

# Uncommon Public Buildings with Vault with Abutments in the Chinese Landscape of Wooden Construction (Sixteenth-Eighteenth Centuries)

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## INTRODUCTION

This paper aims at presenting the *wuliang dian* buildings (translatable as “beamless hall”). These brick barrel-arch structures represent quite an unusual group in the Chinese architecture.

## BUILDINGS DESCRIPTION

### Geography and dates of construction

Only twelve *wuliang dian* have been found in China (Error! Reference source not found.). Three main periods of construction can be distinguished: three halls built during the Jiajing period of the Ming dynasty (1522-1567), six halls during the Wanli period (1573-1620), and another three halls of the Qianlong period of the Qing dynasty (1736-1796) (details of *wuliang dian* dating can be found in Bodolec C. 2005, pp. 127-35.). The oldest *wuliang dian* is located in Nanking. The Linggu si might have been built during the Jiajing emperor reign. The Huangshi cheng is almost contemporary and situated in Peking, very close to the Forbidden City. The third hall built during the reign of Jiajing is located in the Temple of Heaven at Peking. It is the main building of the Zhaigong.

The second period of *wuliang dian* construction consists of six buildings, all designed by a monk named Miaofeng (1540-1613). His first *wuliang dian* was built in 1586 inside the Wanggu monastery in Yongji district in Shanxi province. The second one called Wannian si is located in Sacred Mountain Emei, Sichuan province. It was erected between 1599 and 1605. The third one, Longshang si, was built in Sacred Mountain Baohua in Jiangsu province and finished in 1605. At the end of 1605, Miaofeng returned to Shanxi province and began the construction of the Xiantong si in Sacred Mountain Wutai). Miaofeng’s last work was the Yongzuo si in Taiyuan.

Not built by Miaofeng but directly inspired by his works, the last *wuliang dian* of the Wanli period was the Kaiyuan si of Suzhou in Jiangsu province, built in 1618.

The last three *wuliang dian* were built more than 130 years later during the reign of Qianlong emperor of the Qing dynasty. All of them are located in the Imperial family resting place or promenade at the Zhihui hai in the Summer Palace and the Xuhua zhige in the Fragrance Hills.

They were constructed respectively in 1751 and 1762-63. The very last one to be built was the Xitian fan north-east of the Forbidden City, north of Beihai Park. It was built for the sixtieth anniversary of the birth of Emperor Qianlong in 1770.

### Elements of techniques

All the *wuliang dian*, but the three of the first period have two levels. In the first period, the dimensions are enormous: Huangshi cheng and Linggu si measure more than 50 meters long for 23 and 38 meters large. Their vaults span 9 to 11 meters. The same structure appears in most of Miaofeng works: a barrel vault crossed by three or five oblong vaults. This is also the case in Suzhou Kaiyuan si

All the semi-circular vaults of bricks were built using the longitudinal method. The abutment walls of the beamless halls were very thick in the early period (ten meters for the Huangshi cheng) and became thinner during the Wanli reign-period (four meters for the Yongzuo si). The exteriors were treated with columns, architraves, consoles, and other elements to look like conventional wood-frame main halls. Glazed bricks and tiles cover the three *wuliang dian* of the Qing dynasty.

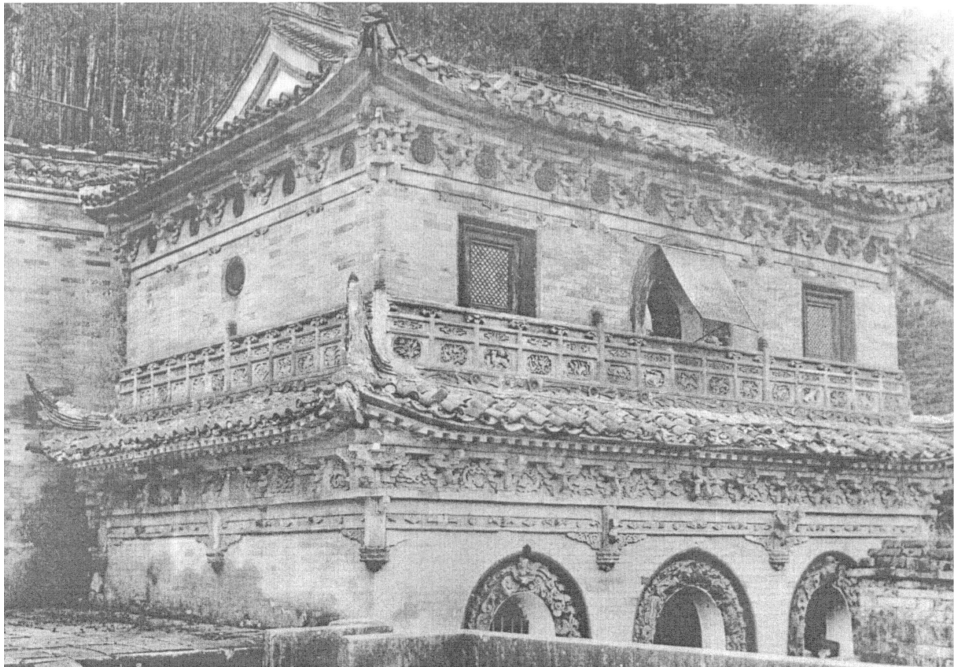


Figure 1. One of the small *wuliang dian* of Baohua shan (Prip-Moller, 1967, p. 255).



Figure 2. Xiantong si, Wutai shan, 1999.

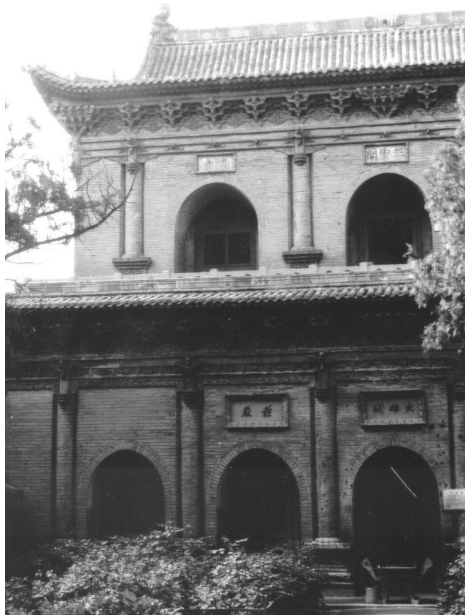


Figure 3. Yongzuo si, Taiyuan, 1999.

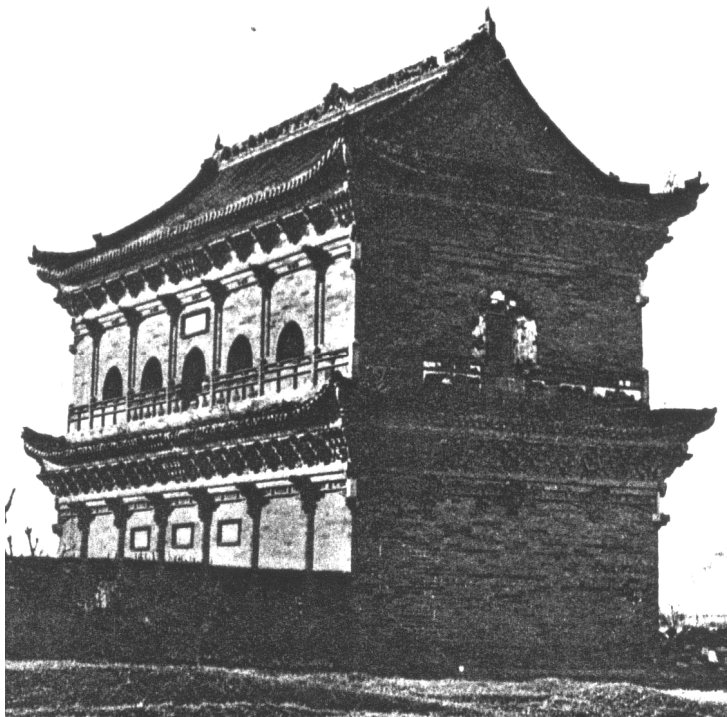


Figure 4. Kaiyuan si, Suzhou (Siren, 1930, pl. 55).



Figure 5. Xuhua zhige. Peking, 2005.

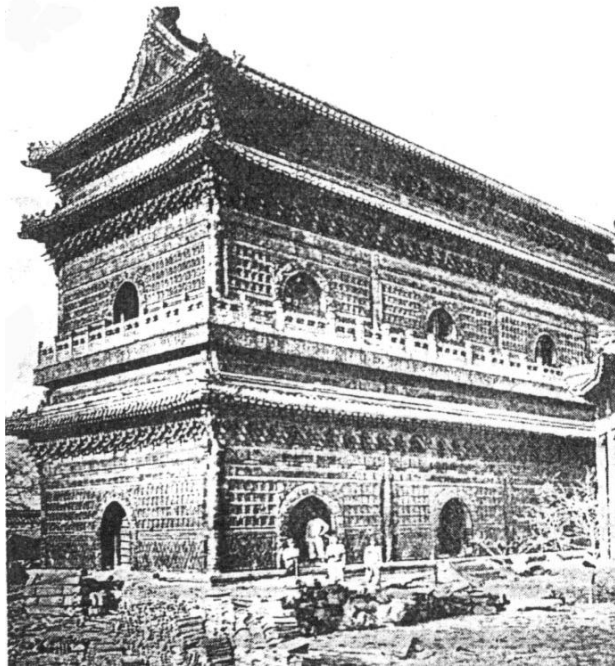


Figure 6. Wanfo lou, Peking. (Combaz 1909, fig.19, p. 83).

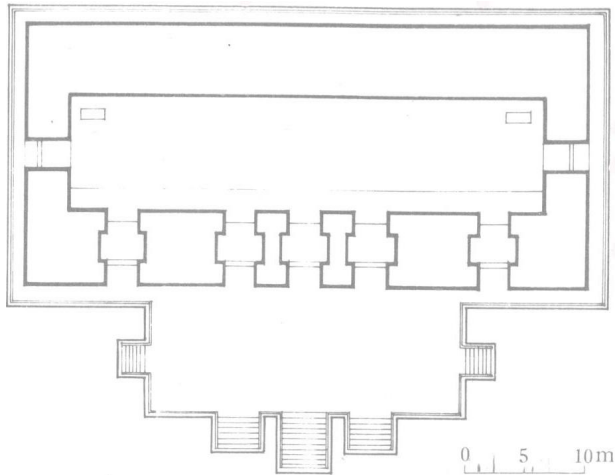


图10-3-1 北京皇史宬砖构无梁殿（明代）平面图

Figure 7. Huangshi cheng, Peking (Zhang Yuhuan, 2000, p. 177).

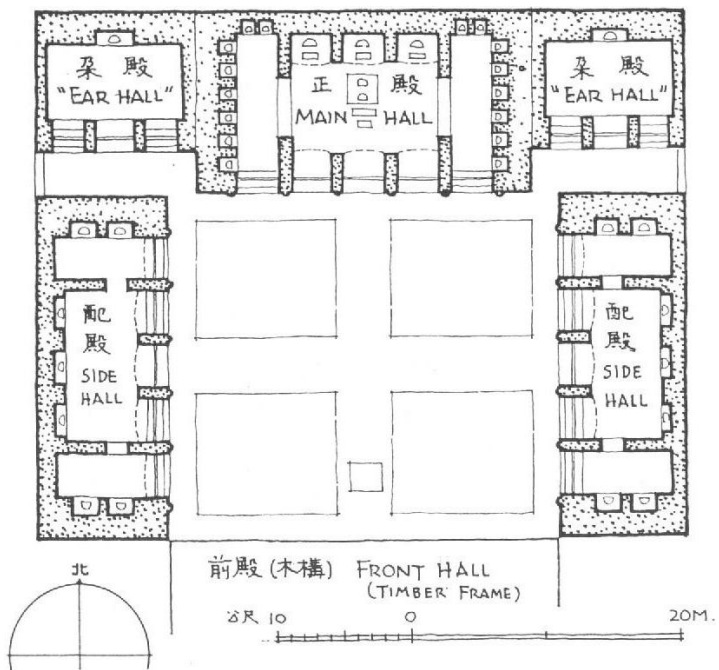


Figure 8. Yongzuo si, Taiyuan (Liang Ssu-Ch'eng, 1984, p. 173).

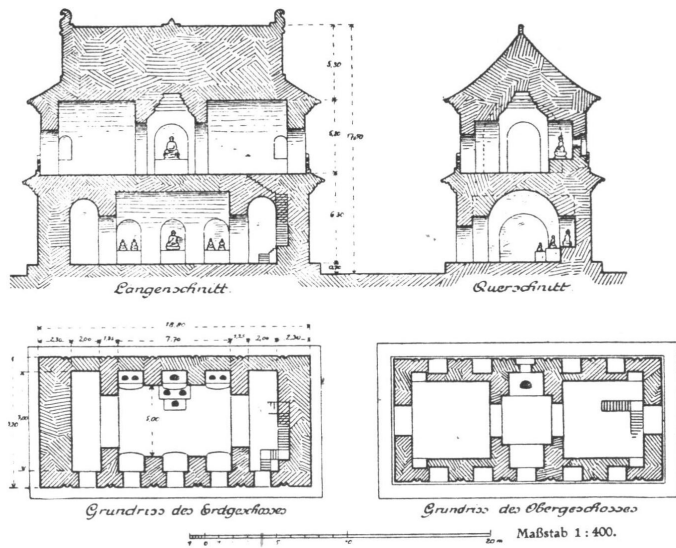


Figure 9. Kaiyuan si, Suzhou (Boerschmann, 1925, p. 35).

## PLACE IN CHINESE ARCHITECTURE

### “Beamless halls” in their time

In most of cases, the *wuliang dian* are part of Buddhist temple or monastery. They were built to conserve Buddhist documents or to the glory of bodhisattvas. The Huangshi cheng of Peking was built to conserve imperial records. For storing documents, the advantage of brick material in resisting fire was important. The Jiajing (1522-1567) and Wanli (1573-1620) periods are known for their increase in library construction financed by Estate or Imperial treasure. The Ming dynasty was also a period of improvement in brick and mortar materials which allowed the construction of larger span vaults and abutment walls.

### Miaofeng and the *wuliang dian* architecture

Most of beamless halls were erected under the supervision of Miaofeng. His biography indicates he was related to the Dowager Empress Cisheng who financed some of his constructions in recognition for his prayers for an imperial heir (Deqing, 1657). Some of the *wuliang dian* localisations were explained by Miaofeng’s vow to build a place for Wenshu and Puxian bodhisattvas in Sacred Mountains. He began his building career when he was 42 years old and was known not only for his beamless halls but also for his brick pagodas and bridges. We know nothing about his technical education and his knowledge of vault and arch techniques but most of the houses in Shanxi province, his birthplace, are built with vault structures. Perhaps these *yaodong* constructions inspired him?



Figure 10. Caojia qifang, Yanchuan, Shaanxi, 1995.

## CONCLUSION

*Wuliang dian* architecture is quite uncommon in Chinese wood and earth tradition. But their survival permits to grasp the subject of the technical knowledge and the training of craftsmen in relation with the Board of Public Works and Imperial Family.

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