any era in the past; but in terms of building group, there has not been a building group surpassing the number of classical buildings in China where thousands of huge buildings belong to a unified building group.

At the same time, single building abides by specific standard, with limited variation; however, the shape and size of the yard can be changed infinitely. This way resolves the problem of limitation and is really a very clever composition method.

## VII. ORGANIZATIONAL SEQUENCE OF BUILDING GROUPS

### A. Ordered and Rigorous

North-South medial axis layout: The main mode of Chinese classical building groups emphasizes the North-South medial axis. The mainstream of the development of plane layout is to maintain the buildings regularly, orderly, with distinct levels in arrangement (as shown in "Fig. 3").

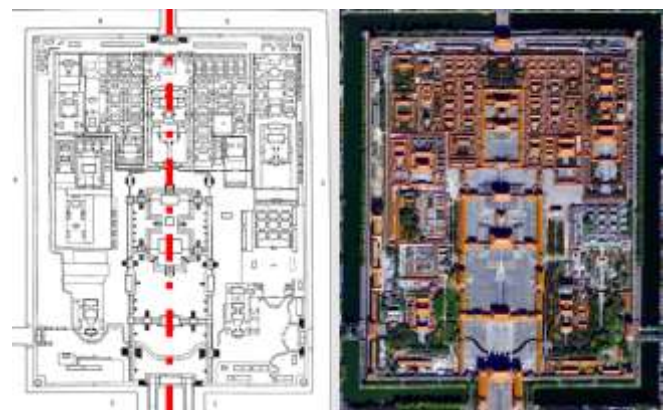


Fig. 3. General plan of the Forbidden City.

### B. Free and Flexible

"Adapt to local conditions" layout: On complicated landform, it is difficult and even impossible to regularly and

gruffly lay out courtyards along the north-south axis and the regular courtyard. Therefore, the layout combined with the terrain appears in order to try to make the layout free and lively and reduce the traces of regular composition. This layout pursues for the principle of creating "natural picture" like composition, namely everything goes with nature and the so-called "if the ground is created where there is no ground and mountain is built up where there is no mountain, it seems always not that suitable although the workmanship is excellent".

On the composition of Chinese classical building groups, the relationship between "host" and "guest" is very clear. If the major environment is composed artificially, the natural objects such as flowers and trees dotted in it are rarely excessive, and most of them are appropriate. With respect to the proportion of garden's configuration, there is a saying "water accounts for 30 %, bamboo accounts for 20% and house accounts for 10%".

The natural scenery is free. A layout composed of fully-free curve and non-geometric shape is generated in order to match with the freedom of the scenery.

Free layout is also an organized layout; the levels in arrangement are very important in landscape architecture. There is the order of arrangement in courtyards exists. At this time, the "courtyard" is changed from regularly and orderly enclosed space to free and flexible scenery enclosure. On the undulating terrain, the scenery outside the building group can easily enter the field of vision, and consciously incorporate the external scenery, which is the so-called "borrowing scenery". The scenery that may affect the quality of the landscape is blocked by various means.

No matter in regular layout or free layout, the levels of arrangement of the building group is laid out in a "continuous" or "motion" manner. For example, in the building group of the "Ming and Qing Forbidden City", there are twelve different "closed spaces", each scene is interlocked to each other, and the spatial rhythm is formed in "motion"; and the garden architecture "Liuyuan Park" is laid out in the arrangement sequence of "seeking for order and exploring the serenity" (as shown in "Fig. 4").

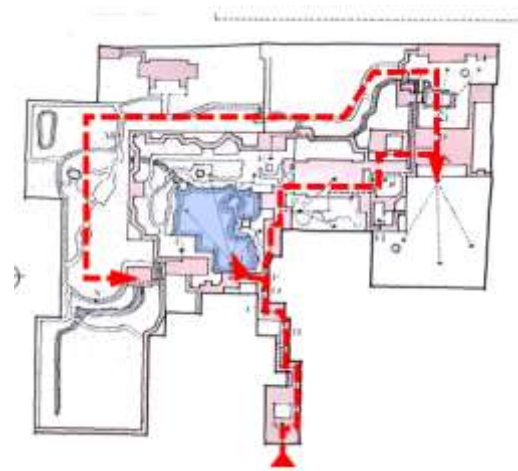


Fig. 4. General plan of Liuyuan Park.

"Spatial movement in building group", "continuous scenery", and "dramatic space" have become the essence of the orderly layout of the space of building group.

## VIII. CONCLUSION

Since ancient times, building groups have been generally accompanied by various organizational units that have emerged in the development of the society. For example, residences, government agencies, religious temples, and so on are planned and designed respectively according to their specific needs. In the historical development course of Chinese civilization, the various constituent units in the society are generally developed in accordance with the law from small to large, and from simple to complicate. With the development and progress of the society, the content and scale of building group are also grown and expanded gradually from small to large, simple to complex, and from low level to high level.

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