The comparative study of classical architecture in Tang and Song dynasties and in ancient Rome

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Abstract. The development of architecture in Chinese and western social culture has a long history. Due to the differences of region and thinking mode, Chinese and Western classical architecture have totally different order and form. Through the comparative study of Chinese and Western classical architecture, we can further understand the historical and cultural differences between Chinese and Western architecture, which is conducive to the further exploration of the history of architectural theory. Taking Chinese architecture in Tang and Song dynasties and ancient Roman architecture as examples, this paper expounds the typical similarities and differences of Chinese and western classical architecture through the comparison of the base of the building, the column of the building body and the roof of the building.

1. Introduction
Architecture, as a rigid demand of human beings, has been in the process of continuous development since ancient times. Architecture nurtured by different cultures presents a diversified form. Under the influence of oriental culture, Chinese classical architecture, which formed a system in Tang and Song Dynasties, and Western classical architecture, which formed a system in ancient Rome, had strict and logical normative records on the use of materials and the treatment of forms [1]. Therefore, these two periods are important nodes in the development of architectural systematization, but they lead to two completely different directions of architectural development.

The different components of the building in these two periods have both the expression of human reverence for religion and the unknown, as well as the unique understanding of the local culture in which they live. Through the comparison of classical architecture in these two periods, we can further discover the differences between Chinese and Western cultures in treating different regions, and then explore the reasons for the differences.

2. Comparison of building bases
The base of the building, whether in the east or in the west, appears in the classical architecture in a striking form. It is the combination of architecture and the earth, and also the "root" of the whole building.

2.1. Commonality of building base
During the Tang and Song Dynasties and ancient Rome, the main purpose of building base is to form the difference between indoor and outdoor elevation, to avoid rain intrusion into the interior, as well as
ventilation and moisture-proof, to reduce the impact of humidity on the interior [2]. Therefore, in the selection of materials, both Chinese and Western classical buildings use durable stone.

2.2. Similarity treatment of building base
The building base can intuitively reflect the volume of the building. In some public buildings, architects in both China and the West adopted similar methods to deal with the building base. They raised the building base to highlight the status and dignity of the owner or the object of architectural pilgrimage.

Foguang Temple Hall in Wutai Mountain, Shanxi Province, was built in the period of Emperor Xiaowen of the Northern Wei Dynasty (figure 1). Although the volume of the building itself is not very large, the relatively high base paved by it is very grand and magnificent under the background of its low eaves [3]. During the period of Augustus in ancient Rome, the Maison Carree was built under the high base and slender column deposit (figure 2). The volume of the building was very strong, and it occupied the most important position in the Augustus Square. Therefore, in the development of Chinese and Western architecture, architects have a more important treatment of the base of the building, in order to express the temperament and purpose of the building.

![Figure 1. Surveying and mapping manuscript of the Foguang Temple Hall.](image1)

![Figure 2. Hand drawing of the Maison Carree.](image2)

2.3. The differences under the influence of regime and religion
In ancient Rome, public buildings had various base styles and had different bases under different columns. In addition to highlighting the magnificence of public buildings and showing off the wealth of their owners, the complex and magnificent foundations of public buildings also reflect people's reverence for the noble gods.

And in ancient Chinese architecture represented by the Tang and Song Dynasties, under the restriction of strict regime, the base with complicated decoration can only appear in Royal buildings. Therefore, ordinary public buildings can only use thick bricks and stones to polish and smooth the base of the building, and the height cannot be too high to violate the symbolic significance of the regime [4].

3. Comparison of the columns in the building body
The body of a building has quite a lot of components, in which the columns and its corridor space are the parts that architects focus on, and even affect the overall sense of the building.

3.1. Basic development of building columns
Both Chinese and Western classical buildings are accustomed to the space composed of columns on the front of public buildings, and the form of columns is developing constantly. On the basis of ancient Greek architecture, ancient Roman architecture developed from three basic orders to five mature orders, and combined with arch technology, created a variety of combination forms of columns [5]. In the Tang and Song Dynasties, Chinese ancient buildings also satisfied the structural performance, while dealing with the columns in different forms to show the social functions entrusted by the
buildings. The treatment of columns also has a variety of forms, which also adds many different highlights to the visual effect of the building.

3.2. Similarity of building columns
The columns in Chinese and Western architecture are composed of three parts: the column head, the column body and the column foundation. When dealing with the columns in Chinese and Western buildings, they will combine the columns with the eaves, and carry out the overall treatment, so as to enrich the external performance of the columns. In the technical treatment of the column, "roll-up" exists in both Chinese and Western classical buildings, forming a perspective decoration effect, so that the column can be more prominent in the visual characteristics. On the basis of the column, both China and the West have used certain proportionality techniques to deal with it, which have played a role in setting off and rendering the atmosphere. In the decorative part of the column head and the column foundation, they also tend to show the wealth and status of the building through the complex and gorgeous decoration.

In the Tang and Song Dynasties, special decoration was often carried out through the use of color paintings, and even in some specific Royal buildings, the form of Panlong column was used (figure 3). In ancient Rome, there were not too many decorative paintings on the columns, but in the eaves of the columns, there were rich and gorgeous paintings and sculptures, and there were spiral column decorations to express the status of superiority and inferiority (figure 4) [6].

![Figure 3. Panlong column.](image)

![Figure 4. Colonna Traiana.](image)

3.3. Different treatment of columns
Further study of the column type can also reveal the different treatment forms of the column type in Chinese and Western classical architecture. In the stigma and eaves, the Western Classical Architecture tends to deal with them richly in the form of sculpture, while in the Chinese classical architecture, this expression is more in the form of color painting, and because of the existence of arch, the ancient Roman architecture in the eaves part is more a vertical pattern, while in the Tang and Song Dynasties, this part is through the sparrow. For processing, it is an obvious cross-sectional pattern.

On the columns, Western classical architecture would prefer to use grooves to enrich the performance of the columns, but in China, pure vermilion would make the performance of the building more prominent.

In the column foundation part, the Chinese classical architecture will be more inclined to meet the needs of the structure, thus simplifying the treatment of the column foundation. In the western classical architecture, the column foundation usually has gorgeous and rich decoration of line foot, to further show the magnificence of the building [7].
These different characteristics can be attributed to the arch technology in ancient Rome and the gradually mature Dougong technology in Tang and Song Dynasties. The horizontal composition of the Dougong (figure 5) and the vertical composition of the arch (figure 6) affect the development of the building columns and show the most fundamental differences between Chinese and Western classical architecture.

4. Comparison of building roofs
The roof is the most moving part of the building, and because the roof is the most intuitive part, it is always used to symbolize some unique cultural customs or regime and religions while improving the visual effect. Different forms of building roofs are the product of the characteristics of the times. They can reflect the politics, economy and culture of a certain historical period [8]. They are also the most prominent part of the regional performance of architecture.

4.1. The influence of materials
Because of the differences between China and the West, the raw materials of the buildings are totally different. Western classical building is dominated by stone, while Chinese classical building is dominated by wood, so the roofs of Chinese and Western classical architecture have different directions in the process of historical development.

4.2. Differences in the basic forms of roofs
Tang and Song Dynasties were the heyday of feudal society in China. The political regime tended to be perfect. With the maturity of the design and construction level of wooden architecture, various forms of roofs appeared. However, the roof is a symbol of status, so there are strict restrictions on the height, color and style of the roof. Because of the advantages of timber, the building roof has a variety of structural decorative components, as well as beautiful roof contour curve, which are also the roof characteristics of wood construction in the Tang and Song Dynasties.

In ancient Rome, the processing technology of stone was also gradually complete, coupled with the development of arch technology, the large-span dome began to appear on the roof [9]. The large and tall roof symbolizes the dialogue with the gods, and the scale of the interior space of the building is relatively large.

4.3. Roof decoration
Apart from its own structural characteristics, the roof decoration of the building is also progressing with the development of society. In Chinese and Western classical architecture, there are a lot of sculptures standing on the roof decoration, which shows the epitome of the social culture at that time.

In addition to decoration and beauty, the decorative components of Chinese classical architecture also have the function of protecting wooden frame [10]. For example, in order to reinforce the roof of Song Dynasty buildings, architects used a chain to pass through the main ridge and vertical ridge of the building. The end of the chain was fixed on the big nail inside the Chiwen or the Wenshou. Originally designed to protect nails, the Chiwen and the Wenshou gradually became exquisite
architectural decorations (figure 7). The decorative effect of the sculpture on the roof of Western classical architecture is relatively strong. And the roof sculptures of Chinese classical buildings are relatively small and delicate, while most of the roof sculptures of Western classical buildings are magnificent and magnificent (figure 8).

Figure 7. Decoration in Chinese classical building: Wenshou.

Figure 8. Sculpture decoration in Western classical building.

4.4. Reasons for roof differences
There are many reasons for the difference between Chinese and Western classical roof sculptures. In the context of large socio-economic, political and cultural background, these factors exist in both China and the West, but for buildings in specific locations, their influence degree is different [11]. Chinese Fengshui and Confucian culture are the two most important factors affecting roof decoration. They belong to Chinese political and cultural factors. Western classical architecture is deeply influenced by the Catholic Church and European classical philosophy, which are subordinate to religious and cultural factors. Therefore, the roof sculpture decoration of Chinese classical architecture embodies the feudal hierarchy more, while the Western reflects the supremacy of religion. In addition, construction technology and the use of raw materials are also one of the main reasons for the difference.

5. Conclusions
The development of Chinese and Western classical architecture cannot be separated from their respective social and cultural backgrounds and technical constraints. Generally speaking, wood-based Chinese classical architecture and stone-based Western classical architecture have similarities in many basic functions, but due to differences in regional beliefs and regime, architectural differences will be more prominent.

But behind these differences, the decisive reason is due to the support of different materials and technologies. The "Dougong" of Chinese classical architecture and the "Arch" of Western classical architecture are the outstanding representatives of their differences in material and technology, which also leads to different trends of architectural development. The cultural and regional background determines the direction of the development of decorative components in various parts of the building on the basis of material technology, which is more dominant in the influence of visual effects on the building.

In the development of modern architecture, the technology is developing rapidly, so we should also pay attention to the traditional regional material expression, and combine the traditional material technology with modern construction technology to form a more regional culture building.

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