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Research on the historical and cultural value of and protection strategy for rammed earth watchtower houses in Chongqing, China

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Abstract

Chinese watchtower houses are part of the unique human cultural heritage of the world's vernacular architectures. Many earthen manor watchtower houses in Chongqing, China, have absorbed the characteristics of other tower houses across the country and have brought together various types of watchtower construction techniques. They are important connection points for the integrity of the Chinese watchtower house as a comprehensive architectural cultural heritage system. They can be a typical sample of Chinese Han classical towers. These buildings are indispensable parts of the Chinese residential watchtower system and have important cultural protection value. However, due to the general lack of excavation and attention to their historical and cultural value, these buildings are on the verge of disappearing. Although they have lost their original architectural functions, they have important value in terms of their building materials, technical composition and artistic modelling. They can stimulate special emotional resonance and become an important bridge that maintains the cultural connection between ancient and modern humans. Therefore, discussing the historical and cultural value of Chongqing rammed earth watchtower houses, the strategy for heritage protection and utilisation is of far-reaching significance for Chinese watchtower dwellings.

Keywords: Chongqing, Historical culture, Rammed earth watchtower house, Protection strategy

1 Introduction

Watchtower houses are enclosed multi-story buildings built by different nations in human history to resist external threats during ancient times, and they exist all over the world. With the development of society, the external factors of the watchtower defence against natural disasters, beasts, tribal feuds, wars and bandits gradually disappeared, and the basic functions gradually declined as well. Most watchtower houses have become architectural relics, and only a few of them have been inherited and developed. Western buildings of this type are mostly ancillary facilities of castles and military fortresses, while watchtower houses have formed a comprehensive system

as independent residential types in different regions of China. They have absorbed the characteristics of the natural environment and cultural customs from Northern China to Southern China and constantly developed and evolved. Watchtower houses have become an important part of the regional architectural landmarks in colourful Chinese residential buildings.

Currently, most watchtower houses in the world have become local historical and cultural landmarks. In particular, rammed earth watchtowers that have lasted for hundreds of years are more quaint and fully display the vicissitudes of history. They are the best proof of the civilisation of the past. With a unique shape and cultural background, they have become important rural landmarks. In China, these buildings have appeared in relevant films and televisions, such as 'Women in the Enclosed House', 'Let the Bullets Fly', and 'Dust Settles', helping these buildings go beyond the countryside,

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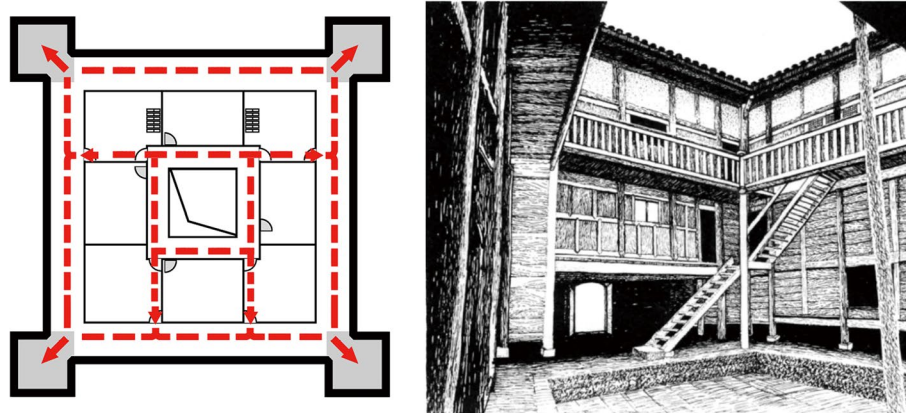


Fig. 1 Chongqing rammed earth watchtower house, which integrated defence and a spatial combination of residences connected by corridors and stairs. Left: the diagram (Source: the author). Right: a view from the courtyard (Source: Ji 2007, 147)

enter the field of public culture, and become well known to people. These buildings form a unique local cultural tourism sign, producing a certain socio-economic and cultural effect. For example, ring-shaped earth buildings have become characteristic of dwellings in Zhangzhou, Fujian, while tall stone blockhouses are signs of Tibetan and Qiang dwellings. In fact, as the characteristic landscape of Chinese local residences, these watchtowers have also entered the world cultural heritage protection field and have received extensive attention. However, as a complete building system protection study, the current work is not sufficient. In particular, the historical and cultural value of the watchtowers in Chongqing has been underestimated and ignored for a long time, and there is no protection or utilisation at all, which is an obvious deficiency in research on defensive residential buildings in China.

2 Historical formation and cultural features of watchtower residential houses in China

The facades of Chinese watchtower houses vary, but the closed appearance and rejection of the outside environment are very similar. This does not mean that watchtower houses are completely isolated individuals. In the era of agricultural civilisation, China used rammed earth to build defensive buildings before the Han Dynasty.¹ The solid earth wall did not block the spread and exchange of culture. For thousands of years, as a special type of residential building in China, watchtower houses have constantly blended and complemented each other, enriching their connotation. Many of the remaining details of existing buildings indicate that these buildings actually form

a completely systematic connection through continuous internal and external integration. Traditional Chinese watchtower dwellings were built in different ethnic regions and are generally divided into five typical types: Han manor watchtowers, Tibetan and Qiang watchtowers, Min-Yue-Gan (Fujian, Guangdong and Jiangxi) Hakka earth towers, Guizhou Tunbao fortress watchtowers and Wuyi Kaiping watchtowers (Du 2005, 77). Based on their historical background and the relevance of their development, we can clearly identify the complete 'settlement defence-family defence-household defence' transition process of Chinese watchtowers.

Chinese watchtower houses have many styles and different appellations. Some are called watchtower houses, while others are called Tulou (buildings made of earth), archery buildings, blockhouses, Hakka round houses and seal buildings. However, they all have the common features of home defence. Through the structural cohesion, penetration and integration of doors, walls, corridors, beams and columns, an integrated combination of defence and residential functions is formed in the enclosed space (Fig. 1) (Liu 2004, 52).

These special architectural forms and functional combinations are constantly changing over time. From the most primitive rammed earth and stone to modern concrete, the Chinese watch tower has undergone a systematic evolutionary process both in time and space.

According to the 'History of the Eastern Han Dynasty', the ethnic minority Qiang people in Southwest China built tall watchtowers very early. In fact, the Han people in Northern China had already begun to use rammed earth to build military defence structures before the Qiang people, which has been confirmed in archaeological excavations. Since then, such military towers were quickly and widely introduced into the lives of civilians

¹ See Vol. 86 of *Houhan Shu* (*Book of Later Han*), which was edited by Fan Ye (398 CE–445 CE).

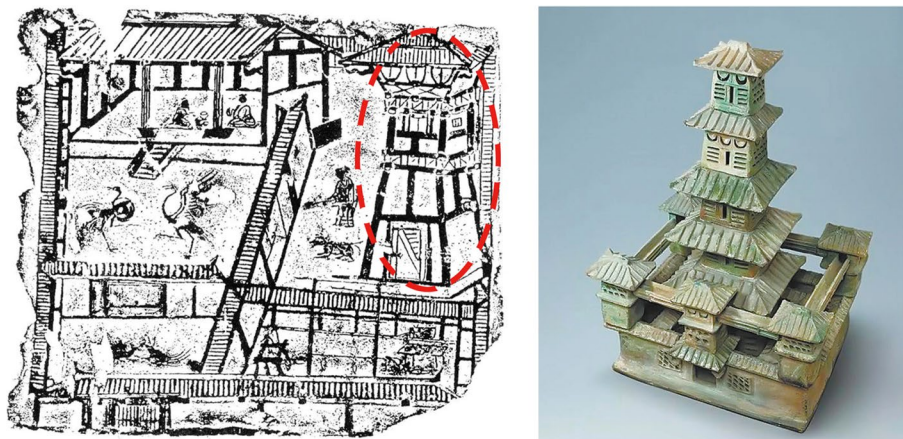


Fig. 2 Left: architectural picture of an ancient watchtower in Eastern Han Dynasty tomb portrait bricks in Chengdu (Source: <http://www.mrjxw.com/articles/2019-07-23/1356643.html>). Right: a pottery five-layer green glazed watchtower unearthed from Han tombs in Wuwei, Gansu Province (Source: Official website of National Museum of China)



Fig. 3 Vivid image of a rammed earth seven-layer watchtower in Wulong, Chongqing, and a five-layer rammed earth manor watchtower in Huilong Villa, Jiangjing, Chongqing (Source: the author)

across the country by the army.² Today, the traditional rammed earth blockhouses preserved in Chongqing are very similar to the architectural forms in the eastern Han Dynasty portrait bricks (Figs. 2 and 3). It is a realistic reflection of the gradual migration and transformation of rammed earth towers from Northern China to Southern China. When such residential buildings disappeared in the northern folks, the Chongqing area was preserved and continued to use.

Although the towers originating in Northern China were mainly used for military defence, they also had many advantages in domestic life. In the early days of






China, ordinary residential buildings were rarely high-rise buildings, but the multi-story building form of towers obviously had unique advantages in preventing and controlling natural disasters. The Qiang people who lived in the mountains and built stone watchtower houses could effectively resist wild animals and the alpine climate.³ Kaiping residents initially chose to build multi-story towers for flood protection. Regarding the differences between the two in building materials and decorative arts, they were subsidiary products beyond these basic living functions (Shu 2017).

The evolution of the Chinese watchtower defensive building system began with 'settlement defence'. As early as the Qin and Han Dynasties, the watchtowers and

² The historical record of the government led the people to build a large number of watchtowers to protect their property was found in the Wei Junjing Bei (Stele of Junjing Wei) in Dazu, Chongqing, which was made in 895 CE, Tang Dynasty.

³ See Vol. 86 of *Houhan Shu* (*Book of Later Han*), which was edited by Fan Ye (398 CE–445 CE).

Table 1 Classification of typical styles of five traditional watchtower buildings in China (Source: the author)

Order Number	Type	Distribution Area	Architectural Image	Building Material	Defence Type
1	Han traditional manor watchtowers	Chongqing and Chengdu in Sichuan Province		Rammed earth	Family or household defence
2	Tibetan and Qiang watchtowers	Ganzi and Aba in Sichuan Province		Stone	Settlement and household defence
3	Hakka Tulou	Fujian, Guangdong and Jiangxi Provinces		Rammed earth	Settlement and family defence
4	Garrison troop blockhouses	Anshun in Guizhou Provinces		Stone	Settlement defence
5	Wuyi Kaiping watchtower houses	Kaiping in Guangdong Province		Concrete	Family and household defence

artillery towers of the northern dynasty combined with the high walls of the capital and the landlord's manor, forming a mature and complete defensive system. At the end of the Han Dynasty, society was turbulent, and the landlord construction of Wubao Castle and Wubi Manor flourished.⁴ During the wars of the Wei and Jin Dynasties, a large number of northern aristocrats moved south and became Hakkas. The Hakkas brought the technology of Wubao Castle and manor towers to Jiangxi, Fujian, and Guangdong Provinces and other places and built a large number of earth walls, houses and forts. These buildings became 'families' support for safe settlement. In this process, they absorbed local customs and continuously improved the architectural form. The large-scale 'settlement defence' was converted into "family defence". In the Ming and Qing Dynasties' policy of 'Jiangxi people immigrating to Hubei and Guangdong Provinces' and

'Hubei and Guangdong people immigrating to Sichuan Province', Hakkas continued to migrate to the southwest. The manor-style 'family defence' architecture was once again characterised by 'household defence' under the traditional influence of small family life in Bashu (now the Chengdu and Chongqing areas) (Lan 1997). This is another in-depth individual evolution. To date, the defensive system of the watchtower building has completed three changes. The systems from large to small have three typical representative architectural forms at each stage in the Jiangxi, Guangdong, Fujian, Sichuan and Chongqing areas (Table 1).

Earth ramming technology is one of the features of northern traditional watchtower buildings. Immigrants from Northern China have retained and inherited the same earth ramming technology. The common building materials in Chongqing are wood and bamboo, and there is no high-quality soil for local house construction. Immigrants still chose to seek soil as the basic material for high-rise buildings. Therefore, ancient Chinese rammed earth architectural forms and traditional supporting technologies of these special dwellings have been preserved in Chongqing. However, with changes in

⁴ See *Zizhi Tongjian* (*Comprehensive Mirror for Aid in Government*), which was a pioneering reference work in Chinese historiography. It chronologically narrates the history of China from the Warring States to the Five Dynasties (403 BCE–959 CE). The major contributor was Sima Guang (1019–1086).

the social environment, watchtower houses were unable to meet the needs of modern rural life. Therefore, towers were gradually abandoned. They are currently on the verge of extinction. In fact, this situation also exists in the protection of watchtower houses in other areas except Chongqing.

In the past 10 years, Fujian Hakka enclosed houses and Kaiping watchtower houses have been included in the 'World Cultural Heritage Protection List'. Western Sichuan Tibetan and Qiang watchtowers and villages and Hakka earth buildings in southern Jiangxi have also been included in the "Reserved List of Chinese World Cultural Heritage". Domestic scholars are also actively studying watchtower houses in Sichuan, Chongqing, Guizhou and other places that have not been included in the cultural heritage property protection list but have precious protection value. Therefore, as an important part of the cultural systematisation of traditional Chinese watchtower house architecture, the value of Chongqing rammed earth watchtower architecture has not only drawn academic attention and research on historical significance but also allowed researchers to take it as the breakthrough point to explore the typology of Chinese watchtower house architecture and the feasibility of implementing joint overall protection in multiple places.

At present, the State Council and some local governments have issued corresponding protection plans and regulations for the historical architectural cultural heritage included in the world cultural heritage protection list. For example, Fujian Province formulated regulations on the protection of 'Fujian Tulou' (enclosed houses) world cultural heritage. Sichuan Province issued implementation opinions on strengthening the reform of the protection and utilisation of cultural relics for the immovable cultural heritage of Tibetan and Qiang watchtower buildings. The regulations and opinions emphasise that it is necessary to maintain the original ecological environment, protect the building itself, support the continued use of the buildings and carry out exhibitions, cultural creativity, tourism services and other activities on the premise of protecting these cultural relics. However, in actual operations, there are still many problems in the protection process. The loss of basic functions and the difficulty of space utilisation make it difficult for watchtowers to resist their inevitable decline in modern society. In addition, the destruction of the surrounding landscape outside the core control area still has an impact on the overall style. Commercial activities are also threats to the watchtower community. The government's guidance on the protection of the architectural heritage of watchtowers and the implementation of laws and regulations are weak because most of the actual property rights belong to villagers, and people's initiative to protect watchtowers

is insufficient. The Sichuan government encourages the acquisition of the right to use cultural relics through circulation, collection and other ways or through the combination of purchases, leases, government subsidies and the market. However, most watchtowers are located in mountainous areas with poor transportation. There is insufficient enthusiasm for the development of the tourism and cultural market. Even in Kaiping, where the surrounding market and transportation conditions are good, it has been difficult to protect its architectural heritage after it was successfully included in the world heritage protection list. The gap in protection funds has reached 230 million yuan, stimulating re-thinking in academic circles after the heritage protection and development boom (Luo 2008, Xiao 2010).

3 History and reality of rammed earth watchtower houses in Southwest China

The southwest region (including Yunnan, Guizhou, Sichuan, and Chongqing) is a relatively concentrated area of watchtower houses in China. Han traditional rammed earth watchtower houses, Tibetan and Qiang watchtowers and Tunbao fortress watchtowers coexist in this geographical unit. Superficially, the natural and social background conditions of the three areas seem to be different, but in fact, they are all products of the combination of immigration and the environment. In recent years, Tibetan and Qiang watchtowers and Tunbao fortress watchtowers have begun to receive more attention, but Han rammed earth blockhouses are still ignored. Interestingly, almost all types of watchtower architectural forms can be found to have similar replicas in the Bashu area, where there is not only the oldest rammed earth watchtower but also square earth buildings built by immigrant families from Jiangxi and Guangdong. The single watchtower has both the tall shape of the ancient Tibetan and Qiang watchtower and the modern Western-style watchtower of the Kaiping watchtower, combining Chinese and Western styles. The whole evolution of Chinese watchtower forms from ancient times to the present can be found in Southwest China; however, the scale is relatively reduced, and the watchtowers are just like the smaller version of watchtowers everywhere else. Unfortunately, most of them disappeared before they had time to attract more attention.

Chongqing and Chengdu are areas where traditional rammed earth watchtowers are relatively concentrated. From the Qin Dynasty to the Ming and Qing Dynasties, the two cities have experienced six major migrations in history, bringing together many cultural elements from all over China. Undoubtedly, these areas are a very suitable example for studying the typical mixed transition of towers. In these large immigration areas, the Han

watchtower in Southwest China has inherited many characteristics of various defensive buildings from different historical periods. Therefore, both in terms of temporal continuity and spatial distribution, they all have various defensive tower characteristics of the Han people in past dynasties. It can be inferred that the development process of Chinese residential towers is integrated into a whole, which is very important for the comprehensive protection and utilisation of this architectural cultural heritage and the implementation of a multi-regional joint protection strategy.

Overall, there are three types of watchtower houses: Han traditional manor watchtowers, Tibetan and Qiang watchtowers and Tunbao garrisons in Southwest China. In this geographical unit, the basic architectural communication culture information from north to south is retained for a long time.

The Tibetan and Qiang watchtower houses have the longest history. According to the records of the Eastern Han Dynasty, the ancient Qiang people 'lived in houses with stones on mountains, which were named Qionglong (watchtower cages), with a height of more than dozen feet'.⁵ The Qiang people's Qionglong (watchtower cages) were very different from the Han watchtower houses in shape due to the high and cold climate as well as the wide use of stone materials (Li 2009, 169). However, from the perspective of the technological language of architectural modelling, the method of shrinking the walls of Tibetan and Qiang watchtower houses is very similar to that of northern Han watchtower houses in terms of construction craftsmanship, except that the materials were replaced by stone.

According to historical records, the Ba and Qiang people in Southwest China had many contacts with various ethnic groups in the north. In particular, the ancient Qiang ethnic group was actually a complex of many ethnic minorities in North-western China and had many contacts with the Han ethnic group in the north. It was quite possible for them to continue to use northern defensive building construction technology.

The ethnic minority Ran and Long, who built Qiang watchtower houses in the mountains, had the same surname as the ancient native indigenous Ba tribe in Chongqing that disappeared in the Han Dynasty. The connection between them and the embodiment of watchtower construction technology make it hard not to think that they had from the same historical and cultural origins. From the Han Dynasty, the Qiang people came to Sichuan as servants from time to time in cold weather.⁶ The continuous influence of life contact in Han areas on

them and the spread of technology became very common. The northern culture of the Han nationality in Southwest China radiated to surrounding areas, with Bashu as the core. Therefore, it can be seen everywhere that the cultural integration is embodied in watchtower buildings.

The fortress watchtowers (Tunbao) in Guizhou were originally the result of the strong invasion of the military culture of the northern Han nationality. Only the form and building materials were improved to a certain extent based on the environment, forming certain regional characteristics.

The cultural connection between the southeast coast and the southwest was established through immigration. Hakka Tulou in Fujian and Jiangxi were the result of the Han people's southward migration during the Northern War of the Han Dynasty. After the Ming and Qing Dynasties, immigrants moved to the southwest to develop inland, integrating with the local natural and social environment of Bashu. Therefore, the war was the cause of watchtower houses, and the wisdom of immigrants made this kind of violent building architectural decoration more humane and artistic, giving the watchtower buildings a strong humanistic atmosphere, one in which they tended to be used to meet to the needs of functional living. Therefore, Hakka Tulou formed their own unique cultural style.

The Han rammed earth watchtower houses in Southwest China are a key link in the evolution of Chinese watchtower houses. If the Han watchtowers in the southwest did not have a temporal and spatial connection with Chongqing and Chengdu as the core, Hakka enclosed houses, Tunbao watchtowers, Tibetan and Qiang watchtowers and Kaiping watchtowers could not be connected, and they would always be independent individuals. The existing watchtower house cultural heritage in Chongqing and Chengdu integrated a variety of mixed elements and comprehensive features of other watchtower houses. On this basis, the broken links were repaired, and Chinese watchtowers were connected as a whole. The watchtower residential system was finally perfected.

For Sichuan Province, where Han rammed earth watchtowers are concentrated, the general trend of the geographical distribution of the province is that Bayu (eastern Sichuan, especially Chongqing) has more watchtowers than western Sichuan, and southern Sichuan has more watchtowers than northern Sichuan. Specifically, they are mainly distributed in southern Sichuan and northern Bayu areas, such as Fuling, the Dianjiang

⁵ See Vol. 86 of *Houhan Shu* (*Book of Later Han*), which was edited by Fan Ye (398 CE–445 CE).

⁶ See *Huayang Guozhi Jiaobu Tuzhu* (*Notes on the Supplementary Drawings of Huayang Records*). This is an excellent annotation written by Ren Naiqiang (1894–1989) on *Huayang Guozhi* (*Huayang Records*), which was edited by Chang Qu (c. 291 CE–c.361 CE).

District, Ba County, and the Nanchuan, Qijiang, Jiang Jin and Qianjiang areas in Chongqing, as well as Gao County, Gong County, and the Yibin, Xuyong, Gulin, Hejiang and Naxi areas in southern Sichuan. In addition, they are scattered in Yilong, Bazhong, Emei, Hongya, Mabian, Muchuan, Linshui, Guangan, Dazhu, Renshou, Jingyan, Weiyuan, Zhongjiang and other counties (Ji 2007, 141).

From an overview of the distribution map, there are many relics and rich types in ancient Bayu (now Chongqing). This paper will mainly use Chongqing as an example for in-depth analysis.

According to a cultural relics survey in Chongqing conducted in the 1990s, there were still more than 1,000 rammed earth watchtowers of various types in various districts and counties in Chongqing. However, according to relevant statistical data from the Third National Cultural Relics (2007–2011) survey and the supplementary investigation of the research team in the past three years, there are currently fewer than 300 items, and most were naturally damaged and artificially demolished.

In the corresponding subject research conducted by the author in the field sampling survey of the districts and counties, the number of watchtowers and the usage statistical results show that 55% have continued to be used and the main body is in good condition, 29% were abandoned, 7% were demolished, 6% were rebuilt or there were plans to rebuild them, and 3% were newly built. Among them, 57.4% have been listed as cultural relics or excellent historical buildings, which are one of the main measures for cultural relic protection. The local government has put up signs for these buildings, but the level of protection is low and poor. There are no more measures or financial support for protection and utilisation except these signs. These data are only from a sampling of areas with better protection status. The abandonment rate of watchtower buildings is most likely higher in other districts and counties (Shu 2015).

4 Architectural features and culture value of rammed earth watchtowers in Chongqing

The cultural exchange between Chongqing and Northern China started very early. In an early primitive society, the indigenous Ba people living in Bayu (the ancient Chongqing area) began to pay tribute to the northern kingdom under the rule of King Dayu and participated in the war between the Zhou Dynasty and the Shang Dynasty (Gu 2005). In these activities, the northern people continued to exchange with the ancient Chongqing Ba people. Subsequently, the Ba people continuously absorbed northern civilisation. The evidence is the rammed earth 'square city' built by the ancient Ba people during the Warring States Period to monitor nearby Chu enemies.⁷ The 'square city' is similar to military facilities in the north

and is very different from the local custom of not building walls.

After the Tang and Song Dynasties, the official organisation of tower and fortification construction was recorded more in classical literature, especially during the construction of defensive system against the Mongols in the Song Dynasty.⁸ In almost every dynasty, immigrants from all over the country continued to migrate to Chongqing. They completely transformed military installations into residences. Due to the differences in the living environment between Chongqing and the northern and south-eastern coastal areas, the immigrants made personalised transformations to the towers based on the original rammed earth tower construction technology and gradually adapted to local customs and living habits (Figs. 4 and 5).

Therefore, the watchtowers in Chongqing not only retain northern traditional architectural technology but also form local characteristics. Therefore, the watchtowers existing in Chongqing often mix traditional craftsmanship from Jiangxi, Guangdong, Fujian and other places (Figs. 3 right and 6). These tower houses were fully adapted to the hot and rainy mountain basin environment and scattered folk customs. In terms of scale, Chongqing's rammed earth towers are different from the giant buildings of large families in the other places, but they are small and relatively scattered with various shapes. Based on the building materials, the watchtowers can be divided into rammed earth, stone and brick. From the architectural style, watchtowers can be divided into Han earth watchtowers, Hakka earth buildings, and Western watchtowers. Based on the building function, watchtower houses can be divided into residential watchtowers, stockade watchtowers, ancestral hall watchtowers and so on (Shu and Liu 2018, 131). These buildings have strong characteristics of traditional architecture in Northern China and are very different from the local wooden houses in Chongqing.

Rammed earth was used as a building material in the early days of Chongqing Han watchtowers because immigrants tended to choose raw soil. This earliest concrete material is simple and easy to obtain. The style of the watchtowers is different from Chongqing traditional folk houses. In the past, local traditional residential buildings in Chongqing mostly used a combination of wood, bamboo and clay. Rammed earth technology was introduced

⁷ See *Yizhou Ji* (*The Story of Yizhou*), which was written by Li Ying, an official of Liang Dynasty (502 CE–557 CE).

⁸ See Vol.7 of *Xiaofanghuzhai Yudi Congchao* (*Collected Books on Geography from the Xiaofanghu Studio*), which is a series of collectanea books on the geography of China and foreign countries. The compiler was Wang Xiqi (1855–1913), whose studio was named Xiaofanghuzhai (Small Square Jug).

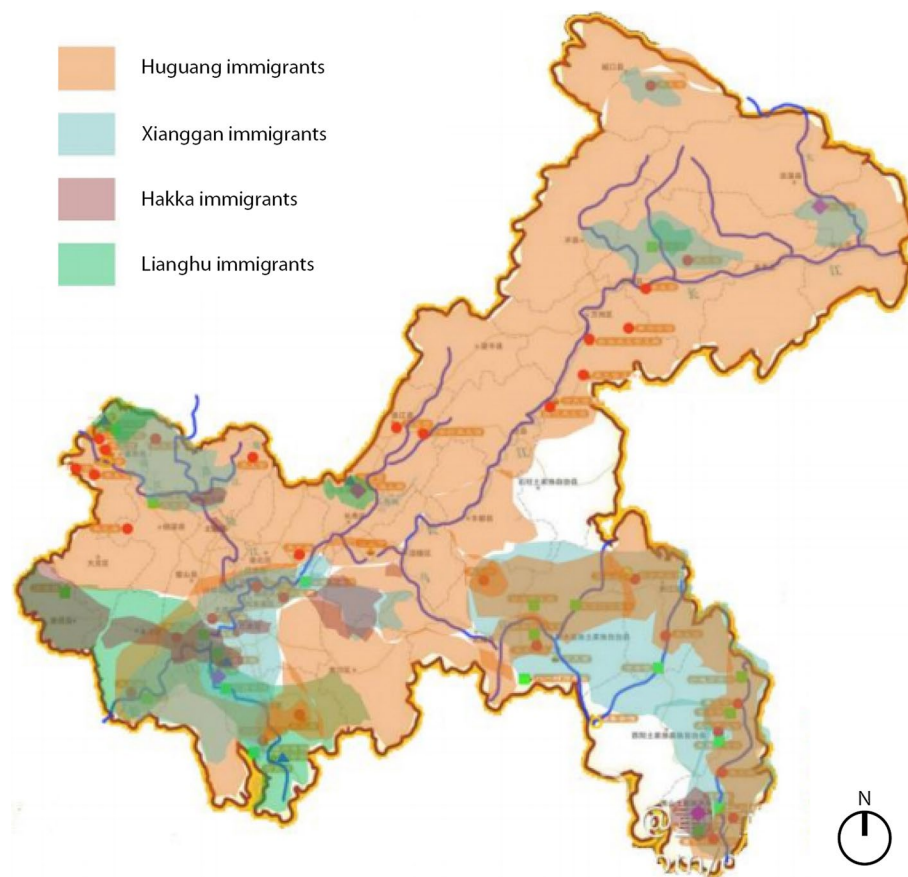


Fig. 4 Geographical distribution of ancient immigrants in Chongqing (Source: Xiaoyin Zhang, based on 'Research on the Geographical Features of the Distribution of Sichuan Indigenous and Immigrants in Qing Dynasty' and 'Chongqing Immigration History')

under the impetus of external technical forces, and people began to collect soil locally. Rammed earth buildings have low processing costs and energy consumption and show good thermal insulation and fire protection performance in practical applications, which means that they have advantages compared with local traditional bamboo and wooden houses.

With the development of society and technology, the original rammed earth watchtower houses have had more options. The application of new materials has led to changes in the appearance of watchtowers. The existing watchtower buildings in Chongqing are mainly rammed earth, stone, brick and concrete. Among them, rammed earth watchtower houses were constructed earliest, and most of the stone buildings were built in the late Qing Dynasty. During the investigation and interviews, the research team found that most of the existing rammed earth buildings were built by people from Fujian, Guangdong and Jiangxi. Brick and concrete watchtower houses were built during the period of the Republic of China, and they were a product of Western maritime cultural architecture. Therefore,

the watchtowers in Chongqing not only retain ancient shapes but also continuously absorb new elements in the process of use. The architectural culture of all watchtowers in various historical periods is collected, preserved and vividly presented in the watchtower architectural heritage in Chongqing.

Among all the watchtower houses in Chongqing, the most representative and creative are the rammed earth watchtowers, which inherit the essence of ancient Han culture and have the wisdom of renewal and creation. In terms of the overall spatial distribution, the rammed earth watchtower houses in Chongqing are different from the giant defensive structures in Fujian, Guangdong and Jiangxi and are often adapted for the defence of scattered and small-scale families. From the individual layout, most of the dwellings were built based on the situation of the mountainous and local terrain conditions, showing strong flexibility. Therefore, there is generally no fixed construction method, and these structures were built just for the purpose of convenient defence and safety (Fig. 7).

Rammed earth watchtower houses focus on overall defence, such as monitoring, shooting, cooperating,

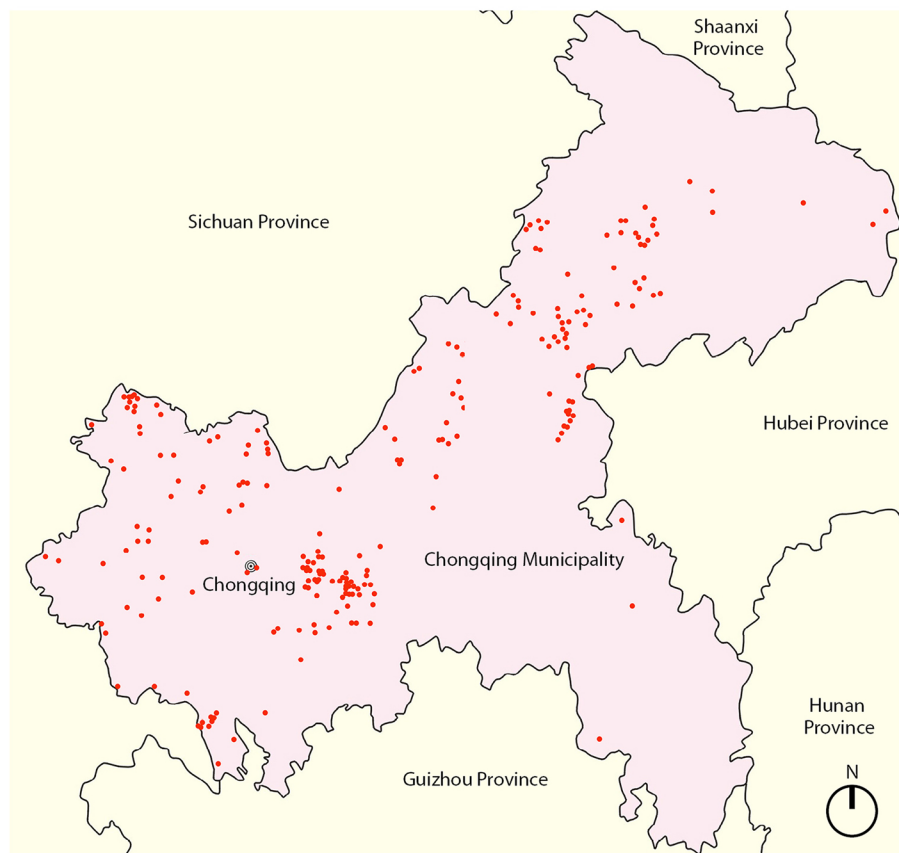


Fig. 5 Distribution of watchtower buildings in the districts and counties of Chongqing (Source: the author and Zhiwei Liu, based on data from China's 3rd cultural relics census of 2011 and the author's survey data of Chongqing from 2015 to 2019. Approval code of the background map: GS[2019]3266, by National Bureau of Surveying and Mapping Geographic Information)

defending, and hiding. Many creative designs have been made for residential safety and reliability. Every relevant detail focuses on satisfying the basic requirements of building internal and external closure and connection, door mechanism design, wall thickness dimensions, shooting hole opening and location selection. Of course, the short-term living convenience and the long-term durability of the buildings are also fully considered in the construction process. The most interesting details are the architectural decoration. Chongqing people usually have needs for comfort and beauty in their daily living space. They often elaborately design details from the stone entrance doors to the windows, and there are decorative patterns on the door and the top of the fence, the arch of the eaves and the roof. The display of some elegant cultural decorations reflects the consistent pursuit of the traditional theme of wealth, good fortune, auspiciousness, longevity and happiness. It is interesting that traditional Chinese design signs express good luck and happiness, with Western flames, arches and other design

frames often mixed for decoration, showing the effect of combining Chinese and Western styles (Fig. 8).

In fact, the important feature of the transition from military defence watchtower buildings to residential buildings is precisely reflected in the decorative details full of humanistic feelings. From the use of decorative style and an artistic pattern language, people can feel the elegance of ethnic and regional cultural integration more clearly. For example, the couplet of the stone gate of Yang's watchtower house group in Ba'nán, Chongqing, is titled 'the dragon protecting the house is bent layer upon layer, the visitors arriving at the gate are rising step by step', with the horizontal inscription of 'all well-known models' to express the family status. The couplet of the landlord Li Weiru's watchtower house group in Fuling is 'watching the ants by the mossy steps, listening to the bees in the flower garden' (Fig. 9). This couplet shows the owner's philosophy of life and good taste. It is also the most respected style of traditional Chinese literati and officialdom.



Fig. 6 Wang's ancestral temple watchtower including traditional techniques in Shixi, Nanchuan (Source: the author)

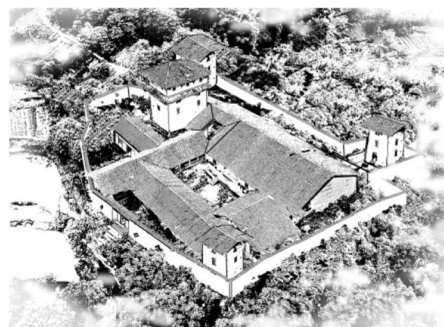
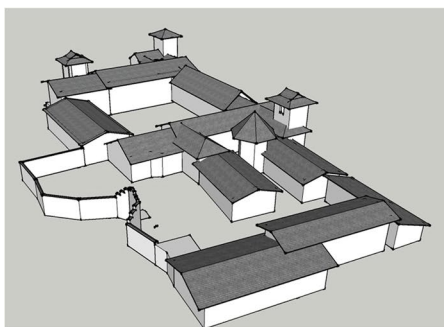


Fig. 7 Chongqing rammed earth manor watchtower with a flexible layout in Bishan and Jiangjing (Source: the author)

Watchtower houses are military buildings with a violent connotation. Since they have been widely used as residential buildings, more methods have been used to intentionally reduce this cold feeling. Therefore, there

are many interesting details in rural rammed earth watchtower buildings in Chongqing. There are dramatic and delicate treatments on the shooting holes of these houses. The shape is no longer a simple shooting



Fig. 8 Watchtower house door and windows with a Western-style decorative pattern in Chongqing (Source: the author)

hole and has changed into a trumpet shape, a gourd shape and other shapes. Rammed earth buildings are generally not suitable for large windows, which would create load-bearing safety problems. Thus, they are not conducive to lighting and ventilation. It is obvious that residential buildings evolved from monitoring and shooting locations and that temporary shelters had some shortcomings. However, these issues were not a problem for the builders of Chongqing rural watchtower houses. Instead, they led to more creative inspiration. For example, builders set up a viewing platform on the top (Fig. 10). In addition to the shooting holes on the wall, they opened many small windows supplemented by a variety of decorations. There are also windows in the upper part of the whole building, but the windows are generally small, and the shape is still elegant. In addition to the square window, there are fan, flame and round shapes for decoration. For example, there are various forms of Western paintings and even a strong sense of Western religious blessing decoration on Yang's watchtower in Ba'nán, Chongqing. Of course, when choosing auspicious patterns for decoration, the owners of the towers mainly tend to select traditional blessing patterns of Han nationality. For example, the Yakou watchtower house of Fengsheng town in Ba'nán, Chongqing, has gourd, vase, bat and other patterns that mean happiness and wealth. People can see a 'Baxian' pattern (Baxian is 8 kinds of immortals in Chinese mythology) and auspicious magic patterns with triangle painted arch pictures on the roof of the main watchtower house of Yanghui Villa in the Jiangjin District (Fig. 11).

Overall, the expressions of architectural technology and artistic techniques fully reflect the dual effects of function and decoration. At the same time, for reasons of pragmatism and pragmatic psychological appeal, the Han people in Chongqing pursue both practicality and aesthetics. They endow this kind of tower architecture with special cultural beauty and historical and cultural value. These are the best inheritance and development of traditional Chinese culture in Chongqing village architecture.

5 Current situation and protection types of rammed earth watchtowers

In recent years, China has continued to promote the construction of new rural areas. The Beautiful Countryside Project has become an important task in the state's construction strategy. With the support of planning, architecture, tourism and culture departments, local governments in some districts and counties in Chongqing, such as Fuling and Ba'nán, have carried out relevant work for the protection of watchtowers. With rammed earth watchtower building groups as important tourism resources, they have carried out traditional village landscape tourism construction and achieved certain economic and cultural benefits. However, in general, the protection scope and measures of the towers are extremely limited and singular. The current protection and utilisation situation in Chongqing is as follows (Table 2).

The statistics show that only preserving and sustainably using the architectural heritage of a watchtower can allow it to retain its vitality. Only the appropriate use or conversion of functions that meet the needs of modern people's lives can prevent the fate of abandonment. If there is no reasonable use of watchtowers, long-term idleness will only lead to their collapse and ultimate destruction.

6 Discussion

The best way to protect tower architectural cultural heritage is to make use of it. The history, culture and construction technology of rammed earth watchtowers embody the wisdom of ancestors. Looking back at the historical development of the rammed earth watchtower house, it was the mission of watchtowers to guard the homeland in wartime, and it was reborn in the form of ecological construction in peacetime.

At present, China is promoting historical and traditional culture to revitalise the countryside and take the road of green environmental construction. The protection and use of tower buildings are undoubtedly a good topic. In view of the current situation of rammed earth towers in Chongqing, some strategies can be explored to protect the remaining 300 rammed earth towers.



Fig. 9 The couplet of the stone gate of the landlord Li Weiru's rammed earth watchtower house group in Fuling (Source: the author)



Fig. 10 Viewing platform around the top of the watchtower house in Ba'nian and Jiangjing, Chongqing (Source: the author)

6.1 Clarify the main responsibility for and work content of building protection management

Watchtower houses in Chongqing have not been well

protected and used, which is closely related to the lack of a clear management system. Most of the architectural cultural relics in China belong to the state. According



Fig. 11 Small window decoration with different shapes of rammed earth watchtowers in Ba'nán and Jiangjin, Chongqing (Source: the author)

to the administrative level of government management, the cultural relic management departments of the state, province, city, district and county implement management, daily use and maintenance, and the funds come from the state finances of different levels of government. However, watchtowers are different from traditional cultural relics. Most of the 300 watchtowers are private property and have not been protected as cultural relics; thus, they cannot obtain financial support from the state. On the one hand, there is a lack of funding sources; on the other hand, because they are not under the jurisdiction of the cultural relic management department of local governments at any level, they have more flexible capital access possibilities and are more flexible in the implementation of commercial use. In this way, watchtowers can be approved by the planning and construction departments of local governments to absorb social capital. Under the premise of ensuring the historical authenticity of watchtower buildings, through the intervention of social capital, people can compensate for the funding gap and engage in market-oriented transformation and utilisation. Watchtower heritage can be revitalised by the modernisation and diversification of use functions.

6.2 Protection classification of single buildings and group areas

To prevent the collapse of valuable single towers and the disappearance of areas characterised by tower groups, the existing rammed earth towers should be protected in different grades. The first is endangered watchtower individuals with high historical and cultural value. This type can be considered for restoration and activation, for example, the watchtower of Yang's manor in Shilong Town, Ba'nán, and the watchtower of Yanghui Villa in Simianshan Town, Jiangjin. All of them have a good foundation that can be restored intact and allow continuous residence and use.

The second is watchtower group protection. The rammed earth towers in Chongqing are scattered in





different areas and form some areas characterised by tower groups. People often choose in situ protection. There are tens of rammed earth towers in some areas, but the cultural value of individual towers is not high. Some watchtowers were built late and have low historical value. However, they are numerous and have a special landscape effect. For this type, the more appropriate protection mode is style protection, maintaining the local natural scenery.

In fact, in these areas that are the historical and cultural origins of watchtowers, rammed earth watchtowers are no longer used for defence; rather, they are mainly used for residence. The local governments in these places should encourage the continued construction of traditional towers and create rural historical and cultural spaces as destinations for the display of local culture and special scenery tourism. This measure is conducive not only to the inheritance of traditional craftsmanship but also to the construction of characteristic rural buildings, and it also provides a harmonious spatial background for protecting these precious towers. For example, a village with a watchtower style and features was built in Dashun Township, Fuling, and it has become a unique watchtower rural scenic spot.

6.3 Residential and tourism activation

Rammed earth watchtower houses are flexible and adaptable. With natural ecological advantages, the building space is warm in winter and cool in summer. With China's emphasis on investment in rural construction, this unique architectural form is likely to become the choice for new rural residential spaces. Activation and utilisation can start with improving the use function or optimising the replacement and technology of rammed earth materials with modern technology to support the transformation of new functions. For example, adjusting load-bearing performance, improving the lighting, and effectively promoting the space utilisation rate are all

Table 2 The statistics of the rammed earth watchtower houses preserved current situation in Chongqing (Source: the author)

Order Number	Protection Type	Typical Example	Present Situation	Remarks
1	Good protection—continuous use	Jiangjin Huilong Villa and Bishan Hanlin Villa	 <p>Well preserved and used as a village culture museum or private manor hotel</p>	Functional updating and continuous use
2	Limited protection—included in the protection list but actually abandoned	Banan Yang's Garden and Nanchuan Wang's ancestral temple	 <p>Included in the official protection list but idle without any use and tending towards dilapidation with safety threats</p>	Abandoned with safety issues
3	No protection—decaying gradually	Liu Hannong watchtower in Wulong Town and Yanghui Villa in Jiangjin	 <p>No protection and idle with serious safety risks</p>	Abandonment or collapse
4	No protection—use in daily life	Low-grade watchtower houses in Fuling	 <p>No protection, with the watchtowers in continuous use in slope terraced rural villages</p>	Natural state and continuous use

good ways to transform watchtowers into modern rural villas.

Rammed earth watchtower houses often have exclusive tourism product attributes due to their unique shapes and rich legendary stories. In particular, manor watchtowers have more unique advantages in this respect, and they can be used for rural tourism planning. Therefore, watchtower house buildings in Chongqing can go beyond the mountainous area of the valley with unique folk culture to attract attention, attract tourism consumption, and promote rural economic development. For example, the old functions of Hanlin Villa and Huilong Villa have been adjusted, and they are now used as museums or hotels. Therefore, tourism consumption is conducive to

the continued use of the building itself and financial support for daily maintenance.

6.4 Collage protection

Finally, it is worth mentioning that in architectural heritage protection, we generally encourage the 'local protection' mode. However, this mode is an ideal method of protection. Once the surrounding environment changes considerably, the in situ protection strategy will be difficult to implement, or the implementation effect will not achieve the expected purpose. Due to the remote location of rammed earth watchtower buildings in Chongqing, the surrounding historical environment is deteriorating day by day, and the protection status is very poor. As a

result, a large number of rammed earth watchtowers have collapsed or been damaged, and for many exquisite buildings, only ruined walls and building foundations are left. Their original historical and cultural value has been destroyed.

For dilapidated buildings that can be kept in place, it is possible to consider a combination of new and old technology for repair without relocation. On the one hand, this combination is the minimum intervention into the existing building objects. On the other hand, it makes full use of the existing conditions of the original building such as its materials, space and textural characteristics to improve its functions by grafting and adding new space without changing the original appearance of the historical building. In the operation process, relying on the original cultural nature of the original essence, new technologies and materials are added to the new collage space, and the new and old space are collaged, forming a new space and endowing it with new functions. At present, there have been many successful attempts in China and elsewhere, but they are rare in Chongqing. This combination represents an interesting attempt and will bring many new possibilities to old watchtowers.

For watchtowers that have collapsed or disappeared but have special value in the history of vernacular architecture, we can consider using raw materials and original technology for on-site mapping and collecting complete comprehensive building information for reconstruction. This is not the usual reconstruction; rather, it is about choosing centralised reconstruction through collage in a similar geographical environment. Such collage reconstruction can not only re-excavate and inherit traditional technology to form technical support for rammed earth watchtowers but also form a certain scale through centralised reconstruction, bringing new tourism resources to regions and saving money with regard to centralised management to a certain extent. All of these factors can bring good social and economic effects. This similar approach has actually been used in Japan for the 'replacement protection' of wooden architecture.

7 Conclusion

Chongqing watchtowers are a regional architectural cultural heritage worthy of in-depth study. In the evolution of geographical time and space, Chongqing watchtowers have retained considerable valuable historical information. They are the successive connection point of ancient and modern Chinese watchtower architecture, holding great significance for systematic research on Chinese watchtowers. The purpose of integrated research is to treat the towers in various parts of China as a whole, instead of placing too much emphasis on differences and

individuals and ignoring the interconnection between them. People can systematically study and categorise various types of towers based on their respective migration and evolutionary processes and implement protection and utilisation. From the national government to local administration, they can jointly formulate more targeted overall protection strategies instead of working independently. In this case, the value and status of Chongqing watchtowers can be reassessed, their endangered situation may be alleviated, successful experience can also learn from each other, more funds can be allocated, precious buildings can be protected and properly used, and finally, history and culture will continue smoothly into the future.

Abbreviations

Bashu: A joint name of Chengdu and Chongqing; Bayu: The old name of Chongqing; Tulou: A building made of earth; Wubao: A square fortress made of clay; Wubi: An earthen square manor; Baxian: Eight immortals in Chinese myths and legends. They have their own magic tools, representing good luck in Chinese customs.

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Competing interests

The author declare that they have no competing interests.

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