COURTYARD IN THE NATIVE HOUSE OF HONG KONG:
A NEW PERSPECTIVE IN NATIVE HOUSE DESIGN

LAM Chi Man
May 2006
Courtyard in the Native House of Hong Kong
A New Perspective in Native House Design

2005-2006 | Tectonics Studio | Lam Chi Man 043399 | Advisor: Prof Gu Daging
Introduction

A courtyard house is composed of opaque boundary enclosure and an internal open space, the courtyard. It is an "inward looking" type of spatial organization.

Privacy is the key quality of the courtyard house. With the opaque boundary surrounding the house, the inside is completely separated from the outside. Privacy is thus ensured. The courtyard is as enclosed and intimate as any room of the house. (1) The courtyard allows natural light and ventilation to penetrate.

Courtyard facilitates outdoor life because it is sheltered from the wind, free from being overlooked by neighbours and shut off from the noise of the public world. (2)

The thesis tries to apply the principle of courtyard space to develop a courtyard village in Hong Kong. In the first semester I focus on studying the characteristics of courtyard space. The study divides into two main parts: the spatial organization of single unit and the grouping of courtyard houses to form a complex/village. In the second semester I will apply the findings and design a lowrise courtyard village for single family in Hong Kong.

various courtyard views
Unit Study: Summary Charts and Case Studies

CHART 1: Courtyard Positioning

Types

Examples

Peripheral

Centre

1 2 3

4 5
CHART 2: Courtyard-Indoor Relationships

<table>
<thead>
<tr>
<th>Types</th>
<th>Examples</th>
<th>no semi-open space</th>
<th>with semi-open space</th>
</tr>
</thead>
<tbody>
<tr>
<td>transparent separation</td>
<td>1, 2, 3, 4</td>
<td>[Diagram of transparent separation]</td>
<td>[Diagram of transparent separation]</td>
</tr>
<tr>
<td>opaque separation</td>
<td>1, 2</td>
<td>[Diagram of opaque separation]</td>
<td>[Diagram of opaque separation]</td>
</tr>
</tbody>
</table>

1, 2, 3, 4  | 1, 2   | 1, 5 | 5, 5 |
Case Studies - Analytical Diagrams

Study House, China
- courtyard for gathering
Kristianfeldts Street, Finland
- courtyard for gathering
- semi-open space connects the exterior open space and yard
Paqueta Housing, Brazil
- courtyard for gathering,
- prevent direct sunlight
- staggered two-way roof to enhance ventilation
Row House, Japan
- courtyard for gathering, circulation; only source for natural ventilation and light
Fong's Residence, China
- courtyard for gathering
- semi-open space extends as the family hall
Grouping Study: Summary Charts and Case Studies

CHART 1: Types of Grouping

<table>
<thead>
<tr>
<th>Types</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) row, 1 way</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>b) row, 2 ways</td>
<td>4</td>
</tr>
<tr>
<td>c) free</td>
<td>5, 6</td>
</tr>
</tbody>
</table>
Street-house Relationship

main street - house

secondary street - house

private street - house

secondary street - shared open space

main street - open space - walkway

Diagram 3  1  4  6  2
Case Studies - Analytical Diagrams

Type a 1
Li-Lon, Shanghai, China

Type a 2
Paqueta Housing, Brazil
Type a 3
Patio House, Chicago

Type b 4
Wu's Residence, Chunzhou
Type c 5
Haka Patio Houses, Finland

Type c 6
Qiantong, Anhui, China
Background of Native House in Hong Kong

In 1972, the British government of Hong Kong established a law allowing the natives to build their own house with the following restrictions:

i. all houses must be within 300m range of their old village

ii. the floor area should be no more than 780 sq. ft (~63 sq. m), including the balcony

iii. the height limit is 27 ft (~8.2m)

i.e. 3 floors high

Design Objective

In order to build as much houses as possible, the properties in the site are closed packed. The face to back grouping causes lack of privacy and difficulties to access. Ventilation and natural lighting are poor.

The objective of the design is to apply the courtyard strategy to improve the living environment, including privacy, access, ventilation and natural lighting.

The design criteria are:

i. same number of houses

ii. same plot ratio

iii. each house has the same total floor area as the traditional design

iv. a few variations in unit design to fit different situation

v. some houses may have a portion that can be rent out to fit the needs of the natives

vi. adopt precast method for fast, easy and tidy construction
Kak Tin Village South (1:1000)

Site Area: 12299.04
House: 65 x 202.80 = 13182.00

Plot ratio = 1.07
Site coverage = 37.5%

Arrangement method: row, 1-direction
Trial 1

- back to back grouping
- Convert the open space to internal courtyard

Arrangement method: row, 1-direction
Trial 2

- two-way rows:
  main street - secondary street
- shift the road to the side
- sequence of public plaza:
  entrance - centre - two ends

Arrangement method: row, 2-directions
Trial 3

- shifting to create pocket spaces
- divided houses into groups
  sharing a more private
  open space

Arrangement method: row, 2-directions
  shifting
Final Scheme
- revised of trial 3
- clearer grouping of units
- internal facing organization:
  resemble of courtyard concept

Arrangement method: row, 2-directions shifting
Unit Study

Design Concept

1. Structural Wall Idea
In the first trial I started with fixing the structure position first. This method has a few drawbacks:

i. structural concept over spatial concept
ii. difficult to justify the positions

2. "Puzzle" Idea
This concept is inspired by a puzzle game. The "puzzle" represent floors. Shifting the panels within the boundary results in different sizes and positions of left over space, which can be interpreted as courtyard and vertical circulation.

With this operation, many variations can be produced to fit different situation, for example, orientations, family structure etc. There is also a possibilities for the client to take part into the design process to fit there own needs.

Unit Dimension

<table>
<thead>
<tr>
<th>Type A</th>
<th>Type A</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Design Steps

Internal Area

Covered by "puzzle": remaining area as courtyard

Vertical circulation added

May add additional light steel structure to connect the panels
Variations
Components

The main components are the "puzzle" - the precast floor panels. 6 standard sizes panels are used in this project.

Other components included plastic board partitions, glass panels, windows and steel stair unit.

The number of components are minimized to facilitates prefabrication. Prefabrication is adopted for quick, easy and tidy construction.

Floor Panels

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3000 x 4000</td>
<td>12.80 sq.m</td>
</tr>
<tr>
<td>B</td>
<td>3000 x 4000</td>
<td>14.00 sq.m</td>
</tr>
<tr>
<td>C</td>
<td>4000 x 4000</td>
<td>17.80 sq.m</td>
</tr>
<tr>
<td>D</td>
<td>3000 x 3000</td>
<td>13.00 sq.m</td>
</tr>
<tr>
<td>E</td>
<td>3000 x 4000</td>
<td>15.00 sq.m</td>
</tr>
<tr>
<td>F</td>
<td>3600 x 4500</td>
<td>17.25 sq.m</td>
</tr>
</tbody>
</table>

Unit Type 1

Wall Panels

structural

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2400 x 1200</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>2700 x 9500</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>3000 x 2550</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>2700 x 2550</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>3500 x 6000</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>4000 x 6000</td>
<td></td>
</tr>
</tbody>
</table>
Unit Example: Single Family House

Dimension: type 1
Floor Panels: 2 x A, C, (E)
Panel Area F: 57.96 (42.84)

0 1 2 5m
Unit Example: Two Families House

Dimension: type 2
Floor Panels: A, (A), D, E
Panel Area /F: 55.08 (42.48)
Construction Process

1. foundation and precast shear wall
2. precast concrete column
3. precast concrete floor

4. staircase, G/f - 1/f
5 partitions and glazings

6. facade;
roof of staircase cover
Detail Section
Street View
Street View
Unit 1 Internal Views

front-yard

back-yard
Unit 2 Internal Views

front-yard
dinning room, 2/F
Appendix 1:
Retrospect of Lowrise Family House in Hong Kong
Introduction

My thesis topic is about designing a village of lowrise family courtyard houses in Hong Kong.

Lowrise family houses are quite common in Hong Kong. Most of them are designed for the natives or the wealthy. In both cases, courtyard is rarely applied in the design.

This short paper starts with explaining the rationale behind the design of courtyard house of different regions. With this understanding, I will try to find out if courtyard design is suitable for single family house in Hong Kong. If yes, why courtyard design is rarely utilized here. If not, what do we need instead.

Characteristics of courtyard house

A courtyard house is composed of opaque boundary enclosure and an internal open space, the courtyard. It is an introspective spatial organization. Illus 1 shows the comparison between courtyard house and other types of house with open space.

There are three main origins of courtyard house, namely the Baghdadi house of the Middle East, the Greek peristyle house and the Chinese courtyard house. They all share the same key quality: privacy. With the opaque boundary surrounding the house, the inside is completely separated from the outside. Privacy is thus ensured. The courtyard is as intimate and enclosed as all the room of the house. The courtyard.
allows natural light and ventilation to penetrate.

Courtyard facilitates outdoor life as it is free from the overlooking of neighbours, sheltered from the wind, and shut off from the undesirable noise of the public environment. (2)

Comparison of house with open space

![Comparison of house with open space](Illus 1: comparison of house with open space)

Courtyard house is introspective while others are outward-looking

**Comparison between the three main origins of courtyard house**

As mentioned in the introduction, the designs of the three origins have the same key underlying principle: the need for privacy. Besides this main requirement, some other issues lead to the difference in their design. These issues can be categorized into two main aspects, the adaptation to climate and culture.
I) Adaptation to climate

In Baghdad, the temperature range is huge. During summer the temperature can rise to 50 °C in the shade while dropped to 2 °C in winter. The architectural design must adapt to this extreme condition to make the house livable.

Courtyard was a key temperature regulator in the hot season. It functions as a vertical vent connecting all levels. Heat could be disposed from the living space successfully. Some might have fountains in the middle of the courtyard to cool down and humidify the air. The ventilation throughout the house was further promoted by the use of screens, trellises and awnings. In addition, every house had a basement which can be kept cool under solar heat. (Illus. 2)

In winter, the heavy building mass provided an excellent insulation effect to keep the house warm. (3)

In Greek, the courtyard known as peristyle was usually located in the southern part of the dwellings. This ensured better insulation in the principle rooms. (Illus. 3, p44) Heavy building mass was achieved by mud, stone or brick which helped further to keep the house temperature steady. (4)

The climate in China is very different from the northern part to the southern part. The north is cold and dry while the south is hot and humid. The houses in the north had large and wide courtyard to increase the exposure to the sun in order to keep the house warm. (Illus. 4) Meanwhile, the courtyard design in the southern China was small and narrow. (Illus. 5) This facilitated upward air movement thus hot air and moisture could be withdrawn from the room more efficiently.
Courtyards were overshadowed by high walls to avoid exposure to the sun.
II) Adaptation to culture

People of Baghdad had a different perception of a house’s function. The house was not divided bedrooms, living rooms etc. The function of various living spaces alters in order to optimum its use in summer or winter. (5)

The courtyard (hosh) was the center of the house, with important social spaces surrounding it. For example the shaded talar with its long edge opened to the hosh.

Traditionally the spiritual and social division was sharp in Muslims ritual. Women’s social status was low. The house was divided into two distinct sections: one for male residents and guests, the other for servants and female. There might be a common lobby (ma’bain) connecting the two parts. (6) (Illus. 6, p.45)

The social position of women in Greek’s world was also low, as reflected in the courtyard house design. The men’s quarters were separated from the zones for the women. The floor plan of the “House of Many Colors” showed the dominant of men in Greek society. (Illus 3) The men’s zone consisted of south facing rooms for gathering and entertainment. Women shared a small portion facing north, in the between the services area.

This division also reflected the man’s desire to guard his private life. The private zone of the house was reserved for male while the living space for the female was more public. (7)

The house organization in Beijing of China best reflected the Chinese family structure, which was based on Confucian principles, both patrilocal and
patriarchal. (Illus. 7) The father was the master of the family. Married sons shared the house with their parents.

The arrangement of the buildings followed the ethical hierarchy. Typically four buildings were organized around a central courtyard. The least important one was placed at the south, facing north. It usually accommodated servants and services facilities. Side buildings were for married sons with their families and unmarried children. The master of the family occupied the rear of the complex overlooking the whole family. *(8)*

III) Conclusion on the comparison

Though all three origins of courtyard house started from fulfilling the needs for privacy, they evolved distinctively according to different climate and culture. With the particular adaptation, the design of the courtyard houses developed to suit the specific needs of the people. It is this evolvement showed the identity of the courtyard house in different region. Like all vernacular architecture, courtyard house became tailor-made for a group of people sharing the same ritual and living habits.

Illus 6: plan of a Baghdadi House

Illus 7: basic arrangement of Beijing courtyard house

Retrospect of Lowrise Family House in Hong Kong
Lowrise family house in Hong Kong

I) Introduction

Villages of lowrise family houses are quite common in Hong Kong. They can be found throughout the New Territories, the outlying Islands and the South of Hong Kong Island.

These villages can be divided into two types: luxury and condensed. The density of luxury type villages is rather low. Most of them applied American House design, with a garden space surrounding the house. Hok Lok Yuen, Discovery Bay and Marina Cova are some examples (Illus. 8 - 10).

The second type, such as Old Yuen Long Market and Cheng Chou, (Illus. 11, 12) is built for the natives. In 1972, the government allowed the natives to build houses within the 300 metres range of their village. These villages consist of economical houses in Spanish villa style. In order to build as much houses as possible, these small and compact villas are packed extremely closely together. Natural lighting and ventilation depends on the narrow avenue space.

In both types, courtyard design is rarely utilized

II) Why not using courtyard?

In fact, courtyard design can improve the living environment for both types. The first type exposes to the weather without any protection. The house can be unbearably hot and humid in the summer and as cold as the outside in winter. In the second type, natural lighting and ventilation is undesirable as there is limited
external open space for light and wind to penetrate.

Courtyard design helps to maintain a mild temperature in the interior space for the luxury houses. The boundary wall of courtyard house can block direct sun light into the house. A narrow courtyard can facilitate the withdrawal of heat and moisture. In winter, the wall reduces heat loss and helps keeping the house warm. While for the compact villages, courtyard can provide the essential natural light and ventilation.

If courtyard design is so suitable for Hong Kong, why it is neglected in both cases?

For the condensed villages, the answer may be the houses are too small. If we compare the typical floor plan of a compact village house to the simplest courtyard house in the Chinese village, we can find that the village house in Hong Kong is only two-third in size. (Illus. 13) The area is just enough for basic living spaces. As the size of the house is controlled strictly by law, the floor area is impossible to expand. The owners may prefer more spacious interior space rather than having an open courtyard in compromised, tiny size just for the sake of climatic control.

Omitting the courtyard in the luxury types may because of the change of the inhabitants' needs. Courtyard house is an introspective space. It is inward-looking. But nowadays Hong Kong people love external views. We want to look as far as possible as the environment is so dense. The outward view makes us relax and is much more enjoyable than the inward view of a courtyard. We prefer looking out.
rather than weather protecting the house with hard boundaries. As a result, the garden design becomes more suitable form of open space as it ensures a desirable distance between houses and the inhabitants can look further. The architectural design follows to change in culture.
III) Why American/Spanish House, not Chinese House?

The direct application of American and Spanish design on lowrise family houses in Hong Kong has become a trend. It is no doubt that modern Hong Kong people do not live in the same way as traditional Chinese. Housing design needs to adapt our new requirements. But does it mean it is the right solution to simply put an

Retrospect of Lowrise Family House in Hong Kong
American/Spanish house directly on our land? Did we give Chinese design principle a chance to evolve and adapt to Hong Kong? Do we lose all our Chinese-ness?

The answers of these questions may be obtained through examining the development of Hong Kong.

The modernization of Hong Kong started when she became a British colony. The important buildings at that time were the government buildings and cathedrals. These landmarks, such as the old Supreme Court (now Legislative Council building), old Stanley police station and St. John's Cathedral were of western neo-classical style. (Illus. 14-16). Illus 17 shows the waterfront was occupied by western style buildings in 1865. Many small English houses were built in the mid-levels to accommodate the in-coming British.

The reclamation projects in Central in the early 1900s kick-started the rapid development of the district. Major development schemes included Des Voeux Road Central, Pedder Street and Ice House Street. (9) As Hong Kong continued to develop, western architectural style overwhelmed.

But at the same time the Chinese architecture continued to develop to meet the needs of the common local residents. A new type of Chinese tenement house was popular in the southern China in the late 19th century. This was the Chinese row house, which is what we call Tang Lou. Because of the high land price, the area of this housing type is very small, with building height increased to three to four storey. The floor plan was very narrow so that the street fronting could be shared
by more blocks. The courtyard was shrunken into an atrium besides the service rooms to maximize the interior living space. Balcony, which extrudes into the street, extended the living space. Many Chinese row houses were constructed in Hong Kong before WWII. (Illus. 18, 19) Tong Lou was designed for single family at first, but because of the rapid population growth of Hong Kong, each block was shared by a few families.

The design of the early Tang Lou in Hong Kong already showed some Western influences. For example the large French window that separated the balcony from the living room, the design and decorations of the balcony, the choice of paving etc.

Unlike the English houses in Hong Kong, which were direct copies from their origin, Tang Lou had some adaptations to Hong Kong’s unique environment and culture. They can much better reflect our identity.

Unfortunately, many of the Tang Lou were destroyed or damaged severely during WWII. Combined with the flooding in of Chinese refugees, serious overcrowding problem was produced. In the mid 1950s, the public housing scheme was triggered by the horrible fire in Shek Kip Mei in 1954. Tang Lou began to be out of favour.

For architects Tang Lou is invaluable heritage of Hong Kong. It illustrated how a building type developed through time to adapt to the changing local conditions. The detailing showed the characteristics of East meeting West. It reflected our memory and identity.
However, the general public might not feel the same way. Tang Lou did show a collection of memories, but these memories may be something that they wanted to erase such as overcrowding problems, the disastrous war and tight economy.

In addition, Hong Kong economy began to surge after WWII. We acknowledged this success to modernization and westernization, especially when we compared the situation in Hong Kong to that of China. Hong Kong people admired the West more than the Chinese traditions. China customs are something we get used to, but not proud of.

In the 1970s, lowrise family house became popular again in Hong Kong, thanked to the rise of economy and the establishment of law allowing the natives to build their own houses. The undesirable memories related to the Tang Lou and admiration to the West might be the reason that people did not even bother to look at the Chinese row house and other Chinese precedents and went to western examples to search for what they needed.

Besides, direct inserting foreign style architecture in Hong Kong was not a new thing to do. Thousands of English houses had been standing in Hong Kong since the British come to rule. To the locals, what is the difference between put an English house and an American House on our land? Not much. This is because we detach the style itself and the culture behind it. Style becomes purely form.

III) Hong Kong culture — what are we looking for?

Hong Kong people are westernized Chinese. We never lose our Chinese-ness as reflected in our daily lives. For example the traditional Chinese religions,
believing in Feng Shui, eating habit like enjoying “Yum Cha” etc. However, the influence of the West on us is as much as Chinese customs. The architectural expression of the Hong Kong Heritage Museum fails to represent our identity not only because of its laughable distortion of the architectural scale of the Chinese courtyard complex, but also its misinterpretation of cultural scale. It over-emphasizes on Chinese-ness. (Illus. 20)

In the mainland, people began to search for their cultural root. The Fifth Garden in Shenzhen showed the characteristics of China nowadays by a modern expression of Anhui courtyard house design. (Illus 21) This type of design can represent the mainland, but not Hong Kong. If we follow the route of the Fifth Garden or the Heritage Museum, we can never do things right.
Illus 16: old St John's Cathedral

Illus 17: waterfront of Hong Kong, 1865

Illus 18: exterior of Tang Lou

Retrospect of Lowrise Family House in Hong Kong
Illus 19: Interior of Tang Lou

Illus 20: Hong Kong Heritage Museum

Illus 21: the Fifth Garden

Retrospect of Lowrise Family House in Hong Kong


4. SCHOENAUER, Norbert: *6,000 Years of Housing*. New York: W.W. Norton & Company, Inc., p.130

5. SCHOENAUER, Norbert: *6,000 Years of Housing*. New York: W.W. Norton & Company, Inc., p.169


7. SCHOENAUER, Norbert: *6,000 Years of Housing*. New York: W.W. Norton & Company, Inc., p.131-132

8. SCHOENAUER, Norbert: *6,000 Years of Housing*. New York: W.W. Norton & Company, Inc., p.196-198

9. WALKER, Anthony, ROWLINSON, Stephen M.: *The Building of Hong Kong: Constructing Hong Kong through the Ages*. Hong Kong: The Hong Kong Construction Association and Hong Kong University Press, p.42

Retrospect of Lowrise Family House in Hong Kong
Overdue Fines on Thesis
HK$1.00 per hour

<table>
<thead>
<tr>
<th>Time Due</th>
<th>遲還書時間</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 hrs.</td>
<td></td>
</tr>
<tr>
<td>14 Sep 2010 8:30 am</td>
<td></td>
</tr>
<tr>
<td>16 Mar 2011 8:45 pm</td>
<td></td>
</tr>
<tr>
<td>2 Nov 2011 8:30 pm</td>
<td></td>
</tr>
<tr>
<td>12 Nov 2011 8:30 pm</td>
<td></td>
</tr>
</tbody>
</table>