

**Heritage Dwelling Buildings in Urban Change:
The Change Process of the Quadrangle During the Reform and Opening-up Period of China**

Xiao Cheng

Delft University of Technology

Faculty of Architecture and the Built Environment

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I .Introduction

Urban change refers to the multifaceted transformation of the physical, social, economic, and cultural aspects of urban areas. As cities and urban areas continue to grow and develop, they encounter various challenges, such as sustainability, inequality, and gentrification. Preserving heritage is a crucial aspect of urban change as it reflects the historical and cultural identity of a place, encompassing its tangible and intangible elements such as buildings, monuments, traditions, and customs. It is essential to ensure that the unique character and identity of a place are sustained and celebrated while accommodating the dynamic needs and demands of an evolving urban environment.

Urban change has a profound impact on the built environment, including heritage dwelling buildings. These buildings are often recognized for their cultural, historical, and architectural significance, and they are an essential component of a city's identity and character. As cities grow and evolve, heritage dwelling buildings face a range of challenges, including urban renewal projects, changes in zoning and land-use regulations, and shifts in population and demographics. These changes can have a significant impact on the preservation and adaptation of heritage dwellings, and they require careful consideration of the cultural and historical significance of these buildings. This text will explore the changes that heritage dwellings in urban areas undergo. It will focus on a type of heritage residential building from China called the Quadrangle Courtyard, and examine the challenges and opportunities involved in preserving and adapting these buildings to meet the needs of contemporary urban transformation as the Reform and Opening-up¹(1978-date) in China.

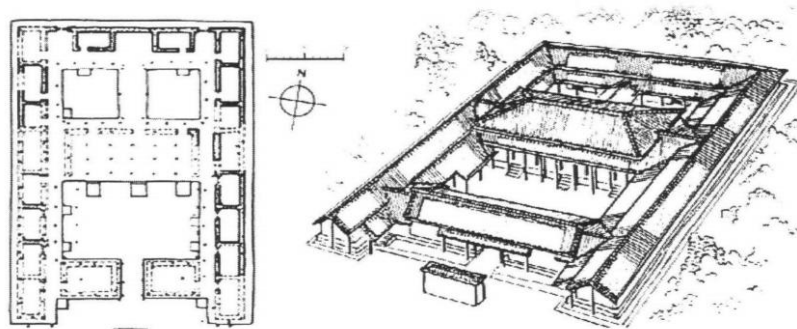
II .The Value and History Background of the courtyard houses

The Siheyuan, commonly known as the quadrangle courtyard house, is a prominent and cherished architectural type in Chinese culture. This traditional Chinese residential style is characterized by a courtyard situated at the center, surrounded by structures on all four sides. Its rich history can be traced back to the Western Zhou Dynasty (1046 BC-771 BC), where it was primarily utilized by the aristocrats and royal families. However, this type of dwelling became more widespread throughout China over time, and by the Ming (1368-1644) and Qing (1644-1911) dynasties, it was a prevalent housing style in Beijing and other cities.

The basic pattern of a courtyard house is a central courtyard, surrounded by four living rooms and courtyard walls. A standard unit (called a "jin"²) of a courtyard house covers an area of about 660 square meters. The quadrangle courtyards of rich and powerful families will have two "jin" or even four "jin", or even add a garden to meet the needs of their large families for living, meeting guests, master and servant, and the completeness of internal and external spaces. From this perspective, The Imperial Palace and the Forbidden City are actually a super-large courtyard with many "jin". The large and small courtyards are connected by staggered hutongs and surround the Forbidden City³, other temples and gardens with the same elements, forming the urban texture of the old city of Beijing. Therefore, a courtyard house can be said to be the basic constituent unit of Beijing city, and it has a certain degree of isomorphic relationship with Beijing city.

1. Siheyuan in different historical periods

Siheyuan, as a representative of Beijing's urban development culture for thousands of years and a traditional residential building in Beijing, represents the history of this ancient city of Beijing. Historically, courtyard houses can be divided into several periods: establishment, development and heyday.



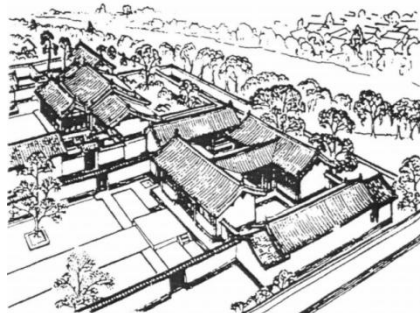
*Construction Site and Restoration of Qishan Fengchu in Western Zhou
(Image taken from "History of Ancient Chinese Architecture" Liudun Zhen,1984)*

¹ Reform and opening-up is a major decision-making and turning point in the history of the People's Republic of China. It started in the period of "putting order out of chaos" after the Cultural Revolution. With the rapid economic development, the economic system in mainland China has gradually changed from a "planned economy" to a "socialist market economy"

² A "jin" is the basic unit of a courtyard house. A courtyard surrounded by living spaces on four sides is called a "jin"

³ The Forbidden City was the imperial palace of twenty-four emperors in the Ming and Qing dynasties of China. The Forbidden City was first built in the fourth year of Yongle (1406), Emperor Chengzu of the Ming Dynasty, and completed in the eighteenth year of Yongle (1420). Located in the center of Beijing's central axis.

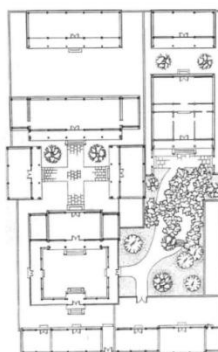
The history of Siheyuan can be traced back to the Shang and Zhou dynasties. From the restoration pictures of the Qishan Fengchu architectural site in the Western Zhou Dynasty in historical materials, we can see that our ancestors have already adopted the courtyard as the basic form of architecture. But when it comes to the establishment of courtyard buildings as the basic form of urban architecture in Beijing, people will still regard the establishment of Yuan Dadu⁴ as the source of Beijing courtyards. This is because starting from the Yuan Dynasty, Kublai Khan, the first emperor of the Yuan Dynasty, migrated rich people and officials from the former site of Jinzhongdu to build houses in Dadu, and made relevant plans for the buildings of Dadu in Yuan Dynasty. According to Ma Bingjian's "Siheyuan Architecture" and Xiong Mengxiang's "Records of Xijin"⁵ in the late Yuan Dynasty, "Dadu street system is called the longitude from the south to the north, and the latitude from the east to the west. The street is 24 steps wide. Three hundred and eighty-four fire alleys, twenty-nine streets lead." From the book, we can see that in the early stage of the construction of Yuandadu, hutongs were the basic urban mechanism, and the buildings that make up hutongs are courtyard houses. Today, the ruins of the city walls of Yuan Dadu in Beijing still exist, but the existing courtyard houses are gone. The only thing left for us to refer to is the Yuan Dynasty Houying house ruins excavated from the Yuan Dadu ruins.



*Restoration of Houyingfang residential site in Yuan Dynasty
(Image taken from "History of Ancient Chinese Architecture" Liudun Zhen,1984)*

The Ming Dynasty was the development period of Beijing Siheyuan. In the early Ming Dynasty, the capital was established in Nanjing, and the capital was moved to Beijing in the reign of Ming Chengzu Zhu Di⁶. On the basis of Yuan Dadu, Beijing's urban construction and courtyard buildings were built on a larger scale. During the reign of Emperor Chengzu of the Ming Dynasty, a large number of wealthy people from the south and Shanxi moved to Beijing, and allocated land for them to build houses, which further promoted the urban development of Beijing. During the Ming Dynasty, the national power was strong, and the forms and colors of buildings began to be more abundant. In addition, the Ming Dynasty imposed strict regulations on the scale and color of buildings to distinguish the status of different people in society. This period played an active role in the development of courtyard buildings in Beijing.

On the basis of the urban development of Beijing in the Ming Dynasty, the Qing Dynasty completely inherited the urban structure and architectural system since the Yuan and Ming Dynasties, and developed on this basis, making the development of courtyard buildings unprecedentedly prosperous. Most of the courtyard houses existing in Beijing are preserved from the Qing Dynasty. The most representative courtyard houses in the Qing Dynasty were large and medium-sized courtyard houses where bureaucratic landlords and wealthy businessmen lived. After continuous development and evolution, the courtyards in this period have developed on the basis of traditional courtyards, and the courtyards have reached two or three layers or even more, and some courtyards have their own gardens. Many existing palace gardens are representative works of this period.



*A certain courtyard house with a garden in Maoer Hutong
(image taken from "Beijing Courtyard House" Bingjian Ma,2005)*

⁴ Yuan DaDu was the capital of the Yuan Dynasty. Its city site is located in the urban area of Beijing today.

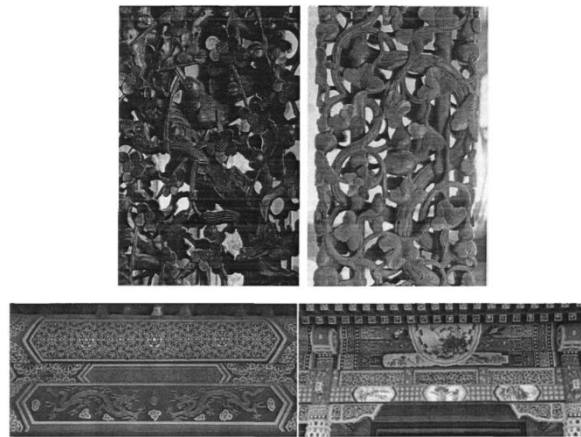
⁵ Records of Xijin:Written by Xiong Mengxiang, a native of Yuan Dynasty, it is the earliest local chronicle of Xijin (now Beijing).

⁶ Ming Chengzu Zhu Di (May 2, 1360-August 12, 1424), or Emperor Yongle, the third emperor of the Ming Dynasty

2. Decorative Aesthetics and Artistic Value of Siheyuan

People often use "carved beams and painted buildings, resplendent and resplendent" to describe ancient Chinese buildings. The quadrangle building can be said to be more appropriate in this respect.

"Carved beams" reflect the carving art in the courtyard space. A large number of carvings in the courtyard building are one of the decorative features of the courtyard building. From the carving materials, it can be divided into wood carving, brick carving and stone carving. From the artistic technique of carving it can be divided into flat carving, relief carving and openwork carving. Wood carvings are generally used on building components such as Menzan⁷, Queti⁸, Huayazi⁹, doors and windows, and play a very good role in modifying and decorating the building components of each part. Because most of the carved content is auspicious patterns and traditional patterns in Chinese traditional culture, such as "Four Gentlemen, One Plum, Orchid, Bamboo and Chrysanthemum", "Suihan Three Friends, One Plum, Pine and Chrysanthemum", and auspicious words such as "Fushou" and "Auspicious Ruyi". These carvings also entrust the beautiful sustenance and blessings of the ancient Chinese for life.



Wood carvings and colored paintings of Siheyuan(He 2013)

"Painted building" refers to the artistic characteristics of colored paintings in courtyard houses. The wooden materials of traditional Chinese buildings are easily eroded by wind and rain and gradually rot. At first, the paint on the surface of wooden building structures was only applied as a means of protecting building materials. Later, after development, it gradually became a unique art of color painting in Chinese architecture, and this art of color painting also reached the peak period of ancient Chinese architecture in Beijing's courtyard houses. And according to the different social class status of the house owner, it stipulates the form of color painting that can be used. The forms of colored paintings are divided into three basic types: "Hexi colored paintings", "Xuanzi colored paintings" and "Su-style colored paintings". Hexi colored paintings have a higher grade and specific uses, and are generally not allowed to be used in courtyard buildings. As a form second only to Hexi color painting, Xuanzi color painting is only allowed to be used in the palace compound or the buildings of the emperor's relatives. Su-style color painting is a relatively common form of color painting in Beijing courtyard houses. The key part of Su Shi's colored paintings is mainly the heart-like part, which has a larger area and richer changes in form. The contents drawn are mainly stories of historical figures, flower-and-bird paintings and ink landscapes, which are more life-like. The atmosphere is also more easy-going, which complements the characteristics of the courtyard building.

III. Dilemma faced by Beijing Siheyuan before the reform and opening up

After the founding of New China, due to changes in the nature of society, the courtyard buildings that originally belonged to aristocratic families became state property. In the early days of the founding of New China, many state agencies and institutions used these large courtyards as their office space. The architecture of the courtyard house also began to undergo many changes to meet the needs of various offices. Later, many courtyard buildings were further used by more residents, and courtyards began to enter the lives of ordinary people more.

Unfortunately, during the period between the founding of the People's Republic of China in 1949 and the reform and opening up in 1978, rapid urban changes and numerous specific historical events led to difficulties in the preservation of courtyard houses. During this period, courtyard houses were even in danger of disappearing

⁷ Menzan is a gate component of traditional Chinese architecture, probably from the Han Dynasty at the earliest, and is located above the gate. Its practical function is to fix the couplets used to install the upper shaft of the door leaf on the upper sill, and later evolved into a decoration.

⁸ Quiti is a special component in East Asian traditional architecture. It refers to the short wood placed under the beam and intersected with the column, which can shorten the clear span distance of the beam and prevent the angular deformation between the beam and the column. It is also used for hanging between columns, but it is a purely decorative component.

⁹ Huayazi is a decorative component used to hang the corners of the two ends of the lintel upside down. It is made of lattice strips or wood carvings. It looks like a Quiti, but it is lighter and lighter.

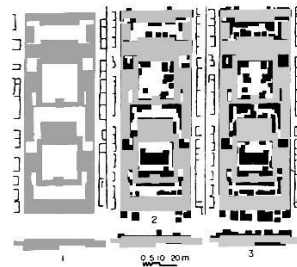
forever, a phenomenon that posed a major threat to the preservation of traditional Chinese culture.

1. Demolishing from The Cultural Revolution

The Cultural Revolution was a sociopolitical movement that took place in China under Mao Zedong between 1966 and 1976. The movement aims to transform Chinese society and culture by purging capitalism and traditional elements with feudalism and promoting Maoist ideology. It began with Mao Zedong's "Fifty-Six Circular" in 1966, which called for the creation of a new revolutionary culture to eradicate the "Four Olds"¹⁰: old customs, old culture, old habits, and old ideas. One of the goals of the Cultural Revolution was to create a society that was more egalitarian and communist in nature.

However, the movement ultimately failed to achieve its goals. Lacking rational order to guide it, it did not bring about a more just and equal society, but instead created chaos and division. The emergence of Red Guards¹¹ (a group of young people who enthusiastically supported Mao Zedong) who blindly attacked all traditional things in society led to a wave of violence and destruction. They attacked and destroyed a lot of historical relics, temples and cultural symbols, and the courtyard houses, which are traditional dwellings, could not escape the fate of being severely damaged. In some courtyards, the hanging flower gates, side rooms, rear cover rooms, verandahs, verandahs and other spaces may be demolished, which has caused great damage to the artistic and historical value of the courtyard house. More courtyard houses were built in a frenzy and recklessly.

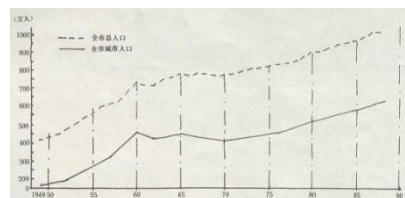
Taking a certain traditional courtyard house as an example, we will analyze the evolution process of the pattern of this kind of crazy addition. As shown in the picture, the courtyard maintained the architectural style of the original courtyard in the early days of the founding of the People's Republic of China, with a construction area of 2440m²; during the "Cultural Revolution", as shown in the second picture, it can already be seen from the main building, corridors, ear rooms, courtyards There are additions to the open space, and the construction area at this time has reached 3200m², which is 1.3 times that of the early days of the founding of the People's Republic of China. The distance between the houses is narrow, and the architectural style of the entire courtyard is completely destroyed. As a result, the architectural space forms of many traditional courtyard houses in Beijing have disappeared, and the courtyard form of courtyard houses has been destroyed beyond recognition. This damage was a severe blow to China's cultural heritage.



The changing process of the construction area of courtyard houses(Liu 2013)

2. Effects of population growth on courtyard houses

Since the founding of New China, the total population of Beijing and the population of the old urban areas have shown a continuous growth trend. On the other hand, the frantic struggle in the Cultural Revolution led to the persecution of intellectuals, educators, many of them were sent to re-education camps or forced to do manual labor in the countryside, these people were called "educated youth"¹². Therefore, at the end of the Cultural Revolution, a large number of educated youth returned to the city to work or settle down with the support of government policies. In the late 1970s, the phenomenon of educated youth returning to the city reached its climax. As shown, in 1978, Beijing's urban population surpassed the historical record set in the 1960s. At the highest level, a new high was reached in 1982. The increasing population year by year has caused housing problems in Beijing's old urban areas.



Urban population growth in Beijing
(image taken from "Beijing Siheyuan" Lu Xiang and Wang Qiming, 1996)

¹⁰ Destroying the Four Olds refers to a social movement in the early days of the Cultural Revolution of the People's Republic of China that advertised "abolishing old ideas, old culture, old customs, and old habits." The initial focus was on breaking certain old cultural traditions and customs, such as changing the names of shops and streets, prohibiting certain clothing and hair styles, etc., but in a short period of time it developed into a large-scale destruction of cultural relics and historic sites, beating people, and ransacking homes violent actions.

¹¹ Red Guards is a name given to some special groups by the People's Republic of China during the "Cultural Revolution". Generally speaking, the Red Guards are mass organizations established under the dominance of ultra-left ideological trends. The Red Guard Movement played a role in fueling the development of the "Cultural Revolution" and was an important factor in causing national turmoil.

¹² It is a historical term for intellectuals in the People's Republic of China. After the founding of the People's Republic of China, in order to reduce the urban population of 20 million, from the mid-1950s, the young people in the city were organized to move to the countryside, especially the remote rural areas to establish farms, and it ended in 1977.

During the "Cultural Revolution", the number of citizens in Beijing who urgently needed to solve their housing problems had reached a rather large number. Most of these sources of population are migrant workers and educated youths staying in Beijing. Although China at that time used part of the "siheyuan housing public ownership" as staff dormitories, and combined the national "economic lease" and individual housing rental models to alleviate the housing shortage, it was far from meeting the demand. However, the space in the old city is limited, and the number of courtyard houses is also limited. As a result, some residents began to build small houses by themselves in the courtyard houses, which set off a boom of "self-built houses".

With the rise of the "self-built housing" craze, more and more people have joined this trend. But because it was built by the citizens themselves, the residents have a weak awareness of the protection of traditional buildings, which has brought irreparable damage to these courtyard houses. For example, building components such as hanging flower doors¹³, verandahs, and eaves are removed, and replaced with storage spaces or residential buildings; residential or auxiliary function rooms are added next to buildings such as ear rooms and back cover rooms; etc.

Since these "self-built housing" relieved the housing shortage to a certain extent, and the government at that time was in the "Cultural Revolution" period, it had no time to take care of this construction trend. Therefore, this "self-built housing" construction boom has spread throughout the entire Beijing urban area. However, since these houses were remodeled by citizens without unified planning and design, serious disadvantages appeared in the process of using the houses. At the same time, these transformation methods are unscientific and unorganized, which seriously damages the traditional scale and model of building courtyards.

3.Tangshan Earthquake Destruction

In 1976, the Tangshan Earthquake¹⁴ shocked China and the world. The epicenter of the disaster was Tangshan, and it even affected Beijing. The disaster suffered heavy losses and a large number of people were affected. The government made a quick disaster relief response, and the whole people set off a disaster relief boom. As the capital of the country, Beijing is not far from the disaster-stricken site, so the task of disaster relief is even more onerous.

In response to the government's call for "disaster resistance and relief for all", residents built a large number of temporary emergency anti-seismic sheds, which made the already oversized courtyard houses even more crowded. These "seismic sheds" were built in courtyard houses. The shape is relatively free and random, and the building materials are distributed by the state, and at the same time, it is also allowed to use its own materials, mainly bricks, tiles and wood, which further changed the living pattern of courtyard houses and formed a "big courtyard" with higher living density.

Temporary emergency measures such as the "shock-resistant shed" project have pushed the evolution of Beijing's traditional courtyard houses to "Miscellaneous House"¹⁵ to a new height. After the "shock-resistant shed" project was completed, due to the serious imbalance between Beijing's population surge and social housing supply, these "shock-resistant shed" were transformed from temporary housing to permanent use. So far, basically the original features of courtyard houses have disappeared.

In conclusion, it can be seen that prior to the reform and opening up, the courtyard houses were in a precarious state due to the damage caused by the Cultural Revolution, population pressure, natural disasters, and other factors that affected their political policies, functional capacity, and structural safety. Fortunately, the arrival of the reform and opening up brought new opportunities for the transformation of the courtyard houses.

III.Literature Review

There have been many document records about the changes in the Beijing Supreme Courtyard.

The residential concept derived from the contemporary courtyard and the evolution of the contemporary courtyard(Chen 2008), that is, the "Westernization Movement"(Meng 2013) -"Quadrangle Building"(Meng 2013)-the "Miscellaneous House"(Chen 2008) -The Courtyard returns to tradition(Chen 2008).

During the "Westernization Movement" period, the newly built or remodeled courtyard residential buildings showed various characteristics:the building adopts western-style glass windows;the building adopts Western-style decoration techniques;the building adopts a traditional architectural form that is not commonly used(Lu,Wang,1996).For example:The former residence of Zhu Qiqian, the building in the courtyard, has no ridge on the roof, but adopts the method of hanging flower doors and corridors in traditional courtyard residential buildings, and adopts the form of rolling shed roof(Liu 2013).

¹³ The hanging flower gate is the gate inside the courtyard of ancient Chinese buildings. Because the eaves column does not fall to the ground, it hangs under the eaves.

¹⁴ The Great Tangshan Earthquake refers to the magnitude 7 earthquake occurred twice within 16 hours in Tangshan City (now Guye District, Tangshan City) and Fengnan County (now Fengnan District, Tangshan City) in Tangshan District, Hebei Province, People's Republic of China on July 28, 1976. above strong earthquakes. The transportation, communications, water supply, and power supply of Tangshan City were cut off, and they were razed to the ground in an instant. Considering the situation in Beijing, Tianjin and other disaster-stricken areas, as well as unknown information conditions such as the successive deaths of the wounded and missing persons, the number of deaths in the Tangshan Earthquake reached at least 300,000.

¹⁵ Miscellaneous House is intentionally or unintentionally formed under the circumstance of poor protection of the courtyard house. It is usually the product of one or several families living in the courtyard house quickly added. The serious construction has seriously deteriorated their living environment. Therefore, in the rural dilapidated house renovation project of the State Council of the People's Republic of China in the 1990s, a considerable number of large courtyards were demolished.

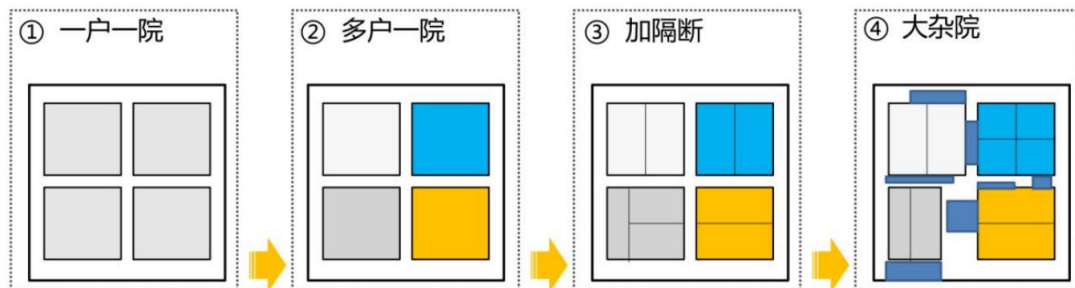
A new two-floor building was built in the yard of Tan Xinpei's courtyard house (Lu and Wang 1996), which is connected to the original building. The first and second floors of the facade are distinguished by three-dimensional line corners. There are windows on the surface to increase the lighting area. The upper part of the window of the building is provided with an arch, and the lower part of the window is provided with a window sill (Liu 2013).



Tan Xinpei's courtyard house (Liu 2013)

Since then, quadrangle "courtyard communities similar to residential areas" have appeared (Liu 2013). The layout retains the courtyard space of the courtyard house. The courtyard plan is divided into multiple use units so that it can be shared by multiple families. The scale of the building is limited to the first to second floors, and the facade is mainly Western style with Chinese style incorporated. Such buildings can also be regarded as the early unit houses in Beijing (Meng 2013).

"Miscellaneous House" was formed by intentionally or unintentionally when the Quadrangle is not protected. It is usually a product that is quickly added after one or more families living in the courtyard. In severe cases, the living environment worsens sharply (Liu 2013). The layout changes of Beijing Courtyard during this period: from one courtyard with one household to one courtyard with multiple households, to indoor partitions to Miscellaneous House (Liu 2013).



Schematic Diagram of the Evolution Process of Siheyuan Multi-Family and One-House Development Model (Liu 2013)

Considering the background of the times, the rapid development of the economic model requires a large amount of labor to support, and a large number of migrants gather in the capital. (Meng 2013) The sudden increase in population exceeded the range that the city could accommodate at that time. The most direct response was the housing shortage, which was the root cause of the destruction of courtyard houses in the future and gradually evolved into "big miscellaneous courtyards" (Meng 2013). In addition, after the Tangshan Earthquake in this period, the government supported the residents to build their own houses to accommodate the victims, and the residents' awareness of the protection of traditional buildings was weak, which caused irreparable damage to these courtyard houses (Liu 2013). For example, building components such as hanging flower doors, verandahs, and eaves are removed, and replaced with storage spaces or residential buildings; residential or auxiliary function rooms are added next to buildings such as ear rooms and back cover rooms; Build residential housing, etc (Liu 2013). These transformation methods are unscientific and unorganized, and seriously damage the scale and pattern of building courtyards. At this stage, the limitations of the reconstruction methods of courtyard houses in Beijing were far greater than their rationality (Meng 2013), which caused irreparable damage to traditional buildings and did not adapt to the development of the times in the long run. This has brought urgency and challenges to the subsequent protection and reuse of courtyard houses.

IV. The Relationship between the Change of the Quadrangle and the Urban Transformation

1. The New Context

From the previous analysis, we can know that the Siheyuan faced many unfavorable factors in the background of the era before the reform and opening up, and it can even be said that its traditional structure is precarious in the social changes. But fortunately, many new changes have taken place in China's policies and society during the

period of reform and opening up, and these changes have provided a new context for the restoration and renovation of courtyard houses.

A. New requirements of economic development

In the early stage of reform and opening up, the Chinese government put economic development as the top priority, and at the same time opened up some new ideas for economic development. At that time, there was a severe shortage of foreign exchange in China, and there was an urgent need to earn foreign exchange to introduce foreign advanced technology and equipment.

Compared with other industries, tourism has obvious comparative advantages in earning foreign exchange. Therefore, in the early stage of reform and opening up, it became the three pillars of the country's foreign exchange earning together with trade and labor services. Because of this, the main economic orientation of the tourism industry at that time was to earn foreign exchange, which also made the development of inbound tourism the number one task of the tourism industry.

As the capital city, Beijing's unique urban landscape has pushed the tourism industry to a stage of rapid development. From the reform and opening up to the mid-1980s, the number of tourists in Beijing increased from 186,500 to 937,100 in just a few years, with a growth rate of 26.0%. The total foreign exchange value of international tourism was US \$95.56 million, with an annual growth rate of 22%. From the above data, we can see the rapid development of tourism in Beijing. Of course, what attracts these tourists from home and abroad is the ancient style of the old city, including the traditional courtyard house.

However, a large number of people outside Beijing put forward the temporary capacity of the old city of Beijing. In the old city, Siheyuan as the main residential buildings, these foreigners can only be accommodated by these Siheyuan. We have talked about the impact of population growth and natural disasters on Siheyuan. Siheyuan has been basically in a state of expansion and saturation, and it is unrealistic to rely only on residential functions. Therefore, in this context, on the one hand, the function transformation of Beijing Siheyuan appears, and some tourist buildings specially responsible for accepting these tourists appear. On the other hand, some foreigners who moved to Beijing and residents who became rich first due to the economic development of the reform and opening up drive the trading and renovation of Siheyuan.

Therefore, the development of reform and opening up and tourism is an important factor to promote the development of Siheyuan, which provides an opportunity for the development of Beijing Siheyuan.

B. A new trend in the reuse of heritage

The urban construction of Beijing has the same international community background as that of many cities in the world. Since the 1970s, western developed countries have gradually realized the devastating impact of urban construction characterized by large-scale demolition and construction on national urban history and culture, so they began a new urban revival plan focusing on the reuse of old buildings, especially the protection and reuse of historic heritage buildings.

After the 1980s, western countries positioned the reuse of architectural heritage as one of the basic ways of building development and utilization, thus creating a new direction of architectural practice. For example, the Louvre in France changed from an ancient royal palace to an art museum. Driven by the new era, Bei Xingming was able to leave a glass pyramid in front of such an ancient building by means of high-tech techniques. All these are the continuous innovations of Western countries in the protection and reuse of ancient buildings in the development of history. In Britain, the proportion of state funds invested in new buildings and retrofitting old ones rose from 75:25 in the 1970s to 50:50 in the 1990s. In 1985, about half of all construction in the United States was renovation and restoration. To date, about half of the work of contemporary American architects involves the preservation and reuse of old buildings.

Under such an international background, the Beijing government and relevant experts have also produced some new ideas and attempts on the construction of the old city of Beijing. These attempts and the new trend of heritage protection around the world created the conditions for a series of reconstruction and reuse of Beijing courtyard houses.

C. The new Planning policy of reform and opening up

In 1983, The State Council approved the Master Plan of Beijing City Construction, and made ten approvals in the text of the plan. Beijing, as a famous historical and cultural city, is also the capital city, so the urban construction of Beijing should reflect the capital style, revolutionary tradition and historical background. It also points out that the old city is the characteristic of Beijing, the city construction should take the old city as the center, and the reconstruction of the old city should be combined with the construction of the new city; As there are important cultural relics, historic buildings and Siheyuan in the old city, it is necessary to protect and preserve the historical buildings and ancient capital style as much as possible in the process of rebuilding the old city. In fact, in the 1970s, Beijing organized a survey of traditional Siheyuan, but in these master plans, there was no specific protection plan for traditional Siheyuan.

In the mid-to-late 1980s, the Beijing Municipal government began to formulate and promulgate some controlling construction regulations after the master plan. In 1985, the Beijing Municipal government put forward the "Beijing Height Control Plan", stipulating that the construction height of the old imperial City should be centered on the Forbidden City, nine meters, 12 meters, 18 meters on both sides; At the same time, the old imperial city was divided into three levels of areas, 18 meters, 32 meters, 45 meters; The two sides of the front door shall not exceed 18.5 meters. Although the provisions have made clear provisions, errors will inevitably occur in the implementation. For example, the area allowing the construction of high-rise buildings is too large, which drives and encourages the construction of high-rise buildings, and even puts forward the requirement of breaking through the construction height. It can be seen that only controlling the height of construction can not implement the provisions of the overall plan well, and can not achieve the purpose of planning. Subsequently, the Beijing Municipal government formulated the zoning plan in 1987, adjusted the height control of buildings in 1985, and made more strict regulations on the height of construction in the old city: The height of buildings on either side of Chang 'an Avenue and on either side of the Second Ring Road and Front Sanmen Street shall not exceed 45 meters and 30 meters respectively. In other areas, the height of buildings has decreased from 1985 to 6 meters, 9 meters, 12 meters and 18 meters.

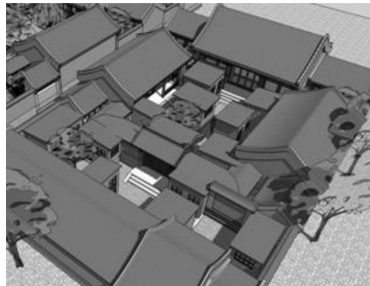
From the above policies of Beijing Municipal government, it can be seen that people have experienced the process from the upsurge of urban construction to the realization of the importance of old city protection, from the recognition of high-rise residential buildings to the restriction of construction in the old city. In this process, the protection consciousness of Siheyuan began to reveal. It should be said that these regulations play a certain role in curbing disorderly construction.

2. the New Changes of the Quadrangle

During this period, the courtyard house underwent different changes in different aspects.

A. Layout

The reason for the formation of the courtyard is the implementation and promotion of "push, connect and expand" project. However, due to the lack of clear guidance and norms for the construction bank in the implementation of the project, the irregularity and freedom of the construction of the addition: the original orderly and exquisite symmetrical plane pattern along the axis has become a non-axis, asymmetric, free and disorderly plane pattern, and the original unified style of the quadrangle courtyard building form has become a mixed state of various types of simple houses and original buildings. The original square and wide rectangular shape of the courtyard is divided by additional buildings, which leads to the fragmentation of the spatial form, resulting in the damage of the function. Most of the yards have become narrow aisles and corridors, becoming pure traffic space, losing the original sharing and activity function. The courtyard has also changed from single-family private to multi-family public, and the use rate is very low. If a family wants to match a pergola or plant some flowers, it is generally restricted, and even causes disputes between neighbors.



After the addition, the courtyard becomes a passing passage

(image taken from "Renewal and Exploration of Traditional Siheyuan in Beijing under the Mode of Modern Life" Yong Shi)

The implementation of "push, connect and expand" project is basically to rebuild the house along the inner direction of the original courtyard. The specific operation mode is: in the main room or the outside of the wing to expand a small house, used as a living aid; Or in the small space between the main room and the wing room to build a house, as shown in the construction of Baimixian Street yard 12. As shown in the figure, the courtyard space of Siheyuan is saturated. When "pushing, connecting and expanding" reaches the extreme, houses are built in the middle of the courtyard until the courtyard becomes a narrow and long passage. Most of the new houses are one-story flat roofs, and the building structure is brick and concrete. The construction materials used are red or gray brick, cement, wood, mechanical tile or corrugated board. Therefore, from the building materials, structure and construction, it is completely the construction and construction of modern low-rise buildings. In the architectural appearance, the detailed practices and styles of traditional Siheyuan are not considered. It can be said that these additional houses were built as temporary structures for easy construction, and did not intend to exist for a long time. However, due to some social problems that have not been solved, coupled with the practical needs of residents, these additional houses have survived until now. This project is forced to solve practical problems, the number of large, wide range, resulting in the implementation process of the lack of construction standards and basis, and finally resulting in the addition of buildings in different forms and the courtyard patterns after the construction of the situation.

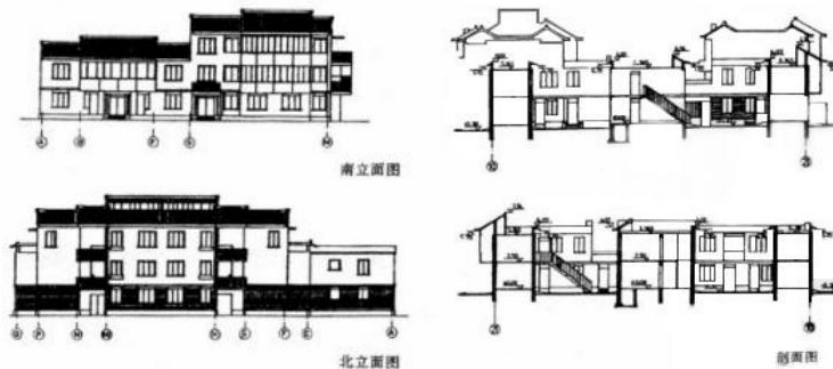
B. Form

During this period, the forms of courtyard renovation and protection gradually began to change.

From the previous analysis, we can see that the architectural space of courtyard houses, which constitute the large "urban texture" of Beijing's old city(Lv 2002), is far from the functional requirements of modern ordinary living. However, this kind of unitary courtyard forms a large-scale building group in an orderly manner, which can be used as a public building, such as cultural, educational and commercial buildings. Courtyard has shifted from the original residential function to office, commerce, entertainment, catering and other functions(Meng 2013), and complements the original residential function in terms of industrial composition. The acquisition of funds for commercial functions is a continuous process. Firstly, it provides a solution channel for the renovation funds of the old city courtyard, and secondly, it serves the surrounding residents within a certain range(Meng 2013). Finally, this kind of functional diversification is just to integrate new content into the courtyard, endowing the courtyard with new characteristics of the times, but fundamentally did not change the architectural appearance of the courtyard.

With the rise of urban renewal theory and its introduction into China, many people have made beneficial exploration on the renewal of Beijing old city and the formal renewal of Siheyuan in the period of reform and opening up. The most influential one is the organic renewal theory proposed by Wu Liangyong. The organic renewal theory, namely the courtyard system and the texture insertion theory, adopts the insertion method to partially replace the new with the old, and treats different preservation conditions of the existing houses differently, rather than demolishing them all together. So there are some new forms of Siheyuan.

Juer Hutong in Dongcheng District is a typical case of the practice of this theory. The renovated houses not only reflect the style and characteristics of the old Beijing Siheyuan in the old city, but also take into account some advantages of modern buildings. That is to say, new courtyard buildings replace the dilapidated Siheyuan buildings with "danger, accumulation and leakage", and at the same time, all the original residents can live in them.



Elevation and Sectional Schematic of Courtyard No. 41, Ju'er Hutong

(image taken from "A History of the Fifty Years of the Ancient Capital Beijing" Dong Guangqi,2006)

The renovation of Ju'er Hutong began in the late 1980s. The renovation design was undertaken and completed by Professor Wu Liangyong, who implemented the organic renewal theory and courtyard-like form into the project. Ju'er Hutong Rehabilitation covers an area of 2,100 square meters, including 7 courtyards including Courtyard No. 41, with a building area of 2,780 square meters. The scheme respects and inherits the style and features of traditional courtyards, draws lessons from southern courtyard forms, and expands east-west or north-south on the basis of a courtyard according to the different terrains, forming "cross-courtyards" or "into courtyards", which also avoids occupying mass Better possibility of existing courtyard house. The courtyard is semi-enclosed, and 100 square meters of public activity space is reserved in the courtyard, and the courtyards are connected in series by corridors. The basic courtyard size is 30*30 meters, and there are about 30 units in total. These courtyards are surrounded by newly built two- to three-story buildings. The roof form respects the original appearance, and some parts have outdoor platforms. Because of the high cost of this renovation method, it was not practical to use it all over the old city, so the exploration did not spread.

On the other hand, there are still a large number of dilapidated houses in the old city of Beijing that need to be renovated urgently, so the government, experts and scholars have explored two models: "Microcirculation" is to carry out renovations one by one on the basis of residents' consent, abandoning the method of large-scale demolition and large-scale construction, and carry out overall renovation of seriously damaged and poor living conditions in courtyards, that is, all houses including self-built houses will be demolished. rebuilt(Meng 2013). The "Renovation and Repair of Streets, Alleys and Hutongs" project is to repaint the walls on the side of the streets and alleys, repair courtyard walls and gatehouses, etc, and carry out renovations or overhauls, roof repairs, etc according to the different situations of four or five types of houses(Liu 2013). They are a new and beneficial

exploration of the protection of the style and features of the ancient capital and the improvement of the living environment of courtyards.

C. Function

The deepening of reform and opening up, the development of economic construction and the frequent exchanges at home and abroad make the tourism of Beijing Old City take off quickly. Beijing's rich historical resources and unique architectural features attract many tourists from home and abroad.

However, at that time, the tourism industry in Beijing was in its infancy, and the number and scale of hotels and hotels that received foreign guests were small. Some of the existing hotels and hotels are left over from the Republic of China or even the late Qing Dynasty, and some are newly built. These so-called "hotels" and "hotels" are actually the specifications of guest houses, which are not of high grade or large scale, and are not the true embodiment of the strength and characteristics of the capital Beijing. If the tourist season, almost all the reception of foreign guests hotels are full, there is not enough room to live in. According to the statistics of the tourism system, from 1978 to 1985, the occupancy rate of foreign hotel rooms in Beijing has been maintained at more than 90%, some as high as 100%.

Beijing Siheyuan offers tourists an alternative when there is a high volume of visitors and a shortage of rooms. Many people also see business opportunities, some of the more complete, large traditional Siheyuan began to be used for other properties, at this time foreign hotels appeared, such as: bamboo Garden hotel, Hebei Provincial office in Beijing, Lv Song Garden hotel, Dayan restaurant, etc. This kind of building can be divided into two forms: one is to use the original Siheyuan building to repair and transform, replace its original residential function; The other is the antique form of the building, the plane layout and building space relationship are generally consistent with the original Beijing Siheyuan.

Lv Song Yuan Hotel is located in Dongcheng District, Banchang Hutong 22, Kuanjie Street, near Nanluoguxiang, close to Houhai, Jingshan and other famous scenic spots. Lusongyuan Hotel is located in Nanluoguxiang Historical and Cultural Protection area. The main body of the building was originally part of the palace of the late Qing Dynasty general and Mongolian Prince, which belongs to the cultural relics protection unit of Beijing. Lusong Garden Hotel was founded in 1980, so far has been a traditional courtyard building and modern building combination of the Siheyuan hotel, recently renovated in 2007, the scale of guest rooms up to 58.

"Lv Song Garden" hotel is renovated on the basis of the traditional courtyard. Along the street of the hotel is the gate with eight-character screen wall, which serves as the entrance and exit from the door to the reception hall. In addition, along the street near the entrance west side for one - or two-story buildings, gray brick walls, antique Windows. The courtyard consists of five courtyards, the whole is a single-storey house, except for the two-storey buildings along the street which are modern buildings, the rest are quadrangle courtyard buildings. Each courtyard has a unique style, such as a bamboo garden, vineyards, etc., the main courtyard has a corridor around the open air tea house. The courtyard uses pavilions, corridors, color paintings and antique interior decoration to create a strong atmosphere of old Beijing courtyard and traditional culture.

Another form of functional transformation in this period is to rebuild or build new Siheyuan, so that its architectural form is close to the traditional Siheyuan, and at the same time, the renovated building can meet the new functional requirements. The Hebei office in Beijing is one example, converting an original courtyard building into an antique form.

Hebei Office is located in the center of Dongcheng District, on the northeast side of Jingshan Park. Hebei Office is a group of quadrangle courtyard buildings with a history of hundreds of years. It was first used as the chief secretary of the Ming Dynasty, and later as the needlework bureau of the Qing Dynasty. Later, due to its complete courtyard, superior geographical location and convenient transportation, the house was used as an office. Influenced by the reform and opening up of tourism, the house was also used as a hotel open to the outside world.

The Siheyuan is a simple, elegant, courtyard set of courtyard buildings, later according to the actual needs and reconstruction. The buildings on the east and north sides of the courtyard were transformed into modern buildings with traditional elements, mostly two or three storeys high. The courtyard gate is restored to maintain the traditional style. After entering the gate, the three-story building on the right side of the Hebei Resident Office is on the ground. The eaves of the building are high and peaked, and the corners are warped. The gray brick walls are supplemented by red brick corners, and the Windows are in the traditional form. To the left of the entrance gate is a row of buildings in the form of a one-story pitched roof, which is used as administrative and auxiliary rooms. There is a row of buildings facing the gate of the courtyard with gray brick and red Windows. The building height is 2-3 floors. The second floor building on the left is a restaurant, the first floor is a la carte restaurant, and the second floor banquet hall can accommodate 150 people at the same time. The three-story building on the right of the restaurant is a hotel, followed by a one-story office building and a two-story dormitory building on the right. The middle part of the courtyard is a 1 - and 2-storey building enclosing a small courtyard, with painted paintings, sloping eaves and grey bricks, continuing the traditional style and characteristics.

The west side of the courtyard is a row of north-south three courtyards, these three courtyards from south to north are successively Xuchun Garden, Guhuai Garden, Yangxin Garden. Xuchun Garden is a typical enclosed courtyard house with porch in front and building in back. The most representative of ancient Huai Garden and

Yangxin Garden is connected by a small gate around the verandah. The three courtyards have a beautiful view of the traditional courtyard house in Beijing, which is used as a superior suite.

V. New Changes in Cultural Meaning

1. A new order breaks the traditional residential order

The social structure and family structure model under the "ritual" system in ancient China made the traditional Siheyuan in Beijing a place where a large feudal family lived together: the elders of the family lived in the main room on the central axis (i.e., the north room of the main room), the juniors lived in the wings on both sides of the main room on the south side, and the servants and other outsiders of the big family lived in the southernmost inverted room. Beijing Siheyuan architectural pattern and thousands of years of feudal ethics organic combination.

Since the reform and opening up, due to the change of times, the difference of economy and technology, the change of traditional culture and way of life, the traditional living form has lost its practical significance to a certain extent. While the current Beijing Siheyuan has broken through the traditional living way, it is still limited to the traditional space form. The old siheyuan, which was established under the hierarchical social system of feudal ethics, lost its original meaning and value.

Influenced by population, nature, ideas and other factors, Beijing quadrangle courtyard gradually formed the situation of multi-family living together. Today's complex courtyard is different from the "complex courtyard" in the Republic of China and the early period of the founding of the People's Republic of China, which only stayed in the multi-family living together. Nowadays, in addition to the multi-family living together, the addition of construction bank in the courtyard is becoming more and more intensive. Originally a family lived in a courtyard, but now crowded in one or two rooms, there is no condition to inherit the upper and lower elders, the middle axis symmetry of the living order, that is, from a family to the center of the pattern of multiple households. Especially after the exploration of siheyuan, although the newly built two - and three-story buildings can meet the needs of single family living, the living mode has been completely different from the traditional Siheyuan living with the combination of nature and man.

2. New cultural connotations in the new context

"Diversity" is a concept put forward by Jane Jacobs in the book "The Death and Life of Great American Cities", believing that diversity is the nature of cities and the source of their vitality. The "diversity" advocated by Jacobs refers to the mix of urban functions or functions.

Considering the actual situation of Beijing Siheyuan at present, the more complex and diversified the functions of the place, the more prosperous scene, the more full of vitality. Shichahai and Nanluoguxiang, for example, form a concentrated area of commerce, entertainment and tourism in the traditional residential areas, with a large flow of people at different times of the day. The real attraction for these tourists is the multifunctional business district and the characteristics of the ancient capital. They also want to learn about the customs of old Beijing and hear the Beijing dialect.

Therefore, there are multiple functional combinations within a block, such as Siheyuan hotels, restaurants, bars, government offices, art galleries, traditional handicraft workshops, traditional old shops, and so on. Together with the old residents living in the area, this not only solves the fund problem of the revival of traditional residential courtyards, but also preserves the traditional characteristics, realizing the cultural diversity and living vitality of the old city.

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Jacques deLisle. To Get Rich Is Glorious: Challenges Facing China's Economic Reform and Opening at Forty[M]. Brookings Institution Press:, 2019.

This book aims to explain the secret to China's rapid growth over the last 40 years from the viewpoint of a firsthand witness. In

1978, China launched economic reforms that brought about one of the most dramatic national changes in history. The reforms removed bureaucratic barriers to growth and leveraged China's vast labor pool and entrepreneurial talent to unleash unparalleled economic growth. At the same time, China faces daunting challenges in maintaining growth, continuing its economic transformation, dealing with the adverse consequences of its economic success, and coping with growing suspicion from the United States and other trade and investment partners.

Wang Q. M. Beijing Quadrangle Courtyard/100 Chinese Fine Architectures[M]. China Building Industry Press:, 2006.12.

Beijing Siheyuan With exquisite text and diagrams, starting from the origin of the name of Siheyuan (also known as Siheyuan), detailing the formation history, overall layout, courtyard, screen gate wall, corral, the flower bed and other details and construction. Siheyuan methods. , windows, doors, walls, etc. The introduction of this book is extremely detailed and guides readers to form a comprehensive understanding of patio houses.

V. Echarri, C.A. Brebbia. Heritage Architecture Studies[M]. WIT Press / Computational Mechanics:, 2018.02.

The study, restoration and maintenance of heritage buildings has become increasingly important in modern society. Recent rapid growth in many parts of the world has made the need to preserve our built cultural heritage all the more urgent. This required the collaboration of all parties, not just architects, engineers, and scientists, but also artists, socioeconomic professionals, and all other stakeholders to ensure the effective integration of the restored building within the community. The book consists of a selection of essays covering a variety of topics related to the historical aspects and reuse of heritage buildings, as well as technical issues of structural integrity for different types of buildings.

Marieke Kuipers, Wessel de Jonge. Designing from Heritage: Strategies for Conservation and Conversion[M]. Delft University of Technology:, 2017.

The book is a reflection of the philosophy and pedagogy of the Heritage and Architecture (H&A) section of the Faculty of Architecture and the Built Environment (TU Delft). Design, cultural values and technology work closely together to lay the groundwork for the preservation and continued use of architectural heritage. The book is intended to be a tool in architectural education and conservation, where research is an integral part of the design strategy.

Ugo Carughi, Massimo Visone. Time Frames:Conservation Policies for Twentieth-Century Architectural Heritage[M]. Routledge:, 2018.

Time Frames examined current conservation rules and conservation policies in more than 100 countries, with a particular focus on emerging nations and 20th-century architecture. These contributions illustrate key issues related to architectural listings, with a brief history of state methods, a map of links, and a brief bibliography. The book also offers a brief critical dictionary on topics such as identity, heritage, conservation, memory and the economy. By examining the ways in which buildings are designated as heritage sites on every continent, this book provides a comprehensive overview of current conservation policy for 20th-century buildings and the role of architectural history.

Priscilla Chen. Quadrangle in Beijing: The Story of a Chinese House[M]. Priscilla Chen:, 2000.

The quadrangle courtyard, the traditional dwelling of people of the Han ethnic group, has a time-honored history. A quadrangle courtyard is surrounded by houses on all four sides. The courtyard — which is spacious and well-arranged, and the houses of which are independent, yet connected by pathways — embodies the beauty of traditional Chinese architecture. Quadrangle courtyards in Beijing are the most typical — and most famous — of the quadrangle courtyards in China.

Morning Glory. Classical Architecture of Beijing's Dongcheng District[M]. Morning Glory Press:, 1998.

Chengbei Xu. Old Beijing: People, Houses and Lifestyles[M]. Foreign Languages Press:, 2001.

Through real historical materials and historical pictures, it reproduces the old appearance of old Beijing, so that readers can understand the historical and cultural changes of Chinese cities from another perspective.

Ronald G. Knapp. Beijing:China's Old Dwellings[M]. University of Hawaii Press:, 2000.

A comprehensive critical examination of Chinese folk architectural forms. Together with its companion volume, Living Housing in China: Folk Beliefs, Symbols, and Home Decoration, it examines the environmental, historical, and social factors that influence the housing patterns of nearly a quarter of the world's population. Both books are based on the author's 30 years of fieldwork and travel in China, as well as published and unpublished material in several languages.

Guanhua Liu. Beijing:The Cornucopia of Classical Chinese Architecture[M]. Graham Brash:, 1982.

Layla Dawson. China's New Dawn: An Architectural Transformation[M]. Prestel:, 2005.

This incisive look at the historical, social and economic forces that have shaped China's modern architecture analyses the country's struggle to define its own architectural aesthetics.

Guangqi Dong. A History of the Fifty Years of the Ancient Capital Beijing[M]. FD:, 2006.

through the analysis of Chang'an Avenue and Tiananmen Square Planning and construction, the practice of rebuilding dilapidated and dilapidated houses in the old city and the analysis of several cases, from the macro to the micro, from the technical level to the policy level, summed up the experience and lessons, and discussed how to implement the modernization of municipal infrastructure in historical and cultural protection areas A supplementary discussion was made.