

A STUDY ON THE FABRIC OF COURTYARD-TYPE LILONG HOUSING

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ABSTRACT

Lilong housing, which emerged before the 1900s, had been the most representative dwelling housing type in China till the 1940s. It combined the Chinese traditional housing and western row housing and showed different characteristics in different cities among each other.

The courtyard-type Lilong housing, which existed in Tianjin, was an essential type witnessing Tianjin dwelling housing's modernization and shaping the urban fabric.

This paper focuses on the courtyard-type Lilong housing, aims to interpret it's fabric characteristics, and clarifies the formation mechanism.

Firstly, according to the plans, I analyzed the morphological characteristics of plots, lanes, and units, which make up the courtyard-type Lilong housing, including its location, size, forms, divisions, connections, and unit types. Basd on it, I analyzed the relationships between plots, lanes, courtyards and building entities, and proved the factors affect and restrict each other. Finally, I proved that the Lilong housing was a kind of organism made up of the three elements, and found the modularization trend in the transformation process.

Key words: courtyard-type Lilong housing; fabric; formation mechanism; modularization trend.

INTRODUCTION

Lilong housing was one of the most crucial dwelling housing forms in modern Tianjin. Coming out under the background of social unrest, population explosion, and land price rising, the Lilong housing adjusted to the social, economic, cultural, and regional conditions opportunely. According to different origins, we divided the Lilong housing in Tianjin into two types, the Old-type Lilong housing with the traditional courtyard as the matrix, and the New-type Lilong housing with the western collective housing as the matrix. These two types showed apparent differences in appearance, form and room layout.

As the paper's research object, the Courtyard-type Lilong Housing is the main one of the Old-type Lilong housing. Distinguishing from other types, the Courtyard-type Lilong housing has four requirements:

- a. built uniformly;
- b. the pattern showed as row-type;
- c. repeated units;
- d. unit's layout inherited the traditional courtyard's.

And the development process could be divided into five periods:

- (1) Beginning before 1900;
- (2) Flourishing from 1900 to 1928;
- (3) Continuing from 1928 to 1937;

- (4) Declining from 1937 to 1949;
- (5) Stopping after 1949 gradually.

Because of the unique morphology, the courtyard-type Lilong housing played a critical role in Tianjin's modernization of dwelling housing.

BACKGROUND

The investigation and researches of Tianjin Lilong housing dates from the 1960s, and the studies covered wide aspects which mainly focused on the background, distribution, site plan, unit type, and gave general distinction of the Old-type Lilong housing and the New-type Lilong housing (Wang, 1964). Based on the comprehensive research, other scholars paid more attention to the external and internal space (Wang, 1987; Yang, 1983), and development periods (Yang, 1988).

After the 1990s, apart from supplements and corrections of the previous results, the research has a broader range of topics, which include influences (Sun, 2007), the inheritance of traditional dwelling housing (Jin, 2002), protecting and reusing (Jin, 2002; Luo, 2007; Li, 2014), comparison between different cities' cases (Sun, 2007), people's behaviors (Chen, 2007), and relationships with urban form (Liu, 2016).

However, there are also some shortages. First, the Old-type Lilong housing, especially the Courtyard-type Lilong housing has worse preservation state, lower artistic value, and is about to disappear in the last decade of rapid urban development, while the New-type Lilong housing is still preserved. Most of studies focused on the latter. Second, the limited studies of the Old-type Lilong housing ignored the importance of fabric, which is crucial, because the fabric of early collective housing is an indispensable and even a decisive factor. (Jia, B.S. Yang, Y.P. Zhang, L.H. 2013)

Third, although scholars have put forward different classifications of fabric according to lane structure and shapes (Wang, 1964), spatial layout and sequence (Sun, 2007), unit types and layout (Sun, 2007), and behavior vitality (Chen, 2007), the research is not systematic because there is no uniform standard or sufficient cases. Moreover, instead of thinking synthetically, scholars usually analyze the fabric elements individually. The relationships between blocks, plot series and building entities should be also taken into account because the modern urban fabric is an organism made up of these elements (A. Levy, 1999).

Therefore, this paper tries to give a specific interpretation of how the elements affect each other, that is, the formation mechanism of the Courtyard-type Lilong housing fabric.

METHODOLOGY

There is a common hypothesis in urban morphological research that there is an organic attribute in the fabric, in which the part and the whole, that is, the building type and fabric are interdependent (A. Levy, 1999). The fabric formation is the result of the interaction of elements.

Contrary to the British Cozen School, the Italian Caniggia School defined the building type and urban fabric as the typological process, which begins with elementary cells and accumulates continuously (Conzen, M.R.G, 2009).

This paper uses the Italian typological process approach introducing the important concept: level. That synchronic concept, which considering different scales, shows the classification on the current period.

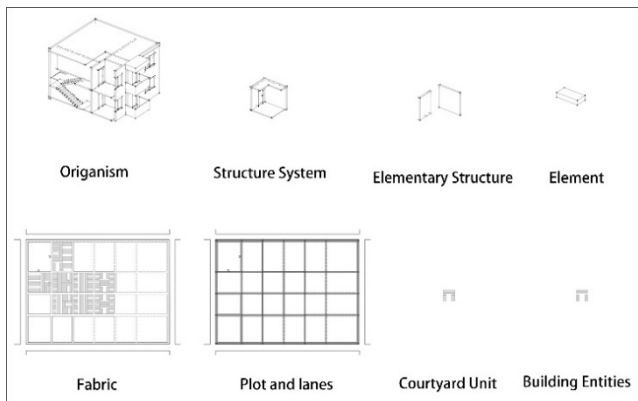


Figure 1. The all levels of the fabric of the Courtyard-type Lilong housing.

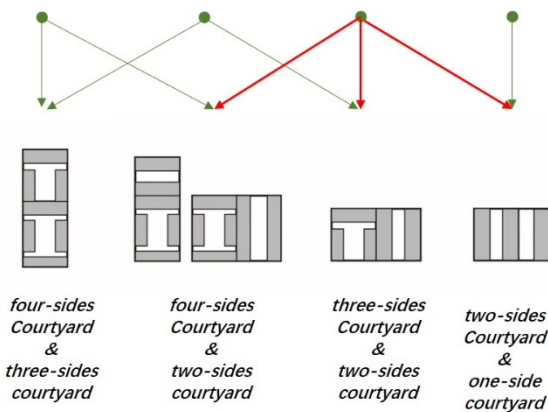
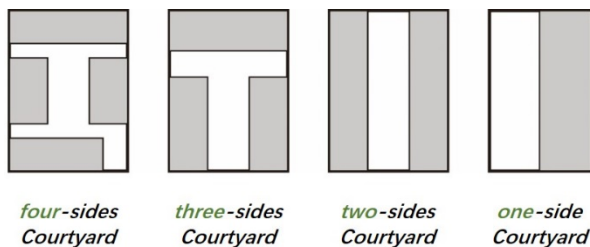


Figure 2. Combinations of the courtyard units.

courtyard and one-side courtyard. In order to meet different requirements of developers and residents, most of the Courtyard-type Lilong housings consisted of more than one type of courtyard unit. Benefiting from the best adaptability, the two-sides courtyard always combined with others. Based on the premise that scales of building entities and courtyards are reasonable, all kinds of courtyard units could be combined by the sides with the same length, that is, the modularization trend (Figure 2).

In the Courtyard-type Lilong housing, the plots could be classified by scale, and actually, the length of the short side always influences the lanes structure directly. Usually, when the short side length is

Caniggia interprets the human environment as a complex entirety consisting of elements, elementary structure, structure system, and organism (A.V. Moudon, 1994). When the organism refers to the city; the structure system refers to the block with a certain relationship with the organism; the elementary structure refers to the plot which is not directly related to the organism; the element refers to the building the smallest-scale composition.

The method could be used to analyze the organic attribute of the Courtyard-type Lilong housing. The organism refers to the fabric; the structure system refers to the plots and lanes; the elementary structure refers to courtyard units; and the element refers to building entities. (Figure 1)

As evolved from the Chinese traditional courtyard, the Courtyard-type Lilong housing unit is similar to the Siheyuan in form and layout. But in the way of constructing and using, they are totally different. Because the hierarchy between building entities in Siheyuan had disappeared, resident composition had changed, and the requirement of housing had increased. The courtyard-type Lilong housing adapted to all these changes well.

According to the number of building entities, the courtyard units could be classified into four-sides courtyard, three-sides courtyard, two-sides

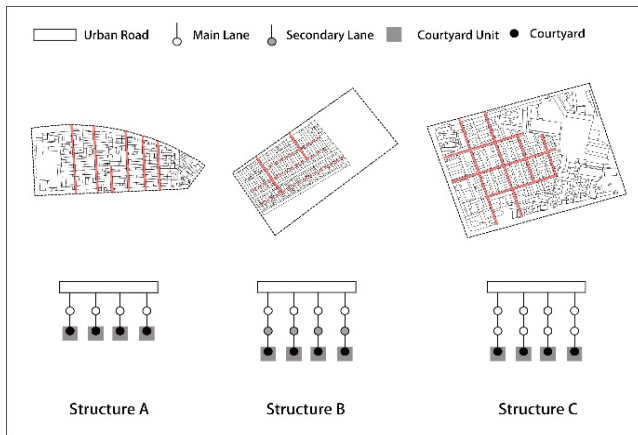


Figure 3. Three types of spatial structures.

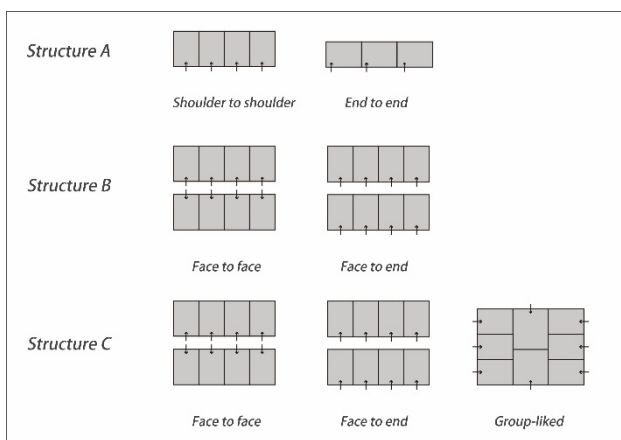


Figure 4. Five types of connections of the Courtyards.

entrance directions in different rows are opposite, and the "Face to back" which the entrance directions in different rows are the same. In the Structure C, there is another unique way of connection named "Group-liked" which entrances lie on all four sides and directly leads to the main lanes. (Figure 4)

The typological process analysis from the traditional courtyard to the old-type Lilong housing is based on the classification study above. In this paper, one example will be taken to explain the process.

The formation mechanism of the Courtyard-type Lilong housing fabric is based on the analysis above. In this paper, one example will be taken to explain the mechanism and the modulization system.

The Qingjидong Li located in the Hebei district in Tianjin and was constructed in 1920, with a scale of 220 meters long and 160 meters wide. The plot was divided by five lanes paralleled to the short sides and three lanes paralleled to the long sides, which made up the structure of the Qingjидong Li. After decades of demolition and reconstruction, only eight groups remain intact with a scale of 30 meters by 30 meters and show six ways of the combination of courtyard units. The analysis of the Combination 1 (C1) to the Combination 6 (C6) is below.

The C1 has a scale of 38 meters long and 30 meters wide. There are three courtyard units on the left. The C1a is a two-sides type courtyard, and the C1b is a three-sides type courtyard, which has

shorter than 50 meters, the Lilong housing would be divided into two parallel rows by the main lane. When the short side length is longer than 50 meters, there would be more than one main lane and several secondary lanes perpendicular to the main lanes so that occupancy and accessibility could be most efficient. So, according to an analysis of 101 cases, there are three types of the Lilong housing spatial structure, named Structure A, B and C (Figure 3).

Contrary to the traditional courtyards were built separately by families, the courtyard units of the Courtyard-type Lilong housing were built uniformly. So the connection of courtyard units followed specific rules.

In the Structure A, there are two ways of connections that "Shoulder to shoulder" connected by long sides, and the "End to end" which connected by short sides. In the Structure B, in addition to these two ways of connection which showed on the same row, there are two other ways showed between rows. "Face to face" (or "Back to back") in which the entrance directions in different rows are opposite, and the "Face to back" which the

a same scale of 15 meters long and 10 meters wide. The C1b is also a three-sides type courtyard with the scale of 18 meters long and 15 meters wide. The right part is a row of one-side type courtyard, which has the same scale of 15 meters long and 9.5 meters wide.

The C2 has a scale of 30 meters long and 35 meters wide. There are three two-sides type courtyard units with the same scale of 25 meters long and 10 meters wide on the left. The row of the building parallel to the short side of the group was built uniformly and left a path to interlinked the three courtyards. On the right, there is a three-sides type courtyard that has a scale of 15 meters long and 10 meters wide, while the one-side type is 10 meters long and 15 meters wide.

The C3 has a scale of 31.5 meters long and 28meters wide. Different from the other five ways of combination, it had been divided into three parts. The two parts on the short side are made up of a row of two-sides type courtyards that with the same scale of 6.9 meters long and 10.5 meters wide. And the middle part has two three-sides type courtyards which with the same scale of 15.75 meters long and 14.2 meters wide and appear like the "Back to Back".

The other three groups have the same scale but different layout, which made up of different courtyards with at least one side in the same. These three groups demonstrate the modulization

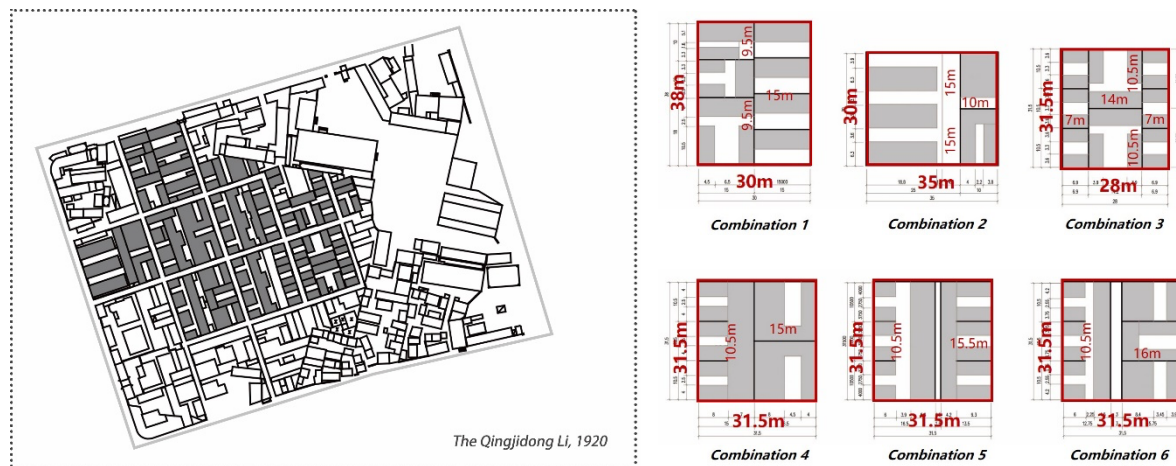


Figure 5. The example of ways that courtyard units combine.

system of the Courtyard-type Lilong housing particularly. Even though the scale is slightly off from the original, the modulus of 10 meters and 15 meters are still apparent.

These six groups have almost same scale but shows different combination. The diversity comes from the application and control of the modulus. Even though the scale is slightly off from the original, the modulus of 10 meters, 15 meters and 30 meters are still apparent.

Since the length of all levels have the multiple or half relationships, the construction of the Courtyard-type Lilong housing could be constructed efficiently and meet different requirements.

As analyzed above, one or a few numbers decide the measures of courtyard units in order to combine them flexibly.

The shape and scale of the plot determine the lanes' structure which divided the plot into groups with a similar scale, and connection of all courtyard units.

As a result, the fabric of the Courtyard-type Lilong housing could be varied in appearance but consistent in essence, because they always under the control of the modulus.

CONCLUSIONS

The fabric of the Courtyard-type Lilong housing shows as an organism resulting from the comprehensive effect of all levels. For meeting the need for efficiency, convenience, and universality, the modulus had been applied in the construction, that is, the formation mechanism of the Courtyard-type Lilong housing.

This paper supplements the research of the Courtyard-type Lilong housing with levels division as the entry point and fills the gap in the history of Tianjin's residential development. As one of the essential residential housings in modern times, the Courtyard-type Lilong housing has valuable reference and guidance value to the urban planning and collective housing construction in the near future.

What's more, this paper shows that the typological process approach could be applied to basic building analyzing of Chinese urban, with which, the formation of the urban fabric could be explained from the relationships between elements.

In the following research, apart from the spatial factors, the housing demand, economic condition and construction technology are also included. In the planning and designing process, it is necessary to consider all of the relationships among the factors above.

REFERENCES

- Caniggia, G.L. Maffei (2001). Architectural composition building typology interpreting basic building. Alinea, Firenze 50
- Chen, Z.Q. (2007) 'Shang hai li long zhong de chang suo yan jiu', Shanghai jiaotong university
- Conzen, M.R.G.(2009). 1960: Alnwick, Northumberland: a study in town-plan analysis Institute of British Geographers Publication 27. London: George Philip. Progress in Human Geography. 859-864.
- Gao, Z.L. (1990) 'Tian jin jin dai jian zhu' (Tian jin ke xue ji shu chu ban she) 1.
- Jia, B.S., Yang, Y.P. and Zhang, L.H. (2013) 'Zhong guo zhi min cheng shi zao qi ji qun zhu zhai xing tai xue bi jiao ji yan jiu', China Ancient City 5, 35-43
- Jin, K.W. (2002) 'Li long wu ti - dui li long ju zhu xing tai de li shi fen xi', Tongji university
- Lan, S. (2015) 'Yuan shi he liu xin yang zhi cun - xi yu zhuang cheng shi yu he liu kong jian guan xi tan tao', Tianjin university
- A.Levy. (1999). Urban morphology and the problem of the modern urban fabric: some questions for research Urban morphology. 79-80
- Li, C.H. and Shu, P. (2010) 'Ben tu yu wai lai —shuang chong wen hua ying xiang xia de tianjin jin dai cheng shi zhu zhai', Huazhong Architecture 6, 126-128
- Li, Y.B. (2014) 'Shang hai li long jie qu de jia zhi' (Tong ji da xue chu ban she)

- Liu, M. (2007) 'Tianjin "wu da dao" li shi jie qu de kong jian ji li yan jiu ji qi zai bao hu geng xin zhong de yan xu yu chong gou', Tianjin university
- Luo, S.S. (2007) 'Shanghai lilong zhu zhai de yan bian he ji cheng', Shanghai jiaotong university
- Moudon, A.V.(1994) 'Getting to know the built landscape: typomorphology', Urban morphology, 291.
- Qian G. (1996) 'Lilong Housing, A Traditional Settlement Form', McGill University
- Ren, J. (2005) 'Wen hua shi ye xia de zhong guo chuan tong ting yuan' (Tian jin da xue chu ban she) .
- Shen, H. (1993) '
Shanghai Lilong Nin ju' (Zhong guo jian zhu gong ye shu chu ban she) 23-26
- Sun, Z. (2007) 'Chinese jin dao li shi zhu zhai bi jiao yan jiu', Wuhan technical university
- Teng,S.H, Jin,Q.M(1983) 'Tianjin architecture style' (Chinese jian zhu gong ye chu ban she) 101
- Wang, S.Z. and Chen, Z.M. (1987) 'Lilong jian zhu' (Shanghai ke xue ji shu chu ban she)
- Xu, J.X. 1979) 'Shang hai li long zhu zhai'
- Yang, B.D. (1983) 'Li long zhu zha chu tani she ji shou fa tan tao' , Architectural Journal 2, 20-23
- Yang, B.D. (1988) 'Tian jin jin dai jian zhu shi de duan dai yu fen qi', Huazhong Architecture 3, 27-31.

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