<table>
<thead>
<tr>
<th>Title</th>
<th>Title in Japanese</th>
<th>Title in Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and design of the city and dwelling, and Landscape Structure</td>
<td>長崎大学工学部研究報告</td>
<td>長崎大学工学部研究報告</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Guan, Xiaoli; Sasano, Yoshitugu; Okabayashi, Takatoshi</td>
<td>長崎大学工学部研究報告</td>
</tr>
<tr>
<td>Citation</td>
<td>長崎大学工学部研究報告 Vol.39(72), pp.52-59; 2009</td>
<td>長崎大学工学部研究報告</td>
</tr>
<tr>
<td>Issue Date</td>
<td>2009-01</td>
<td>長崎大学工学部研究報告</td>
</tr>
<tr>
<td>URL</td>
<td><a href="http://hdl.handle.net/10069/20938">http://hdl.handle.net/10069/20938</a></td>
<td>長崎大学工学部研究報告</td>
</tr>
<tr>
<td>Rights Information</td>
<td>NAOSITE: Nagasaki University's Academic Output SITE</td>
<td>長崎大学工学部研究報告</td>
</tr>
</tbody>
</table>

Please note that the table contains information about the document's title, authors, citation, issue date, and URL, along with a link to Nagasaki University's Academic Output SITE.
Planning and design of the city and dwelling, and Landscape Structure*1

by

Xiaoli GUAN*, Yoshitugu SASANO** and Takatoshi Okabayashi***

City planning in Quanzhou, China, has been developed in the preservation of a historical environment and the confrontation with the social development in Ancient city. In this research, new city planning that makes the best use of a local potential of topography and the context of historical cultural heritage is necessary. This study views Quanzhou landscape as “mountain-sea” space axis, analyze the city and dwelling structure, and clarify its transformation process. Mainly, literatures were studied as the investigation method. Methods of analysis are Aspect of layered structure like nature-city-street-dwelling. Result, landscape as “mountain-sea” space axis existed in Quanzhou. It is clarified that the “up-down” spatial axis is used as intermediate axis in city and dwelling.

Key words: City planning, dwelling, Landscape Structure, intermediate axis

1. Introduction

1.1 Background and Purpose

City planning in Quanzhou, China, has been deployed with priorities on economic issues. Especially, during the 1990’s high economic growth, traffic problems were considered as significant issue together with city population and automobile increase. On another front, existing road expansion and ancient shopping area renovation are being conducted to preserve Quanzhou’s Ancient city and the traditional landscape. In Quanzhou, this community improvement and environmental renovation are causing conflicts between social development and historical landmark preservations.

A new viewpoint of city planning is demanded for Quanzhou city by utilizing the potential of topography and the context of historical cultural heritage (1).

For this reason, this study views Quanzhou landscape as “mountain-sea” space axis, analyze the city and dwelling structure, and clarify its transformation process.

1.2 Research and Investigation Method

In order to perform Quanzhou’s structural analysis, the hierarchical structured of nature-city-road-dwelling viewpoint was applied (2).

In addition, this study recognized the latest city plan as issued in 1949 when People’s Republic of China was declared. Mainly, literatures were studied as the investigation method.

1.3 Investigation Status

(1) City Landscape Investigation

Kevin Lynch’s The Image of the City (3) is well known in landmark studies. Lynch investigated the city of Boston by suggesting 5 elements of paths, districts, edges, landmarks, and nodes to recognize and analyze city spaces, but his study did not apply landscape spatial axis that connects landmarks as a recognizable element. At the same time, Narumi (4) observed villages and dwellings in Bali, selected “mountain-sea” and “east-west” axes, and unveiled the sacred line existing in northeast. Also, Higuchi (5) studied the city landscape problems as people’s “homeland (identity) loss,” stating that such loss affect human existence.

(2) Principle Constituting of Dwelling Spaces

On traditional private dwellings in China, Guan (6) clarified existing “up-down” spatial axis in
traditional dwellings; however, he did not clarify “front-back” spatial axis. Liu (7) analyzed up-down spatial axis through the intermediate axis. Li (8) analyzed “sheng jing” (court) located above the intersection of orthogonal axes from ecological and cooperative point of view. This investigation was conducted as an extension of these studies.

1.4 History and Location of Quanzhou

Quanzhou is located at southeast of Fujian Province in China, and known as the starting point of Sea Silk Road to Istanbul (9).

Current Quanzhou consists of 4 districts (Licheng, Fengze, Luojian, Quangang), 3 country level cities (Jin River, Shishi, and Nan’an), and five counties (Hui’an, Anxi, Yongchun, Dehua, and Jinmen) as shown in Fig.1. Total population recorded in 2006 was recorded as 6,620,000 and total area was recorded as 11,015km².

The climate of Quanzhou is subtropical marine monsoon (evergreen broadleaf forest area), and it is different from Beijing’s broad-leaved deciduous forest.

2. Past City Development Plan in China

2.1 Ancient City

As shown in Figure 2, the Ancient city in Quanzhou is located on the center axis connecting Qingyuan Mountain and Jin River, and it was built in the 18th year in Tang Dynasty (730 AD). 4 gates were originally set in the square shaped property, and then increased to 7 during Five Dynasties and Ten Kingdoms Period (943-957). City’s original square shape was transformed to an irregular shape (10).

Also, as shown in Fig.3-1, the city was built in 1352 (Zhizheng12), side wings were added and transformed to a city with 15km wall. In addition, during the Ming Dynasty (1368 - 1398), Quanzhou Ancient city created multi-layered walls, and people started to call the city as “Licheng (carp shaped castle).” During 15th year during the Qing Dynasty (1658), stonewalls were built to surround the city. Later, “Chaoyuan” Gate was opened, and the dynasty was collapsed around 1937.

2.2 Ancient City and Water Channel

The Ancient City is located on the center axis between Qingyuan Mountain to Jin River, and 7 important water channels circulated in the city.
including the outer moat. From the water channel, 5 additional channels were created. Also, the outer moat was connected to a drainage system, and the city and its water system transformed commonly.

2.3 Ancient City and the Temple

Kaiyuan Temple was built in the 2nd year of Chuigong era in Tang Dynasty (686) inside the city. Two pagodas exist on east and west side of the Temple 200m apart. The East Pagoda (Zhenguo Pagoda) was built in the 6th year of Tang XianTong (865) and is 48m high. The East pagoda (Renshou Pagoda) was built in the 2nd year of Zhenming in Five Dinasties (916), and is 44m high. In addition these “twin pagodas” were the highest structures in the city, and famous as the city’s symbol. As Narumi suggested in his article on east–west spatial structure, those “twin pagodas” stand supporting the spatial axis.

2.4 Streets and Local Shopping Area

In the Ancient city, intermediate axis existed between Qingyuan Mountain (up) and Jin River (down), and “South Street (718-740)”(South Street) existed as a key point. As seen in Fig.3-2, this up-down intermediate axis crosses at South Street, and “EastWest Street(Dahe827-835 in Tang Dynasty) was formed (cross shape). In addition, under “EastWest Street,” a new street (3~4m wide) connecting “Xinmen Street and Tumen Street” was constructed (1352) and crossed “South Street” forming a double cross shape. Also, wooden construction shops (single/double story) existed on both sides of streets. At starting points of those streets, Banyan Tree created a space for people to enjoy evenings and communication. This means that streets in the Ancient city were not so wide but organized in grid street pattern, and constructed appropriately for people.

2.5 Private Dwellings

(1) Local Ruling Family Dwelling Floor Plan

Fig.4 and 5 (6) are dwelling floor plans for local ruling families. Fig. 4 is a “5-section” plan and Fig.5 is a “3-section” plan. The first section of the 3-section plan is called “Xialuo(down section),” and the second section is called “Dingluo(up section).” Also, the area between the first and the second section is called as “Jiaotoujian(side room).” The court surrounded by “Xialuo,” “Dingluo,” and the right and the left “Jiaotoujian” are called “Shenjing(court).” “Dingluo, “Xialuo,” and left and right “Jiaotoujian” act as basic structures to form traditional Siheyuan (dwelling with a courtyard surrounded by four buildings) as shown in Fig.4 and 5.

In Fig.4 floor plan, there is an “up - down” spatial axis between “ding luo” “xia luo.” Also, there is another “up-down” spatial axis with “shang da fang(up room)” as up and “xia fang(down room)” as down side. And these two spatial axes bisect at right angle called “shen jing,” and divide the whole area into 4 sub areas. In addition, the area is divided with a board wall, and “ding ting(up hall)” is located at front and “hou xuan(back room)” is located at back creating a “front-back” spatial axis.

The floor plan in Fig.5 demonstrates a spatial axis with upper side “ding ting(up hall)” and lower side “xia ting(down hall).” It also includes a spatial axis with “shang da fang” as up and “xia fang” as down side. In addition, the area is divided with a board wall, and “ding ting(up hall)” is located at front and “hou xuan(back room)” is located at the back creating a “front-back” spatial axis.

![Fig. 4 Floor plan of Local Ruling Family Dwelling](image)
(2) Traditional Dwelling (shou-jin-liao)

The traditional dwelling is narrow in façade, and inherited from Yuan and Qing Dynasty (Fig. 6 (6)). It is called as “shou-jin-liao”, and has an oblong shape (front is 3~4m wide and 20~30m long). “shou-jin-liao” has “up-down” spatial axis with “ding ting” as up and “shang fang” as down, and “shen jing” is located at the middle part. Also, “ting hou fang” is located behind “ding fang,” and “hou fang” is located behind “shang fang.” It means that “front-back” spatial axis exists on “front - back” spatial axis.

3. City Plan in Days of the Republic of China

3.1 Ancient City

City wall was all destroyed after the Chinese RevoRoadtion in 1910 as a symbol of feudal society. In the same manner, new roads and buildings were constructed to symbolize the new society. It was the same way in Quanzhou. Construction started, and ancient buildings were destroyed from 3m wide South Street as a part of “chai ma lu” movement. During this time, the road was named after a leader of the time and called as “Zhongshan Road.” And in 1922, Arcade (Qilou) shopping streets were formed. City map of this time period is shown in Fig.7.

3.2 City Streets • Shopping Area

With the construction of a motorway (28km) connecting Anhai, Quanzhou, and Quanzhou South Gate Shunji Bridge in June, 1922, South Street(single pathway), an up-down double cross shaped axis described in Fig.3-3 was expanded, and the name was changed to Zhongshan Road. And side roads were also developed from the main road consisting of one longitude and two latitude roads (double cross). For these changes, West Street shopping arcade became noncontinuous in structure.

In addition, as indicated in Fig.8 (11), “Zhong shan South Road” with arcade peristyle (2.7m in with) was located lower part of “Zhongshan Road,” and 200m and 9 m wide open air motor way will be constructed between Shunji Bridge to South Gate.
3.3 Shopping streets—appearance of arcade

In March, 1922, Quanzhou city Engineering Division was established, and stores located on main traffic roads of Zhongshan Road, Xinmen Road, and Tumen Road were rebuilt to “Qi lou” (arcade). As a result, the current Zhongshan Road type of “Qilou” was formed.

3.4 Dwelling

(1) Introduction

There are two types dwelling in this period: “Qi lou” and “Yang lou”.

(2) Qi lou

“Qilou” shown in Fig.9 is two-story type. 1st floor is called “lou xia(down)” and the 2nd floor is called “lou shang(up),” and they mark “up-down” spatial axis. Stairs and landing area exist in the intermediate part of the “up – down” spatial axis. The landing area is directly connected to the living space. That means that “front – back” spatial axis does not exist.

(3) Yang lou

Two-story “Yang lou” described in Fig.10 (12) was designed at the beginning of the 20th century by Overseas Chinese. In this yang lou, the 1st floor is called as “lou xia” and the 2nd floor was called as “lou shang,” marking “up–down” spatial axis. And at the intermediate of the axis, “ting (hall),” stairs, and landing area exist, and additional “front–back” spatial axis is marked with “qian fang(front room)” and “hou fang(back room)” on left and right side. “Front–back” spatial axis also does not exist as in Fig.9.

4. City Plan After People’s Republic of China

4.1 Quanzhou city plan

(1) 3 mountains, 2 rivers, and 1 bay structure

In 1982, after People’s Republic of China” was established, Quanzhou was firstly designated as the “Country’s historically significant location)” by the state Council. In return, Quanzhou established “Quanzhou Historical Property Protection Plan” in 1983 and 1988. Also, in 1983, Tianjin University created “Quanzhou Ancient City Spatial Property Protection and Innovation – History, Culture, and City Protection Plan” and suggested to develop the new town through the idea of “Quanzhou Historical and Cultural Area” by protecting the historical sites while forwarding with the city development. In addition, “Quanzhou Total Development Plan (Master Plan:1995~2020)” was issued in 1995, and submitted “Quanzhou History, Culture, and City Protection Policy” which was centered around preserving the ancient city. In the article, Quanzhou pointed out a new concept that focuses on “3 mountains (Qingyuan Mountain, Zimao Mountain, Taohua Mountain), 2 rivers (Jin River, Luoyang River), and 1 bay (Quanzhou Bay)” as shown in Figure 11. Additionally, “Ancient City Protection Plan” suggests to preserve natural mountains, water, ancient city, morphology of carp shaped Castle, historical buildings and historical districts, traditional dwellings, and landscape view line(Fengjingxian).

(2) “Ancient City” area designation

Designated area for the Ancient city protection by Quanzhou officials was 6.71km², and about 150,000 people live in the area. East side of the designated
Ancient City Landscape Maintenance (broad sense)
Keeping good balance of historical environment and landscape maintenance is considered important to keep the whole ancient landscape.

Landscape view line (perspective line)
Quanzhou limits the height of buildings according to its landscape axis of “Qingyuan Mountain-ancient city-Jin River”, to protect the landscape view line set in Tang Dynasty. And any buildings on the extension of the line must not be higher than 5 storages, and must not exceed 16m.

In addition, they expanded the concept and set additional six landscape view lines: (1) North Gate Road to Qingyuan Mountain, (2) Nanjun Road to Qingyuan Mountain, (3) Wenling Road to Qingyuan Mountain, (4) Huanchengbei road to Qingyuan Mountain, (5) Xianhou Road to Qingyuan Mountain, and (6) Chong fu Road to Qingyuan Mountain. These 6 lines are indicated as yellow lines in Fig.12.

4.2 Temple, Ancient City, and Tall Buildings
This study found out that Kaiyuan Temple, located at the west of the ancient city, also set the view line with the cityconsciously. Following 6 new landscape view lines were set to protect the view of Kaiyuan Temple’s twin pagodas from the modern verticalization trend: (1) Nanjun Road, East Street to twin pagodas, (2) Xinhua North Road to twin pagodas, (3) Xiangfeng Alley to the East Pagoda, (4) Sanchoa Alley to the East Pagoda, (5) Weiyuan lou to twin pagodas, (6) West Lake Garden’s E, Variegata Pagoda to twin pagodas.

4.3 Streets and Shopping Area
Chinese streets in Yuan Dynasty were located in double cross shape as shown in Fig.3-2. During the Republic of China era, the structure was referred to as “1 longitude and 2 latitudes”, and changed to “2 transverse and 1 vertical” during People's Republic of China. And based on the “2 transverse and 1 vertical,” it was changed to “3 planes and 1 line.” Maintenance method was suggested as described in Fig.3-4. 3 lines were distinctive preservation streets in Quanzhou, and include North Castel Kaiyuan.
Temple plane, Qingjing Mosque plane, South Castel Tianhou Temple plane, and Kaiyuan Temple is located at North Castel Kaiyuan Temple plane. “One” is the recuperated Zhongshan Road expansion construction. Zhongshan Road re recuperation project received UNESCO Asia-Pacific Heritage Awards for Culture Heritage Conservation, and this event opened up the deeper concerns to preserve Ancient cities in Quanzhou.

5. Discussion – Comparison with Nagasaki, Japan

5.1 Landscapes in Quanzhou and Nagasaki

This study clarified that planning and design in Quanzhou shifted from “mountain-ancient city-river” axis landscape view to “3 mountains, 2 rivers, and 1 bay” and this is due to the existence of intermediate axis on automobile road in Quanzhou. When this “mountain-ancient city-river” landscape is applied to examine Nagasaki City, similar “Mountain-ancient castle - Nakajima River” landscape axis appeared and hancients in. Also, long time ago, there was a “sacred line” between Kompira Mountain and Morisaki Shrine as shown in Fig.14, and the line acted as a baseline for Dejima and Dejima 6 cyo(city) (13). When this view is applied to examine Quanzhou, “Qingyuan Mountain” (said to be the origin of the name, Quanzhou) and legendary “Nüwa Temple” axis can be replaced with the “sacred line.”

Fig.14 Sea-Mountain Axis in Nagasaki

5.2 Traditional Dwelling Comparison: Quanzhou and Nagasaki

This study clarified that Quanzhou traditional dwellings have two orthogonal “up-down” axes and one “front-back” axis as a principle structure.

This concept was applied to examine Honda dwelling, a cultural property in Nagasaki, and the two dwellings were compared and investigated.

As described in Fig.15-1, Fig.15-2, Honda house plan sets “floor” side as “up,” and earth floor side as “down,” creating “up-down” spatial axis. Also, Reception room side is considered “Omote(outside)” side while storage side is considered as “Ura(inside),” creating “Omote-Ura” spatial axis. These two axes cross at point X, and divide the house into 4 areas. Additionally, the area has “Kuchi(front) ”side in the floor area and “Oku(back)” side in the reception room. This clarified the existence of “front - back” spatial axis.

This similarity suggests the dwelling in both cities have the same compositional principles for having 2 orthogonal axes and “front-back” axis included in the area; however, a difference was observed in their spatial concept. That is, vertical axis was called as “up-down” social axis in Quanzhou while it was called as “Kuchi-Oku” spatial axis in Nagasaki. Cultural differences were observed through structural differences.

Fig. 13 Sea-Mountain Axis in Quanzhou
6. Conclusion

The purpose of this study was to clarify the principles that consist of dwelling, city, and landscape structures, in Quanzhou from the stand of working hypothesis. Findings came out as follows:

(1) City landscape axis in Quanzhou shifted from the “Mountain-Ancient City-River” to “3Mountains-2 Rivers-1Bay”. In this investigation, “mountain-city-river” axis was understood in broad manner, and applied to create “Mountain - Quanzhou - Sea” axis that connects Qingyuan Mountain and “Nüwa Temple” as a intermediate axis for the new city design.

(2) The study also found out that the dwelling structure in Quanzhou has “up-down” orthogonal axes and “Omote-Ura” axis inside as a part of composition principle. The study clarified that court was located at the intersection of these axes, but now “front - back” spatial axis disappeared in modern dwellings and transformed to a spatial configuration of a living room instead. The study also found out that a vertical axis in a dwelling structure in Quanzhou is “up-down” while “Omote-Ura” was used in analysis in Nagasaki. This difference may be the result of cultural difference.

(3) Principle of “intermediate axial line” existed as a part of composition principle in Quanzhou.

References