URBAN HOUSING RENOVATION IN CHINA

TOWARD A NEW APPROACH

by

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ABSTRACT

Urban Housing Renovation in China - Toward a new approach

by

Youxuan Zhu

Submitted to the Departments of Urban Studies and Planning and of Architecture on May 26, 1986, in partial fulfillment of the requirements for the Degrees of Master of City Planning and Master of Science in Architecture Studies.

This work searches for an alternative process for urban housing renovation in China, which could help to improve the current living conditions and to maintain a quality environmental of the old neighborhoods. It is argued that the problems of the current housing renovation process come from both physical and institutional aspects, which can be seen primarily as a matter of levels of control. In response to this, a new decentralized housing renovation process, with a new institutional and a new design framework, is proposed.

The major arguments of the thesis will be developed through two stages:

1. From analyzing the overall urban housing background, and reviewing a typical old residential neighborhood in Beijing, we see clearly that it is the existing housing process (institutions, policy and housing production system) that caused the problems in the current housing renovation. The major nature of the problems is the highly centralized governmental control on the one side, and relatively less power of the local residents on the other. In order to attack these problems, we need to decentralize the control to the local level in both the design process and the implementation process.

2. The process of exploration for a new housing renovation, however, reveals the possibilities and constraints for such a approach. Through this process, we see how the design concerns and social concerns are interrelated in the issue of housing renovation. It is argued that a new housing process not only is desirable, but also is possible in the current context of China.

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Thesis Readers: William Doebele

John Habraken
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Chapter 1. Introduction

As an urban designer, it is the environmental concern of the current urban renewal process in China that first drew my attention to this subject. In the summer of 1984, I received an Aga Khan travel grant and visited many cities in China. During this trip, I was disappointed to see that many old cities were losing their traditional characteristics in the process of new urban development.

These old cities, such as Beijing and Suzhou, are surrounded by miles of new mass housing. Now, these kinds of "international style" buildings have begun to infiltrate the old cities in the process of urban renewal. Based on this environmental concern, I started my research on historic preservation to seek some solutions to preserve China's old cities and culture.

However, the more I studied this subject, the stronger I felt that current historic preservation researches in China would not lead to saving the old cities, because the focus of these approaches is to save the "monumental" buildings, with little interests on "ordinary" residential buildings.

As a result of this trend, many temples, gardens and specific courtyard houses have been renovated or even rebuilt. For example, Lu Li Chang - an old commercial and art crafts district in Beijing, was completely rebuilt at a very high cost. At the same time, many ordinary old residential buildings were torn down to give way to the "historic
[Fig.1-1]
The perspective drawing of the new proposal for Liu Li Chang District in Beijing.

[Fig.1-2]
The master plan of the redevelopment proposal for Qinan Men District in Beijing, made by professors and students in Qinghua University.
preservation process" <Fig.1-1>.

In another example - Qian Men District renovation scheme - the only concern is to maintain the existing shopping and recreational streets, while the rest of the district are going to be replaced by new mass housing <Fig.1-2>.

I find it is difficult to imagine that the traditional character of old cities will remain without the ordinary residential neighborhoods. It seems that housing renovation holds one of the keys for conserving the environment of the old cities. Realizing this issue, I switched my focus from historic preservation to urban housing renovation and hoped to find some new ways to renovate old housing, so that the historic cities, their environment and cultural identities could be preserved.

The involvement in the subject of the urban housing opened up a much wider and a much more complicated field, in which social issues and environmental issues intertwine. However, the focus of this study will concentrate on the housing renovation issue, particularly on how to renovate the one story courtyard house environments, which are very common in many middle-sized and small cities of China.

This study will examine problems in the current housing renovation process; the factors which caused these problems; alternative processes to solving them; and how the new process could be developed within the context of contemporary urban China. Both design concerns and social concerns are linked in
this housing renovation issue, and the whole study will address both. I hope that this study will provide a better understanding of the problem and lead to an alternative housing renovation process, and will also help us to develop a more integrated way to study environmental design issues.

The thesis is divided into two sections. The first section (Chapters Two and Three) is about the context and the framework of this study. In this section, I will first introduce the background of urban housing in China and point out the factors that cause the urban housing problem today, and why a new housing renovation process is the key toward solving it. Then I will examine an old residential neighborhood: What is the current situation of that area? What are the problems of the area in terms of the current housing renovation process? And what are the potential resources for alternative interventions? Based on the above analysis, I will formulate a conceptual framework for a new housing renovation process.

The second section (Chapters Four, Five and Six) mainly illustrates the procedures of developing this new approach. Through a delineation of the intellectual process, I would like to show how the new process is developed, and how social and design issues are interrelated in the process. After these two sections, a conclusion will assess the basic significance and the limitations of this study.
Chapter 2: Urban Housing Problem in China - A Background Review

As the issue of housing renovation is part of the current housing problem, understanding the general situation of the urban housing in China would give us a clearer context to address the housing renovation issues. In this chapter, a brief analytical description about the urban housing situation in China today is presented, to illustrate what the problems and the causes are of the current urban housing process.

Feeding, clothing and housing a nation of more than one billion people would not be an easy task for any welfare state, much less for a relative poor developing country like China. Incredible gains have been made in the first two areas, but it is in the area of urban housing that performance has been the poorest. The extreme shortage of residential accommodation in China's cities and increasing inequality of living conditions have already reached very serious stage, which is widely acknowledge by Chinese citizens as one of the most explosive social issues facing their society today.

The problem of urban housing, however, could be explained through describing two contradictions in the current urban housing process. They are the contradiction between the government ideological intention and the extremely limited economic resources, and the contradiction between the highly centralized housing production system and very unequal housing distribution system. Next, we are going to see how these two contradictions contributed to the housing problem today.
1. Intention and Constraints

Whenever we talk about housing policy in China, we have to trace back to the Chinese government's notion that housing should be a social welfare enterprise undertaken exclusively by the state. It is this notion that has guided China's urban housing policy for about 30 years. This notion obviously came from the Marxist theory and the Soviet model, which were the only available references for new Chinese leaders when they started to develop their new socialist state.

Even though neither Marx nor Engels clearly pointed out what kind housing policy would be in a socialist society, from reviewing their arguments about housing in capitalist countries, and from examining the Soviet housing policy, the new Chinese leaders were convinced that in a socialist country housing should be considered as a social welfare.<2> Every urban citizen should get housing offered by the state with very low rent.

Maybe more important than this pure ideological concern, are its social and political concerns for the new housing policy, a policy characterized by nationalizing the housing stock, equalizing living conditions and reducing housing rent in most cities of China.

For the new government, the re-allocation of the existing housing stock left by the old government and the rich, like distributing land to the farmers, has its political significance. In fact, in the early Liberation days, actions such as the re-distribution of urban housing, up-grading of
slums and more importantly the dramatic reduction of the rent, were all well supported by much of the urban population. All these helped to largely equalize the living conditions in cities across the country, and also achieved great political popularity and legitimacy for the new government.<3>

At the same time, the private housing ownership was greatly discouraged and eliminated significantly. For example, in Qingdao, which is a typical middle-sized city in China, the percentage of private housing dropped from 57.6% (4.12 million square meters) in 1949 to 5.6% (0.87 million square meters) in 1979.<4> In addition, the housing market was also removed. Only the government is considered to be responsible for building and distributing housing to each individual.

However, the best intention and commitment are not necessarily followed up by action. To the contrary, the new government had deliberately kept urban housing investment at a very low level in the past 30 years, which is agreed by many Chinese planners as a major factor causing today’s housing problem.

For 30 years (1949-78) the housing investment was constantly decreasing relative to the increasing urban population <Table 2-1.>. The reason is due to the national development policy. According to socialist economic theories, it is believed that only the productive sector could more effectively bring economic growth. As a result, the housing and other non-productive sectors were sacrificed to heavy industry. It is estimated that during this period, the percent
of GNP allocated to housing in China was only 0.37%, which is much lower than many developing countries.<5>

[Table 2-1 ] Proportion of Basic Construction Investment Funds Allocated to Urban Housing

<table>
<thead>
<tr>
<th>Period (1)</th>
<th>Share of urban housing in total construction funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953-57</td>
<td>9.1%</td>
</tr>
<tr>
<td>1958-61</td>
<td>4.1%</td>
</tr>
<tr>
<td>1962-65</td>
<td>6.9%</td>
</tr>
<tr>
<td>1966-70</td>
<td>4.0%</td>
</tr>
<tr>
<td>1970 alone (2)</td>
<td>2.6%</td>
</tr>
<tr>
<td>1976 (3)</td>
<td>6.1%</td>
</tr>
<tr>
<td>1977 (3)</td>
<td>6.9%</td>
</tr>
<tr>
<td>1978 (3)</td>
<td>7.8%</td>
</tr>
<tr>
<td>1979 (3)</td>
<td>14.8%</td>
</tr>
</tbody>
</table>


When the state made less money available for urban housing, the government's low rent policy reinforced this economic difficulty. The rent for public housing was set so low that it could not cover the maintenance cost, (in many cases, only 30% - 50% of the maintenance cost is recovered) not to mention the investment cost. This low rent policy, on the one hand, further discouraged the limited housing investment, simply because to invest in housing, one could not get economic return, and one had to subsidize for the maintenance cost. On the other hand, the lack of funding for maintenance and repairs accelerated the deterioration of existing housing stock, which again intensified the already crowded living condition in many old residential areas.

It is clear that this contradiction, with great intention on one side and limited resources on the other, set a great constraint for fulfilling the government's commitment. Another explanation could be that the Chinese revolutionary leaders, with their agrarian background, vastly underestimated the difficulties of solving the housing problem associated with industrialization and urbanization.<7>

2. Production and Distribution

The political and ideological intention and economic constraints are not the only factors that created the housing problem today. In addition, the housing production and distribution system are also directly responsible for the current housing problem.
In China, under the socialist planned economy, the urban housing production is almost 100% controlled by the government. The urban land is publicly owned; the materials are produced and allocated according to government plan; and one or two state-owned construction companies monopolize all housing construction in one city. Even the size and standard of public housing units are set by the state government with only marginal differences across the country based on climate. What features could we expect under such a housing production system?

The first and most obvious feature is the mass housing image, which has dominated public housing for more than thirty years. Wherever you go in China, from the north to the far south, from the mountain to the coast, you will find that very similar image of public housing. In fact, with the monopoly construction company and industrialized and standardized building system, mass housing seems to be an inevitable result. The second feature is the inflexibility of this production system. The housing production system, with its bureaucratized process, standardized units, monopolized ways of construction, largely deprived the role of architects and planners in the housing process. In other words, there is very little room for architects to maneuver in the current housing process. As one architect pointed out: "Between the bureaucrats and the cranes, there is not much say by architects." <8>

Lastly, maybe more critically, is the fact that because
of this rigid production system, there are no other choices. You either have the mass housing or do not have any housing. Therefore, this housing production system could not respond to different and less standardized situations, such as those institutions who have less money or those old residential areas which need special design and treatment. They are left out from this production system, which is also a contributing cause of the urban housing problem today.

Generally speaking, this mass housing approach tends to give one the impression that every urban citizen in China has very identical living space and condition, each has a very similar apartment. However, the reality is just the opposite. Since the 1950s - when the state government had successfully reallocated urban housing, and to a certain degree equalized the living conditions, a new kind of inequality of living conditions began to emerge in urban China. This inequality is mainly created by the unequal housing distribution system.

With the market mechanism removed, the new housing allocation system relied exclusively on the administrative system, which means two types of organizations. One is the workplace - such as a factory or a school, and the other is the local city housing office. Ideally, the workplaces will be responsible for housing their employees, while local city housing offices will be responsible for those who either do not belong to any workplaces, or their workplaces are too small to build housing. Under this process, it seems that every urban citizen could expect to get housing from some
appropriate institutions, like the other social services that are available.

However, the result is unfortunately very different. In a workplace system, there are a lot of workplaces which could not afford to build housing for their employees due to the unequal political and economic framework. In brief, only state-owned workplaces receive the state housing investment, while most collectively-owned workplaces could not get any investment from the state. Furthermore, among the state-owned workplaces, the productive workplaces, which directly produce profit, received the most state housing investment. <9>

As a result, a lot of workplaces are left out of this distribution system. For example, in Chengdu, about 2,000 workplaces (about 15% of total workplaces) built housing during 1979 - 83, while the rest of the workplaces (85%) were not funded and could not build housing.<10>

The city housing office, a local municipal agency, also received very little state investment. In addition, under the low rent policy, the large amount of existing housing stock increased the financial constraints for the city housing office. On the other hand, the target population is very large, and together with the people who are left out of the workplace system, it seems hopeless for the city housing office to fulfill its commitment.

The only thing the city housing office can do in terms of housing construction is to collect investment from many different workplaces, and develop some large housing projects
by using city owned land and construction forces. These new housing projects helped the city housing office to reduce the pressure from both the city government and the public.

As we see, this approach will not reduce the housing problem meaningfully. Rather it will reinforce the housing shortage and inequality problem, since the workplaces joined in the project are the ones who already shared the state housing investment. In other words, the people who are left out of the workplace system are also left out of the city housing office system.

With this unequal housing distribution system and the rigid housing production system, it is not difficult to imagine what the result would be.-- an explosive housing problem in urban China today. And housing is becoming the overwhelming social issue in urban China.

3. Problems and Response

The result of the urban housing policy with these two contradictions is quite obvious. By 1978, after the Cultural Revolution period was over, the urban housing situation reached a very serious stage. The national average urban living space dropped from 4.5 square meter per person in 1949 to only 3.6 square meter per person in 1978. It was estimated that about 35.79% of the urban households lacked housing in China.<11>

The direct response from the government was to increase the state investment. Since 1979, the urban housing sector has
received an increasingly large share of the total capital construction budget. According to the China's Statistical YearBook, 1981,<12> the proportion of total capital construction funds allocated to the urban housing sector has shown a significant increase, as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>% of total capital construction funds allocated to urban housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>6.1</td>
</tr>
<tr>
<td>1977</td>
<td>6.9</td>
</tr>
<tr>
<td>1978</td>
<td>7.8</td>
</tr>
<tr>
<td>1979</td>
<td>14.8</td>
</tr>
<tr>
<td>1980</td>
<td>20.0</td>
</tr>
<tr>
<td>1981</td>
<td>25.5</td>
</tr>
</tbody>
</table>

The government's intention is clear, the large increase in the state investment would help them to reduce and solve the urban housing's shortage problem.

However, the result is not so encouraging. For example, in Beijing, although the average living condition has been raised from 4.55 square meter per person in 1978 to 5.38 square meter per person in 1983, the number of "households with housing difficulties" still remained at the 1978 level. In fact, the actual number has increased from 216,800 households to 276,000 households. Furthermore, the inequality of living condition has also increased during the same period.
Also in Beijing in 1983, about 21% of the total households have a living space below 4 square meter per person, while at the same time 17% of the city's households' have above 8 square meter per person.<13> What does this mean? Increased housing construction did not reach those people who needed it most. Instead, it enhanced a segment of urban population who were already better.

From the above, we have seen that the housing problem is not only caused by economic constraints, but by the way that housing is being produced and distributed. To only temporarily increase the investment without changing the housing policy and the housing distribution system would not solve the housing problem.

If we look more closely, we will find that all the new housing construction took place around the city periphery. A lot of farmland was developed for huge housing projects. The mass housing began to spread into all directions along with city expansion, while the old neighborhoods and their residents are ignored.

As most of these residents work in small or collectively-owned workplaces, which are already left out of the current housing distribution system, it is not surprising to know that a quite large percentage of households with housing difficulties comes from the old residential areas. For example, in Shanghai, more than 60% of the households with housing difficulties live in the old neighborhoods.<14> For those residents, not only do they live below the average
living standard, but they also suffer from deteriorated building conditions.

The government's response to this issue is very slow. In Beijing, in past eight years, only 1.94% of the housing investment went to housing renovation.<sup>15</sup> In other words, the needs of those old residential areas residents are largely ignored. Since it is these residents who need the housing most, the slow housing renovation process partly explains why the current increase in housing investment fails to effectively respond to the current housing shortage and inequality problem.

It is clear that one of the keys to resolving the urban housing problem is to successfully develop a new approach to renovate the old residential area. With a more appropriate housing renovation process, more and more old urban housing could be quickly and economically renovated, which will directly improve the living conditions for those local residents. As a result of benefiting such a large group of people, the new housing demands could be reduced. And the degree of overall the housing shortage and housing inequality problem could also be reduced accordingly. In addition, from exploring alternative ways for housing renovation, some new housing production and distribution models could be created.

With the understanding of the background and significance of this subject, we now move to the central focus of the thesis - the urban housing renovation.
Chapter 3. Fa Hua Shi District
- A Typical Old Residential Community

1. Introduction

In this chapter, we will look much more closely at one old residential neighborhood. We will find out the problems of current housing condition, and how these issues relate to the overall urban housing framework; what the consequences of these problems are; and what potential resources are available in the local community, which are crucial for future interventions. It is hoped that a clear understanding of these problems and the nature of the subject area will facilitate a search for an alternative process in the following chapters.

There are two points I want to make before going into this case study. One is about the limitation of this study, the other is about the available information.

In terms of the limitations of the study, due to the initial intention for this research, the scope of the study will be focused on those old one-story courtyard houses. In other words, this study will not cover some old central districts in large cities, where major land-use changes and the high intensity development are expected. Instead it is intended to focus on the traditional residential neighborhoods in most middle-sized and small cities, where future development will be less intensified.

However, the site I choose is Fa Hua Shi District in Beijing, one of the largest city in China, due to available reports and articles. Inspite of these available
information, it is still difficult to give a complete picture, particularly some important issues that most old residential areas share. Therefore, I will use some information and examples from different neighborhood but with similar conditions in order to highlight some important issues. I think it will not make a lot of difference because of the identical nature of these kinds of old communities, and the demonstrative nature of this study.

In addition, the Fa Hua Shi district, located in the southern part of old Beijing, is one of the 29 districts with "bad building condition" designated by the city government in the late 70s. <Fig.3-1> The over-crowded living situation and the deteriorated building condition have already reached a very serious stage in this area. To choose this district as a case study and to develop some alternative solutions for improving the neighborhood will have a significant meaning to the issue of urban housing renovation as a whole.

As an old army settlement in the Qing Dynasty, the Fa Hua Shi district was located in a much less populated area in the south of old Beijing. During the end of the last century and the first half of this century, many refugees and migrants flowed into the city because of continuous wars and natural disasters in the nearby provinces. As a result, this area had been developed into a quite populated residential district.

Accordingly, the built environment reflected the same status of the area. Unlike many courtyard houses in the inner city where many rich and middle-income people lived, the
[ Fig.2-1 ]

The location of the Fa Hua Shi District in the city of Beijing. And the existing plan of Fa Hua Shi District.
courtyard houses here were much smaller in size and poorer in condition. In addition, instead of being owned by one family, most courtyard houses were shared by several families. But, it is still one part of old Beijing with its old image, scale, color and structure of the environment.

After 1949 -- the liberation of Beijing, the new government began to establish a new social order under which, the social evil, slums and poverty were eradicated. In the early 50s, in the Fa Hua Shi district, the streets were paved; the sewerage and water supply system were constructed; bad housing were repaired and other facilities were added. As a result, the environmental quality was changed greatly along with the improvement of residents' life. However, the housing condition was still remained the same as before, except for some minor repairs and renovations.

Since 1950s, after most people's basic needs were satisfied and a new social order was established, the new government began to focus on economic development. In this process, the major emphasis was put on the productive sector; and the non-productive sector, including housing, lagged behind. Under this social and economic situation, there was less and less investment available for the city housing office to renovate the old residential neighborhoods except for small repairs and routine maintenance.

On the other hand, the population of the Fa Hua Shi district had increased greatly during the same time. Without birth control in the 50s, many households tended to have large
families, on the average about 3-5 children per family. As a result, the living condition was getting worse and worse. Particularly, starting from the late 70s and early the 80s, with most of the second generation getting married and having children, the housing situation in the Fa Hua Shi district has reached the crisis stage. Next, let us examine more closely the housing situation in this area.

2. Housing Situation in Fa Hua Shi District

The housing situation in Fa Hua Shi district could be accurately described by two words - over-crowding and deterioration. It is the seriousness of the housing situation that brings out the housing renovation issue. In order to address the issue of housing renovation, it is important to understand what the actual situation is, and what the direct causes and the implications are in this neighborhood.

a. over-crowding

Over-crowding of living space is a very common phenomenon in this area. Statistically, with only 4951 square meter of old housing in this district, there are about 1,251 local residents. That means the average living space is only 3.67 square meter per person, which is much lower than the city average of 5.38 square meter per person (1983). In some courtyards the average living space drops to 2.18 square meter per person.<2>

This extremely tight living condition directly affects the people's daily life and causes a lot of negative
consequences. As a 4-5 members family live, eat, study and sleep in one room, conflicts and inconvenience are unavoidable. In some families, to make bed from the table every night is not an easy task. In some families, three adult brothers have to sleep on one bed. Maybe the more critical issue for the local residents is that many young people could not get married because they do not have separate rooms.

For Chinese parents, to arrange the children's marriage is a very important commitment in their life. In order to help the children get married, the parents would try whatever they could. In some families, the already crowded room is cut into two; the parents might live in the smaller and darker one and let their son have a separate room to receive the bride. In some other families, the parents even move out and stay separately at workplace dormitories or at relatives' homes to let their children get married. It is said that only "divorcing" the parent could the children get married.<3>

This over-crowded living condition also has its negative implications on the children's education. In those over-crowded rooms, the children do not have enough space to study; the education level of the district is much lower than the city's average level. According to a survey, there is almost no college student, and only a very small number of high school students.<4>

The direct reason of this ever decreasing living condition comes from the increasing population in this area. For example, Mr. Zhang Feng-kuei, who is an old resident in
number 36 courtyard of Ying Fang Hutong, was a drummer in the old days. He was married in the late 40s. After 1949, he worked in a small shop. During the 50s and 60s, he had six children, four sons and two daughters. The living condition had constantly decreased until the early 70s, when his eldest son and daughter went to live in the countryside.<Fig.3-2.>

However, since late 70s, when his eldest son and daughter came back and got married and had their babies, the living condition started to drop again. Now his three sons are married and all stay at home - in the temporary sheds built by
themselves. As a result the living condition dropped below 2 square meter per person, even though his family income has reached 100 yuan per person. Now his youngest son is also getting married soon, the housing problem is inevitably a headache for him <Fig.3-3>.

Looking at the whole district, this trend is also revealing. From 1979 to 1983, the newly married couples increased by 23 % (from 214 couples to 264 couples). Among the 94 new person in the area, 86 are new babies. <5> As we see, the ever increasing young married couples and their babies directly contributed to the housing over-crowding in this neighborhood.

In addition to the increasing population, the current housing distribution system also contributed to this problem. Because most of local person work in small or collectively-owned workplaces, it seems hopeless for them to get housing from their workplaces. In this neighborhood, only 3.2 % of the people work in state-owned workplaces, while the rest (96.8%) work in collectively-owned workplaces.<6> Therefore, for most local residents, the only hope they hold is to wait for housing renovation from the city housing office.

b. deterioration

If housing over-crowding is the major issue concerning the housing problem, then, the deteriorating building condition intensifies the already explosive housing situation.

The poor building condition is can be seen from two aspects: (1) the deteriorated and dangerous building structure
and the shabby image; (2) the unhealthy environmental condition, including poor ventilation, lighting and infrastructure condition.

(1). Built 50 or 70 years ago and lacked appropriate continuous maintenance, most courtyard houses in this district are in very bad condition now. Many wooden structures had rotten away; the brick wall was broken; many buildings leak during the rainy season, which leads to a very humid and unhealthy environment for the dwellers. The furniture were mildewed and rotted. Some residents complained that their winter clothes had to be stored in relatives' homes, not to mention new furniture.<7>

One housewife mentioned that " during heavy rain the floor are drenched and the stove has to be moved on to the bed to make the meals." <8>

Among all the consequences of the deteriorated building structure, safety becomes the most critical concern from both the users' and the city housing office's points of view. In fact, it was an accident of 1972 that brought the government attention to the housing renovation issue.

In the summer of 1972, a series of big storms in Beijing caused 4,000 houses to collapse and killed 3 people and wounded 400 people.<9> When the city housing office realized the seriousness of this issue and wanted to largely improve the situation by carrying out the urban re-development plan, the limited investment greatly hampered their efforts. From 1974 to 83, only about 200,000 square meter of old housing
have been renovated, which is only 0.8% of the total old housing from "29 redevelopment districts" (2,470,000 square meter). It is estimated by some Chinese planners that with such a speed, the renovation of all the 29 districts would take more than 200 years to finish. <10> Under this situation, the only thing that the city housing office can do is to ensure the safety of the building structure and to wait for future renovation actions.

Another concern comes from the city government. Along with urban development and tourist booming, more and more of these old residential areas are exposed to foreigners. To show these slum-like areas to foreigners is unacceptable by the government. As one Chinese planner pointed out: "a lot of these shabby old housing areas are located along the second ring road of Beijing. If Beijing is a window to display new China's achievement, then these deteriorated housing would also possess a corner of this window. When our friends are sitting inside their car running along the modern highway, they are looking over these old houses; what a disappointed feeling they would have! " <11>

For the government, to let the outsiders see these deteriorated housing would lead to the impression that there still are slums in the city, which will bitterly discount the government's achievement in wiping out slums and poverty. Based on this concern, some old areas closer to the major streets or tourist spot were renovated first, even though the building condition of these areas might be better than the
others. That further created discontents among those residents who were left out. In a letter to the municipal government, residents argued, "What we need is to solve our problem, to improve our difficult situation no matter how much it is, so we can have a better rest after work. Less highrise tower could be built; less 'skin building' (buildings along main street) could be built."<12>

(2) When the building safety and image draw much concerns of the city governemnt, there is relatively less concern or action about the environment quality inside these old buildings, which, however, has more effects on people's lives. Ironically, the deteriorated lighting and ventilation conditions, to a certain extent, are created by the dwellers themselves in the process of fighting overcrowding.

The courtyard house, which used to have a large open space in the center, is now filled out by many temporary sheds; these small sheds are used as additional spaces for those over-crowded families. The courtyard becomes a narrow corridor winding through these different structures. Many of these sheds directly block the light and the ventilation of the existing building. In No. 36 courtyard Yin Fang Hutong, the building density (the ratio of open space vs. total site) increases from 42% to 77%; and as many as 32% of the rooms do not have natural light <Fig.3-4>. The thermal condition in most rooms is almost intolerable, particularly in hot summers and cold winters.

It is these residents who sacrifice their own thermal
The process of building small sheds in No.36 courtyard house of Yi Fang Hutong. We could see that most sheds have been built after 1976.

comfort in order to obtain a little more space to ease the over-crowded living condition. The question one might ask, is that of why they did not make a little more sophisticated effort to expand their space without blocking the light and ventilation. The answer to this question very much reveals the problems or difficulties behind this bad building condition.

The first factor affecting the residents' performance is the right to do so. In urban China, after more than 30 years of socialist development, private housing ownership has been constantly decreasing. In this particular district, privately-owned housing accounts for about 22 %, publicly-owned housing, which is managed by the city housing office, accounts for 62%;
and the rest belongs to some workplaces.<13>

As we see, most residents live in publicly-owned houses, therefore they are not supposed to change the building condition. Even though these temporary sheds have already violated the regulations, the city housing office tend to tolerate these situations because of such crowded living condition. To expand the space without blocking the light and ventilation means that change has to take place vertically, which obviously would not be allowed. In addition, it is also technically not feasible for many families to make efforts alone like removing roof and adding a second floor.

The second factor also has its profound impacts on whether and how the residents would spend their efforts to improve their living environment. (particularly these private house owners.) This factor comes from the strong commitment and promise of the city housing office. Believing the old houses as a symbol of backwardness, and in conflict with the socialist image, the city housing office considered that it is their responsibility to convert these old courtyard houses into new modern housing district.

Under these promises for the completely rebuilding, the local residents would naturally wait for the government's redevelopment program. As a result, any permanent renovation efforts, both public and private, have been largely discouraged.

In summary, the housing problems in terms of congestion and deterioration in this area were created by a series of
housing policies and the urban housing institutional framework. Under these systems, the government holds full responsibility and commitment to renovate these old areas and discourage individual residents to act by themselves. On the other hand, the very systems and policies are incapable of, economically and technically, producing possible solutions which could critically improve the current situation.

3. The hidden picture of the community

It is the problems of the old residential area that firstly draw much of attention from the city planners and architects; however, they become the only concern in the current housing renovation process. To the planners and designers, the old residential neighborhood is nothing but deteriorated structures. The major objective of the renovation, therefore, is to clear out these old structures and rebuild new housing.

As a result, in many renovation projects, the old neighborhood is wiped out completely and is replaced by many new apartment housing -- multi-story and highrise buildings; and the existing neighborhood relationship was also disintegrated. In this process, there is little concern for the living community -- its people and its environment. Therefore, I would like to bring out this ignored picture of this old neighborhood to see what kind of qualities are of this hidden picture, and how important they are to the local residents. In fact, to recognize these ignored qualities is
one important step toward preserving these qualities. This
hidden picture will be revealed from two different sides, the
physical environment side -- the sense of the place, and the
social life side--the sense of the community.

a. the sense of the place

The sense of the place in these old residential areas has
much to do with the traditional courtyard house environment.
As a quite sophisticated house form in traditional Chinese
Architecture, the courtyard house was an ideal environment for
Chinese families for centuries. It was well-suited with the
old extended family structure. Even today, although the
courtyard house is no longer occupied by one family, and the
life style of the residents has changed to a certain degree,
the courtyard environment still suits the residents' daily
life. In this respect the private open space - the courtyard
plays an important role.

The courtyard, which allows a generous penetration of
sunlight and fresh air while maintaining a constant connection
to the street, is considered, from many aspects, "a living
room" for the dwellers within. The people in the courtyard
house spend much of their time and energy to decorate and fix
this "living room." The special brick pavement was made and
the elaborated arcades were created along the surrounding
buildings to form a comfortable setting for various purposes.
The flowers and fruit trees were often planted in the small
yard to bring the nature into the private world, which is very
important for Chinese people's daily life <Fig.3-5>.

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In this private or semi-private open space, many daily activities take place. The guests are greeted in the courtyard; the children safely play in the courtyard; the old people chat in the courtyard. In other words, the courtyard is the center stage of people's daily life.

Since 1949, the courtyard is getting even more important, because along with the increasing over-crowding, there are more and more daily activities moving from the crowded rooms to the relatively spacious courtyard. The additional activities like food preparing, eating, washing and drying the clothes are often found in today's courtyards, through which, the daily news is exchanged and the close neighboring relationship is established. The courtyard becomes an inseparable part of the people's living environment.

If the courtyard contributes very much to people's private life, then, the hutong - small streets organizing all
The private courtyard house has a close relationship with the public hutong through the gate in between. The courtyard houses, is being utilized as a community living room. Hutong, with the narrow space defined by the high walls of courtyards, is very vital for the community. Many different kinds of daily needs and services are organized either around the entrances of a hutong or located inside it. These services bring local residents together; bring a lot of information together; and bring various aspects of the society together. The life of the hutong itself is a small world, very much reflecting the life of the society.<14> While the gates of courtyard houses along the narrow hutong, however, provide "a window to the world" <Fig.3-6>.

Perhaps the more important character of these courtyard houses is the flexible nature for change. Courtyard house, with its wall surrounding, can accommodate easily changes inside it. For example, additional rooms could be constructed to accommodate the visiting grandparents; the smaller courtyard could be divided for married sons, etc. All these activities
would not disturb the neighboring courtyards. Other more big interventions, like rebuilding the courtyard houses or expanding the existing one were also found in the old days, when the ownership of courtyard house changed hands or the condition of the house was unsuitable for the users.

However, this flexible nature for growth is very much interrelated with the relatively decentralized control of housing in the old days. In other words, the real flexible growth of the courtyard house is determined by the fact that whether or not an user holds the direct control over the same courtyard. Since 1949, more and more old houses are being placed under public control, which is much more centralized than previous one. For many old houses, whether to renovate or to rebuild a deteriorated old courtyard house becomes a government's decision. Given the current government's policy and attitudes towards these old residential areas, it is not difficult to understand the reason why the old area keeps deteriorating without much improvements.

When there is little actions from the government, the local residents tend to make more "temporary actions" in order to cope with the extreme tight living conditions, the increasing small sheds clearly illustrated this situation. As a result, the once spacious and important courtyards filled out with small sheds and became narrow corridor. And many charming characters of the courtyard we just saw are becoming less and less visible. And many daily activities once took place in the courtyard have been greatly hampered <Fig.3-7>.
Under the current condition of overcrowding and deterioration, the courtyard no longer exists; the people's daily life is affected.

Therefore, the issue of housing renovation not only is to renovate the physical condition and improve the living environment, but it is more important to renovate the housing process and the institutional framework behind the physical facade. It is hoped that through this new intervention, the traditional housing process could be recreated, so could the valuable characters of these courtyard houses.
b. the sense of the community

In these kinds of old residential neighborhoods, not only is the traditional built environment very important for the local residents, but also, maybe more importantly, is the strong sense of the community, which affects very much their daily lives. In this neighborhood, for example, the mutual concern and assistance are the common phenomena. Although there is not much studies done about this particular issue, a lot of stories from the films, novels, and personal experience vividly show this important character. Here are some stories told by several residents about this issue.

"There is a lot of exchanges of mutual favors in this neighborhood, neighbors help each other buy vegetables, grains and the like. If one had a neighbor working in a pork store, he would help one get pork. ... The policeman (who lives next door) helps a lot of people to get bycycles which are hard to come by. It is said that he had a friend working in one of the department stores. When my brother comes back from Hainan Island, he would always bring lots of salted fish with him for all the neighbors who want to buy some from him, and to those with whom we were closest, he just gives them some."<15>

"In my courtyard, the neighbors watch the fire in the stove for you, unlock the door for your child, and even if you have to go to the countryside for two days on business, they would watch your child when you are gone."<16>

As we can see, this sense of the community developed through a fairly long time of living together, is an
invaluable asset for the local residents, particularly for those who spend most time at home like the old people and younger kids. However, this close neighbors relation is very difficult to find in the new residential neighborhoods, specifically the new apartment buildings. Without many shared spaces and facilities, the new apartment doors close tightly. There is very little communication among the neighbors. As one study indicates that 70% of the residents who live in new housing projects do not know their neighbors, not to mention mutual help and care.<17>

There are two basic factors contributing to this phenomena. One is time. People from the old neighborhood have lived together much longer than those in the new housing projects. During this long period of time, many activities organized by the neighborhood committee and small groups, like sweeping streets, meeting for public announcements, have helped to bring many neighbors together, and a strong neighborhood relationship was developed.

The other factor is that there are much more informal interactions in the old neighborhood, which is essential for creating a sense of the community. This intense communication is partly because of many shared facilities and partly because of the nature of the courtyard house environment. With these shared spaces, like the courtyard and the hutong, the residents can easily develop the interpersonal relations with their neighbors through many routine activities, such as cooking, eating, chatting and children rearing, etc.
These mutual concern and help, however, are not limited only to small favors. In some occasions, they extend into some larger tasks such as the building construction, which has a lot to do with the housing renovation process. Several events in the past clearly illustrate this possibility. One is the work of digging the air-raid trenches during the cultural revolution. At that time, each family is assigned the portion of trenches which is located within the district. The other is the work of building earthquake shelters after Tang San earthquake (a city to the north of Beijing).

In these two incidents, the work was organized by the neighborhood organizations and was carried out by all residents. The mutual help among the neighbors for finishing these task is the common case in this community. As we see, just like the rural sector, the momentum of self-help still exists in these old urban neighborhoods, which are important human resources for any housing renovation process.<18>

4. the conceptual framework of the new approach - a summary

From the above description and analysis, we have seen that the housing situation in this neighborhood is becoming too serious to ignore. The problem here is not just over-crowding or deterioration but rather the social implications. The poor education performance and the unhealthy environment are already the common character of these neighborhoods. Living in this kind of environment, the local residents are very frustrated and feel hopeless; and tensions are growing in
the neighborhoods.

On the other hand, the city housing office as the only institution responsible for housing renovation could not effectively respond to the problems. For instance, this particular neighborhood was designated as one of the "redevelopment districts" in the early 70s, and the plan and other preparation was finished in 1976. However, after almost ten years, only one apartment building was built in this district.<19>

The reasons behind this poor performance, as we already touched upon, is the current housing renovation process itself, which could be summarized in the following: (1) a centralized institution framework; (2) narrow-minded attitudes and unrealistic housing policies; and (3) standardized and centralized housing design and construction system. It is clear that a great gap exists between the current housing renovation process and the local residents' needs and concerns. A new renovation process, therefore, is in need of closing this gap.

The problems of the current renovation, however, come from both the social policy side and the physical design side. These two aspects are interrelated to each other in contributing to this slow process and unsatisfactory results. For instance, on the one hand, it is the government housing policy and centralized institutional system that set the framework for the housing design and production. In other words, the current mass housing result is, to a certain
degree, determined by the policies and institutional arrangement. On the other hand, the well established standardized and monopolized housing production system reinforced the existing housing institutional system. So, any one-sided intervention would not lead to a successful result.

Therefore, in this study, I would like to suggest interventions on both the design and the process aspects of the current housing renovation. It is hoped that in the newly designed housing renovation process, both the social concern and the environmental concern will be considered together.

In this new approach, the major issue is how to perceive housing. In the current process, urban housing is still very much considered as a social welfare and a product, which can be mass produced by the state. However, theoretically, more and more architects and planners begin to agree that housing is not just an end-product but rather a process.<20> It has much to do with people's daily life. It is the people's constant actions that concretized and finalized the living environment.

Under this conceptual framework, the user's role in the housing process will be emphasized. It is believed that a successful housing renovation lies much in the hands of the local residents. Through their individual efforts a successful renovation could be realized. In this sense, a successful renovation process, to some extent, depends on an appropriate housing production process and an appropriate design approach.
In summary, the new strategy for an alternative renovation process is: (1) localizing the renovation process by creating an intermediate institution responsible for housing renovation; (2) creating a self-financed renovation process by changing the current housing policies in terms of housing ownership, land tenure as well as the basic attitudes toward the government's role for housing; and (3) incrementalizing the building process by inventing a new design model with more respect to both the users' role in the housing process and the existing house form and conditions.
Chapter 4. Urban Housing Renovation - a design response

In the following three chapters, we are going to explore the new housing renovation process. This exploration, however, will start from the design aspect in order to respond to our initial environmental concern and to search for a more appropriate design framework for housing renovation. First, we are going to analyse the physical result of the current renovation projects to see why it caused so much environmental concern, and what kinds of qualities of the courtyard houses have been lost in the current renovation. Based on the evaluation and a systematic study of the existing courtyard house environment, a new design concept will be formulated. Then, under this new design concept, a series of design proposals will be generated with regard to the different contexts and situations as well as to the different stages of development.

1. Observation

In the previous chapters, I mentioned several times about the environmental concerns of the current housing renovation approach. Therefore, before we start the new design exploration, it seems necessary for us to know exactly what the current renovation results are, and why they caused such serious environmental concerns.

Here, I selected several renovation projects or proposals which represent the most common results of the current housing renovation efforts in urban China. The first one is a finished
housing renovation project - Qin Nian Hu district. The Qin Nian Hu project, finished in early 80s, is located in the Xuan-Wu district of Beijing. The Qin Nian Hu district is a typical housing renovation project in the city of Beijing and even across the country <fig.4-1>. The second case is the detailed renovation plan for Fa Hua Shi District made by the city housing office of Beijing. With several revised plans, this proposal demonstrates some issues and concerns that are
The proposal for renovating the Fa Hua Shi District, in Beijing.

The perspective drawing of the proposal for Xi Dan Nan District.
significant in the planning process of the current renovation <Fig. 4-2>. The third example, instead of being a real project, is a study proposal for the renovation of Xi Dan Nan district in southern Beijing, made by some graduate students at Qinghua University <Fig. 4-3>.

From reviewing these three projects above, we can see that although these three cases are different in terms of location and intention, the results are very similar. They are all using standardized apartment buildings to replace the existing old courtyard houses. In fact, this result is quite predictable under the current housing design and production system. However, the important issue is to know what kind of changes are made in these projects, comparing with the courtyard house environment; and what these changes mean to the local residents. These issues will be evaluated and discussed from three different levels according to the physical scale of the new housing environment: (1) the apartment unit; (2) the apartment building; and (3) the housing district.

a. the apartment unit

We first start from the lowest level of the new housing environment - an apartment unit, which is occupied by a family <fig. 4-4>. Obviously, the living standard in the new apartment unit has been much improved. The private and modern kitchen and bathroom are much more convenient than the shared ones in the courtyard houses. The living space has been increased dramatically from less than 4 square meter per
person to above 10 square meter per person.<1> In general, the living condition in the new apartment housing has greatly improved.

However, this high standard renovation has its tradeoffs. The higher cost for these projects means a slower process of renovating the existing old residential areas. On the other hand, the higher housing standard does not automatically lead to a better quality of the living environment.

Compared with the courtyard house, the major difference in the new housing unit is that the quiet and private open space -- courtyard -- has disappeared. The courtyard, once an inseparable part of people's living environment linking the outside and inside, has been replaced by a very small balcony. In addition, this tiny balcony is always crowded with drying laundries, plants, television antennas and many other junks, which once are easily stored in the courtyard <fig.4-5>. As a result, the communication between the private world and the
The only open space - balcony - is crowded with vegetables, clothes and other junks.

Extra space is obtained from enclosing the balcony.

public and natural world has been greatly hampered. And many daily activities that used to take place in the courtyard could no longer be housed in the crowded balcony.

Another big difference between the courtyard house and the apartment unit is the adaptability for change. In the courtyard house, the adaptability for change is quite visible. One can easily change partition within the building structure to re-arrange the interior space, and can also add more spaces in the courtyard. While in the new apartment unit, this kind of adaptability seems to be very little. With the fixed
concrete wall and high raised floors, there is not much room for dwellers to change, except for the small balcony. In many new housing projects, we could see that many balconies are even enclosed to provide precious additional interior space, since moving to a larger apartment is usually impossible. These enclosures, as a result, cut off the only direct access to sunlight and fresh air, as well as the link between the inside and the outside.

b. the apartment building level

The second major difference between the courtyard house and the new housing is the level or the scale of physical intervention. The apartment building, as a basic element of the new housing environment, represents the scale of physical intervention in the new housing environment. In the old residential area, the scale of physical intervention is the courtyard house, which is much smaller than the apartment building.

The change of the scale of intervention from the old courtyard house unit to the apartment building unit is quite obvious. In the courtyard house environment each courtyard house unit has only to do with one or at most several families. The building is a one-story structure, which means people could easily intervene by themselves. While in the new mass housing, this level of intervention has been changed to an apartment building level, which relates to more families (30 to 50 households in general). In addition, unlike old courtyard houses, the new apartment building is a multi-story
The apartment building is the basic unit of new housing environment. Because of this larger scale of intervention with much more users involved and much more complicated construction applied, the control of the new housing process tends to be centralized, which has two serious impacts on the current renovation process and renovation results.

The first issue is the flexibility of the newly built environment. As we mentioned before that the courtyard house has more flexibility for change and growth, because of its small scale and decentralized control. In contrast, the new housing environment is very difficult to change. With the centralized control, prefabricated building components and the large scale of
construction, it has become a very rigid system, which could not respond to the changing needs of the dwellers's life style and family growth. For example, in the Qin Nian Hu project, after only three years moving into the new apartments, the living standard of most households has already decreased due to growing family size. For some households, the new housing problem is so serious that they even built the temporary sheds again outside the building to accommodate the changing needs.<2>

The second issue is the high cost of renovation. With a large scale of intervention, to build any new apartment building means have the destruction of more courtyard houses first. Furthermore, with the industrialized building construction system, more steel, cement and building machinery are needed, which leads to a much higher construction cost. Some Chinese architects estimated that the cost for a six-story walkup apartment building can be doubled for a one- to two-story brick structure.<3> High cost is one of the crucial factor affecting the current renovation process.

c. the housing district level

In the overall environment level, the difference between the new mass housing environment and old courtyard house environment is even greater by simply looking at the morphological maps of these two different environments <Fig.4-8>.

As we can see, in the new housing environment, the once clear hierarchical and inward built environment is replaced
The contrast between the old environment and the current mass housing environment.

They are the existing situation of the Fa Hua Shi District, and the proposed plan for the same area.

[Fig. 4-8.]
by the monotonous concrete blocks sitting on large empty open space. This result first brought a lot of attentions from outside architects and planners.<4> They are very worried about that the traditional environment is being destroyed under the current urban housing renovation. The once narrow and intimate space is replaced by senseless openness; and the once intimate scale built environment with clear identification is replaced by the repetitive mass housing. In general, the sense of the place in the old residential area has disappeared in the current renovation process.

The change of the physical settings, to a certain degree, has also affected a lot on the community life in the new housing district. As we have discussed before, the sense of the community, to a large extent, is created by the informal communication among the local residents through various daily activities. The physical setting, in this respect, facilitates these formal or informal communications by providing the shared space with appropriate scale and territory.

While in the new housing environment, not only is there no shared open space within the apartment building, but also there is no appropriate outside space for adults to meet and children to play. Although some open space is designed to be the green space for community use, the lack of financial support and local residents' care (the public space is supposed to be controlled and managed by local city housing office.) means that these spaces always turn out to be no-man's land <Fig.4-9>. 

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In the renovated neighborhood, the once close neighbors within the courtyard houses were displaced spatially in the new housing environment. Although these neighbors still could visit one another, the mutual help and daily communication is no longer possible in the apartment buildings. As a result, the once vital neighborhood life and the sense of community are greatly reduced.

Along with decline of the community life, the crime rate is getting higher in the new housing projects, particularly
for those residents who feel much less secure by living on the first floor.<5> As a result, many spontaneous actions were adopted by the people to deal with this issue, such as locking the windows, blocking the balconies with bricks and even putting fences to create small yard outside their apartments to give themselves some feeling of security.

For example, in Qinghua University residential area where the author used to live, just after people moved in, many fences or walls were built by the first floor families to form many small courtyards. Together with these small courtyards, flowers and trees are growing up; the environment has changed. But these changes only happened in the private courtyards, beyond the fence, the planned public green space has remained empty after people moved in for five years <Fig.4-10>. In the case of Qin Nian Hu district, even the residents living in upper floors joined the process of "courtyard building", in order to either expand the living space as we mentioned, or to obtain the private open space. These actions totally changed the original site plan made by planners <Fig.4-11>.

Although these results, particularly the Qin Nian Hu case, do not please the planners and architects, they vividly illustrate what the local residents want for their outside environment and what the new housing environment has failed to provide.<6> They want private open space - a courtyard; they want a more flexible environment, which they could act on to cope with family growth; and they want a more vital public space with a clear boundary from the private world.
Fig. 4-10.
A sketch of the Qinghua residential area.

Fig. 4-11.
The pictures and floor plan of "new construction" in the Qing Nian Hu District.
From the above discussion, we could see that although building condition and living space are improved after the housing renovation, the environmental quality of the new mass housing is far from satisfactory. With the elimination of the private courtyard and increased the scale of intervention, the new housing environment has become a less flexible system, under which the natural relationship between people and the living environment no longer exists. In short, the sense of place, together with the sense of community of the old residential neighborhood, has been lost in the current renovation process.

During the process of reviewing the current renovation projects, one question I have kept asking myself is: Are there any alternative ways of urban housing renovation, which could improve the current environmental conditions in the old neighborhood and could also retain the sense of place and the sense of the community?

With this question in mind, a systematic study on the existing courtyard house environment is conducted by the author under the instruction of Professor John Habraken to explore the nature of courtyard houses and to have a better understanding of the character of courtyard house.

From these studies, an important character of the courtyard house is discovered, which indicates that the importance of the Chinese courtyard house is not how the buildings are arranged within the walled lot but rather is the walled lot itself. The walled lot of the courtyard house
clearly defines the relationship between the public and the private. In the walled lot, all the decisions are made by the people who live inside. People could search for a more appropriate environment for their lives and styles; while public interventions will stop outside the wall. In this kind of housing system, the renovation is a continuous effort and takes place in an incremental way according to each family's changing needs. In other words, it seems that there is no need for the current kind of renovation at all.

But because of more and more old housing under public control after 1949, this natural relationship has been broken. The courtyard house is no longer a living environment for one family; and the residents no longer have complete power to change their immediate environment even within the walled lot. The living condition, therefore, has been deteriorating.

However, the situation does not mean that the courtyard house as a house form is out of date and should be discarded. In fact, if we look at the rural farmers' houses, the courtyard houses are still being widely used in recent new construction <fig.4-12>. The question here is not which type of house is better; instead it is the question of how much control people should have over their living environment. In farmers' houses, as the dwellers have full control, the environmental result is obvious - much more encouraging and much more diverse than the new urban housing.<8>

Based on the above recognition of the merits of the courtyard house, an idea for an alternative housing renovation
Fig. 4-12.

A typical new farmhouse, in which the courtyard is still the center of the living environment.

Fig. 4-13.

The basic idea for new design intervention is to remain and transform the existing courtyard house environment.
process has emerged which is to recreate the condition for the growth of natural relationship between the people and the physical environment. It is hoped that under this new framework, the existing housing environment could be improved and the cultural continuity could be maintained.

In more specific terms, the idea for an alternative approach is (1) to use the courtyard house as a basic unit for intervention (either infill or rebuild); (2) to cooperate with dwellers and to incrementally improve the living condition in each courtyard house; and (3) to develop a new design framework to guide step by step the housing renovation process in the neighborhood. This basic idea is clearly illustrated in the following diagrams <Fig.4-13>.

2. exploration

Starting from this new concept, the actual design exploration is carried out along the process of thematic design. The thematic design is a new design approach with both the theoretical recognition of the built environment and the systemic design process. The basic assumption of this approach is that there are certain systemic rules from which the actual built environment formulates. One objective of the thematic design, therefore, is to look for the "theme" of the built environment and articulate the rules behind in order to develop more appropriate design framework, under which local residents could participate in the design process, and a more appropriate living environment be achieved.

Following the same line, the alternative design process is
being developed. In this process, the theme of the courtyard house has been reviewed and explored, some new rules or requirements are added in order to adapt to the current situation; and a series of new design proposals have come out from the process of design exploration.

However, the significance of the new design approach is not only because of the design proposals but also of the process of design itself. Therefore, the illustrated design proposals and studies are arranged in such a way that the sequence of design exploration will be revealed. The sequence could be divided into three stages.

The design approach starts from exploring the theme of the courtyard houses. In this level, the walled lot, with its size, scale and capacity for change, and the nature and function of the private open space - courtyard, will be carefully studied. And the issues like privacy, growth, and lighting, etc., will be raised and discussed.

After that, the focus of the study is going to move downward, to the smaller lot level within a courtyard house. At this stage, the focus is to improve the current living condition by exploring the dimension and the position of the smaller lot. In fact, with a better understanding of the capacity of these smaller lots, better proposals could be developed on the courtyard house level.

When we have a better knowledge about the scope and the possibility of renovating these courtyard houses, the whole neighborhood environment becomes the issue in the design process.
In other words, the emphasis this time is on the neighborhood level. In this stage, the quality of public space and public facilities, and the relationship between the public space and the private courtyard houses are the major concerns. Again, the exploration on the higher level will also provide a better understanding on how to intervene at the courtyard house level.

The relationships of these three stages in the design process are illustrated in the following diagram. Under this design process, a new environmental system would emerge, which on the one hand would improve the current living condition in the old residential areas, and on the other hand, would retain and even enhance the sense of place and the sense of the community. Next let us move stage by stage to see the whole design process.
STAGE ONE: EXPLORATION ON THEME

First, we will look at some existing typical courtyard houses in that area.

Several buildings are being selected and drawn in the plan in order to find the shared theme of these courtyard houses.

Courtyard house A is the most common type in the area. This house contains 4 households and 13 persons. Most additional buildings are kitchen. There is no private bathroom in this courtyard house.

Courtyard house B is similar to courtyard house A, but with increased depth. The front buildings, used to be shops, are now enclosed for residential uses.

Courtyard house C has grown to a two-stories structure, which shows one way to increase the density on existing courtyard houses.
Here, we are going to summarize the essential character of the courtyard house environment.

A. The scale of the courtyard house is relative small. With each courtyard house as one unit of the organization, the whole environment is intimate and also flexible.

B. Inward is another important character of courtyard house, which gives a quiet open space for people’s daily life.

C. The courtyard house is also the source of light and ventilation, which means each courtyard house doesn’t need to have openings toward the outside. This nature help to achieve high density in the courtyard house environment.

D. The courtyard with some families living together, serves as a semi private space, which creates a hierarchical levels between the private and public worlds.
The new design idea is to increase the density of the existing courtyard houses by keeping them at the same scale. Each courtyard house will be the unit for intervention.

Based on this strategy, we begin to generate some new proposals for renovating the old courtyard house. The new proposals are based on existing structures. In other words, the boundary of the current courtyard house will be the basis for new intervention.
This first round of proposal is trying to imitate the current courtyard house form, with buildings surrounding the middle open space.

However, the problems of privacy, ventilation and sunlight seem not to be solved in these schemes. The reason is to treat the courtyard house as it is.
In fact, the courtyard house, which is used to be housed by one family, is now housed by several families, and has already changed its nature. It seems that a new arrangement within the courtyard house is required in order to solve these problems.

This new arrangement is to divide the existing courtyard house into several small lots, which will be self-contained in terms of ventilation and light, like courtyard house used to be. It is believed that those problems will be solved by introducing this small lot concept.
In addition, the small lot could have many ways to be organized, which bring a lot of choices for the local residents.
STAGE TWO: EXPLORATION ON SMALL LOT

Now we move our studies to this lower level - the small lot - to see what its ability is, and what the relationship is with the courtyard house.

The small lot is a unit for one family. Unlike the new apartment house, in the small lot, each family will have a private courtyard. And the new living standard of the new apartment unit, with private kitchen and bathroom, will be the basic requirement for the small lot.

However, the dimension of the courtyard house, and the relation and dimension of the built and open areas will determine the variations of the small lots.

For example, the one bay (< 4 m) small lot will have less variations of different small lot organizations. While two bays (> 4 m) will have more choices.
As the typical courtyard house dimension is 12 m wide, the major dimensions selected for small lots are the modual of the 12 m, which are 4 m, 6 m, 8 m, 12 m. The capacity of these dimensions is also being considered.

With this small lot concept, there are many ways to use the small lots. It could be applied with one courtyard house, it could also be applied to two courtyard houses.

This large courtyard house, with 8 - 10 families, could be used for some workplaces to accommodate their small number of employees.
Here are some examples of the small lot variations. They are self contained and have different sizes for different needs.
With those different sizes of the small lots, we could have various new plans for different courtyard houses with different sizes. It seems quite flexible to use the small lots to make different new plans.
This diagram shows the relationships between the different small lots and different courtyard house organizations.
These are two detailed illustrations of the new courtyard house floor plan. Using the same dimensions of current courtyard houses, the density and quality have been both increased.

It is hoped that through a careful study of the contexts, many more new plans could be developed to facilitate local interventions.
Having a clear understanding at the courtyard house level, we now move to a higher level - the neighborhood tissue level. The tissue of the courtyard house environment is organized by hutong (lane) and identical courtyard houses.

However, in reality, the actual organization is more irregular and more flexible. For example, two courtyard houses could be converted into one either horizontally or backwardly; The commercial buildings could also easily fit into this structure.

The idea of the new approach is to maintain this basic structure, but to improve certain aspects, such as to increase the small green spaces and community recreational facilities.

This is a sketch of a typical hutong image.
The tissue structure could be divided into three parts: the built area, the open space area and OB area.

The built area contains two regular courtyard houses with back to back. Starting from one story structure, the new courtyard house could reach a very high density with 2, 3, or 4 stories high.

The intention of this new design approach is not to maintain the courtyard house as it is, but rather to transform it into a new housing type, with a much higher density and a more intimate scale.

The dimension of open space area will be determined by the various activities. Ranging from 6 m to 12 m, it could accommodate many different functions in the neighborhood.
Based on this general framework, we begin to explore the alternative ways to organize the tissue structures. Here is only one detailed illustration of the neighborhood organization. We can see that the non-residential buildings could easily fit in the same structure.
Along with the improvement of the individual courtyard houses, a new open space could be created within the neighborhood. This new open space will be the center of the community, with beautiful gardens, and various services.

Here, we will have three levels:
1. the neighborhood level bounded by major streets.
2. residential group level with hutong and many courtyard houses.
3. the courtyard house level with some small lots and shared open space.

Although the scale of the environment is from the neighborhood to the courtyard house, the actual renovation process will start from the courtyard house and gradually move toward a whole neighborhood.
From the above, we can see a new hierarchical living environment will be emerging in the local neighborhood, which will not only improve the current conditions, but will also achieve a much better result than the current mass housing approach.
In summary, we have seen that there are basically two movements starting from the courtyard house level in this exploration process.

One is moving downward, to see how each courtyard house could be renovated. There are three steps in this movement.

The first is to decide the dimension and relation of built and open areas in the courtyard house, according to the current situation and future adaptability. The second step is to re-divide the courtyard house into small lots. The final step is to design the small lot with each household's participation.

The second movement is moving upward to the neighborhood tissue level. The first thing is to decide the built and open elements, which will set the limitations and guidelines for individual intervention.
Then, various neighborhood plans could be developed according to different contexts. The community-based open space and facilities, and the identical hutong groups is the major character of these plans.

The implementation of the neighborhood plans is based on the improvements of each hutong groups, in which the courtyard house is again the basic unit for intervention.

We can see that both movements will start from the courtyard house level, and also end at the courtyard house level. But each cycle will improve the previous one in terms of contents and of relation.

With these two movements finally join together, we will conclude our journey of exploration.
Chapter 5. Evaluation and Discussion - beyond the design response

As we go through these new design proposals for the housing renovation, one might ask what does the new design approach mean? Does it promise a better renovation result physically and socially? Can it achieve similar density in the current approach? Does it require more financial investment? Could the new design approach be carried out in the current housing design and implementation process? In other words, what are the implications of the new design approach?

In this chapter, these questions will be answered and discussed in detail. We will first evaluate the new design proposals and to see what the new design proposals mean for the local residents. The evaluation will be made by comparing the new proposals with the current renovation results from three different aspects: environmental, economic, and social. Then, we will discuss the implications of the new design approach for the design profession in China, from both the design concepts and the design practice. And finally, we will analyze the implications of the new design approach on the current housing renovation process, and to see the implications for the current housing institution, government housing policies and the existing housing production system.

In the following, the relationships of the design approach and its social implications will become much clearer.
An alternative and a more integrated approach for the housing renovation process will be called upon.

1. Implications on the existing neighborhood - a comparison

Will the new design approach lead to a better renovation result? This is the question one, particularly the local residents might ask, after looking at these new design proposals. In order to answer this question, here we are going to have a brief evaluation on the new design approach by comparing it with the current renovation results. We will see what the new proposal would really look like, and what it means for the local residents.

a. Environmental aspect

We begin our evaluation from the environmental aspect. As we mentioned earlier, to improve the physical environmental quality in the housing renovation process is one of the major objective of this design approach. The achievement of this aspect seems to be quite obvious as we compare the new design proposals with existing renovation projects <Fig.5-1>.

In the new design proposals, the problems of the old neighborhood, such as over-crowding, deterioration and the lack of modern facilicits will either be solved or be greatly improved. In this process, additional living space will be obtained from increasing the floors (from one-story structure to two-story structure) or re-arranging the buildings within the courtyard house. The private kitchen and bathroom would be
The comparison of two different approaches. One is the new proposal, the other is part of proposal for Fa Hua Shi District. If the new design approach resembles the current renovation projects in improving the physical conditions of the existing old neighborhood, it differs greatly from the current renovation projects in the efforts to treat and keep the traditional housing environment. As we mentioned before, most good characteristics of the existing courtyard housing environment are lost in the current renovation projects.

[Fig.5-1.] The comparison of two different approaches. One is the new proposal, the other is part of proposal for Fa Hua Shi District.
However, these problems seem to have been corrected to a certain degree by the new design approach. In the new renovation process, the structure of the existing courtyard house environment has basically remained, so have the neighborhood relationships. The private courtyard is maintained and even recreated within which the family would have a quite high adaptability for change and growth. The once vital communal spaces – Hutong and other public space -- are kept and enhanced by gradually improving the infrastructure and adding public facilities and greenery.

In general, the new design approach has the merits of both improving the current condition and maintaining the good qualities of the existing neighborhood.

b. economic aspect

The new design proposals not only have provided a better environmental result, but also cost less than the current renovation project. As we have mentioned several times, limited financial resources is one of the key factors affecting the current renovation process. The lower cost for renovation means that more families who can have their living conditions improved.

Although we do not have the full knowledge to give a detailed cost analysis of the new design proposals, we could still get a fairly clear picture by roughly comparing the cost of major items between the new design approach and the current design approach. The comparison will be focussed on the
housing construction cost between the existing design proposal for the Fa Hua Shi district and the application of new approach on the same site.

For the existing design proposal, according to the architects who made the plan, the total renovation cost will be 4.44 million yuan, and the total housing construction cost will be 3.29 million yuan. The total housing cost (3,287,000 yuan) is obtained by multiplying the unit price (182 yuan/square meter) by the total new housing floor space (18,400 square meter).<1>

For the new design proposal, the unit price will be much lower. According to some experience in the past <2> and similar renovation projects in Shanghai,<3> the unit price for one and two story brick structure is 75 - 100 yuan per square meter. In addition the initial new housing construction will be 11,477 square meter, much less than that of the current proposal. Because in the new proposal, the basic idea is to double the floor space of the existing housing, which will be 11,477 square meter. Therefore, the total housing cost will range from 0.86 - 1.15 million yuan.

As we can see, for housing construction cost alone, the new housing proposal will cost about one third of the current approach. If we consider the fact that in the new design approach, the site engineering cost, the relocation cost and the facilities cost will be all less than that of the current approach, the savings under the new proposal would be more significant.
However, the comparison of only construction cost could not give us a complete picture, since many new housing projects are intended to have a higher initial cost in order to trade for higher density and to save the cost of land and infrastructure. Therefore, in terms of economic comparison, density is another important issue.

Due to the already over-crowded situation in these old residential areas, to have a higher density design scheme will be an important factor for a successful renovation. For the new design approach, the intention is not to keep the courtyard house as it is. Instead, the intention is to transform it into a more appropriate housing type, which could better respond to the current needs with much higher density and better environmental quality. Therefore, a lot of efforts have been made to achieve high density with relatively low structure, which we have seen in previous chapter <Fig. 5-2.>

From a rough calculation of the typical new plans, we can see that the new proposal would finally reach a density of 15,000 square meter housing per hectare, which is quite close to the existing plan for the Fa Hua Shi District (16,000 square meter per hectare).<4>

However, for the new design proposal, it is still difficult to reach the density some new housing projects have. In these projects, a lot of highrise apartment buildings are used. In other words, it is the issue of density, that the new design approach could not fully compete with the current approach, particularly, the highrise buildings.
The new approach could achieve a fairly high density. This is a typical plan. The density ratio is 1.5.

site area = 22 m × 12 m = 264 m

total floor space = 396 m

density = 396 / 264 = 1.5

However, that does not necessarily mean that new approach is less applicable than the current ones.

There are basically two explanations for that. The first explanation is the uncomparable nature of these two approaches. As we mentioned earlier, this study focused on housing renovation issue, which is a very different problem from construction of new housing. It is not practical to impose the same high density of new housing in large cities in the old residential neighborhoods in middle-sized and small
cities. In other words, it is only meaningful to address the housing density issue at a city-wide level.

The second explanation comes from the current discussions on what the costs are of such a high density, and what the significance is of that approach in terms of saving farm land and infrastructure.

On the one hand, we could see that new housing construction is pushing for higher and higher density. This ever-increasing high density is achieved by paying a very high price, such as high initial cost, high maintenance cost, long construction period and negative social and environment implications.

On the other hand, if we look overall urban areas in China, we will be surprised by how inefficient the other types of urban land-usees are. Most of the schools, industries and transportation facilities are just one story high. There is also a lot of vacant land within the territories of these institutions, which is the result of the rent free urban land in China.

One survey indicates that all land for new urban housing construction in the past 30 year is less than 5% of the total farm land converted to urban development.<5> In other words, the key to saving farm land is not reducing new urban housing construction. Rather, it is to re-introduce the land rent system so that higher density industrial facilities and office buildings are developed and more farmland could be saved.
c. social aspect

The better environmental result and the lower cost of the new design approach have very positive social implications for the local residents.

Under the new design approach, the existing courtyard house environment has remained as well as the existing neighborhood relationships. The sense of the community, which is very meaningful for the local residents, could also be maintained and even enhanced through the organized efforts in the housing renovation process.

In addition, the new housing renovation process would not cause much inconvenience for the local residents, because in the new process, the courtyard house is the unit for each intervention. Each time, the renovation action only involves one or two courtyard houses and several families. The construction could take several weeks to finish. While in the current renovation projects, the unit of intervention is the apartment building, and many residents have to stay away for several years until the project is completed. This causes a lot of troubles for both the residents and the government agencies. In fact, to find temporary housing for these renovation neighborhoods is a big constraint for the current renovation efforts.

Perhaps the more significant social implication of the new design approach is its low cost for renovation, the lower the cost of renovation, the higher the number of people who can benefit from the renovation process. In addition, because
the new design approach is an incremental process, the reduced investment, then, could be further divided into many smaller parts, which could be financed by many smaller financial resources. This would have a profound implication on the current housing renovation process.

In the current situation, many residents and their small workplaces could not afford to build housing; and they are, therefore, left out in the current housing process. The new design approach opens a door for these workplaces and individual residents, which could somehow break through the current stagnation of the housing renovation process.

2. Implications for the design profession - a discussion

The new design approach could promise a better renovation result with relatively less financial constraints. However, that does not mean that such an approach will not have any confrontations with the current housing design and implementation process.

From the design point of view, the new proposals are no longer a set of conventional design solutions. In fact, these new design proposals certainly could not be the final solutions for many different courtyard houses. However, they could be a framework or a model for renovating these courtyard houses, from which more appropriate design solution could be obtained.

This change has great impacts for the current design profession in China both theoretically and practically. The
major change in the new design approach is to conceptually recognize the user's role in the housing process. As we mentioned before, in the current housing renovation process, the users are always in a very passive position. They are always being studied and calculated in order to know how many apartment units are needed.<6>

In this process, a typical user is chosen to represent many specific users. The uniqueness of each individual and the specific needs of each family are ignored in the process. For the users, they do not have much to say during the housing design process; and even after moving in, they still have no much freedom or choices to change their given environment. In fact, the exclusion of the users in the housing process, to some extent, has contributed to the housing problems today in terms of its quantity and quality.

However, to recognize the users' role in the housing process, and to let users participate in the housing process is not a new idea. This issue has been raised and discussed in the West for a long time: Suffering from mass housing problem, people began to realize that to decentralize the housing control to the local level, to give the power to the dwellers is essential for a successful housing process.<7> But this is still something new for most Chinese architects. Conceptually to consider a users' role in the design process is not very easy for many Chinese designers, since they are mostly trained to perceive housing as a finished product; and their working environment requires them to do so. This
The individual intervention needs design guidelines to control the environmental quality.

conceptual change means that the architects have to change their ways of design. Maybe that is a more critical issue, because the idea of giving more consideration to the users' role has to be carried out in the actual design process.

In the new design approach, some efforts have made in order to realize this idea in the real renovation process. For example, since the boundary of the existing courtyard house has remained, the renovation efforts will be tied to the interests of the households of each courtyard house. In addition, the smaller lot is introduced in the courtyard, within which each family will have full control over his environment. However, these local interventions will be limited under some regulations and guidelines of the neighborhood community so that individual interventions will not cause any damage to the public and neighbors <Fig.5-3>.

In other words, to study these possibilities and to help the local community to make these regulations or guidelines become the new and important task for the designers. For the designer, the task is no longer to design a final product; rather, it is to perceive housing as a process and to design
a framework under which the local communities and individual residents can participate. This not only changes the nature and the content of the designer's job, it even changes the role of the designer in the housing process.

In summary, the new design approach suggests a change for the design profession both in design concepts and in practice. This change seems to be also a very important step toward an improvement on the current housing situation in urban China.

3. Implications for the current housing process - an exploration

In order to carry out the new design approach, we will not only have to face the current conservative design professionals, but also, more critically, have to face the current housing renovation process - its institution, policies and the housing production system. It is this implementation process that is finally responsible for converting any design idea into reality. So, it is very important to know whether or not the new design process could be literally carried out under the existing housing process. If this is not possible, then, what does that mean, and what the other alternatives are.

As we mentioned before, the current housing renovation process has three basic components: the institution, the policy, and the production system.

(1) the institutional framework: The city housing office, as the only institution to deal with the housing
renovation is highly centralized but financially conditioned.

(2) the policy framework: The current government's housing policy framework still regards housing as a social welfare and excludes the users' involvement, which limited the alternative intervention in the current renovation process.

(3) the production framework: For the housing production system, the standardized housing units and building components, mass production and the centralized process management are its major characteristics.

With this implementation system, it is very difficult to imagine that the new design approach could be carried out, since the new design approach itself implies a quite different process.

For example, in the new design approach, each intervention is taking place at one courtyard house. Since the context and the local needs are very different among the courtyard houses, special attentions for renovating each courtyard house are required. The attentions include helping the local residents decide whether or not the intervention is needed; which kind of intervention is needed; and what procedure of the intervention is and how the intervention could be paid off. These special attentions seem to be very unlikely to be obtained from the existing city housing office. In addition, since the new design process is gradually implemented within the existing neighborhood, it is also very difficult for such a high level institution to stay in a local community for such a long period. In other words, for this new
renovation process, a more local institution might be more appropriate for organizing the implementation process.

For the existing housing policies, the new design approach seems also not fit very well. As we know, one central idea of the new housing process is to bring the users into the housing process. In the new design proposals, the local neighborhood, the groups of residents and each family will be given much freedom for their intervention, which is considered essential to reduce the cost and achieve a better result.

However, these interventions require the government to decentralize some controls of the housing process to the local community and even the individuals, which obviously conflict with the current government housing policies. This conflict means that the new design approach would not be accepted by the government unless the current housing policies are being changed radically.

In terms of decentralization, it seems also very difficult for the new design proposals being implemented under the current housing production system. In the new design approach, in order to give users more choices for intervention, special care is needed for each courtyard house. In this case, the current production system with the standard housing units and centralized way of construction could not be easily applied in the new renovation process. Besides, the courtyard house is too small to use only available large construction companies in urban China.

However, the conflict between the new design approach and
the current construction system does not mean that the new design approach is not in favor of the new technology or industrialization. To the contrary, the new design approach requires much more sophisticated industrialization, in order to allow the residents to get ready made components. Here, the issue is what level of standardization do we really need. The current housing construction system standardized not only the building components, but also the apartments, buildings and even a whole community, which we don't think is an appropriate way to use technology.

From the above analysis, we could see that the new design approach, to a large extent, could not fit into the current housing process. In other words, unless there is a radical change in this housing implementation process, the new design approach would not be implemented, and the current problems in housing renovation will remain.

However, this result should not be a surprise at all. From the discussion, it becomes clear that the problem concerning the current housing renovation is not only a design issue. In fact, it is the current design approach and the related housing renovation process togehter that contributed to today's housing problem. Therefore, in order to change this situation, the intervention has to be made on both the design aspect and the process behind it. In the next chapter, we are going to see whether a new housing process is possible and how it could be developed.
Ch.6. Toward a new housing renovation process

The current housing renovation process, as a well-established planning and implementation system, is based upon the existing social-political framework of the society. Therefore, the problem of the current housing renovation is the direct result of the existing political and social economic factors in today's China. In other words, changing the current highly centralized housing renovation process is a much more political than a simply design issue. Therefore, the new intervention in the housing process will not succeed unless there is also intervention in the social-political framework, which seems to be quite impossible in China until very recently.

After the Cultural Revolution, particularly since 1979, there have been a great deal of changes going on in China, which create some new conditions for exploring a new housing process. In this chapter, we are going to examine what the strategy and conditions are for a new housing process, to see how these conditions could be brought together for a new process. Secondly we will try to have a more detailed picture of the new housing renovation process by introducing the major issues and basic components of the new process. And finally we will see what the role of the design is in this new housing process, and what the relationship is between design and the new process.
1. Strategy and possibility for a new housing process

a. strategy

From the previous analysis and discussion, we have clearly seen what the problems are in the current housing renovation. It is the housing renovation process itself that is incapable of responding to the local neighborhood's needs. In this system, everything is decided by the government - the city housing office; there is very little role played by the local community and residents. As a result, on the one hand, the local residents feel hopeless and rely completely on the government's intervention; on the other hand, the city housing office, due to its highly centralized nature and limited financial resources, failed to provide quality results for the local communities. That is the major reason for the failure of the current housing renovation approach.

As Professor Tunney Lee once pointed out, "The problem here is not that architect does not outmaneuver the bureaucrats. It is that the countries of China's level of development have not developed urban democracy in their socialist state. Without democracy, there will be no decentralized system. That is essence of the problem. It is essential for Marxist and Leninist countries to develop democracy in their cities for their next stage in development.... China lacks urban democracy - in rural areas, there is tremendous amount of democracy, and the results are visible."<1>
The idea for a new housing process, therefore, is trying to change the essential nature of the current process, and to decentralize the control of the housing renovation process to the local neighborhood. If the local neighborhoods could have more direct and more appropriate control over their current situation, it is believed that local communities and residents could more effectively improve their current conditions, and the renovation result will be much better.

Around this central theme, there will be three major changes in forming a new housing process. They are: (1) localizing the institutional framework; (2) self-financing the renovation process within the neighborhood; and (3) increasing choices for actual implementation.

(1) localizing the institutional framework

As we have seen before, the current housing institution is one of the major factors that has directly contributed to the current housing renovation problems. Therefore, to decentralize the control of the housing renovation to some kind of local institutions and let them be responsible for housing renovation is one very important step toward a new housing process. Here, to localize the process means not only the creation of a new institutional framework, but also permitting more individual involvement in the housing renovation process.

(2) self-financing the renovation process

Self-financing does not mean that the whole renovation process has to be financed exclusively by the local community.
It means that the local community will be the major resources for renovation, both financial and human. The financial aid from the outside or from the city government are also important resources, but they could not be solely relied on. From past experience, to rely too much on a centralized financial support will jeopardize a successful localized institutional framework. In other words, self-financing is one of the major pre-conditions for a successful new housing renovation process.

(3) increasing the choices for implementation

Based on the above institutional and financial framework, we could expect that a great deal of renovation actions will be going on within the local neighborhood, because now they would be encouraged and have the right to do so. In order to facilitate these local actions, more choices of the production systems and ways of implementation are required for different levels of local intervention. Therefore, to increase various choices for the construction is also one of the major conditions for such a new housing process.

This general picture of a new housing renovation process does not come from nowhere. Instead, it comes from a clear understanding of the problems of the local community; it comes from a detailed analysis of the limitations of the current renovation process; and it also comes from many successful housing renovation examples in many countries. <2>

b. possibility

As the current housing renovation process is closely tied
up with the political and social economic framework of the society, to introduce such a new housing process means that we have to somehow challenge the government policies and the established institutional and production framework. This seems to be a very difficult task for a designer or even a planner to deal with, particularly in the centralized political context of urban China. For many years since 1949, to challenge the state government policy was always being interpreted as to challenge the regime, which obviously was very risky for anyone. In other words, to generate such a new housing renovation process is just impossible in that kind of political context.<3>

However, since the end of the Cultural Revolution and the end of the "leftist" governmental policy, there have been tremendous changes going on in China, which to a certain degree has changed the social and political conditions. These changes are the direct results of the current economic reform conducted by the new government, which is aiming at correcting the low efficiency and poor performance of the existing planned economy.

The poor economic performance is caused by two major factors, the highly centralized control and distorted price system. On the one hand, the economic activities control is so centralized that local workplaces have very little power to make decisions, which created very serious inefficiency problem. On the other hand, with removing the market system, the prices of goods were set arbitrarily by the government,
which could not effectively respond to changes of supply and demand. This distorted price system further intensified the poor economic performance. These problems are also reflected in the current housing process.

The major attempt in the current economic reform, therefore, is to decentralize the decision making process and to restore the price system. This attempt started in the rural sector where the responsibility was decentralized to each household. The result is quite convincing. The agricultural output, the productivity and individual income have all increased a great deal in the past several years. Now, the reform begins to move into the urban sector. A lot of changes have been brought on many aspects of urban life, even though the changes are slower and more difficult to occur than the rural sector due to their complexity. <4>

These changes have gradually set a new political and social economic context under which the new housing renovation process seems to be possible. Here, we are going to see what these new changes are in relation to the new housing process, and why the new housing process is possible based on these changes.

The most important change affecting the current housing process is the notion that housing as a social welfare is now replaced by the new notion which considered housing as a commodity and should not be subsidized by the government.<5> This ideological change has great impacts on the current housing process.
Under this new recognition, the government now is pushing very hard for housing commercialization. The central theme of the housing commercialization is to somehow change the housing process to a more market-oriented one. The major motivation of housing commercialization, however, is to bring more individual resources into the housing process, from which the governmental housing investment could be re-covered or at least partly recovered.<6> As a result of the current housing commercialization, we have seen that more and more public housing units are sold to the workplaces and the individuals with full price or subsidized price. We have also seen that private housing ownership is allowed, and people are encouraged to buy new apartment units. And in some cities, even the old residential houses are sold to the individuals.

Even though this change is still in a very small scale, and the current housing commercialization does not operate on a full market basis,<7> these changes still have very significant meaning for the current housing process. They imply that the existing policy framework, which is the basis of the current process, is undergoing a great change. Such a change will obviously have profound implications. In other words, the housing commercialization scheme will eventually create a new political framework under which the decentralization of the housing process seems possible.

In addition, under housing commercialization, the city housing office - the only institution responsible for housing
renovation - is now more willing to give away the responsibility for renovating the old residential areas.

For the city housing office, the new housing projects can now recover cost and even become profitable. But for the housing renovation project, it is a totally different story, unlike new housing projects, where many resourceful workplaces could afford their housing investment in order to get the finished housing units. In the old residential neighborhood, the local residents are already the tenants of the old public housing, and moreover, they belong to many different and small workplaces, which financially could not afford to house their employees. In other words, it is impossible for the city housing office to get renovation investment back. This is the major reason why the city housing office wants to give up their responsibility for housing renovation. This obviously sets a possible condition for a new institutional framework to emerge.

When the city housing office wants to give away the authority for carrying out the actual renovation process, the existing neighborhood organizations seem to be quite appropriate for such a job. As we mentioned earlier, the neighborhood organizations have been developed in urban China since 1949. These organizations at different levels, are the local social networks for delivering social services, solving residents' problems and also performing social control in many urban residential areas. These organizations, particularly the neighborhood committee and residential group, have the closest
relation with the local residents. And most staff of these
two lowest organizations are also the residents of the same
community.

Under the current urban reform, besides most social
service activities, more and more economic functions are
performed by these local organizations. For example, in many
neighborhoods, the neighborhood committee helps to organize
the unemployed high school graduates to form small shops or
other convenient services, which not only solves the
employment problems, but also provide increased services for
local residents. These changes indicate that these
institutions could be utilized as the basis for a new
institutional framework.

Finally, also under the current economic reform, "the
city gate" are now opened up for the skilled labors from the
rural sector and other cities. More and more private and
small collectively-owned enterprises are allowed to conduct
business in many cities of China. These enterprises are mainly
food and service industries, like vegetable seller, restaurant
and tailor, etc., which were once poorly performed by the
state-owned enterprises. Along with the development of the
economic reform, more and more new private enterprises, such
as building construction and transportation are also opened
up. Once the centralized and monopolized market is broken up
by these ever increasing small enterprises; more services and
choices are brought in for the people and vitality of the
economy. This obviously is an important condition for pursuing
new alternative housing renovation process.

From the above, we could see that a more responsive and a more localized housing renovation process is becoming more and more possible under the current economic reform development. Next, we are going to have a more detailed picture of the new housing renovation process, to see what it will look like and how it will begin.

2. The new housing renovation process - a summary

   a. organization

   In any new housing process, the institution always plays an important role. In order to decentralize the current housing renovation process, a more localized institution will be established to carry out the housing improvement task. This new institution will be based on the framework of the existing local neighborhood organizations, which will allow this new institution to bridge the gap between the city housing office and the local residents.

   In this new local institution, most of the members will come from the same local community. One-third of the members would come from existing local organizations, such as the neighborhood committee, residential group and the local branch of the city housing office. Because these people have been working either on managing existing housing, or social organizing, to bring them in the new institution would make the transition more easily.

   Two-thirds would come from the representatives of the
local residents, with one to two for each residential group. These representatives will be elected through voting by the residents of each residential group. The members of this new institution will be re-elected every two years.

b. responsibility

This new institution will become the major organization responsible for the whole process of housing renovation in the community. As soon as this institution is established, and certain preparation work is ready, the new institution will take over the basic control and responsibility from the city housing office for managing and implementing the renovation process. These rights include (1) maintaining and managing the existing public housing and the land within the community's boundary; (2) accepting and managing the renovation aid from the government and the rent payment from the local residents; (3) planning, organizing, and implementing the housing renovation tasks.

However, unlike the current renovation process, in which the city housing office is responsible for every detail of the renovation, the new process will bring more involvement from the local residents, and leave more room for individual responsibility and intervention. Therefore, the new institution is also responsible for organizing the local residents, making the institutional and design framework and arranging the possible resources for individual interventions. These are the new and important tasks for this new institution and the new process.
c. financial framework

In order to have an incremental and continuous housing renovation process in the neighborhood, a constant financial flow is a very important issue for the new institution. In terms of financial flow, there are three basic questions: what the financial resources are; where the money goes in the renovation process; and how the cost could be recovered.

(1) financial resources

For the new local institution, the first financial resource will come from the city housing office. As the new institution takes over the responsibility, a proportion of the existing fund for maintenance and housing renovation could be obtained from the city housing office.

The second financial resource will come from the land and the existing housing stock in the neighborhood. Like the community land trust system in the United States, the land and public housing stock within the community controlled by new local institution, not only provide the basic condition for housing renovation, but also could generate income to finance the renovation process by renting out the commercial spaces. In addition, the community land trust system also provides a model to deal with the relationship between private housing ownership and community land ownership.

The third financial resource will come from the government and the loans from local residents. By pulling the individuals' savings together, a special fund could be created in the community to help facilitate the housing renovation
process.

(2) expenditure

These financial resource will be obviously spent on the housing renovation process, which could be divided into several categories. One is direct action to reduce the over-crowding problem. This action will need direct involvement of the new local institution, because it will benefit all the community, and also more resources are needed for such intervention. For example, some temporary housing for young couples could be built in the neighborhood, which could greatly reduced the over-crowding problem in the community, since new married couples are major source for current over-crowding. The cost of construction, however, could be recovered through new rent.

Another kind of action is to renovate the old courtyard houses, which will be operated in the scale of several households instead of the scale of a whole community. This actual renovation could be direct action or indirect action. In terms of direct action, the new institution is responsible for making plans, to order materials and to organize construction process. The scale of these intervention will be determined by available resources of each community. In terms of indirect action, the new institution offer materials or other technical support, the residents themselves will carry out the actual building process.

(3) recovery

As the housing renovation continues, how to recover cost
becomes a very important issue. There could be three possible ways to recover the basic construction cost. One way is through a stable and ever increasing funds from the city government to finance the housing renovation process. The second choice is through increasing the resource from the community itself, such as profit from renting out the commercial spaces. The third way is from the savings of individual residents, through selling the renovated housing to the local residents, or through readjusting the rent.

Among these three choices, the first way seems less promising based on our analysis on the current housing system. For the second choice, although it is possible to have some income from the community based business, it seems difficult to cover all the renovation cost. It is the last choice that seems to be more promising, particularly under the current housing commercialization scheme.

As private housing ownership is encouraged, the responsibility from the individuals for improving their living conditions also increases. In fact, the local residents are not only willing to spend their own money to improve their living condition, but also they are now more capable to do so. According to a survey in 1983, the percentage of expenditure allocated to housing by each urban household is only 1.37%, even lower than the expenditure on cigarettes and wines (4.9%).<8> The actual recovery process will be realized through selling the renovated (or un-renovated) housing to the individuals, and increasing the rent for renovated housing.
For those residents who could not pay the cost of the renovation cost or who do not want to spend on that, they could renovate their living environment by their own hand. This is so called the human resources. And the new localized process would provide the possibility for such an action. In fact, to organize and encourage local residents to participate in the renovation process will not only have less cost, but also will help residents to reinforce a sense of the community, which could not be easily valued by monetary cost.

As we see, the central issue of the process is how to make the new institution work. It is this new institution that will take over the responsibility from the city housing office, arrange the financial resource and organize individual residents into the renovation process, which will finally bridge the gap between the public agency and individual residents in the current process. In this new proposal, we could see a more healthy housing process emerging under which the natural relationship between people and their living environment would be restored.

d. the uncertainties for a new housing process

The above discussion seems to promise a much better housing renovation process than the current process. However, as we have pointed out in the beginning of the chapter, this proposal is still in a preliminary conceptual level; and many specific and detailed issues could not be addressed in depth. The feasibility of implementing this new housing process is
not very clear given some uncertainties in the current social framework, which could be the major obstacles for the realization of the new housing process.

The first uncertainty comes from the current political framework. As we know, in the past 36 years of socialist development, the highly centralized political, social and economic control is the main feature of China's urban society. Even in local neighborhood, the once autonomous neighborhood organizations were replaced by a hierarchical social and political structure.<sup>10</sup> Today, under economic reform, although the economic structure is becoming more and more decentralized, the centralized political control has still remained untouched.

If the new housing process could be carried out, the new localized housing institution would become more and more economically active and politically independent from the current political framework. Obviously, the central government could not tolerate the independence of the local communities and would intervene in this new housing process. This would lead to the end of the new housing process and would bring back the current problems. In fact, these kinds of back and forth changes happened many times in economic development in the past 36 years. This political uncertainty is one crucial factor which we have to face in implementing this new housing process.

The second uncertainty is also related to the current political framework. It comes from the inadequate legal
system. In the past 36 years of socialist development, private land ownership has been taken away; private house ownership has also been greatly discouraged, so as has legal system to protect these private ownership. Even though the current reform began to change this bias, many issues and problems remained unsolved. For example, what exactly are the rights of the new housing owners? what are the relationships between privately-owned apartment units and the publicly-owned land. It is believed that without a clear and official document about these issues, the individual involvement into the housing renovation process would be greatly hampered, so would the whole new renovation process.

In general, although the current economic reform has brought a lot of changes and promises for pursuing a new housing renovation process, the well-established political and institutional framework could be major uncertain factors in preventing the success of such a new process. These uncertainties obviously are beyond the scope of this study simply because they are not so easy to predict.

3. Design and process - toward an integrated approach

In the previous discussion, we have not mentioned much about what the role of design is in the new housing renovation process. That does not mean there is no significant role being played by the designers. To the contrary, the physical design holds a very important position through almost every stage of the new housing process.
In the first stage of the new housing process, the new institution is responsible to make the framework for further individual interventions. This framework includes the institutional, legal, financial and design aspects. In order to carry out the renovation process, the design framework is a very important part of the process, because along with the process, many individual residents' interventions are expected. These individual actions might create some negative effects on the whole community, such as narrowing the streets, casting shadows onto public spaces or blocking neighbors' sunlight <fig.6-1>.

Therefore, based on the special situation of each community, some design guidelines and regulations are required for guiding individuals' actions. To a certain degree, it will be quite like the zoning or guidelines in a community version. This design framework (guidelines, regulations and requirements) could prevent the negative environmental results from the process, but also could ensure a sound
quality of the environment, through which the issues like the conservation of old environment and cultural continuity could be solved.

In the next stage, under these frameworks, the local residents would begin the actual intervention. Here again, the designers' help are needed to advice the users on how to arrange the individual intervention within their own boundary and to offer more alternative design solutions for the local residents.

It is important to offer the legal and financial framework for individuals to act upon; it is also important to provide the design framework and many design choices for the local residents in order to encourage more quality individual intervention. In fact, to provide more appropriate and various design choices will not only lead to a better and more diverse environmental result but it may also lead to using more local resources and human resources, which will have much less cost and much better social effect.

And finally, along with the improvement of the individual houses, more and more of the efforts organized by the new institution could be spent on improving the public space and facilities, such as infrastructure and community recreational facilities. During this period, the sense of the community will become stronger and stronger, and the environment would become more and more livable. Here, the sensitive design work is also very important. It is the designer's duty to help the local institution to plan their future, and to turn their
existing neighborhood into a more physically comfortable and culturally sensitive environment. This is very much the hope of many professionals and also is the very hope of the local community.

It is clear that the designer holds an important role in the new housing renovation process. Therefore, to have a new design framework, - with more consideration on the local situation, with more emphasis on the users' role in the design process, and with more concentration on flexibility for change - is a very important condition for the success of the new housing renovation process.

In this case, the new design approach we discussed in Chapter Four seems to be quite appropriate in this new housing process. The basic idea of that design approach - to inherit the existing courtyard house neighborhood structure and to use the courtyard house as the basic unit for intervention - could be developed into a series of design guidelines and regulations <Fig.6-2>. Those design solutions generated in the process of exploration could be used as the basis for offering more alternatives for each courtyard house or each household <Fig.6-3>. And the conceptual tissue model for the existing neighborhood could also be the blueprint for the future of the old community <Fig.6-4>.

The new design proposal and the new housing process are developed from the same basic conviction that to decentralize the renovation process is to give more power to the dwellers and to be more sensitive to the local community. These changes
[Fig. 6-2.]
The Basic design guidelines.

[Fig. 6-3.]
The different design choices for individual interventions.

[Fig. 6-4.]
The general framework for the whole neighborhood.
are essential for solving the current renovation problems. In fact, they are the two different aspects of the same approach. One is a response to the design aspect, the other to the renovation process. To integrate these two aspects will complete the new approach for an alternative housing renovation process.

From this study, we can see that to intervene in the housing renovation process, we need to address both the design problem and the process problem, because these two aspects are closely interrelated. In other words, a more integrated approach is required in order to successfully attack the problem. This understanding, we believe, will have important implications for both the academics and the professionals in these fields.
Chapter 7. Conclusion

In the introduction, we mentioned the major concerns and major goals of this study. Here, we will try to answer those questions and concerns. First, we are going to summarize the major arguments of this study. Secondly, we are going to point out the significance of this new process. And finally, we will discuss the limitations of the study and suggest some future research directions.

1. the problems and the new approach - a summary

As I mentioned earlier, it is the environmental concern that first brought me into this study, because many old cities in China were losing their character under the current urban development process, particularly the housing renovation. However, the more we studied the problems, the clearer the picture becomes: that urban housing renovation issue is not just a purely design problem, it is also a political and social-economic problem.

From the detailed analysis of the current urban housing situation and the investigation of a typical old residential neighborhood, we have seen that problem of the current housing renovation is directly caused by the centralized housing institutions framework, the governmental housing policies, and the established housing design and production system.

Therefore, to respond to these problems we need both the intervention on the current housing design and production
system, and the intervention on the current housing process. In other words, a more integrated approach is required to address both sides of these concerns.

The new approach started from the design aspect. With a better understanding about the problems of the current housing design and the nature of existing courtyard house environment, a new design framework is formulated. In this new process, on the one hand, the basic structure of existing environment will be maintained by using courtyard house as the basic unit of intervention. On the other hand, the conditions for a new housing process will be recreated, which means a close relationship of people and the living environment will be restored, and the control of the housing design and construction will be decentralized to the local community and individual residents.

However, this new design approach could not be easily implemented unless there are major changes in the current housing renovation system. The intervention on the housing implementation process, however, is based on the current changing political, social and economic situation in China. Along with the current economic reform, there have been a great deal of changes on many aspects of the society, which set a possible context for pursuing an alternative housing process. The basic idea of this new housing process is to localize the institutional framework; to make renovation process a self-financed one; and to increase the choices of implementation. Under this new process, housing renovation
will be managed by local community and be responsible by individual residents. In general, the control of housing process will be returned to the local neighborhood. This localized housing process, once helped to build this traditional environment, would be the basic condition for enhancing this living environment.

2. The significance of this new process

This new housing renovation process, with intervention on both the design and the process aspects, will obviously have many positive impacts on the current housing situation in urban China.

Firstly, the new renovation process will offer a new direction for transforming the current housing renovation process. As we mentioned before, much of the current housing renovation efforts in China, are based on certain well established notions, which have limited many Chinese planners and designers' scope. For example, with a deep belief that government agencies should be fully responsible for housing renovation, they never recognize the local community resources and the human resources, not to mention decentralizing the control to local communities.

Therefore, the new housing process, despite its preliminary nature, will provide many new ideas and new ways of thinking for Chinese planners and designers. It is hoped that this new proposal will bring a lot of attentions and discussions about this issue from which an improved housing
renovation process could be found in near future.

Secondly, the new housing process also suggests an alternative way to carrying out the new housing construction. From the institutional aspect, the new community-based process also be incorporated into the new housing construction process. If we can divide the whole housing process into several stages in which the city housing office, the new housing communities and individual dwellers could all participate and hold their own responsibilities, we believe that the new housing production could be more efficient and show better result.

In this new system, the city housing office is only responsible for developing the land, infrastructure and some basic building structural layout, which are more appropriate to be centralized. Then, many new residential communities would take over these developed land and building structure, to continue the housing process, like the new housing renovation process. Finally, under the community framework, the new residents could finalize their living environment.

From the design aspect, this new arrangement could also change the current mass housing image, because many different communities could easily develop very different environment. The city housing office will only need to lay out the new neighborhood framework, the actual implementation would be carried by the local communities according to their own needs. With this kind process, it is hoped that a more diverse and more sensitive housing environment could result.
Finally, this new approach also has implications for the academic fields. As the architecture and city planning are two different disciplines, we always see that in the issue of housing renovation, the intervention comes either from only the policy side or the design side. On the one hand, we could see that in many planning reports, from problem definition to new policy suggestion, there is little environmental concern. On the other hand, many designers treat the housing renovation as a simple design issue, which does not respond to many social issues behind. In regard to this point, this study, with a constant effort in bringing these two concerns together, is at least a step toward that a more balanced approach, even though it is still in a preliminary.

3. The limitations of this study

For such a complicated issue like housing renovation, the shortcomings and limitations of the study is difficult to avoid. The major limitation of this study, however, is from the lack of depth of this new intervention from both the social aspect and design aspect, which basically comes from the author's limited knowledge, limited time and little experience about this matter.

For the social aspect, due to the lack of a very clear picture of the current housing organizations and their working context, it is very difficult to address many important aspects of the current housing process, such as legal, social and economic, which are very crucial for creating such a new
housing renovation process. It is believed that because of the close relation between the housing process and the societal situation, without a careful study on these aspects, the feasibility of this approach could not be assessed and this study will never be completed.

For the design aspect, although there are many new design ideas generated in this study, there is very little efforts spent on the technical aspect, in terms of how these design ideas could finally be realized through the appropriate building construction system. It is another important issue concerning the implementation of this new approach.

These limitations indicate what the future research efforts should be, in order to continue this study. There are three areas that need to be explored: the social aspect of the new approach, the technical aspect of the new approach, and theoretical aspect of the new approach.

For the social aspect, there are more efforts should be made on the legal, political and economic aspects of the new housing process, and the implications of this new process. On the one hand, it needs more information about the current housing process, how it operates, what the social, economic and political constraints are, and what the feasibility is for such a change. On the other hand, it needs more perspectives from those people who work in the current system. In other words, the future of the study will be based on more personal involvement in the current process, and more reponses and cooperation from local architects and planners, through which
many complicated social concerns could finally be covered.

For the technical aspect, the future research should be emphasized on how to convert the current housing construction system into a new one, which could more efficiently and appropriately facilitate the new housing renovation process. In other words, it needs more innovative thinking on how to use the available technology to respond to user's needs, rather than to simply centralize all levels of environmental needs.

Finally, maybe a more difficult task is how to formulate this study and concerns at a theoretical level. This new intervention has been constantly pursuing a more balanced process. As we can see, it has achieved certain results, and there is a certain relationship between the design framework and the process behind. Therefore, to conceptualize this relationship into a theoretical framework will be my final expectation from this study, which will be based on many successful implementations and the continuous conceptual exploration.
Notes and References

Chapter Two


2. Engels, The Housing Question, Progress Publishers, 1979. In this book, Engels strongly criticized the Proudhon's idea of selling housing to the workers, which becomes the major resources for making housing policy in many communist countries.

3. Low rent, free education and free medical care are always considered by the Chinese government as major advantages of the socialist state. For the typical government's argument about the advantages of the new housing policy, please see Wang Qi-rong, "Residential Building Should not be Commercialized", JiangHan LunTan (in Chinese) June, 1980, p.17.


8. Zhu Ya-xin, "Housing Technology in Urban China", Large Housing Projects, the Aga Khan Program for Islamic Architecture, 1985, p.87.

9. The reason why the state-owned workplaces receive more housing investment is very complicated, which deserves a different study. In brief, it is partly because of the government's early intentions and partly because of the nature of the current economic system.

   On the one hand, in the early 50s, in order to demonstrate the superiority of the state economy, the state-owned workplaces were given special care, including housing investment, which left the legacy until recently. On the other hand, in the current economic system, the state-owned workplaces have closer relations with the different Ministries, which also help them to get housing investment more easily than those collectively-owned workplaces.

11. Huang Li-wei, Lu Dong-liang, ibid., p.204.


13 Zheng Yian-shi, "Discussion on Urban Housing in Beijing - an investigation and recognition of the current living condition in Beijing" (unpublished article) This was kindly provided by Professor Zhu Zi-xuan, Department of Architecture, Qinghua University.


Chapter Three

1. Most information about Fa Hua Shi District come from two resources: one is from the report by Professor Zhang Shouyi and a group of students at Qinghua University; the other is from several articles written by Ms. Hua Yi-zheng, who is an architect in the city housing office of Beijing.

2. Zhang Shou-yi, et.al., ibid., p.231.


14. Lao She, Four Generations Together. In this famous novel, from telling the stories of a small hutong in Beijing, the author vividly showed various aspects of the society during the period of Japanese invasion.


18. These two incidents were experienced by the author himself when he was young.


Chapter Four


Chapter Five

1. Hua Yi-zheng, ibid., p.344. The figures come from the appendix of the same article.


4. Hua Yi-zheng, ibid., p.345.


6. Hua Yi-zheng, ibid., p.344.


Chapter Six

1. Tunny Lee, from the discussion of Ms. Zhu Ya-xin "Housing Technology in Urban China", ibid., p.87.


7. In the current housing sale, the individual households do not pay the full price for buying the new apartment unit. They only pay one-third of the full price. The rest is subsidized by their workplaces or the government. This approach has a lot of negative impacts, which are discussed by Yok-shiu, Lee, ibid, and Li Ping-shan, ibid.


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