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From Biodiversity Landscape to Bioscape Landiversity
- Chinese Pavilion in Milan Expo 2015

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From Biodiversity Landscape to Bioscape Landiversity

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Final Thesis
Master in Landscape Architecture
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Changsha

Alone I stand in the autumn cold
On the tip of Orange Island,
The Xiang flowing northward;
I see a thousand hills crimsoned through
By their serried woods deep-dyed,
And a hundred barges vying
Over crystal blue waters.
Eagles cleave the air,
Fish glide under the shallow water;
Under freezing skies a million creatures contend in freedom.
Brooding over this immensity,
I ask, on this bondless land
Who rules over man's destiny?

I was here with a throng of companions,
Vivid yet those crowded months and years.
Young we were, schoolmates,
At life's full flowering;
Filled with student enthusiasm
Boldly we cast all restraints aside.
Pointing to our mountains and rivers,
Setting people afire with our words,
We counted the mighty no more than muck.
Remember still
How, venturing midstream, we struck the waters
And the waves stayed the speeding boats?

Mao Zedong, 1925

沁园春

长沙

独立寒秋，湘江北去，橘子洲头。
看万山红遍，层林尽染；
漫江碧透，百舸争流。
鹰击长空，鱼翔浅底，
万类霜天竞自由。
怅寥廓，问苍茫大地，谁主沉浮？

携来百侣曾游，
忆往昔峥嵘岁月稠。
恰同学少年，风华正茂；
书生意气，挥斥方遒。
指点江山，激扬文字，
粪土当年万户侯。
曾记否，到中流击水，浪遏飞舟！

毛泽东 1925年

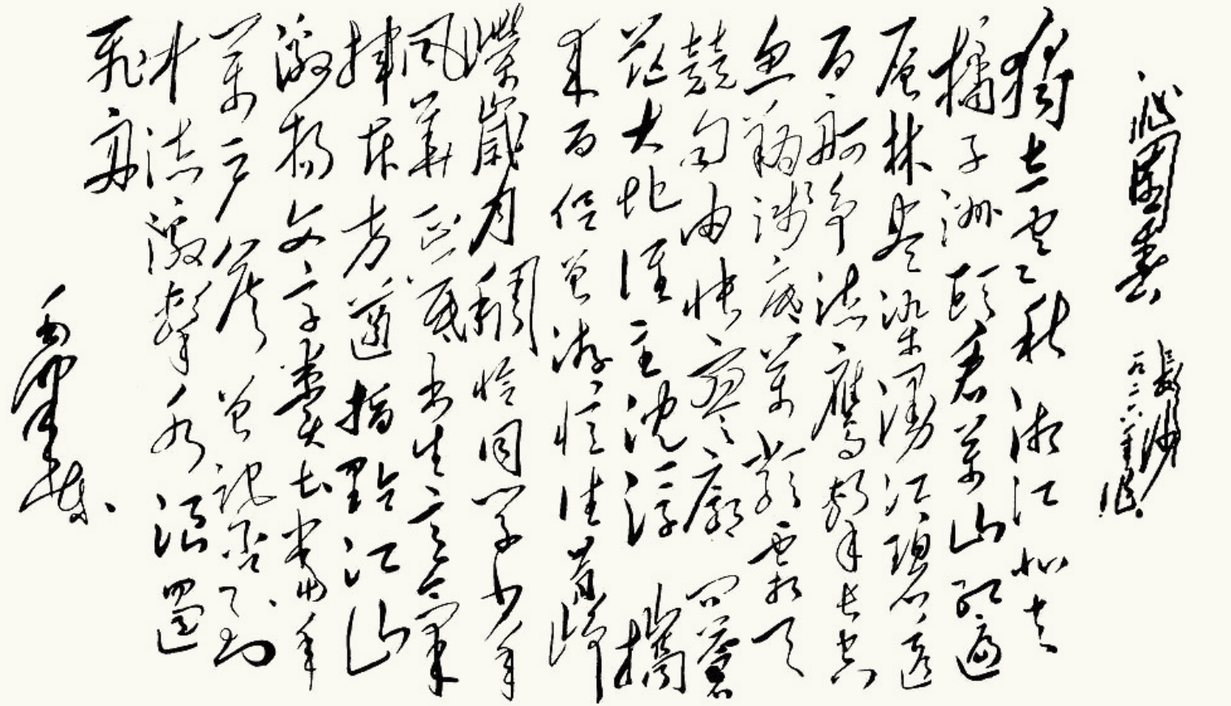

Fig. 0.1

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ABSTRACT

This thesis develops the theory of food-related landscape in the context of China in contemporary era.

Expo 2015 in Milan provides us an opportunity to rethink the importance of territory in food chain. We give an overview of the theory on biological-diversity and landscape, while trying to explore a new concept of biological-scape and landiversity, in order to discover center role protecting from anti-diversity and cultivating industrialization, preserving the biological situation and landscape situation in Great Wall Region in China.

Chapter 1 presents the concepts of 4 words: Biodiversity, Landscape, Bioscape and Landiversity. An overview of traditional Chinese metaphysics related to these 4 words is discussed. Chapter 2 introduces, from natural, artificial and cultural three aspects, the main feature of Great Wall Region, the great linear ecotone zone in North China. Chapter 3 & 4 give a study on paintings, movies, poems about Great Wall Region landscape, experiment one possibility into the design of Chinese Pavilion in Milan Expo 2015.

Our Chinese pavilion design in Milan Expo 2015 is a simulation of harmonization between natural environment and human civilization (between rural and urban).

Questa tesi sviluppa la teoria del rapporto tra paesaggio e cibo nel contesto contemporaneo Cinese.

L'Expo 2015 di Milano ci fornisce l'opportunità di ripensare all'importanza del territorio per la catena alimentare. Nella tesi, diamo una visione della teoria sulla diversità biologica e sul paesaggio, provando nello stesso tempo a esplorare il nuovo concetto di paesaggio biologico e della sua varietà. Il nostro fine è quello di capire l'importante ruolo della protezione dalla coltivazione industrializzata e contro la diversità biologica. Inoltre, vogliamo preservare il paesaggio della Regione della Muraglia Cinese e le sue caratteristiche biologiche.

Il Capitolo 1 presenta una visione generale della metafisica tradizionale cinese sulla relazione tra uomo e natura. Il Capitolo 2 discute le principali caratteristiche della Regione della Muraglia Cinese e della zona lineare dell'ecotone locata nel Nord della Cina considerando tre aspetti: naturale, artificiale e culturale. I Capitoli 3 e 4 analizzano dipinti, film e poemi riguardanti il paesaggio della Regione della Muraglia Cinese, sperimentando la progettazione del Padiglione per l'Expo 2015 di Milano.

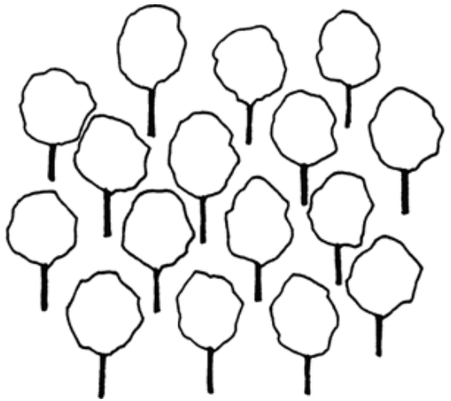
Il nostro progetto per il Padiglione Cinese per l'Expo 2015 di Milano è una simulazione dell'armonia tra ambiente naturale e civilizzazione umana (tra caratteri rurali e urbani).

Fig. 0.2

Feeding the Planet, Energy for Life

The food-related theme of Expo 2015 concentrates on the topic of food chain in which territory plays a central role because the farming and livestock-raising traditions of local peoples and communities developed over the course of thousands of years of experimentation and experience are part and parcel of genuine, high quality food. [1] When we face the food-related problems in China, it is urgent to preserve our natural diversification of territory with manifold cultivation and husbandry which is handed down by generations since thousand years ago. The rooted Chinese Confucius philosophy also advocates the importance of concordance and harmony of natural and artificial activities. So the biodiversity and landscape are the two key words in our research of food-related territory in China. And we create two new words into our glossary: Bioscape and Landiversity which are the theme of our pavilion design.

1. Milan Expo offical website theme page



Only Apple Trees

Fig. 0.3

A blog dairy about Monoculturism

Sunday, April 27, 2008
Against Monoculture

Nature abhors monocultures. Nature abhors them so much that they do not exist in accordance with nature. They would be unknown but for modern man.

We live at a moment of monoculture's triumph - and demise. Around us is the evidence of the near-total victory of monocultures in nearly every field of human activity, at the same time that the recklessness and fragility of monocultures comes ever more fully into focus.

In agriculture we have sought efficiency through crop monocultures, circumventing the need for rotation and variety through high levels of petroleum inputs. We have created monocultures of wheat, corn, potato, rice - all with a growing sense of fragility of their futures in a world of constrained petroleum and water. Industrial methods of farming have severely depleted topsoil around the world, the very source of agriculture and hence human life. Agricultural monocultures - attractive because they can be efficiently produced by means of industrial production - have led to an atrophy of knowledge of how to grow numerous other crops. Even as we face the prospects of decreasing supplies of industrially produced crops, we want the knowledge of how to produce in accordance with local conditions that is the possession of a dying generation.

Posted by Patrick Deneen at 8:20 PM

Blog: What I Saw in America, Patrick Deneen

Chapter One: The Attempt

Apple Tree, Orange Tree, Olive Tree ...

Fig. 1.1

The theories on biodiversity (biological diversity) and landscape, with plenty of different views from various culture backgrounds and study spheres, have already been recognized in multi-dimensional figures.

While in order to correspond to our theme of study: the Great Wall Region, we try to explore a new concept of bioscape (biological-scape) and landiversity. These two new words are more appropriate to our physical situation in the Great Wall Region, as well as the metaphysics in Chinese since the ancient time.

1.1 Biodiversity and Landscape

What we want to deliver to the visitors first is the idea of recall the diversity of biological creatures and landscape through the territory of Great Wall Region as our example. Because the Great Wall of China is the world's largest heritage structure built by successive dynasties over more than 2000 years. It consists of a system of several sections, forming a network of space, which we call the Great Wall Region.

The reason why we choose **a great linear area** which crosses a huge territory to represent in Expo Milan is that our concentration is not a single cultivation or a food element, we deal with the state of a combination of a bio-system and biodiversity in the most beautiful piece of land in China, which separates the myths and the reality of the times, the cold northern grasslands and the fertile southern farmland, the nomadic from the north and farmers from the south.

Biodiversity in China has quite large differences with the western definition since in which the Chinese philosophy 'Hundred Schools of Thought' [2] lies.

2. Hundred Schools of Thought. Philosophers and schools that flourished from 770 to 221 BC, an era of great cultural and intellectual expansion in China. Even though this period - known in its earlier part as the Spring and Autumn period and the Warring States period (春秋戰國時代/春秋战国时代) - in its latter part was fraught with chaos and bloody battles, it is also known as the Golden Age of Chinese philosophy because a broad range of thoughts and ideas were developed and discussed freely. The thoughts and ideas discussed and refined during this period have profoundly influenced lifestyles and social consciousness up to the present day in East Asian countries. This period ended with the rise of the Qin dynasty and the subsequent purge of dissent. Famous philosophers and schools are **Confucianism, Legalism, Taoism, Mohism, School of Yin-yang, and Logicians.**

Natural geographical environment is the basis for the formation of the Great Wall and different stages of various human activities shape the complexity of the territory of the Great Wall Region and after all it is not a single structure at all. The landscape features in the Great Wall Region, with the further review under cultural landscape and landscape ecology, can not be described in a single sentence. The diversity of the lands and the landscapes give us a great topic to explore the connotation and extension of concept and definition of 'landscape'.

The representation of landscape in China was firstly applied in Chinese scrolling painting with a special perspective method called "cavalier perspective", also known as "mobile point of view." The different way of observation decides the different result of judgment.

1.1.1 The Definition of Biodiversity (Biological Diversity) in Western World

The term was used first by wildlife scientist and conservationist Raymond F. Dasmann in a lay book[3] advocating conservation. The term was widely adopted only after more than a decade, when in the 1980s it came into common usage in science and environmental policy. Use of the term by Thomas Lovejoy, in the foreword to the book Conservation Biology,[4] introduced the term to the scientific community. Until then the term "natural diversity" was common, including by The Science Division of The Nature Conservancy in an important 1975 study, "The Preservation of Natural Diversity." By the early 1980s TNC's Science program and its head, Robert E. Jenkins,[5] Lovejoy and other leading conservation scientists at the time in America advocated the use of "biological diversity".

The term's contracted form biodiversity may have been coined by W.G. Rosen in 1985 while planning the National Forum on Biological Diversity organized by the National Research Council (NRC) which was to be held in 1986, and first appeared in a publication in 1988 when entomologist E. O. Wilson used it as the title of the proceedings [6] of that forum. [7]

Since this period both the term and the concept have achieved widespread use among biologists, environmentalists, political leaders, and concerned citizens. The term is sometimes used to reflect concern for the natural environment and nature conservation. This use has coincided with the expansion of concern over extinction observed in the last decades of the 20th century.

A similar concept in use in the United States is "natural heritage." Less scientific, it predates the others and is more accepted by the wider audience interested in conservation. Unlike biodiversity, it includes geology and landforms (geodiversity).

From the definition and explanation of biodiversity in western world, we can easily see that the Nature has widely been treated individually from human body in western natural science and philosophy. Human as an opposite position receive benefits and services from nature, at the mean while produce threats which create the term and method of biodiversity conservation.

3. Dalesman, R. F. 1968. A Different Kind of Country. MacMillan Company, New York. ISBN 0-02-072810-7.
4. M. E. Soulé and B. A. Wilcox. 1980. Conservation Biology: An Evolutionary-Ecological Perspective. Sinauer Associates. Sunderland, Massachusetts.
5. Robert E. Jenkins
6. Edward O.Wilson, editor, Frances M.Peter, associate editor, Biodiversity, National Academy Press, March 1988 ISBN 0-309-03783-2 ; ISBN 0-309-03739-5 (pbk.), online edition
7. Global Biodiversity Assessment. UNEP, 1995, Annex 6, Glossary. ISBN 0-521-56481-6, used as source by "Biodiversity", Glossary of terms related to the CBD, Belgian Clearing-House Mechanism. Retrieved 2006-04-26.

1.1.2 The Definition of Biodiversity (Biological Diversity) in Chinese Culture

Fig. 1.2

Fig. 1.3

'The Heaven and the Body is One Unique Being' Tian Ren He Yi
- Taoism from Lao-tzu

The relationship between nature and human is what Chinese culture defines the biodiversity. Taoism is one of the rooted Chinese philosophies to discuss nature and human body in a universe range. The balance between nature and human we call 'harmony between heaven (nature) and human' which literally should be translated into 'the heaven and the body is one unique being' (Tian Ren He Yi). We can also understand as 'human body lives together with all things, human and nature are equal to each other.'

This universe thought between man and nature from ancient Taoism offers us a guiding principle which man can follow to **harmonize** his relations with nature. We live in this world; actually we share the same planet with all the other creatures. We and all the other creatures are equal on biological sense. The way we used in the past several decades when we believe too much the power of 'science' and the power of 'man' has already got the deleterious effects coming to us. We need to save us from ourselves, learning from 'the heaven and the body is one unique being'. Human beings, together with all the members in this planet are interest community. The threats to other creatures are the same to humans as well as the benefits.

Left: Bagua and Chinese Calligraphy (means 'Imitation of Nature')

Fig. 1.4

Left: Part of the Chinese painting Qing Ming Shang He Tu, Zhang Ze Duan, North Song Dynasty

1.1.3 Landscape in Chinese Glossary
- Phenomenology in Landscape Painting and Cavalier Perspective

When we face the Great Wall Region crossing 2400 kilometers territory from west to east through upper China, the way to read this long length image is influenced by the manner and method of Chinese phenomenology theory. The manner to collect single element apparently without connection but linked somehow in someway can not be seen. A metaphor to simulate the process is to understand how the philosophy influent the art work and traditional landscape designs in a way from Chinese painting and Fengshui (urban design and architectural design). The importance place of human body is highly concerned in these practices of the theory.

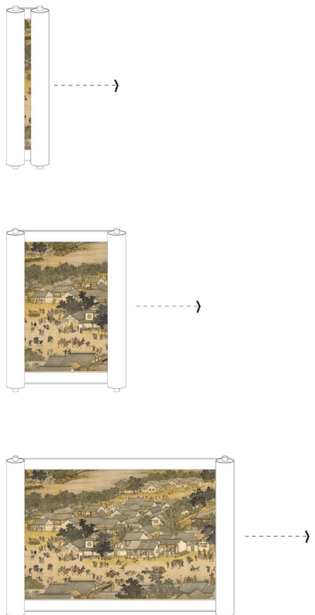
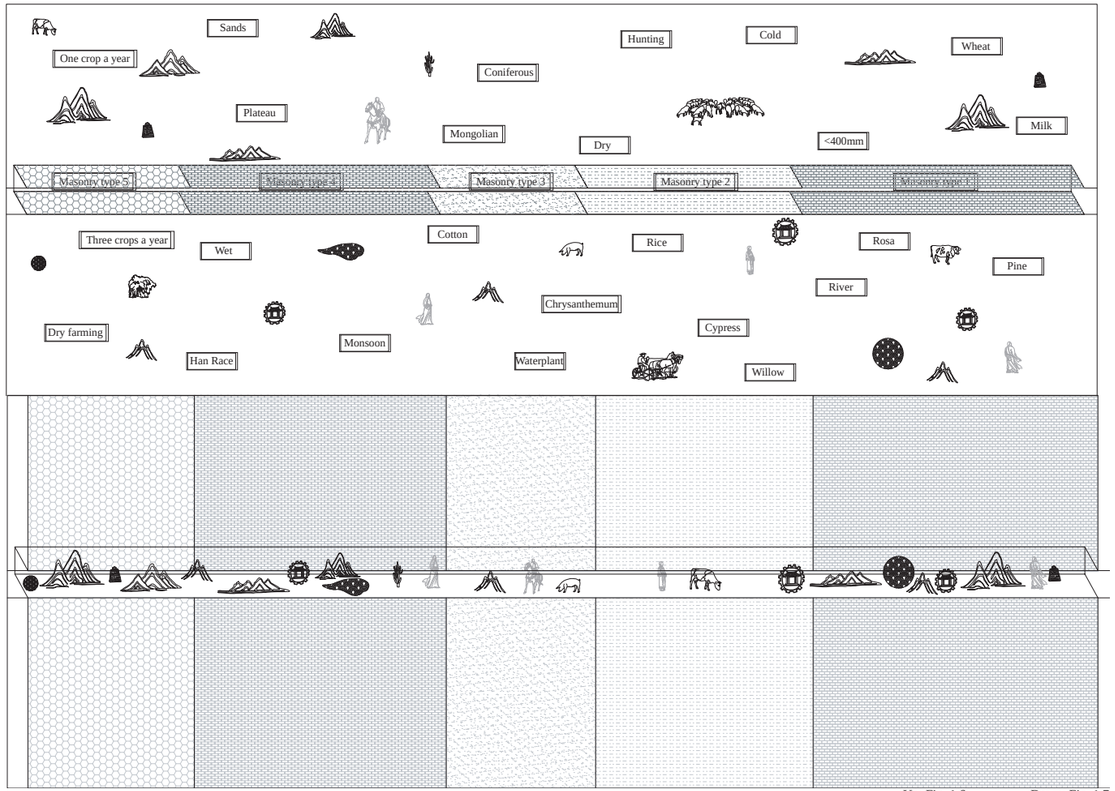


Fig. 1.5

Left: Horizontal Chinese Scroll Painting

Perspective method of Chinese Painting is different from western. The observation point of the painter is not fixed in one point, but also the view field is not restricted in a certain range. The standpoint of observer is moving in a path and the view field is stretched up on the observer at the same time. Elements inside view can be continually collected all inside the painting. The perspective method is called '**cavalier perspective**', also known as '**mobile point of view**.' Chinese landscape painting can express 'right close in the painting now but thousands of miles away of the vast realm' which is due to the unique perspective method. Thanks to the cavalier perspective principle of Chinese landscape painting, the artist can create tens of meters long scroll (such as the Qingming Festival). Also when we open a scroll of Chinese landscape painting, each length of the drawing appearance can creates a individually picture until reach the entire scale. So the image is changing during all the process and the interests lie in the views obtained by the observer self. The relation between the painter and the nature, the viewer and the painting is translated into a dynamic balance and harmony of the all landscape elements with the observation of the all landscape elements.



Up: Fig. 1.6 Down: Fig. 1.7

The dynamic balance in the Chinese landscape painting is the principle that we follow in analyzing the **connection** in territory features of the Great Wall Region. Those apparently fragmentation of all kinds of elements are the first collection with correspondence location horizontally along the Great Wall Region.

The connections between each element are chained according to the influence of sky, climate, earth and people. And then we can observe gradually there is a train from west to east which forms exactly the nature of Yellow River, the culture of Silk Road and the construction of the Great Wall, three linear principal lines. Also the common part of each element in a certain sense is connected with the agriculture along this long length region. The way we read this piece of territory actually somehow is similar to the way we watch the Chinese landscape painting. Follow the balanced trains, the land paper is opened from west and all the vivid beings are melted changing along the lines.

Left: Cavalier perspective in the landscape of Great Wall Region

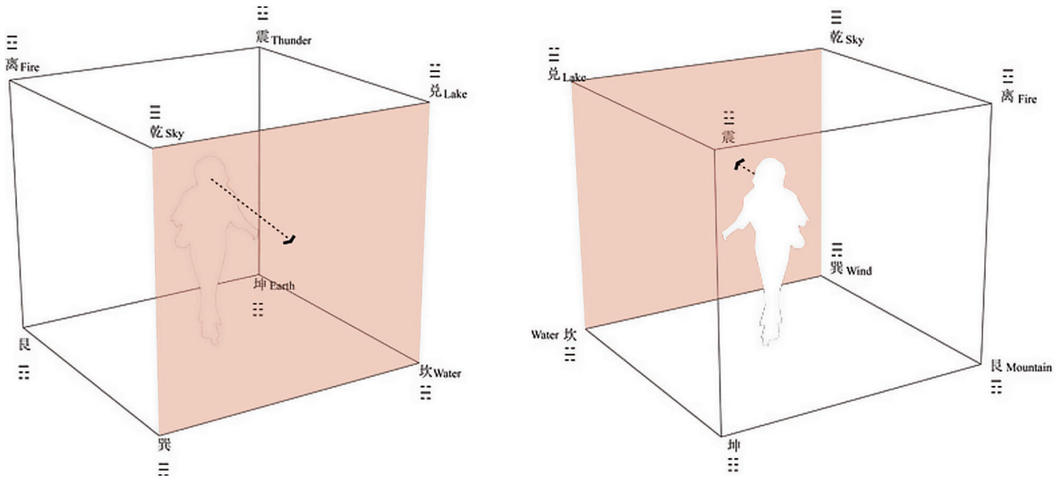


Fig. 1.8

Left: Bagua and their 8 directions in Fengshui theory

1.1.4 Ba Gua (The Eight Trigrams) and Feng Shui

Ba Gua, literally eight symbols, is the principle of the spirit ‘the heaven and the body is one unique being’. There are two possible sources of bagua: The first is from traditional Yin and Yang philosophy. The interrelationships of this philosophy were described by Fuxi in the following way:

The Limitless (Wuji) produces the delimited, and this is the Absolute (Taiji)

The Taiji produces two forms, named yin and yang

The two forms produce four phenomena, named lesser yin, great yin (taiyin also means the Moon), lesser yang, great yang (taiyang also means the Sun).

The four phenomena act on the eight trigrams (ba gua), eight eights are sixty-four hexagrams.

Another philosophical description of the source is the following, attributed to King Wen of the Zhou Dynasty: “When the world began, there was heaven and earth. Heaven mated with the earth and gave birth to everything in the world. Heaven is Qian-gua, and the Earth is Kun-gua. The remaining six gua are their sons and daughters”.

The Bagua is an essential tool in the majority of Feng Shui schools. The Bagua used in Feng shui can appear in two different versions: the Earlier Heaven Bagua, used for burial sites and the Later Heaven Bagua, used for the residences. Bagua generally is a frame of position and direction which has six faces and eight directions corresponding different signs and meanings. The reference frame in the Bagua system is related with the persons inside it. Not like the western reference frame, no matter the person facing which direction, the south always in the south. However, in Bagua system, the sky point is always in the up left direction of the person. If the view point turns, consequently the reference frame turns as well. Again we can read the relation between nature and human in this philosophy, which is human body, the surroundings, the climate and the sky are one unique thing.

1.2 Bioscape and Landiversity

The concept of **Bioscape** describes a new view to our world. Like the word ‘landscape’, comprises the visible features of an area of land [8], bioscape comprises visible biological features. Based on the definition of landscape, an area of land with cultivated and diverse features has bioscape. Combining the physical origins (biological features) and the cultural overlay of human presence (visual features), bioscape reflect the living synthesis of people and place vital to local and national identity.

Bioscape may be further reviewed under cultural bioscape, bioscape ecology, bioscape planning, bioscape assessment and bioscape design.

8. http://en.wikipedia.org/wiki/Landscape

The concept of **Landiversity** suits an area in complex situation with different farming and livestock-raising territories.

The Great Wall Region is perfectly an example of landiversity because the sensitivity in Great Wall Region reflects particularly in relationship between different territories. The Great Wall, from east to west, crosses the plains, mountains and plateau, at the same time passes through consequently the humid, semi-humid climate zones, semi-arid and arid climate zones, which represents the transition not only along the terrain but also the climate.

Landiversity represents also the local-intelligence-diversity. Not only the identity of a land, together with all the physical elements, like sunshine, rainfall, wind, but also traditions of local people, with thousands of years of experimentation and experience, producing high quality food with local intelligence.

1.2.1 Bioscape for Agriculture in Traditional Chinese Intelligence

Simplified	Traditional	Pinyin	English
立春		Lì Chūn	Start of Spring, first
雨水		Yǔ Shuǐ	Rain Water, second (Rainfall Increasing)
惊蛰	驚蟄	Jīng Zhé	Waking of the Insects, third (Spring thunder waking up the insects)
春分		Chūn Fēn	Spring Equinox, fourth
清明		Qīng Míng	Pure Brightness, fifth (The sky is clear)
谷雨	穀雨	Gǔ Yǔ	Grain Rain, sixth (The rain growing the grain)
立夏		Lì Xià	Beginning of Summer, seventh
小满	小滿	Xiǎo Mǎn	Lesser Full Grain, eighth
芒种	芒種	Máng Zhòng	Grain in Ear, ninth
夏至		Xià Zhì	Summer Solstice, tenth
小暑		Xiǎo Shǔ	Lesser Heat, eleventh
大暑		Dà Shǔ	Great Heat, twelfth
立秋		Lì Qiū	Start of Autumn, 13th
处暑	處暑	Chǔ Shǔ	End of Heat, 14th
白露		Bái Lù	White Dew, 15th
秋分		Qiū Fēn	Autumn Equinox, 16th
寒露		Hán Lù	Cold Dew, 17th
霜降		Shuāng Jiàng	Frost Descends, 18th
立冬		Lì Dōng	Start of Winter, 19th
小雪		Xiǎo Xuě	Lesser Snow, 20th
大雪		Dà Xuě	Great Snow, 21st
冬至		Dōng Zhì	Winter Solstice, 22nd
小寒		Xiǎo Hán	Lesser Cold, 23rd
大寒		Dà Hán	Great Cold, 24th

Table 1.1

Left: The Twenty-four Solar Terms Table

'The Twenty-four Solar Terms'

- Traditional Chinese Calendar for Farming

The reason why ancients used to look up sky is to understand the diversification of the climate. We widely believe the physically relation between nature and human exists in 'The Twenty-four Solar Terms'. The solar terms refer to the twenty four time periods and seasons, which are an ancient Chinese invention used to guide agricultural affairs and complement that calendar system. The movement of the planets varies the climate on the earth; the changing of the climate affects the biological diversity. Our biodiversity includes sky, earth and living creature, which be seen as a whole also as a chaos.

Further more, the bioscape point of view is embedded in The Twenty-four Solar Terms. For example, the 3rd term, *Jīng Zhé*, **spring thunder waking up the insects**, and the 6th term, *Gǔ Yǔ* , **grain rain**, the rain growing the grain, are based on the biological features observation. In which the bioscape helps people to understand the laws of the nature. The relations between the thunder and the insects, the rain and the grain, together with other physical elements, make the laws of nature aware-able by human.

This ancient intelligence suggests a very good enlightenment to the development of contemporary agriculture. Nowadays, since bad effects from international, fast food has already been proved, such as obesity, unbalanced in nutrition, 'slow food, local food, organic food' has already been re-valued. One of the basis of local food is using the 'local intelligence'—the traditional knowledge for agriculture. By respecting the local climate rules, we can receive better food according to the thousand year's human experiences.

1.2.2 Landiversity: Ecotone as an Example

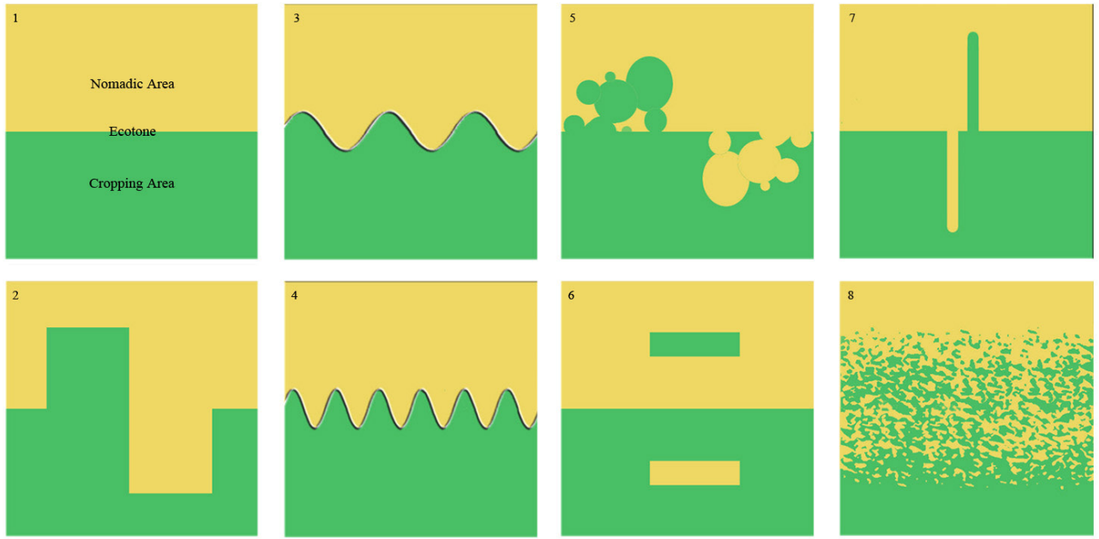


Fig. 1.9

Left: Graph 1 & 2 show simple ecotones with equal and homogeneous surfaces in both cases. Graph 3 & 4 show the edges of forests or banks treated in such a way as to lengthen the ecotone considerably without excessively modifying the environment. Graph 6 shows an inclusion of each medium in the other, creating multiple ecotones, which are shown in a more complex form in Graph 5. Graph 7 shows an ecotone that could have been formed by an animal modifying its environment. Graph 8 shows a common interpenetration of mediums (such as that found at the edge of a forest).

An ecotone is a transition area between two adjacent but different plant communities, such as forest and grassland. It may be narrow or wide, and it may be local (the zone between a field and forest) or regional (the transition between forest and grassland). An ecotone may appear on the ground as a gradual blending of the two communities across a broad area, or it may manifest itself as a sharp boundary line.

An ecotone describes a variation in species prevalence and is often not strictly dependent a major physical factor separating an ecosystem from another, with resulting habitat variability. The ecotone in China is located along the great wall area and it is a transaction zone between cropping area and nomadic area.

Left graph is the schematic representation of different types of ecotones on a square surface. In each case, yellow and green surfaces (schematically two different ecological habitats, eg the savannah and forest, or forest and water, or...) are similar, but the length of the ecotone between them varies greatly from case to case. Note on the impact of the "pattern" of each patch of "color" on the "percolation capacities" of certain species in the landscape ; (compared to the surface considered).

Ecotone can be a perfect example of landiversity. The morphology of the ecotone can be one base to show the diversity of the land and its interactions. The changing of every single line means the changing of the relations for the total system.

Chapter Two: Great Wall Region

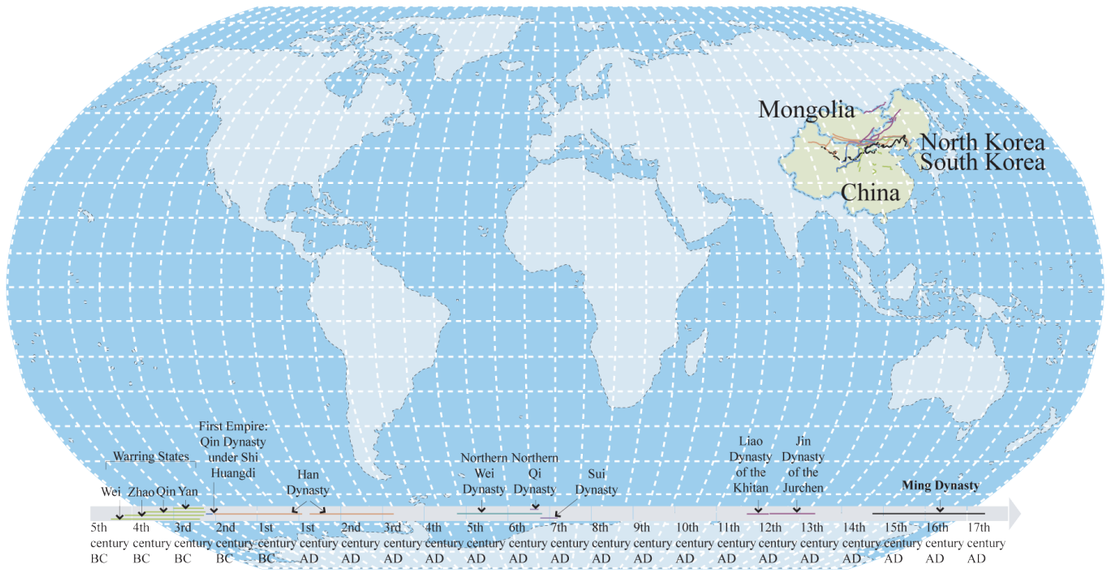


Fig. 2.1

Left: Great Wall Region in World Map

2. Great Wall Region

The Great Wall of China is the world's largest heritage structure built by successive dynasties over more than 2000 years. It separates the myths and the reality of the times, it separates the cold northern grasslands and the fertile southern farmland, it separates pastoralists from the north and farmers from the south. The Great Wall, from east to west, crosses the plains, mountains and plateau, at the same time passes through consequently the humid, semi-humid climate zones, semi-arid and arid climate zones, which represents the transition not only along the terrain but also the climate. Rather, the Great Wall is not a line, but a region of space, we called the Great Wall Region. Natural geographical environment is the basis for the formation of the Great Wall and different stages of various human activities shape the complexity of the territory of the Great Wall Region and after all it is not a single structure at all.(Roberts 2006)

The Great Wall is located in the North part of China, next to the border with Mongolia. It can be seen both as a natural and an artificial line. Firstly, the Wall it is an architecture that divides the Asian landscape into two parts. In the North part of the Wall there are few villages and people live hunting. In the South there are many cities and the main activity is the agriculture. Secondly, it is a natural line that divides different climatic zones, different precipitation levels, big and continue mountains from rare mountains and plains, deserts from wet areas, lakes from rivers.

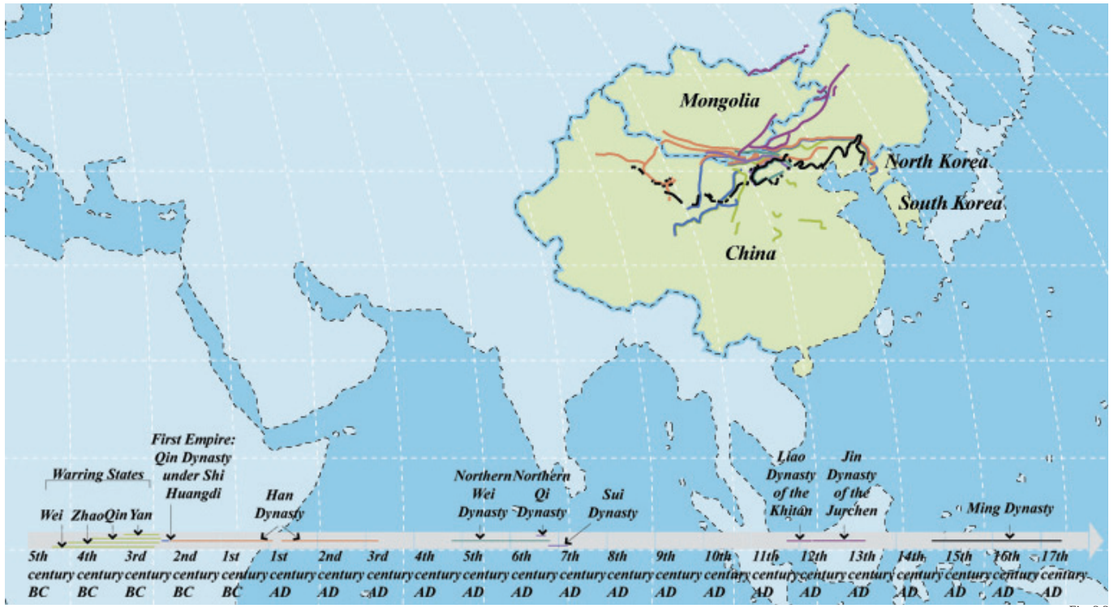


Fig. 2.2

When we read the location transformation of the Walls in different dynasties, it is obvious that:

The confrontation between farming and nomadic is the main reason to build the defense structure which has existed along the “400mm rainfall contours” for long, at the same time forms the ecotone in China. “400mm rainfall contours” is the line divides semi-humid and arid two climate zones, but also the boundary of agricultural with grassland. Farming nation more than once broke the contours into the nomadic area but did not establish long-term governance. However nomadic did the same crossing the ecotone into the central plains, but quickly transformed into the new farming nation and even against the steppe nomads as they were before. So in order to protect from the nomadic irruption, the wall had been built in many dynasties in the history.

Climate changing caused the buffer of the bounder between non-agricultural earth and agricultural earth, the value of land in the ecotone changed at the same time, the dividing line between nomadic and farming moved also, so as the placing of the wall. For example, the Han period is the warm period, contractly Ming is cold period in Chinese history. So compared to the Qin and Han Great Wall, Ming Great Wall located substantially southward.[9]

9, Chen You Xin, The geography background of the Great Wall, education institute journal of Yangzhou, 2002(9), page. 43-47

2.1 Existing States of Research about Great Wall Region and the Focus of the Proposed Research

The research of the Great Wall is one of the topics that China and even all over the world have great concern to. Specially the Great Wall of China entered the Western imagination as both fact and myth at a time of aggressive European trade expansion(Roberts 2006)[10]. Franz Kafka called one of his most famous stories about hierarchy and existential angst The Great Wall of China (Beim Bau der Chinesischen Mauer)(1917)[11]. In the field of historical and geographical study, the well-known Chinese experts and scholars Ge Jianxiong(The Value of the Great Wall)(2001)[12], Luo Zhewen(The Great Wall Of China, translated by Bruce Gordon Doar)(1994) [13] as well as British Royal Geographic Society Member William Edgar Geil(The Great Wall of China)(1909)[14], their books and papers relevant to the subject provide an important foundation of documentary survey and information collection. Most of their researchs give a macro perspective of the lineal heritage with the geographical and historical aspects.

In recent year's researches on the Great Wall can be classified into two main branches: from the perspective of physical geography and from the perspective of human geography. From a historical perspective of physical geography: the relationship between space and the environment in the towns of Great Wall Region; comprehensive analysis of the construction of the Great Wall in the historical periods; the formation of integrated resources and the historical periods of these natural resources development and utilization in the Great Wall region; the Great Wall Region's population flows and the urban population aggregation rule. From a historical perspective of human geography: The Great Wall Region as the boundaries of agricultural areas and pastoral areas; the Great Wall Region as the history of territory, a political subdivision of the formation and change; geographical characteristics of the distribution of settlements along the Great Wall.

These areas of researches mostly start from a macro perspective, however, studies about a certain period of small-scale space are rare. From large scale view that the Great Wall crosses the plains, plateaus and mountains, and if the study zones into a rather small scale, any section of the Great Wall is located in a plain or a mountainous area or a highland. The man-made construction separated the unique landscape into north and south, and the impact of that north-south dividing line to its internal and external sides of the natural landscape, cultural landscape is the interest of the research. As a typical section of the wall the east section of Ming Dynasty Great Wall meets the remarkably difference of the natural landscape and cultural landscape between the north and south sides, so it is the main case study in the research to discuss an appropriate sustainable development of the rural and urban territory of the Great Wall Region.

10. Claire Roberts, Geremie R Barme (2006) Introduction. The Great Wall of China, Powerhouse Publishing, Sydney
11. Franz Kafka, Beim Bau der Chinesischen Mauer (1931) (The Great Wall of China). Gustav Kiepenheuer Verlag, Berlin
12. Ge Jian Xiong (2008) Unity and Division, Zhonghua Book Company, Shanghai
13. Luo Zhe Wen (1994) The Great Wall of China, China Architecture & Building Press, Beijing
14. William Edgar Geil (1909) The Great Wall of China, Original volume from Cornell University Library, Nabu Press newest edition in 2010

Fig. 2.3

Left: GIS Ecotone in China, the yellow part is the ecotone in China, area 813459,06 km^2

2.2 Territory Feature of Great Wall Region – Ecotone

The Great Wall of China is a series of stone and earthen fortifications in northern China, built originally to protect the northern borders of the Chinese Empire against intrusions by various nomadic groups. Several walls have been built since the 5th century BC that are referred to collectively as the Great Wall, which has been rebuilt and maintained from the 5th century BC through the 16th century. One of the most famous is the wall built between 220–206 BC by the first Emperor of China, Qin Shi Huang. Little of that wall remains; the majority of the existing wall was built during the Ming Dynasty.

The Great Wall stretches from Shanhaiguan in the east, to Lop Nur in the west, along an arc that roughly delineates the southern edge of Inner Mongolia. The most comprehensive archaeological survey, using advanced technologies, has recently concluded that the entire Great Wall, with all of its branches, stretches for 8,851.8 km (5,500.3 mi). This is made up of 6,259.6 km (3,889.5 mi) sections of actual wall, 359.7 km (223.5 mi) of trenches and 2,232.5 km (1,387.2 mi) of natural defensive barriers such as hills and rivers.

Natural geographical environment is the basis for the formation of the Great Wall and different stages of various human activities shape the complexity of the territory of the Great Wall Region and after all it is not a single structure at all. The most important characteristic among them is the Great Wall of China identified the ecotone zone of China.

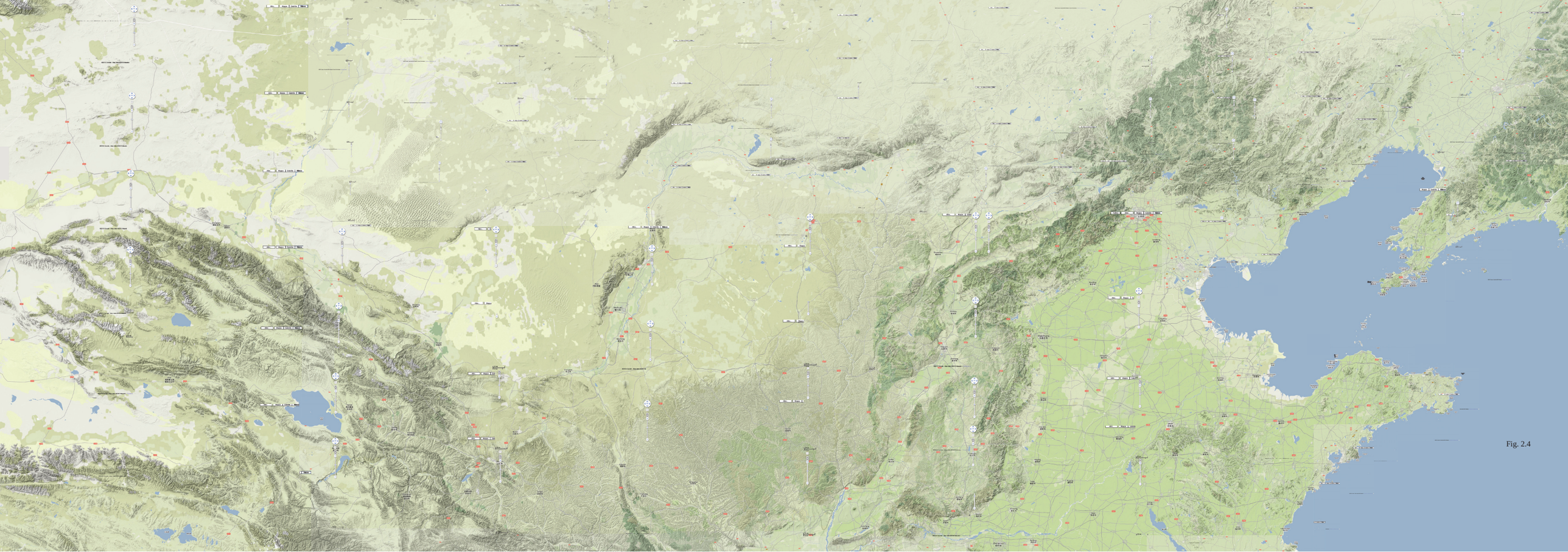
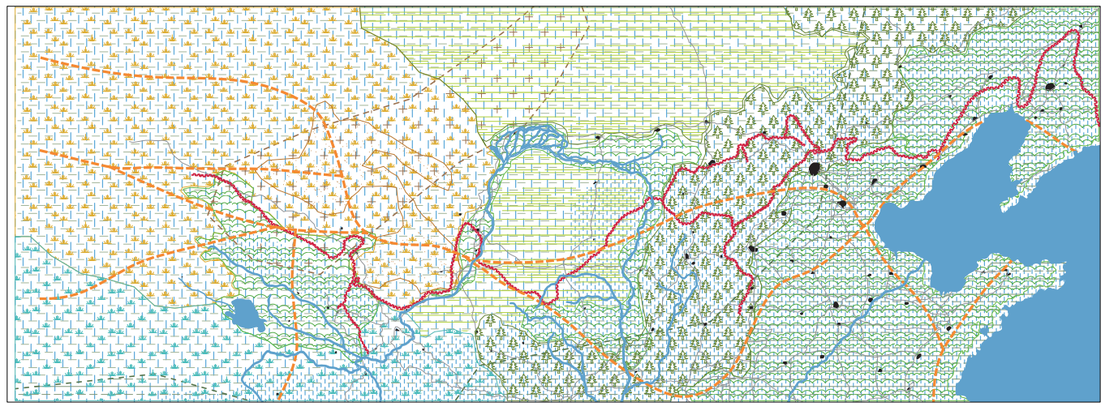


Fig. 2.4



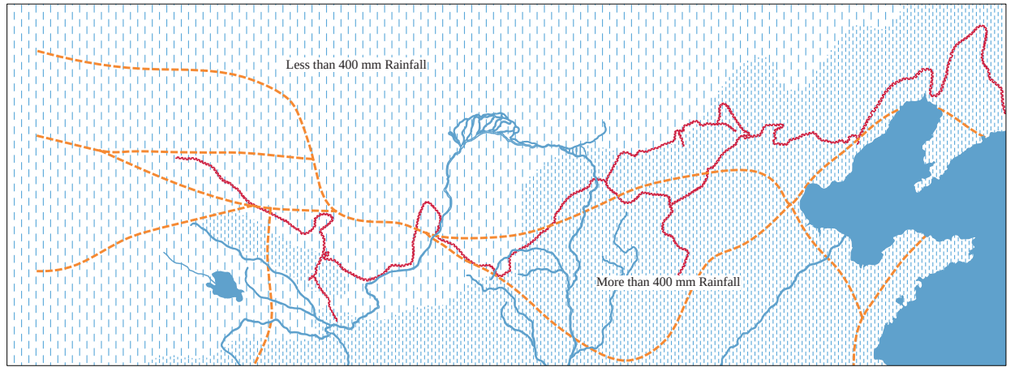
Great Wall
Silk Road
Yellow River

Fig. 2.5

Left: The diagram of complexity of ecotone in China

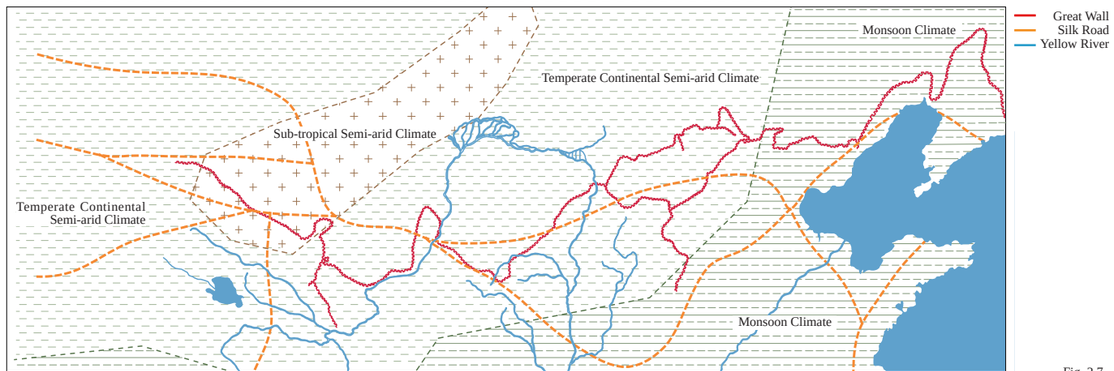
The Great Wall Region identified the ecotone zone of China, in separating the nomadic area and the farming area. The ecotone is a very sensitive zone in agriculture.

Firstly, it matches the 400mm Precipitation Line, which defined the different climate situation for grassland and farming land. Precipitation is the basic element for agriculture. In history, nomadic groups and farming people both had chance in dominating the other, but both of them lost in the end. 400mm Precipitation Line is certificated as the natural border.
Secondly, the ecotone zone defined by Great Wall classifies 2 main different producing and living style. On the north of the ecotone live the nomadic groups. On the south of the ecotone live the farming peoples. There is an ancient poem to describe this separation: ‘On the north of the Great Wall, between desert and void, it is cold and windy; people grazing for eating and dressing fur; they moving all the time and living in carriages and horses. On the south of the Great Wall, it is rainy and warming; people eating on cultivating and dressing silk or linen; they have palaces and houses; they have cities.’
Thirdly, the changing of the ecotone means re-structuring the ecosystem. In thousands years evolution, both the grazing ecosystem and the farm ecosystem has their own complete biological ecosystem. Any ‘revolutionary’ changing can have unknown effects on the ecosystems.



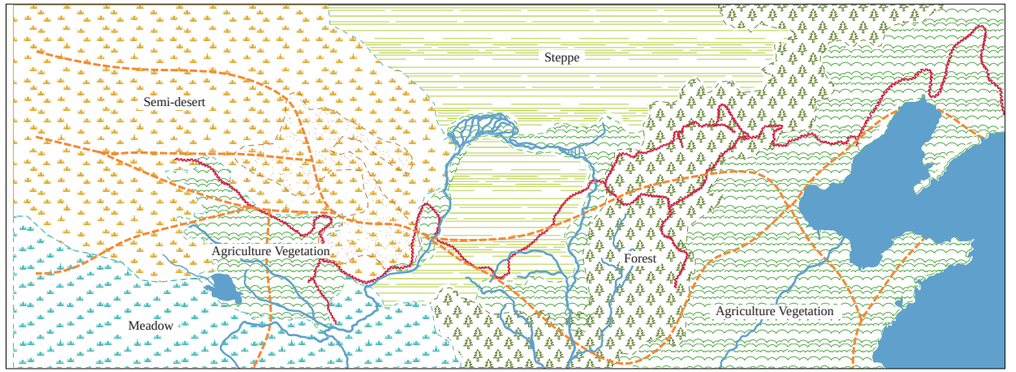
Up: 400 mm Precipitation line

Fig. 2.6



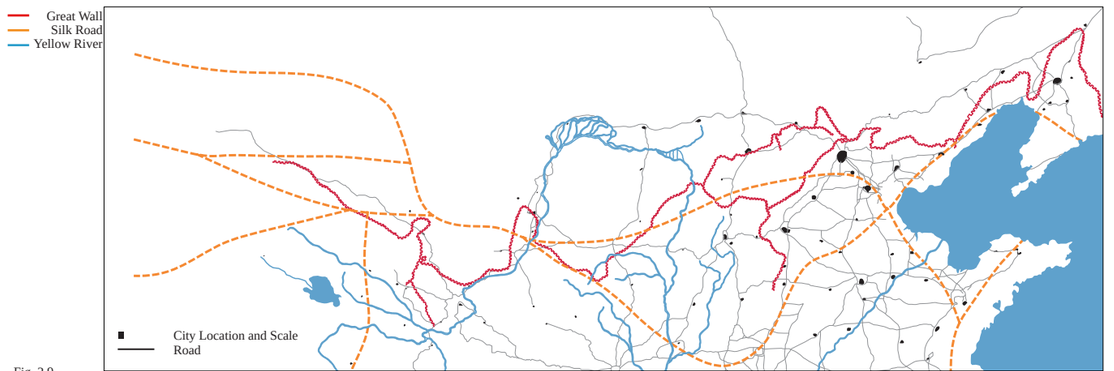
Down: Climate Zones in Great Wall Region

Fig. 2.7



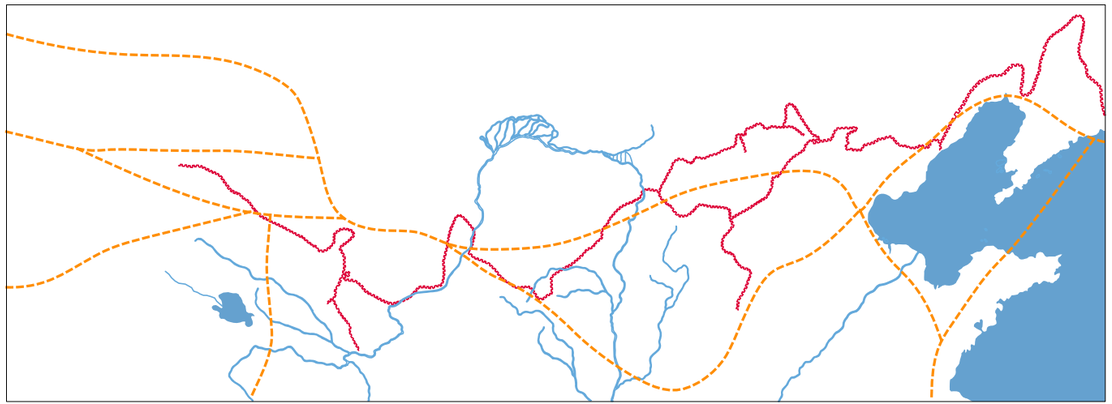
Up: Agriculture Zone in Great Wall Region

Fig. 2.8



Down: Cities distributed in the Great Wall Region

Fig. 2.9



Great Wall
Silk Road
Yellow River

Fig. 2.10

2.3 Three Linear Elements in Great Wall Region

The Great Wall Region contains three very important linear elements which string different natural landscape and cultural landscape.

The Wall

The Great Wall as an artificial element crosses different climate zones, different topography, different natural and cultural landscape. The materials and the construction methods are representing the difference. Stones and dry-laid are used in desert, brick masonry are used along the cities and rammed earth are used in the countryside, etc.

As a medium between the intelligence of human being and natural resource, the Great Wall showing the good relationship between man and nature.

The River

The Yellow River as a natural element interlace with the Great Wall. The Yellow River was called the Mother River of China, along which lived the ancestors of China – Yan-Huang clan. So it is the origin of all the Chinese civilization.

The Road

The Silk Road as a culture element forms a network around the Great Wall and the Yellow River. The Silk Road is an extensive interconnected network of trade routes across the Asian continent connecting East, South, and Western Asia with the Mediterranean world, as well as North and Northeast Africa and Europe. The Silk Road gets its name from the lucrative Chinese silk trade, a major reason for the connection of trade routes into an extensive trans-continental network.[15][16][17]

The Silk Road brings great cultural exchanges and technological development. The Silk Road not only expanded the world map but also transmitting Buddhism, artistic and bringing modern railway network.

15. Approaches Old and New to the Silk Roads" Vadime Eliseeff in: The Silk Roads: Highways of Culture and Commerce. Paris (1998) UNESCO, Reprint: Berghahn Books (2009), pp. 1-2. ISBN 92-3-103652-1; ISBN 1-57181-221-0; ISBN 1-57181-222-9 (pbk)
16. Waugh, Daniel. (2007). "Richthofen "Silk Roads": Toward the Archeology of a Concept." The Silk Road. Volume 5, Number 1, Summer 2007, p. 4.
17. Hill, John E. 2003. "Annotated Translation of the Chapter on the Western Regions according to the Hou Hanshu." 2nd Draft Edition.

Chapter Three: Design of Chinese Pavilion

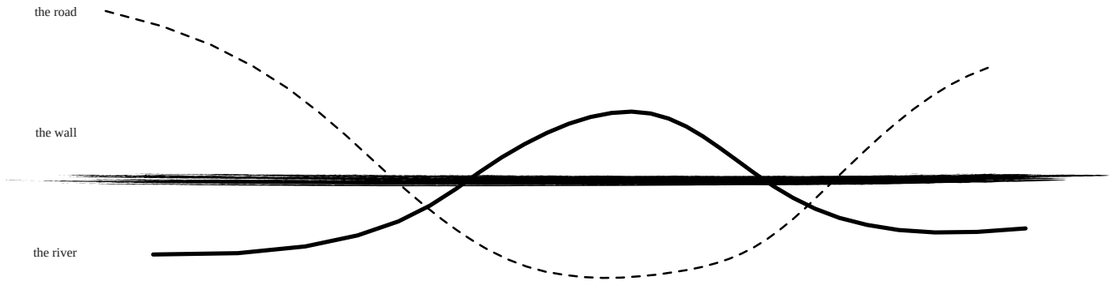


Fig. 3.1

Left: Conceptial drawing of the three main elements

Great Wall, Yellow River and Silk Road

Three meaningful lines cross the Great Wall Region :
the Yellow river (natural line), the Great Wall (artificial line) and the Silk road (cultural line).

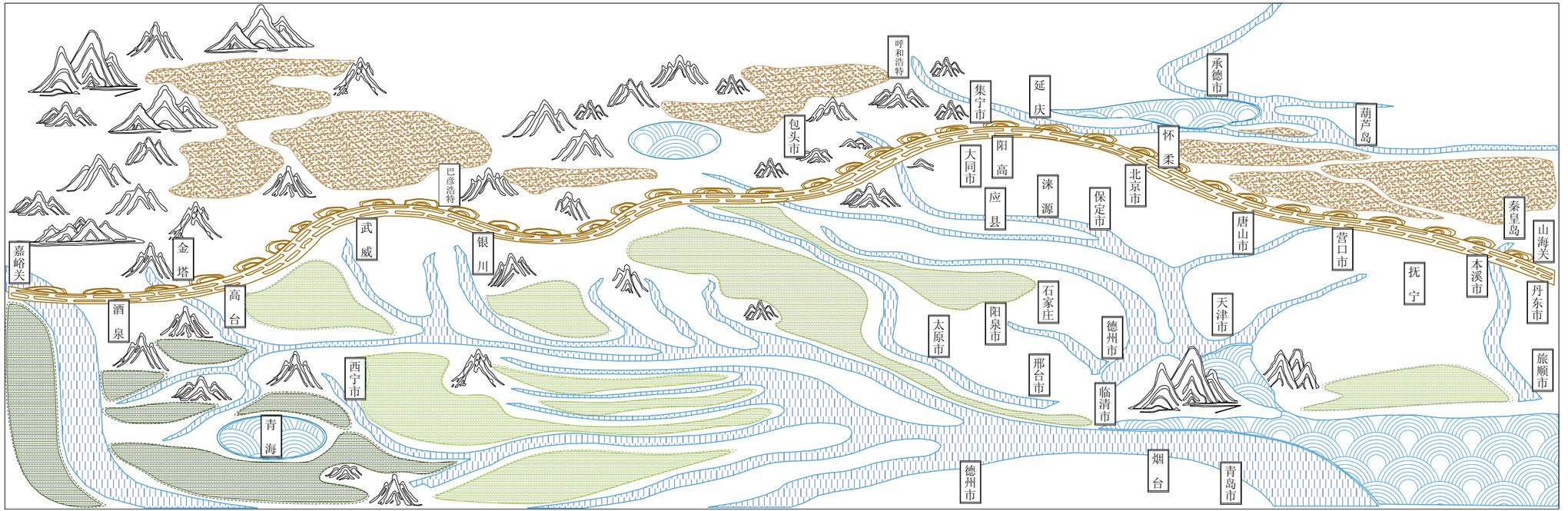


Fig. 3.2

Landscape along the Great Wall

This is a synthetized drawing of a general view of the Great Wall Region landscape. It represents the distribution of geographical land form (lakes, rivers, hills, mountains) with the culture landform (cities, cultivated yards, animal husbandry areas) along the linear structure - the Great Wall.

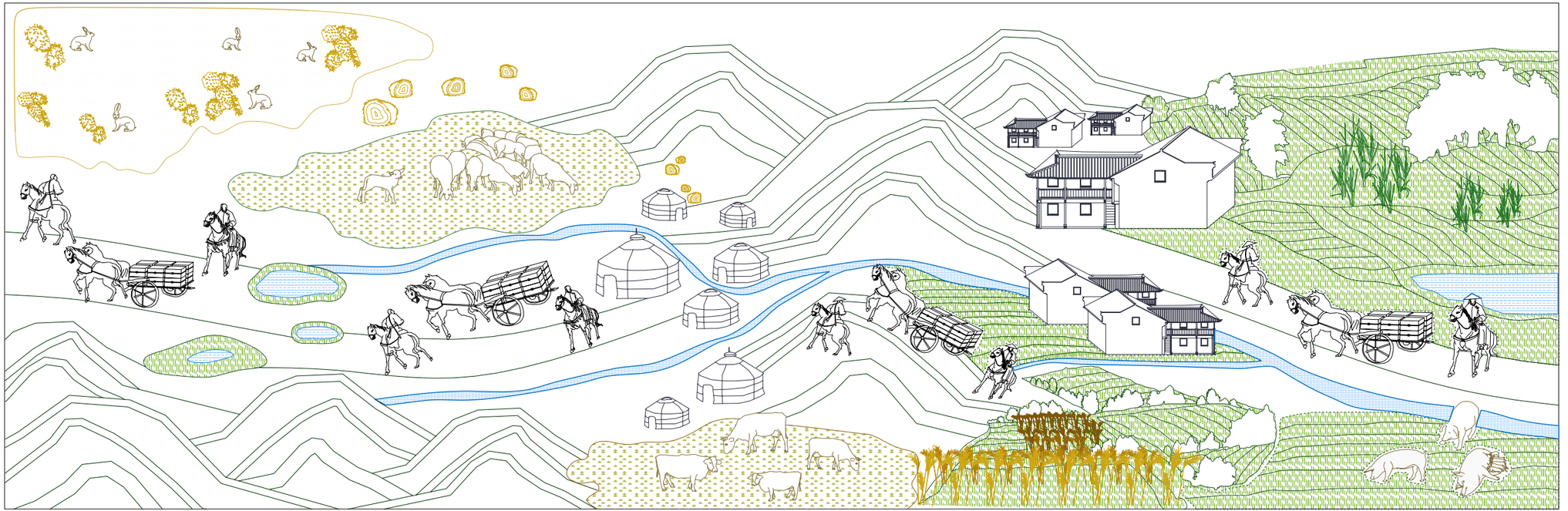


Fig. 3.3

Landscape along the Silk Road

This is a synthetized drawing of a general view of the Silk Road landscape. It represents the distribution of consumption of natural resources (water, rice, meat) with the culture resources (cities, merchant markets, houses) along the linear culture route - the silk Road.

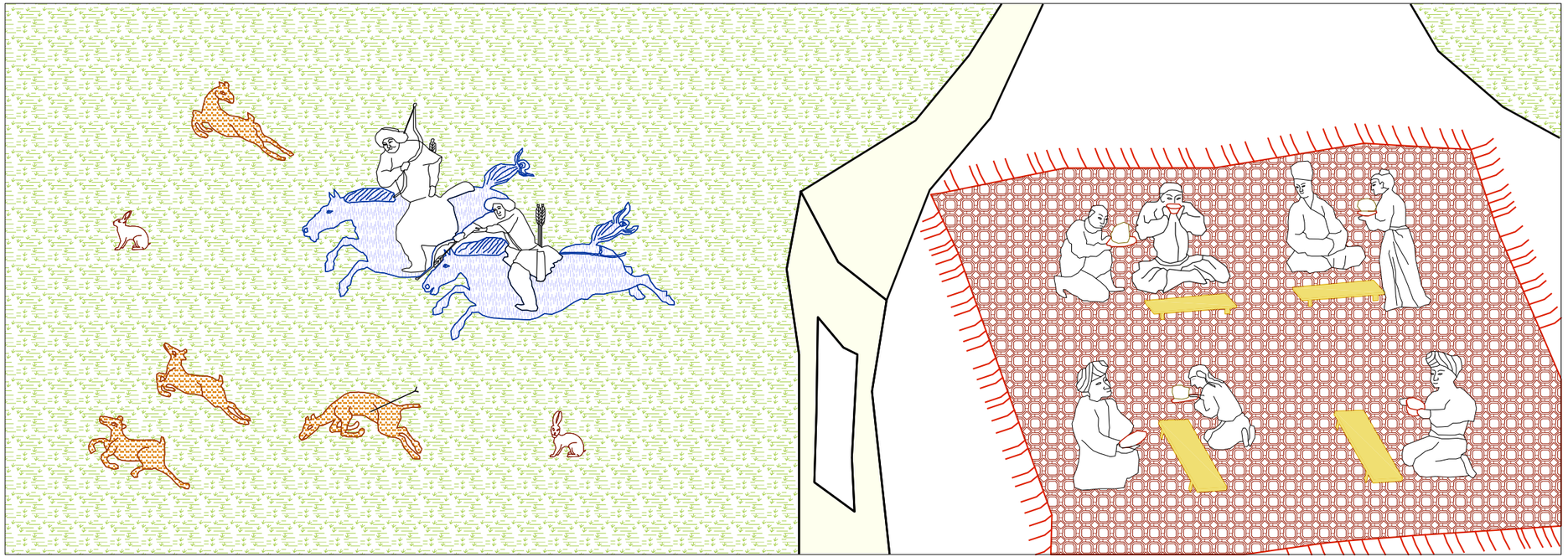


Fig. 3.4

Life Style: Steppe Area

People: Nomads nation
Geography: Grassland, rock, desert, mountain
Food suply: Hunting, livestock, animal husbandry
Architecture: Tent with materials wool, leather, grass
Dining furniture: Carpets for sitting, low and small rectangular wooden table for dishes and cups

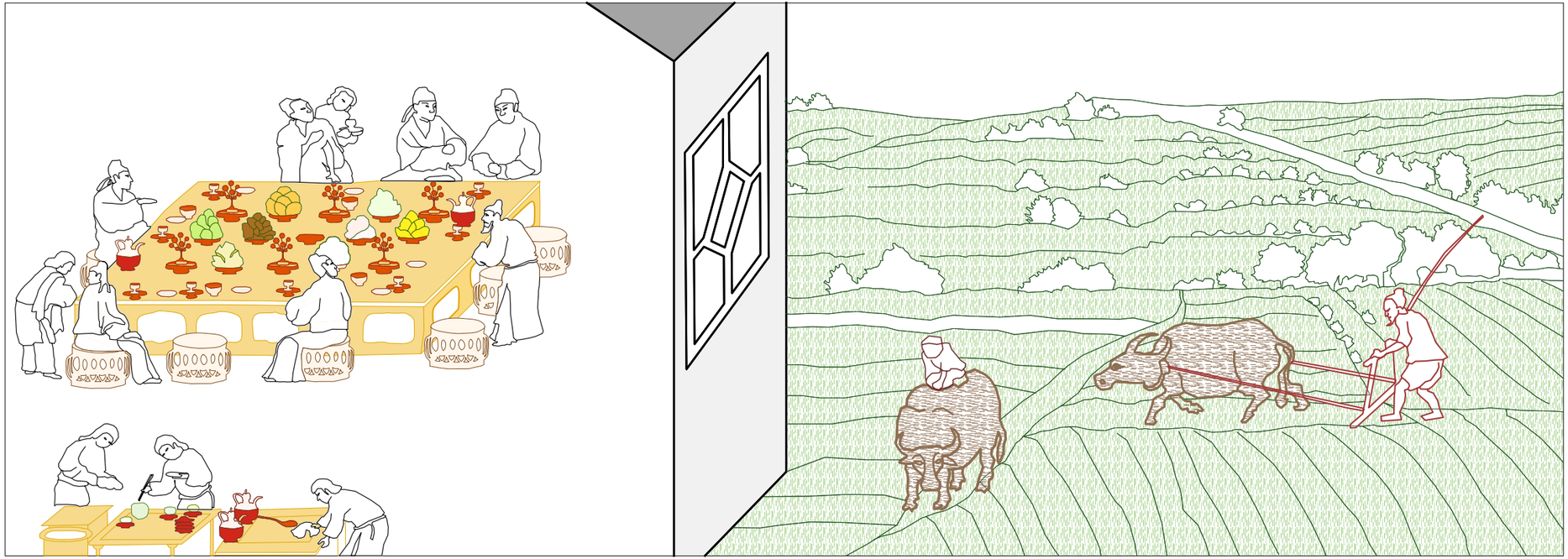


Fig. 3.5

Life Style: Plain Area

People: Plain nation
Geography: Wetland, hill, natural river system
Food suply: Cultivation, animal capitive
Architecture: House with material wood or bamboo
Dining furniture: Wooden or stone chaire for sitting, high and big rectangular wooden table for dishes and cups

Fig. 3.6

Fig. 3.7

Left: Drawing on Dunhuang grottoes and Movie picture about Kun opera performance to represent the lightness of living creature

3.2 Study the Views of Landscape from Contemporary Movies and Poems

Why we study the contemporary movie screen and poem?

Because traditional drawing of person with flying clothes represent the lightness of living creature in China, which we could find the same role and wearing in the contemporary opera performance and movie images. So our approach is that we collected the views from Chinese moives related with poems as the main resources and references to the design of Chinese pavilion in Milan Expo. As a resulte ancient drawings are the inspiration of contemporary screen, the contemporary screen is our inspiration of design.

Poem:

Desert
The minority-flute needn’t sing the Weeping Willow;
the vernal wind could not pass the Frontier by blow.
Wang Changling. Tang Dynasty

Movie image:

Desert
image from movie “Ashes of time”
Wong Kar-wai, 1994

Right page and next two pages: images Desert, from movie “Ashes of time”

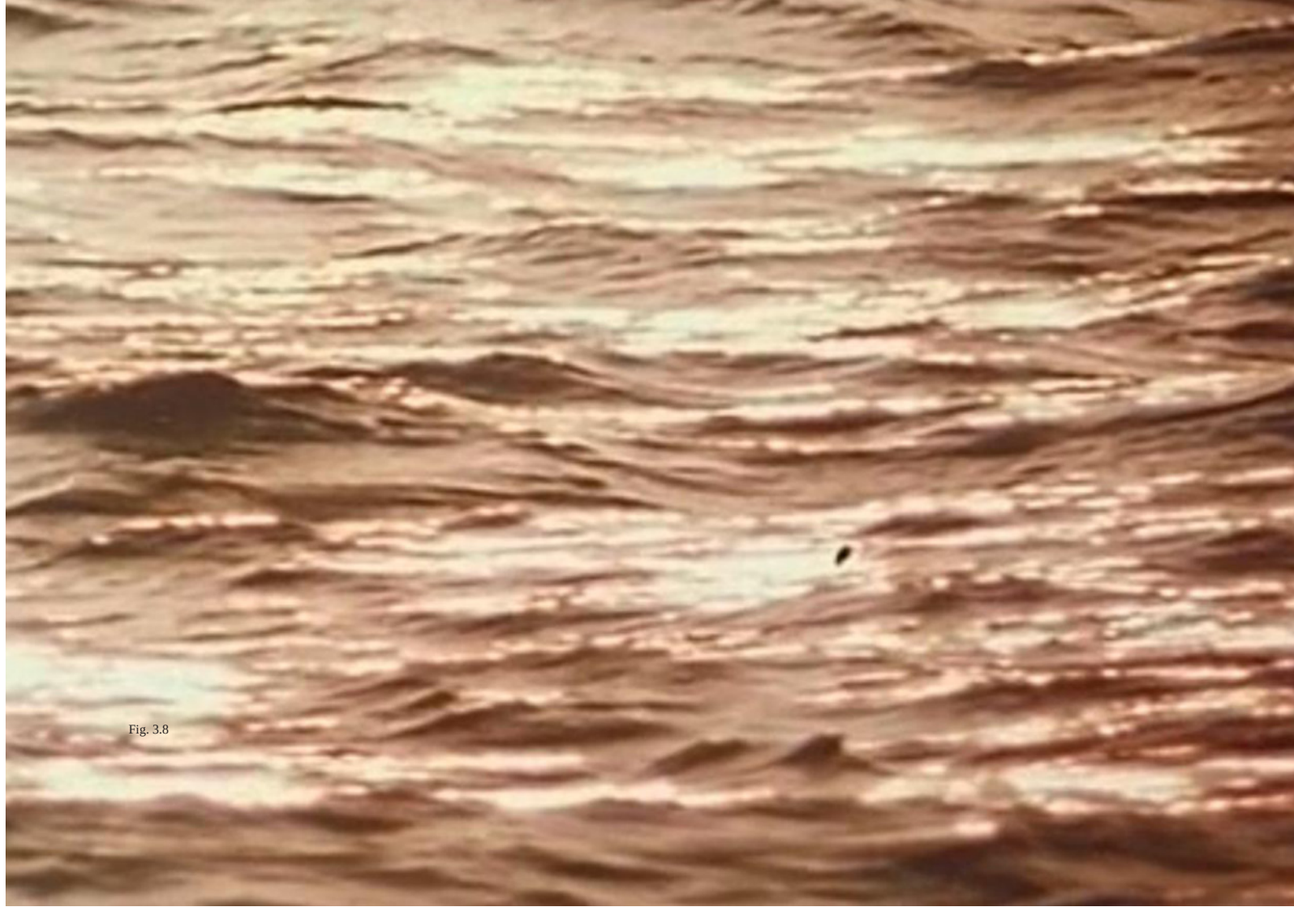


Fig. 3.8

Fig. 3.9

Fig. 3.10

Poem:

Bamboo
No figures you can see in this empty mountain, but you can hear someone talking.
The shadows of the deep pines reflect on the moss.
Wang Wei, Tang Dynasty

Movie image:

Bamboo
image from movie “Crouching tiger, hidden dragon”
Ang Lee, 2000

Right: image Bamboo, from movie “Crouching tiger, hidden dragon”

Fig. 3.11

Poem:

Corn
Like the big dome is the sky,
covering the prairie nigh.
The lofty sky is deeply blue,
the vast wildness not seen through.
Folk Songs, Northern Dynasties

Movie image:

Corn
image from movie “Red sorghum”
Zhang Yimou, 1987

Right page and next two pages: images Corn, from movie “Red sorghum”

Fig. 3.12

Fig. 3.13

Fig. 3.14

Movie image:

Flags
image from movie “Hero”
Zhang Yimou, 2002

Right: image Flags, from movie “Hero”

Fig. 3.15

Poem:

Lantern
In night lights a thousand trees in bloom by the spring wind, ornate carriages drawn by gallant horses.
Filling the boulevards with a sweet fragrance and voice of the magic flute flowing.
All night the fishes and the dragons danced.
Butterflies, willows, charms of gold,
Gone, the angelic laughter, that subtle perfume.
I'd searched for her a thousand times in the crowds
Perchance I turned and there she was where lights were few and dim.
Xin Qiji, Song Dynasty

Movie image:

Corn
image from movie "Raise the red lantern"
Zhang Yimou, 1991

Right : image Lantern, from movie "Raise the red lantern"

Fig. 3.16

Movie image:

Ink
image from cctv ink commercial video
cctv, 2009

Silk
image from movie “Ju Dou” and “Hero”
Zhang Yimou, 1990 and 2002

Right page: image ink, from cctv ink commercial video and next two pages: images Silk, from movie “Ju Dou” and “Hero”

Fig. 3.17

Fig. 3.18

Fig. 3.19

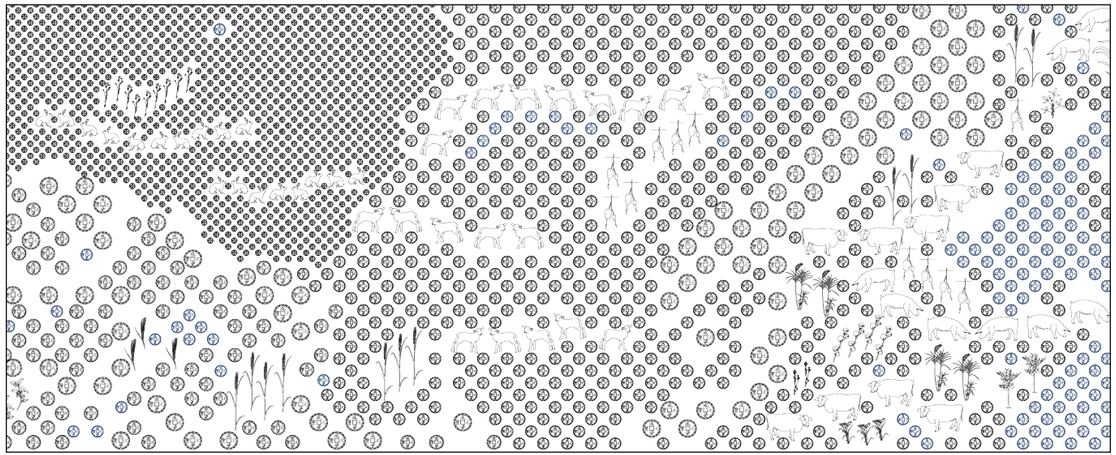


Fig. 3.20

18. Kengo Kuma I wan to erase architecture, writting
19. CCTV ink advertisement 2000
Left: Project Ingredients

Fragmentation, particularization, pixellization

The Great Wall Region crosses three different climates and it is made of three main lines: great wall, yellow river and silk road. The three elements divide the region into two geometric areas: nomadic and cultivated. The problem that we are facing during the design of the Expo 2015 Chinese Pavilion is how to represent the characters of the farming condition. We use transient visions from regional characters of the Great Wall Region to support our landscape and architectural design. Firstly, we fragment[17] the macro cultivated territory into different stripes made by particles following a sequence of dry to wet, hilly to flat. At the end the boundary lines between stripes become invisible with a fluently transforming into the other one. As the principle method of the Chinese drawing “from formless to object, from bounded to infinit”[18], we divided the 120 m length of the plot area into 3 m stripes, attributing to each one a specific density and connecting them with the multiplicity of the territory. From tangible the stripes became formless, thanks to the fragmentation and subsequently particularization and pixellization of the crops. The plan allows a free movement along the site. Silk stripes act as guides for the pavilion experience, suggesting the direction.

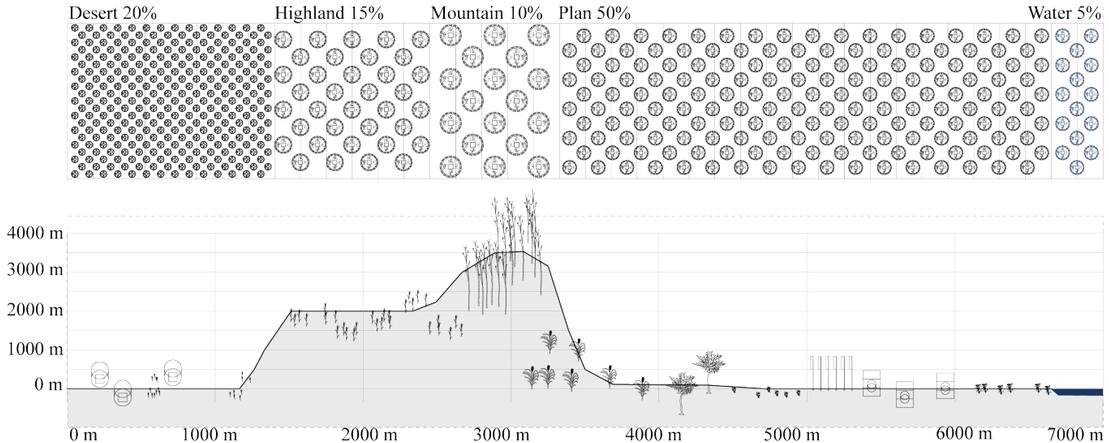


Fig. 3.21

The geographic classification of the Great Wall region is mainly done by the territory feature with the contour from west to east. Respectively 20% of region area is desert in a relatively low height, 15% highland in around 2000 meters height, 10% mountainous area with more than 3000 meters height and half of the whole region is plain close to the east of the Great Wall region. 5% water and wet land is located near the sea entrance of the yellow river. Also the geographic characteristic creates the micro climate feature and difference of biodiversity. We select the common plants and crop of each category and focus on the relationship among the lifestyle, the biodiversity, geography and the climate.

Left: Expo 2015 Chinese Pavilion Ingredients and Great Wall Region Section

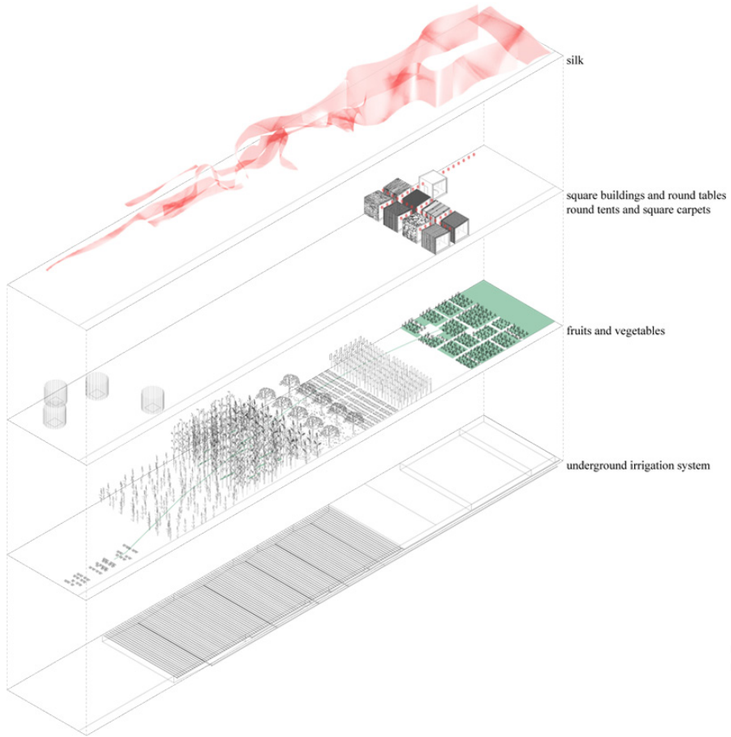
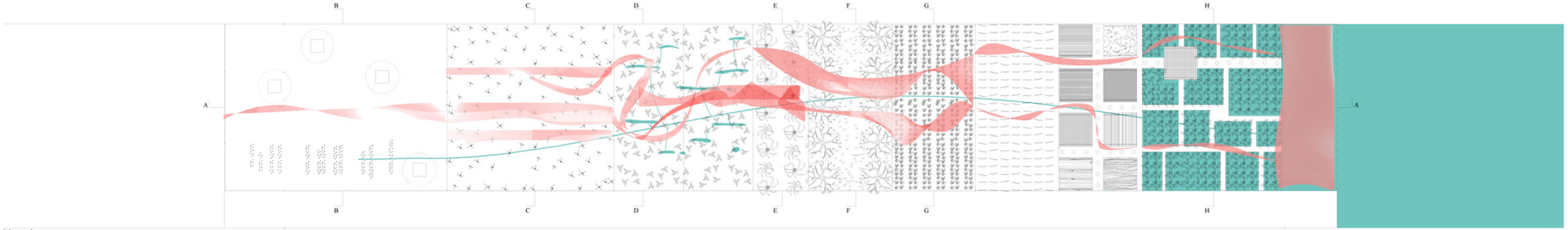


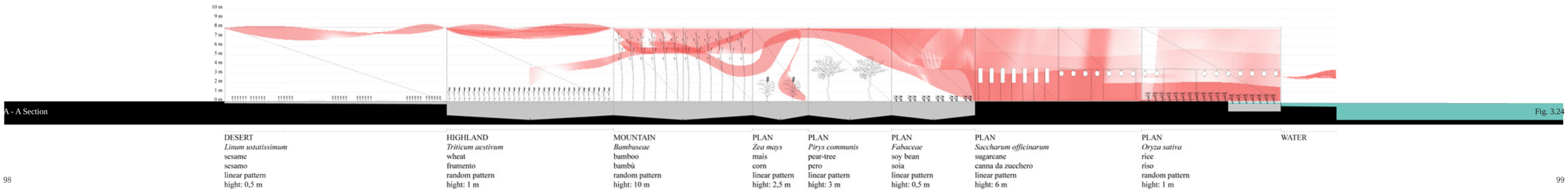
Fig. 3.22
Right: Axonometric View of the Great Wall Region Pavilion

Fig. 3.23

isometric view, 1:150
Sara Lora, Ying Shao, Wenjia Tian

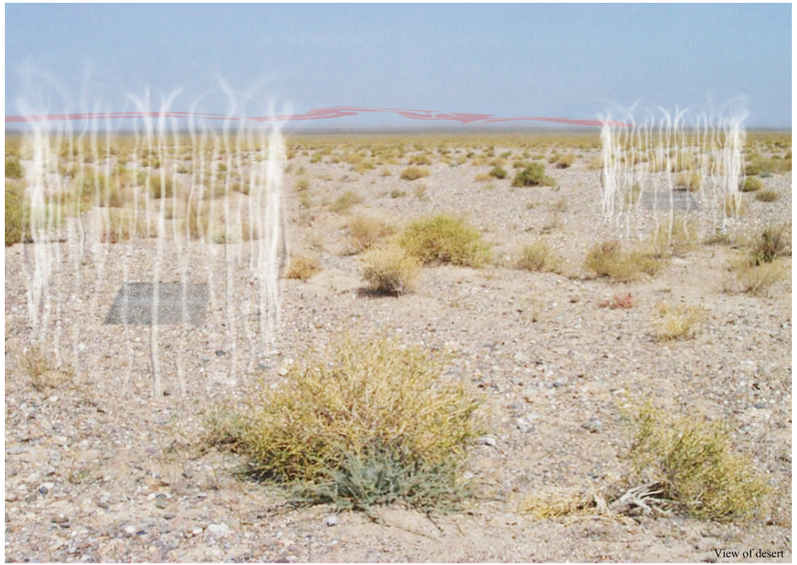


Masterplan

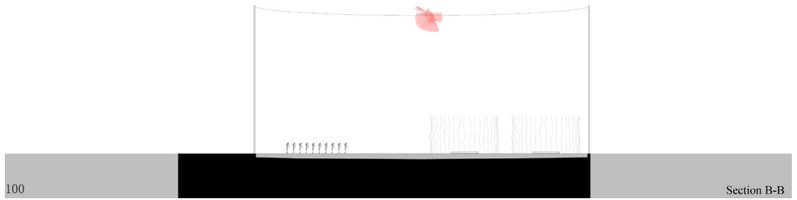


A - A Section

Fig. 3.24



View of desert

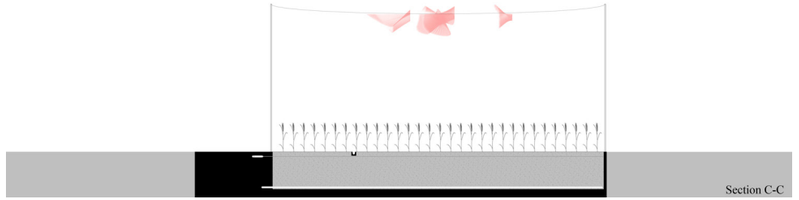


Section B-B

Fig. 3.25

Fig. 3.26

View of wheat field



Section C-C

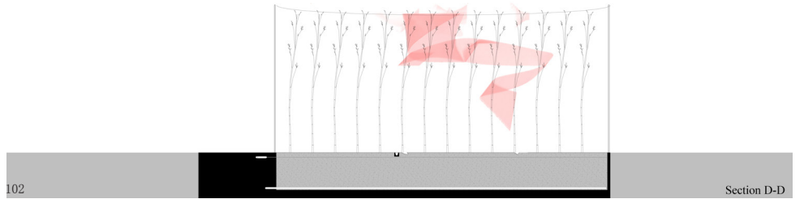
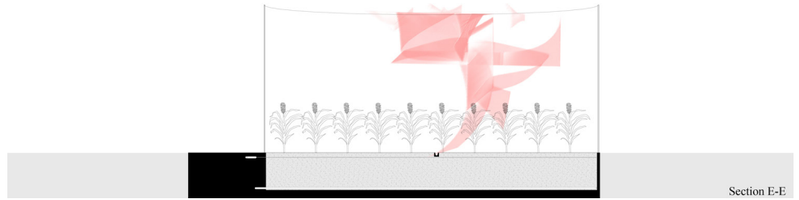
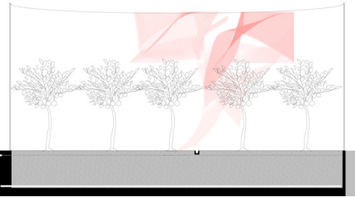


Fig. 3.27

Fig. 3.28



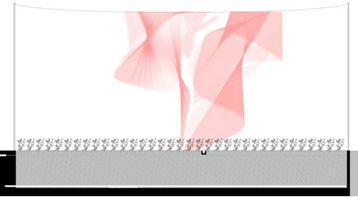
View of pear garden



Section F-F

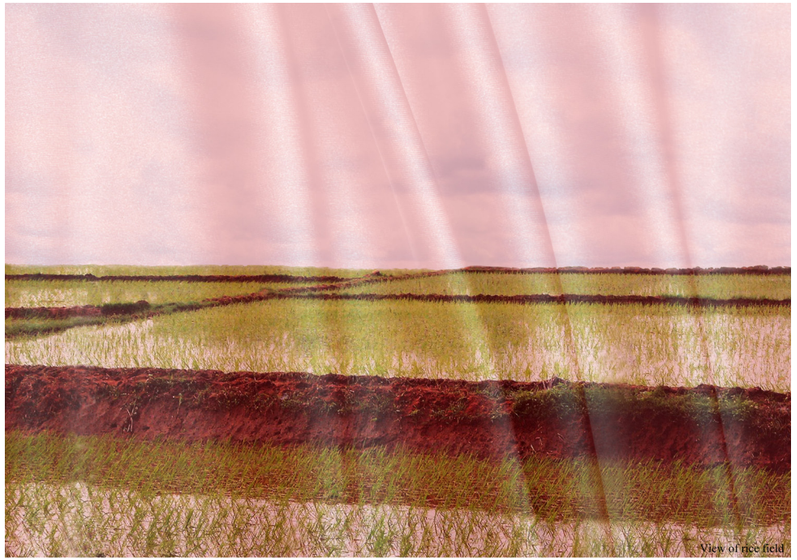
Fig. 3.29

View of soybean field

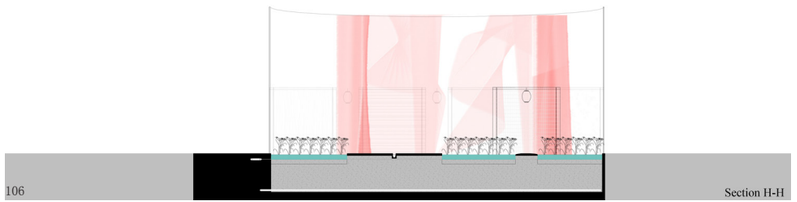


Section G-G

Fig. 3.30



View of rice field



Section H-H

Fig. 3.31

3.4.2 Irrigation System Design

Irrigation system, tipical axonometric section of a basin

1. pipe bringing water to the area (Ø= 100 mm)
2. faucet to control the irrigation according to the different crops
3. pipe distributing the water to the irrigation pipes (Ø= 100 mm)
4. irrigation pipes (Ø= 20 mm)
5. drain pipe collecting water
6. water collector
7. waterproof membrane

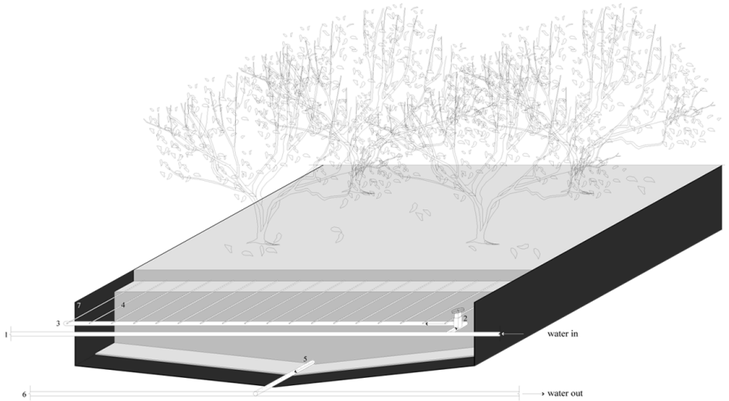


Fig. 3.32

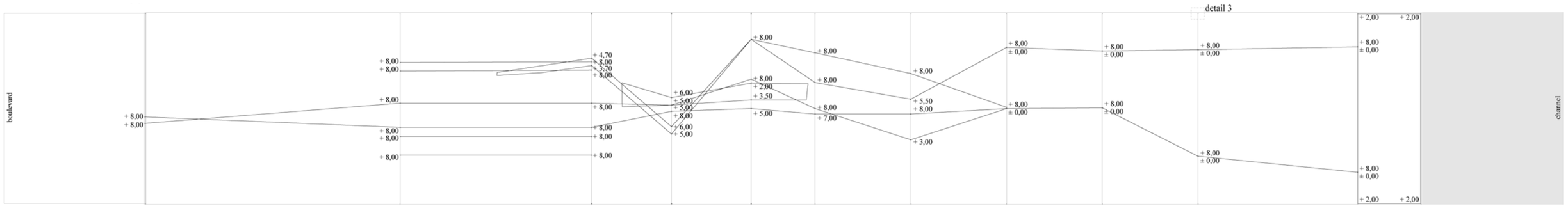

detail 3
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Fig. 3.33

Fig. 3.34

3.4.4.1 Tent in the West

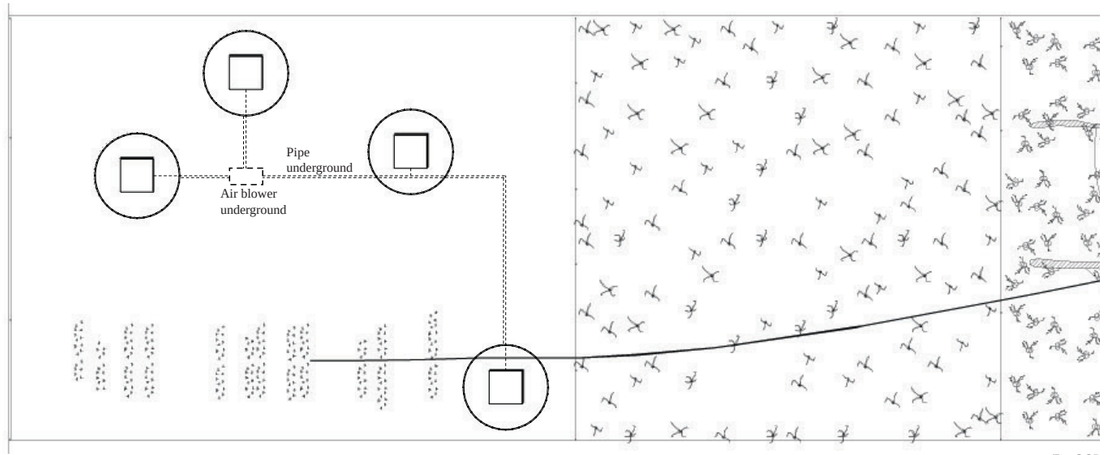


Fig. 3.35

Fig. 3.36

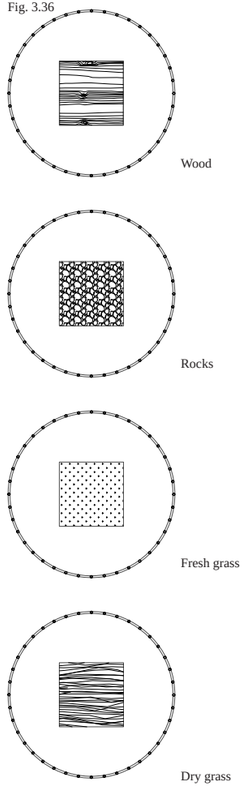


Fig. 3.37

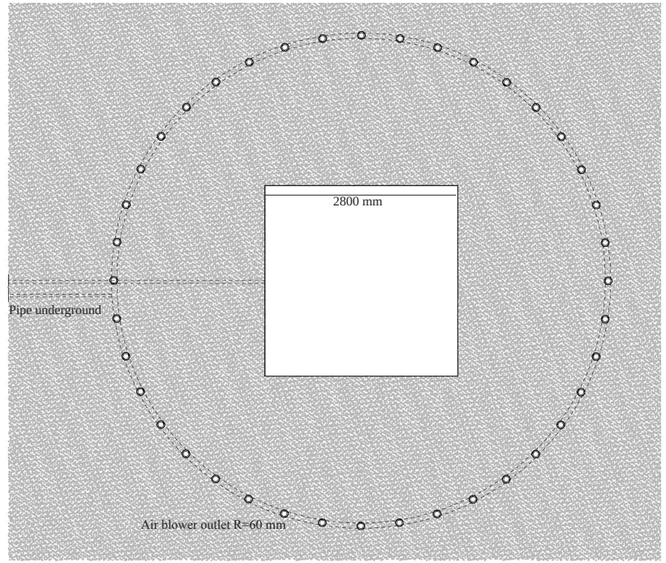


Fig. 3.38

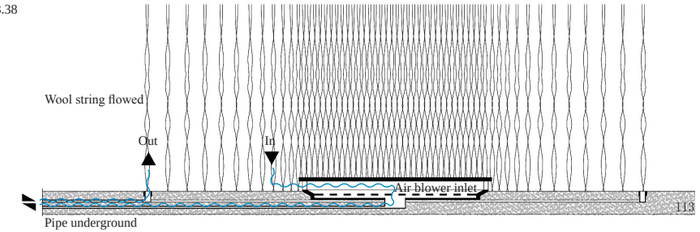


Fig. 3.39

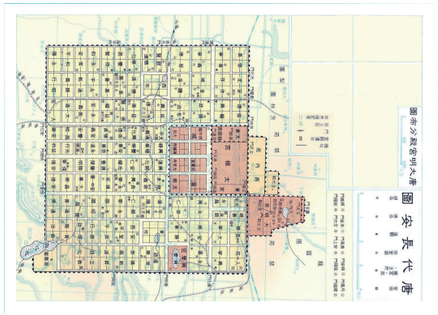


Fig. 3.40 Map of Chang'an Capital City Tang Dynasty (618-907 A.D.)

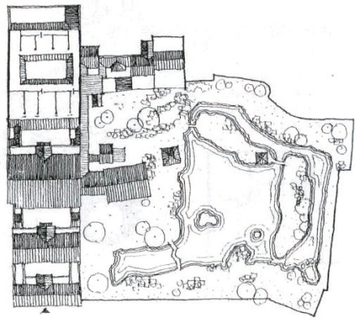


Fig. 3.41 Plan of Bi's house in Jingde Rd. Suzhou, China, fifteen century

3.4.4.2 House in the East

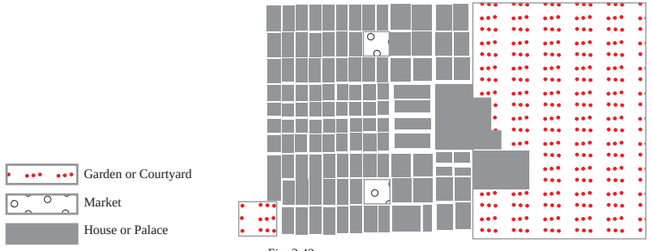
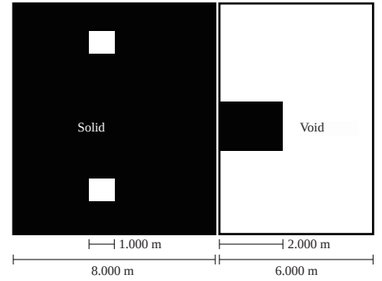


Fig. 3.42



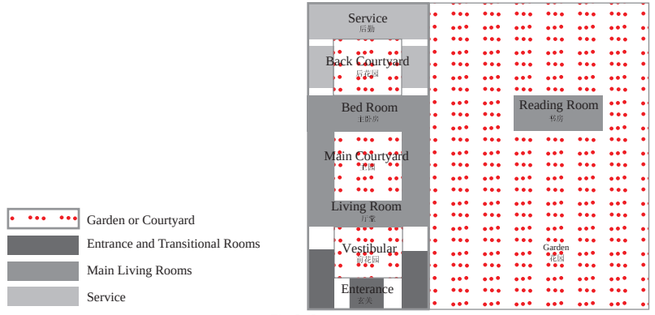
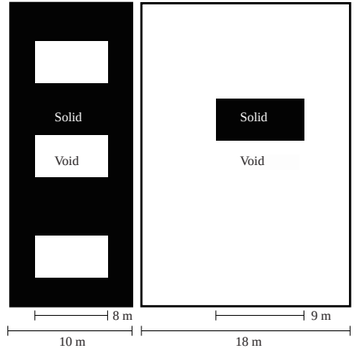


Fig. 3.43



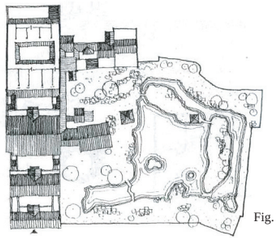


Fig. 3.44

Typical plan of Chinese tranditional private house with courtyard and garden

+

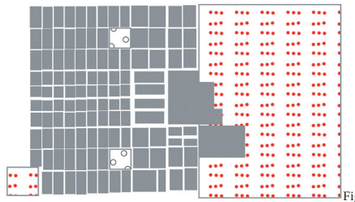


Fig. 3.45

Typical plan of Chinese tranditional urban context with market and public garden

=

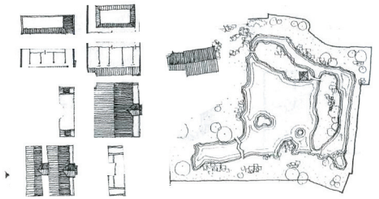


Fig. 3.46

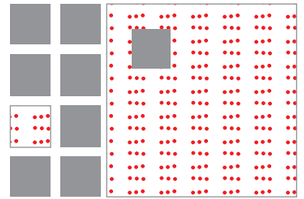


Fig. 3.47

Functional private rooms and open spaces in a tranditional house scale are isolated and then re-connected according to the Chinese northern urban context, in order to hybridized urban scale and courtyard housing scale together.

Garden or Countryside

House or Palace

Garden or Courtyard

House or Palace

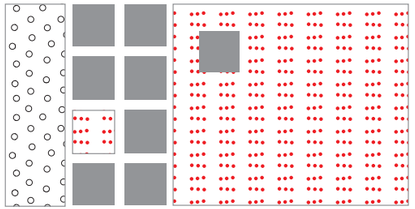


Fig. 3.48

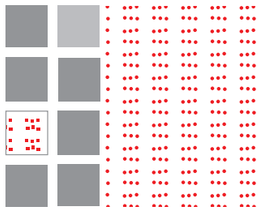
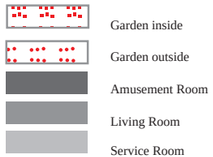
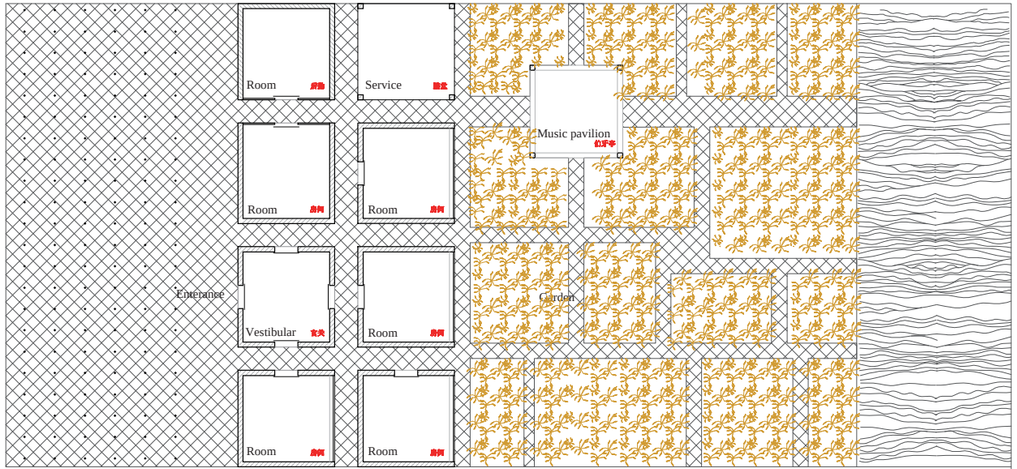


Fig. 3.49





Groundfloor Plan

Fig. 3.50

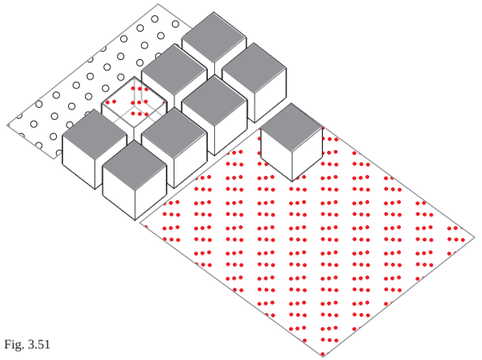


Fig. 3.51

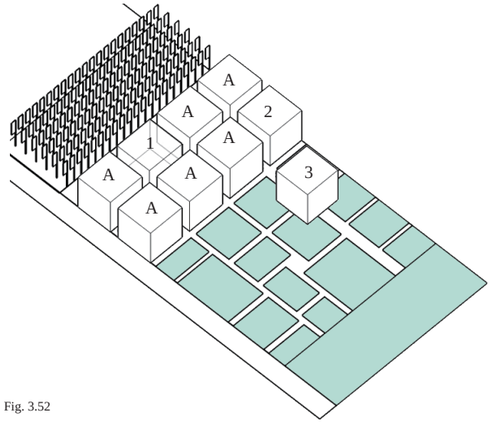


Fig. 3.52

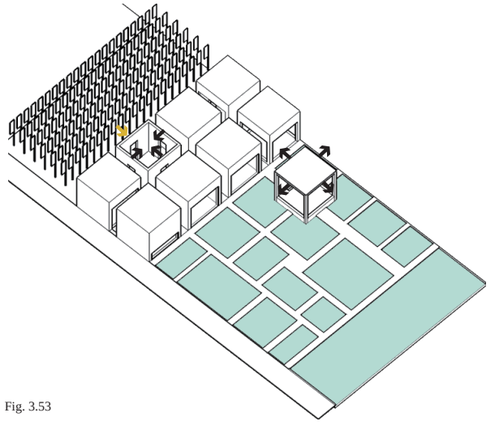


Fig. 3.53

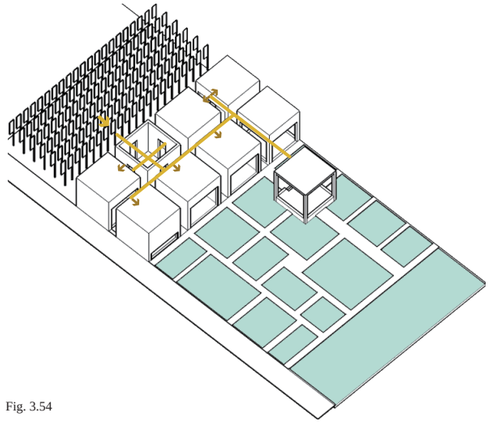


Fig. 3.54

Open Space (Garden or Courtyard)

Market

Rooms

A. Rooms for Exhibition

1. Vestibular

2. Service Room

3. Music Pavilion

Entrance

View Accessibility

Walking Path

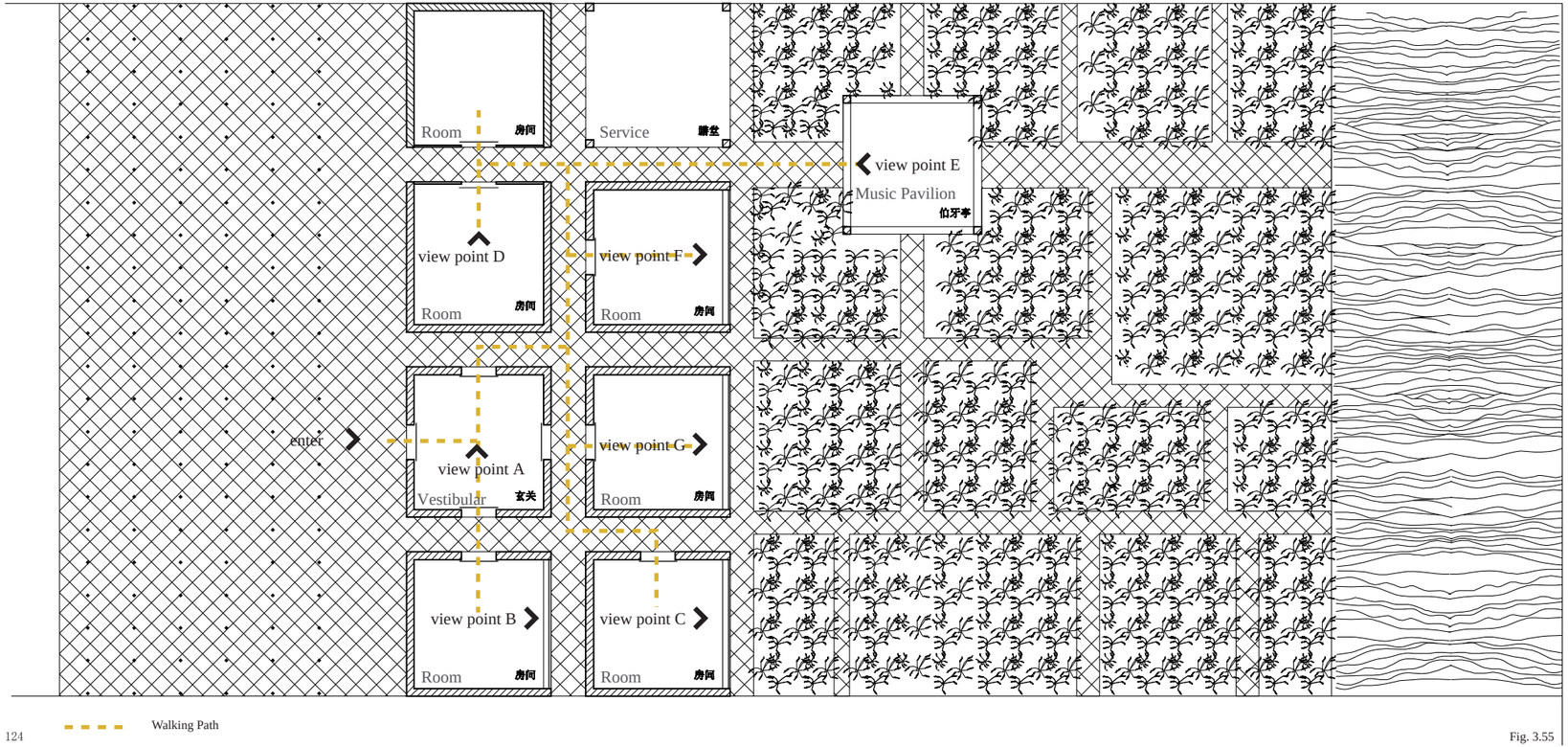
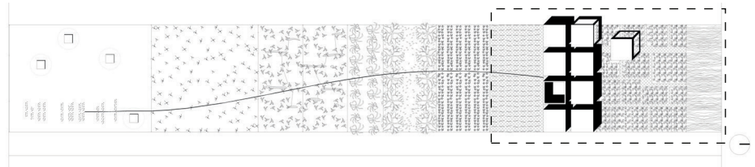


Fig. 3.55

Circulation with Viewpoints along the Main Path



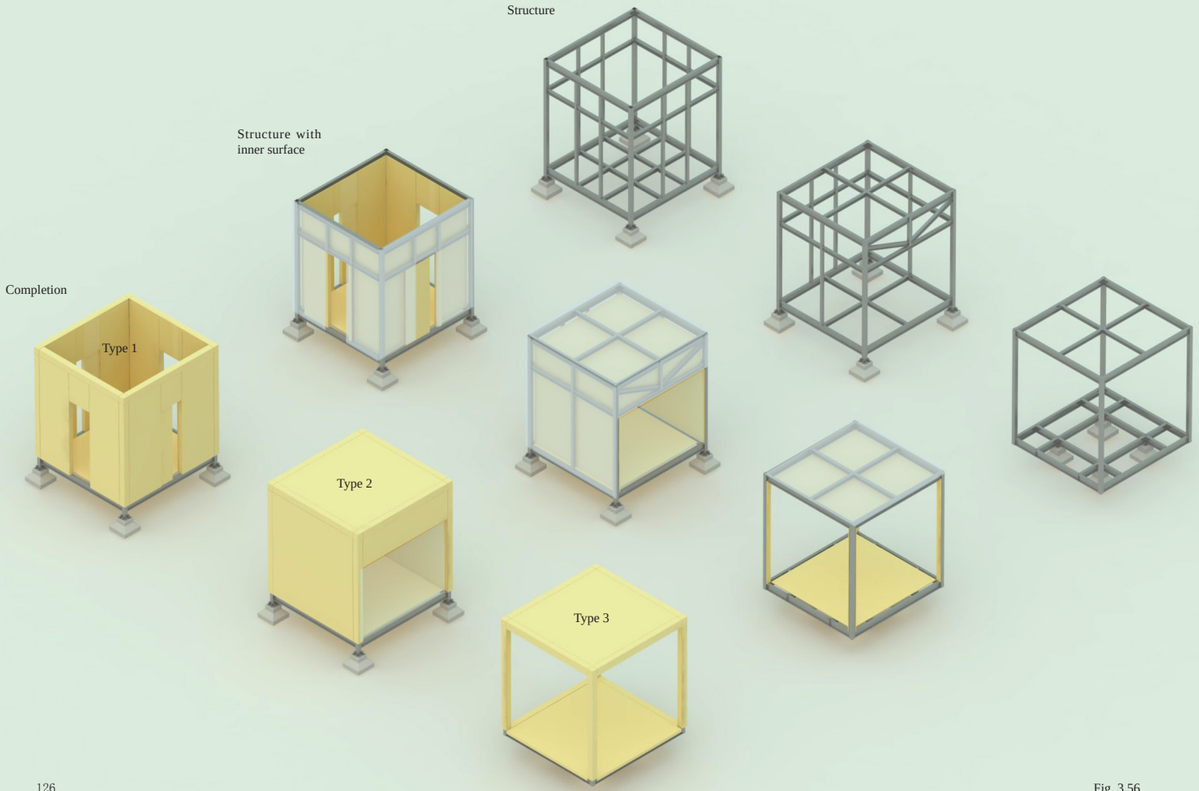


Fig. 3.56

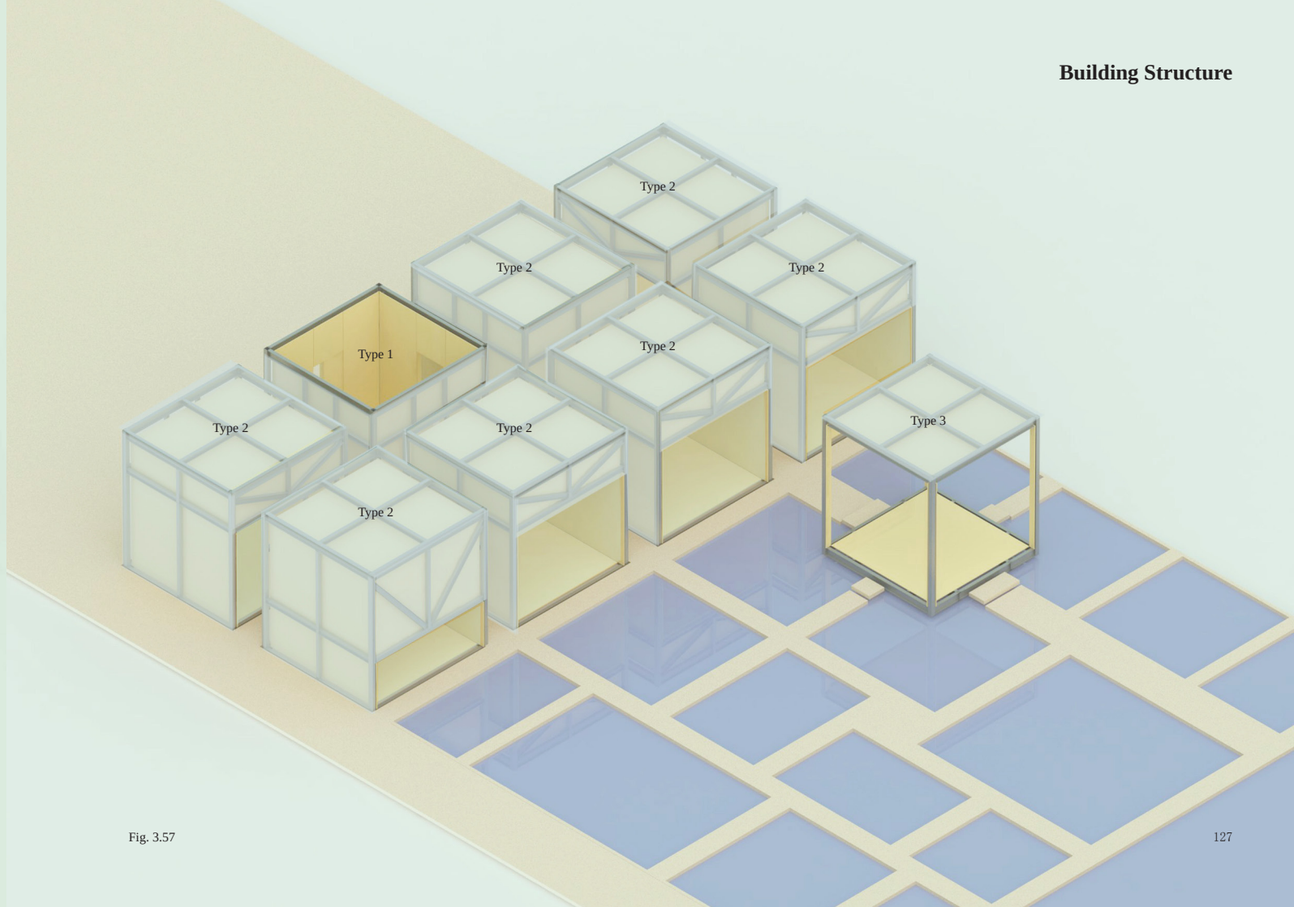


Fig. 3.57

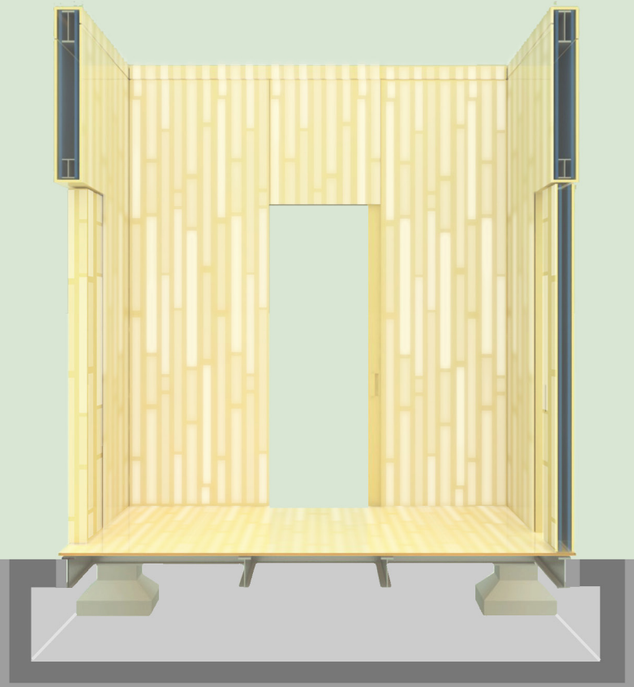


Fig. 3.58

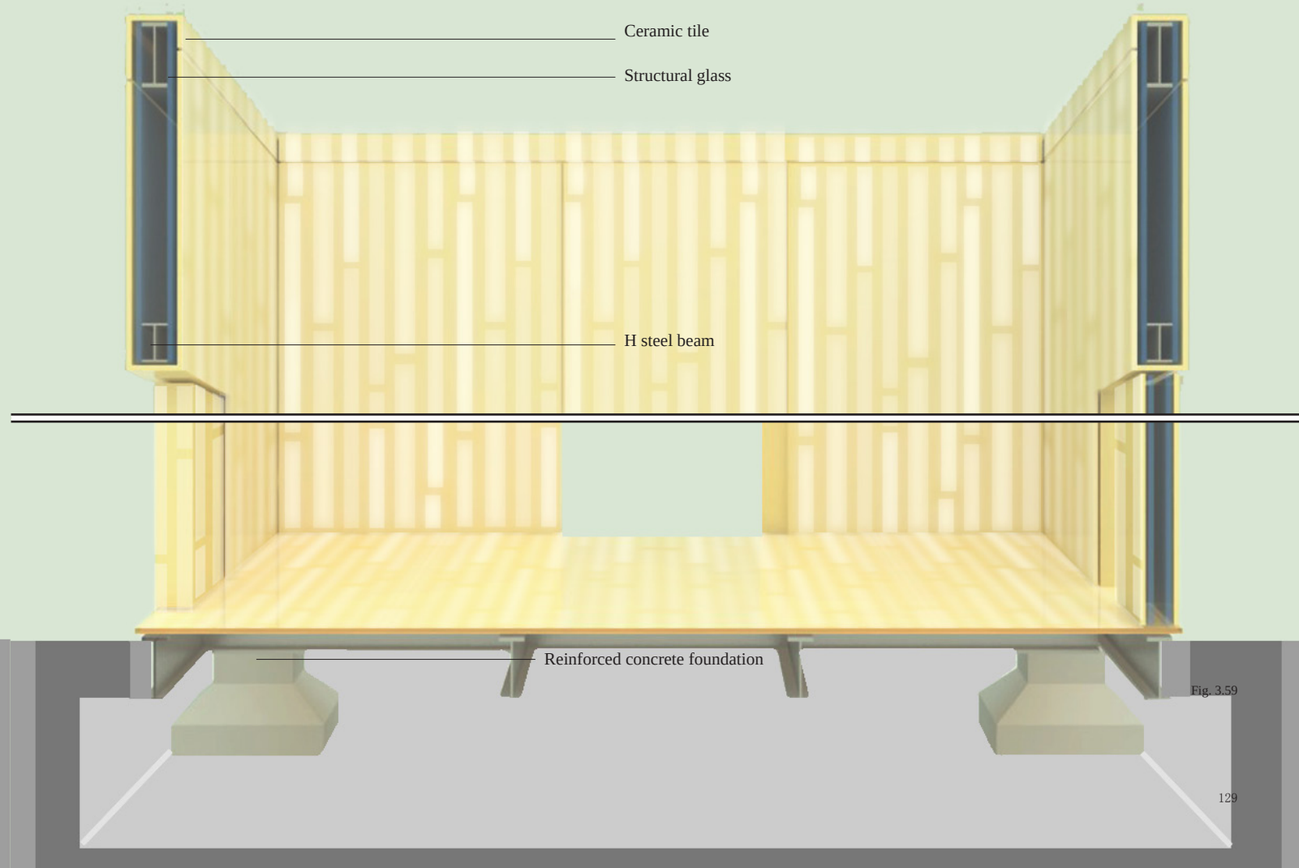


Fig. 3.59

Fig. 3.60

Rice grain porcelain is an old ceramic method. The wall of an object is first pierced through with a sharp tool. After the biscuit firing the hole is filled with glaze which melts into the hole in the later firing creating a small translucent window. Most who are familiar with the technique think first it is developed in China. Chinese potters started to manufacture rice grain porcelain during Tang-dynasty, at late 18th century. The roots of rice grain porcelain reach deeper to the past. Earliest pierced and holes-filled-with-glaze-objects have been found from 900th century Persian empire. These early pieces were not porcelain, but local stoneware covered with white slip. It is possible that when porcelain was invented in China, these Persian potters tried to make things as white and translucent. Porcelain recipe was well protected by Chinese and maybe piercing holes to the surface was one way of imitating translucency of the real porcelain. The silk road transported goods both ways and one can assume these Persian pierced objects travelled to Chinese potters who then defined the technique to perfection. It wasn't until these Chinese objects reached the western markets the name rice grain was applied to technique, because of the most common shape of the hole: grain of rice. [20]

It has a beautiful Chinese name Linglong which means exquisite normally used to describe a girl. The ceramic technology is introduced into our building surface design making each of our single building as an rice grain porcelain art work.

20. Ceramic studio Pot Viapori website, http://www.viapori.fi/~potviapori/eeva/riisiposliini_english.html
Left: Rice grain porcelain art works, from Ceramic studio Pot Viapori , Design by Eeva Jokinen, 2007 Helsinki

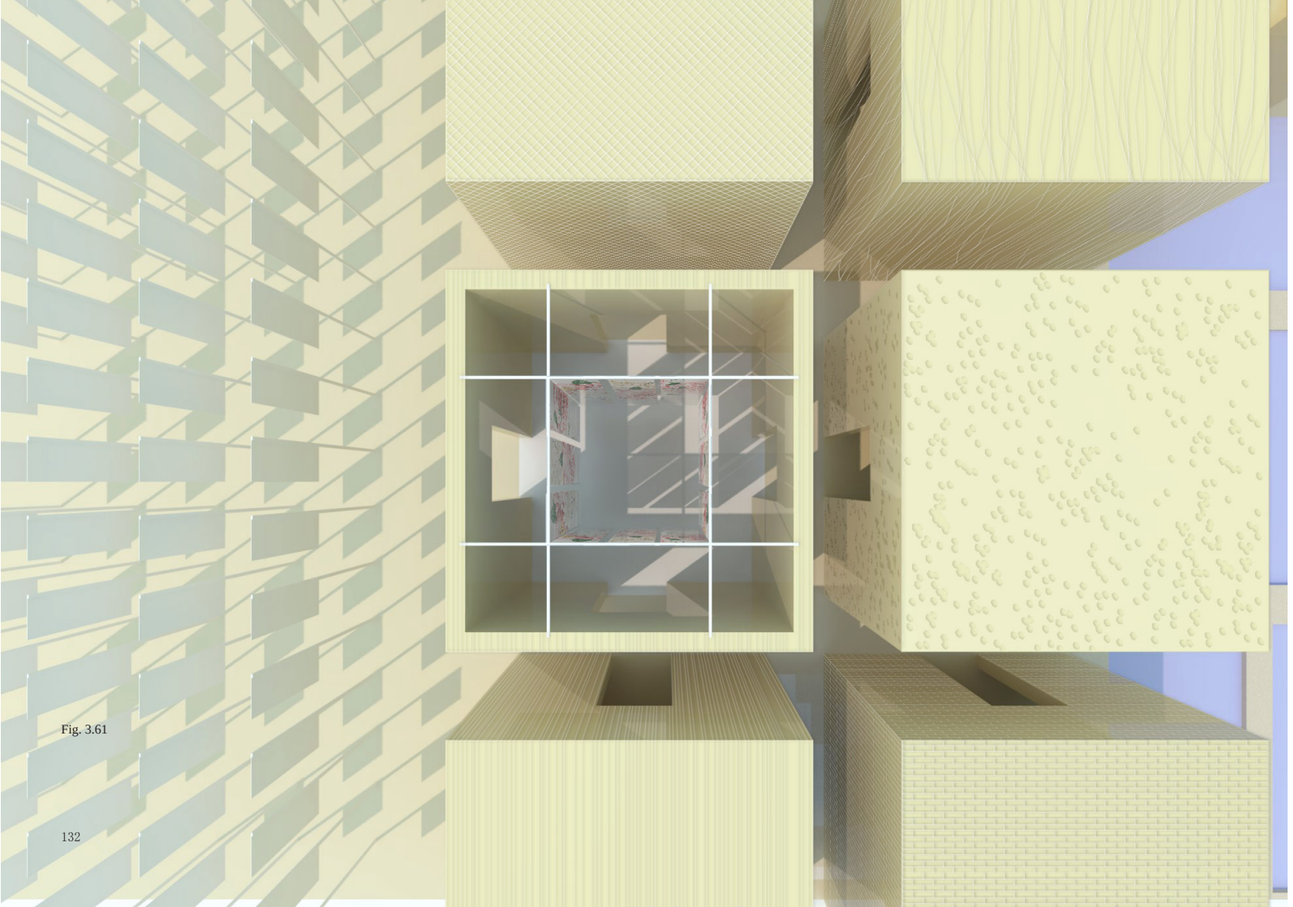


Fig. 3.61

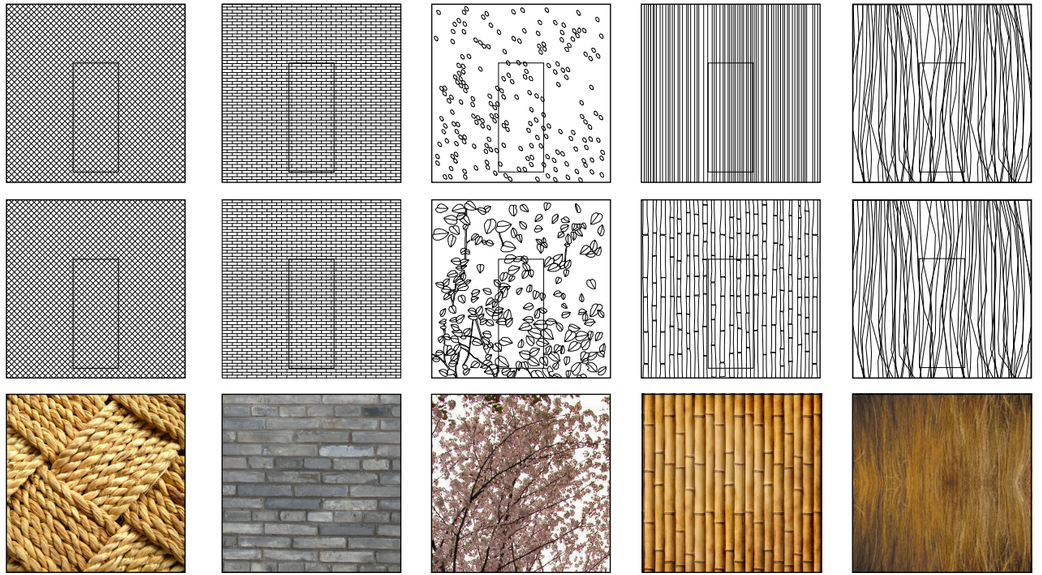


Fig. 3.62

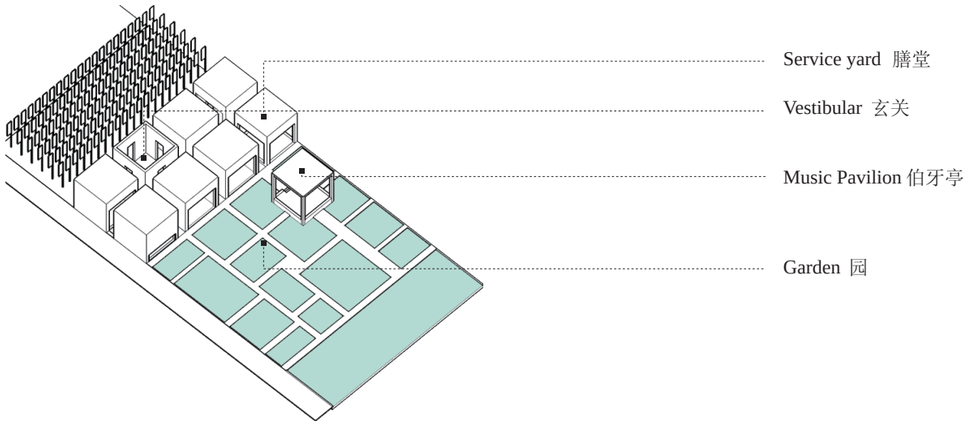


Fig. 3.63

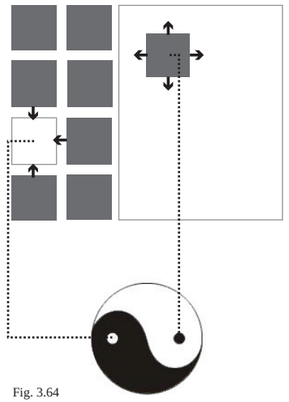
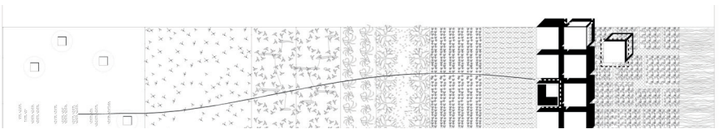


Fig. 3.64

Vestibular in chinese traditional housing design is the place to take off the shoes and for the guest, it is a place preparing himself and calm down before meeting the host or master. It is an open element surrounded by the closed rooms in the tranditional courtyard house plan, but an open volume with four sides closed only without ceiling. Also vestibular is the node to link all functional rooms together. From the entrance area to the back area, follow the consquence from public to private with each one a specified theme inside each cubic volumn.

Music pavilion is a closed tiny building surrounded by open garden which has the opposite space characteristic with vestibular. It is the showroom in chinese garden design sitting inside the musician playing beautiful rhythm.

❮ Voild and solid relationship



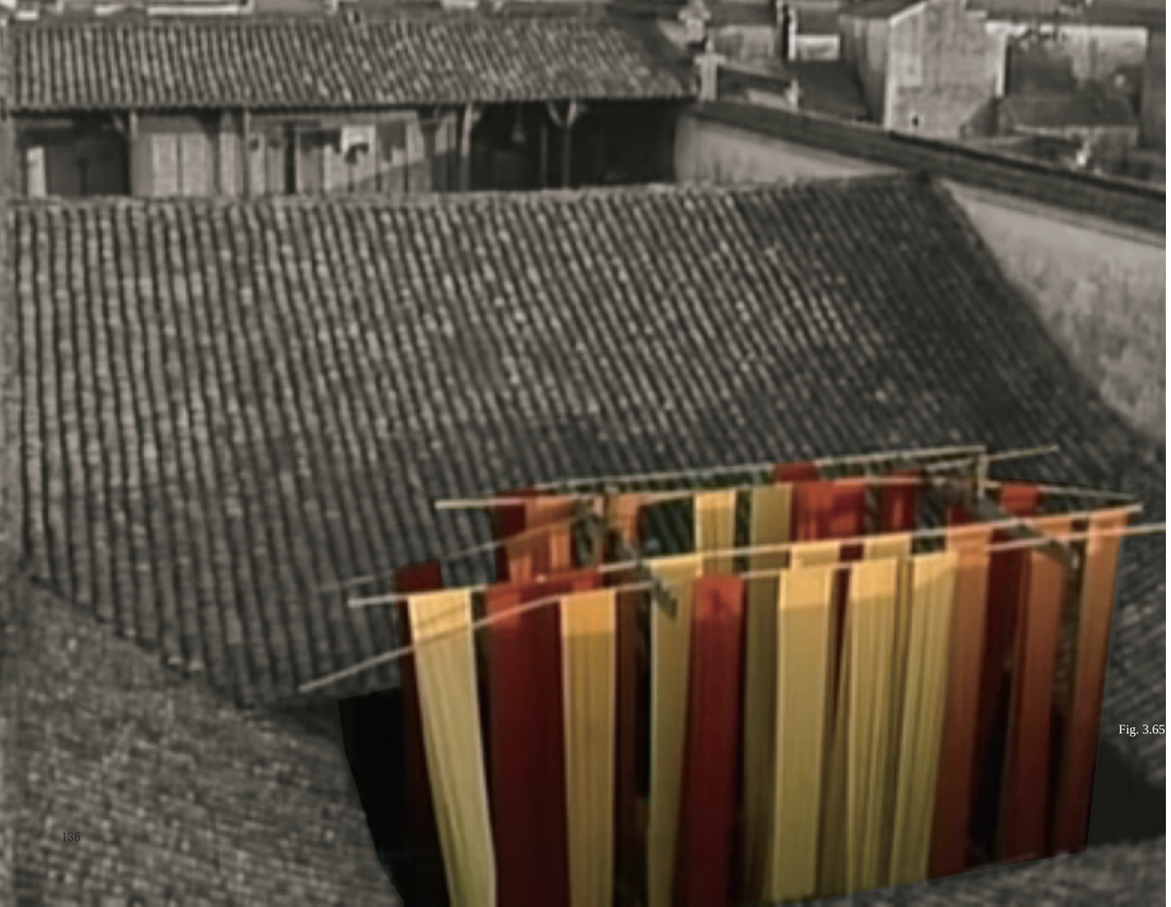


Fig. 3.65

Vestibular

Name	Vestibular
Function	Transition
Theme	Falling drawing
Characteristic	Serve as a foil

Vestibular is a private courtyard. It is a room with four walls but without roof which is used as a inner place to change the shoes preparing guestself well to meet the host.

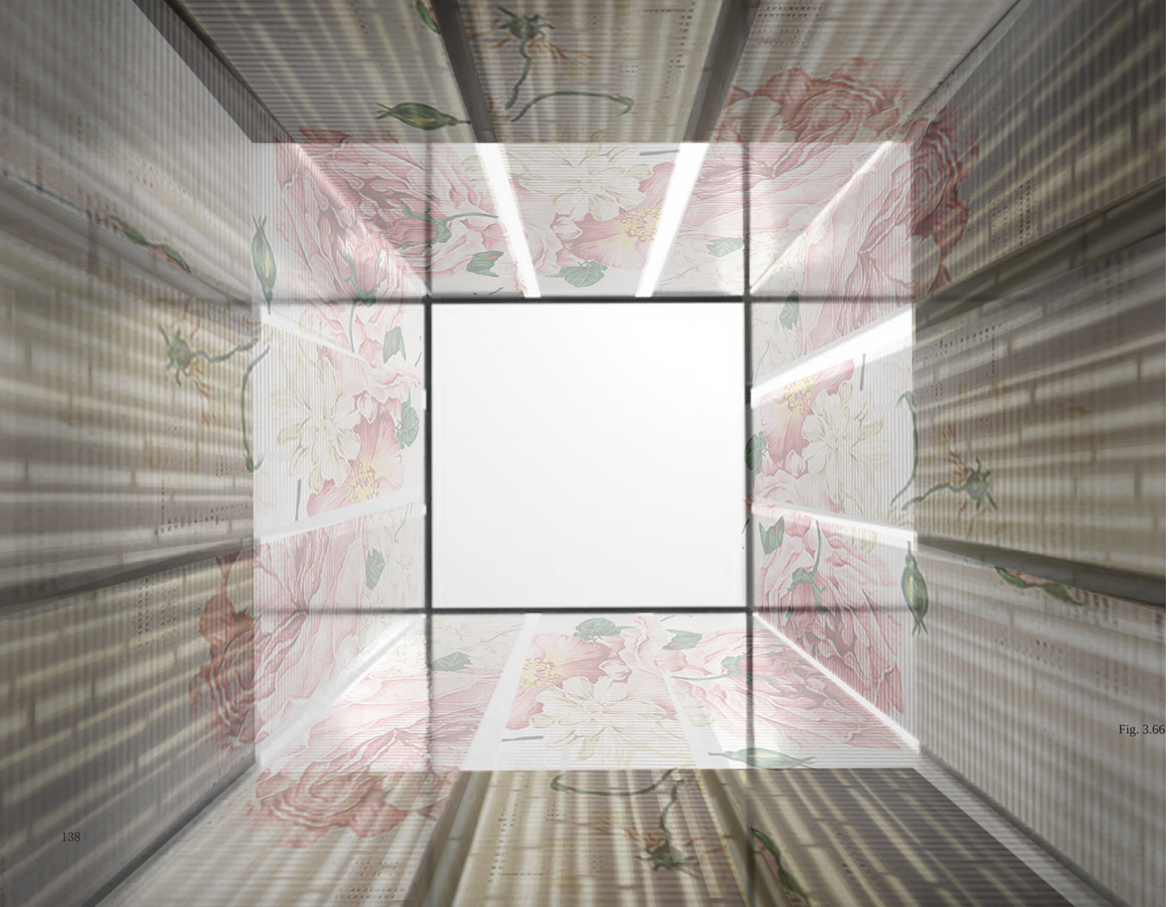


Fig. 3.66

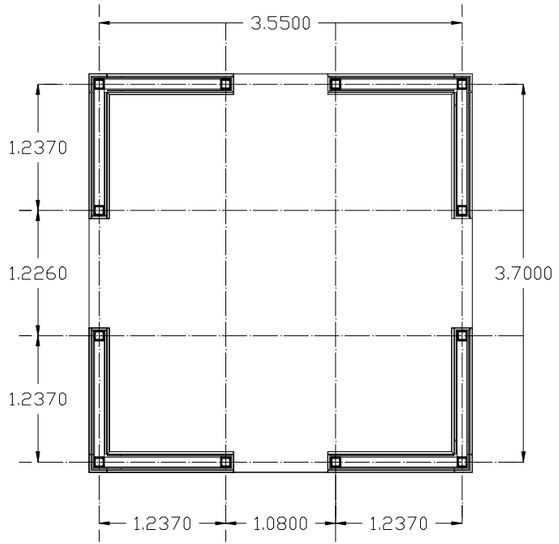
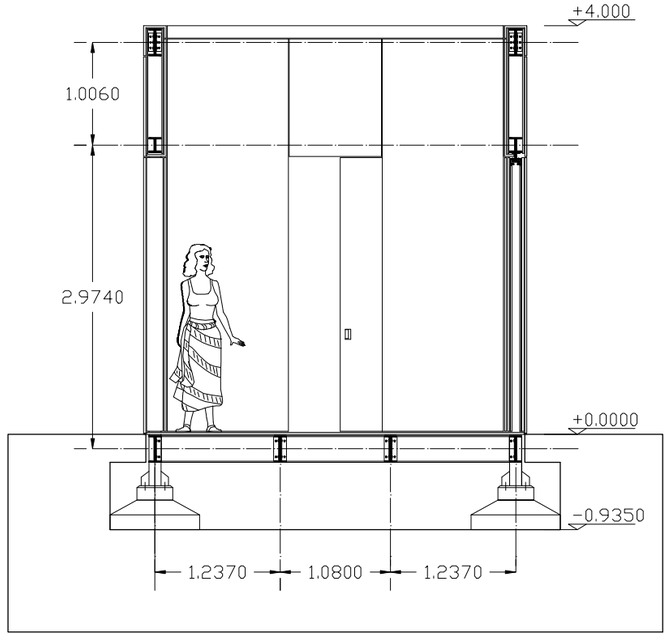


Fig. 3.67



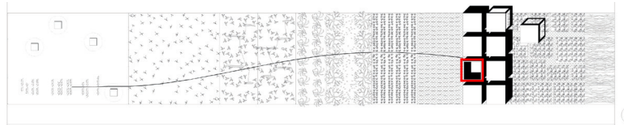
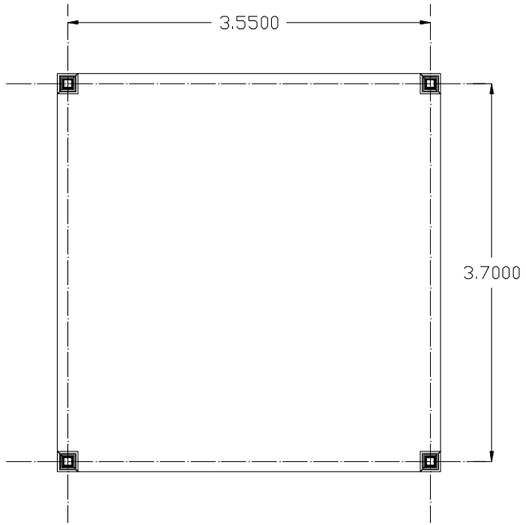


Fig. 3.68

Service-yard

Name	Service-yard	
Function	Exhibit the cooking	Service-yard is a semi-open room used for exhibition of food preparing. In China, the place for cooking normally has very good ventilation and large area. Fresh air and good view of outdoor landscape is compulsory factors.
Theme	Kitchen outdoor	Cooking inside the outdoor view
Characteristic	Permeability	

Fig. 3.69



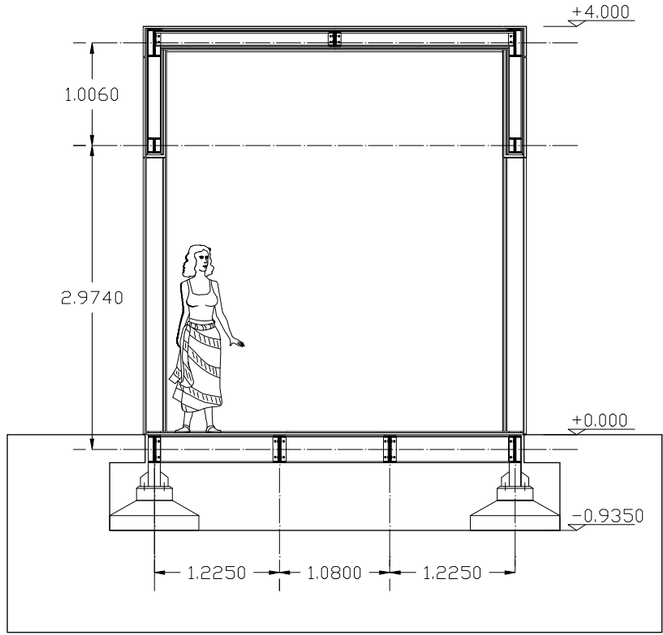
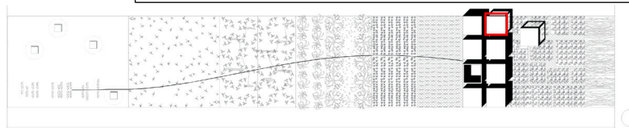


Fig. 3.70



Music Pavilion

Name	Music pavilion
Function	Entertainment
Theme	Music on the water
Characteristic	Sound space

Sound of string instrument is the backgroud music in a Chinese tranditional house. Pavilion on the water or wet land is a popular design of Chinese garden.

Fig. 3.72

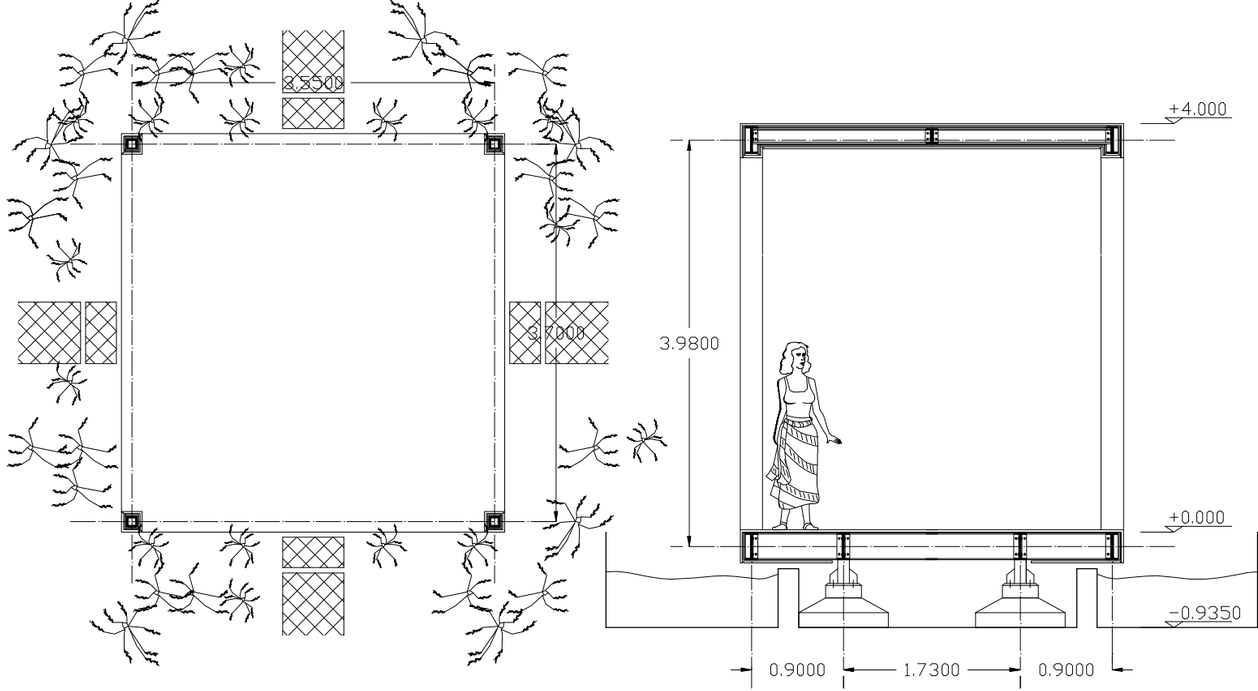
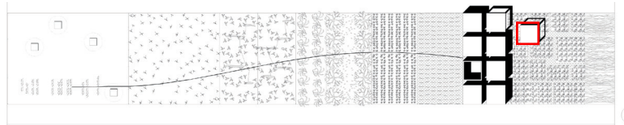
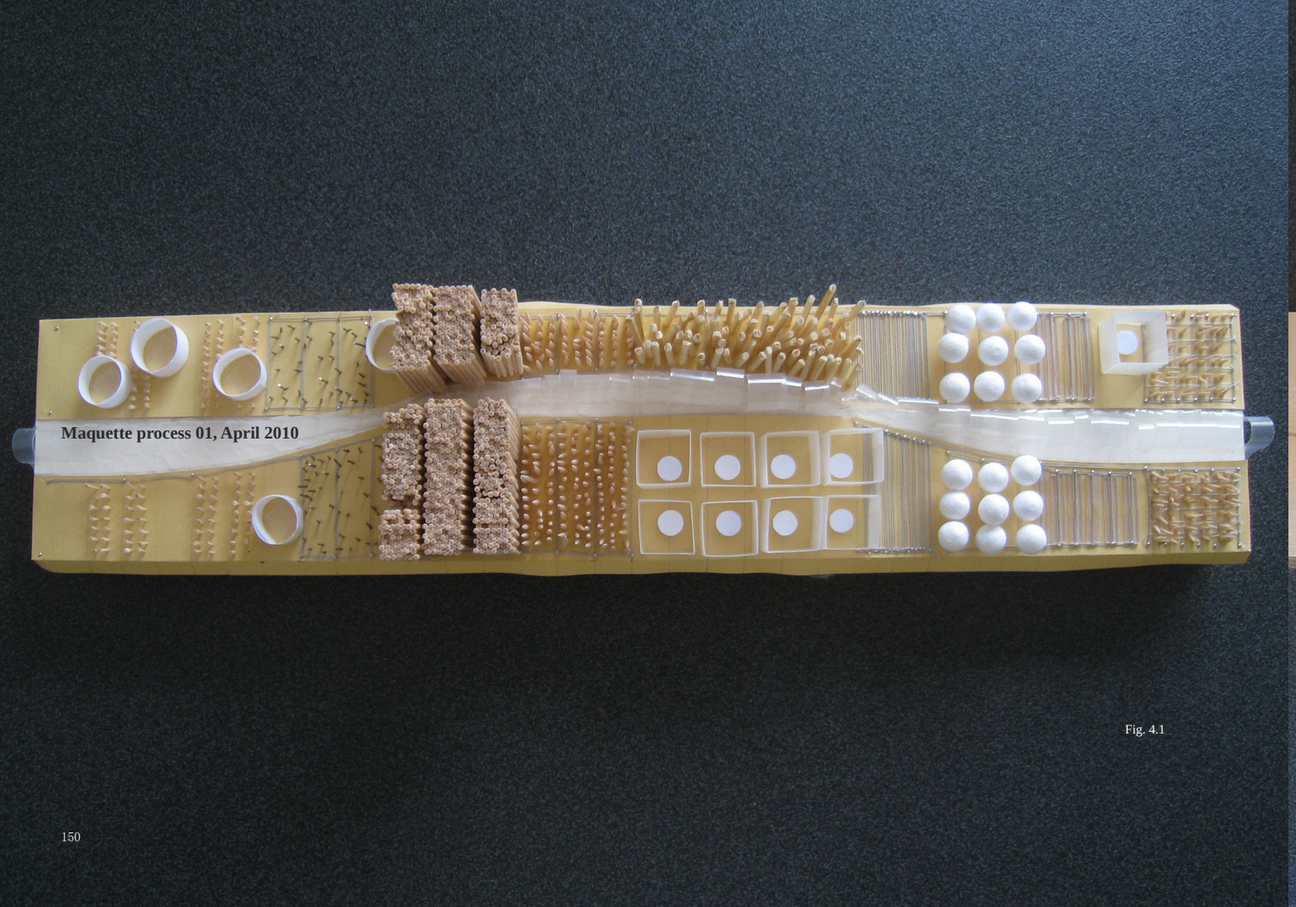


Fig. 3.73

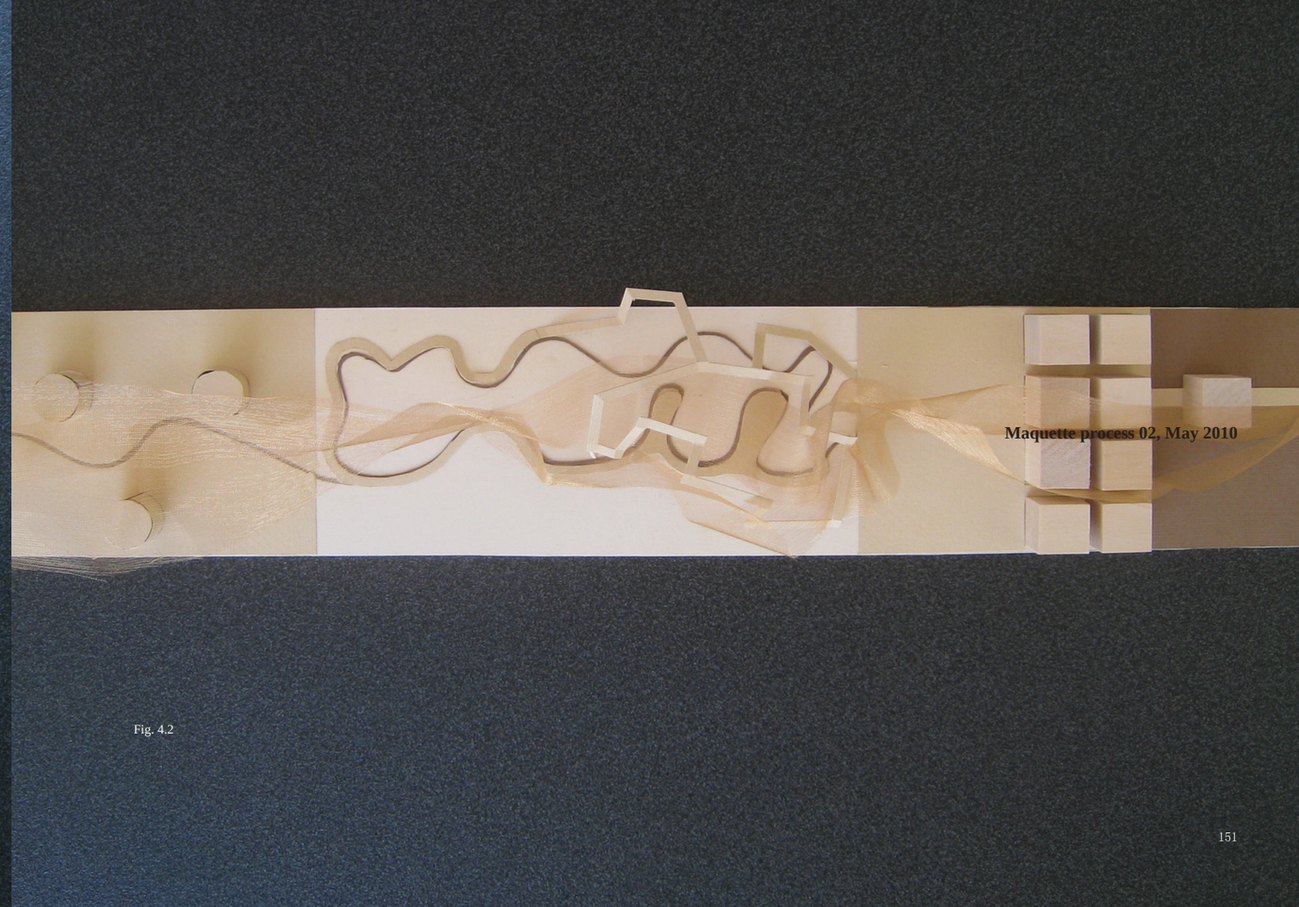


Chapter Four: Maquette



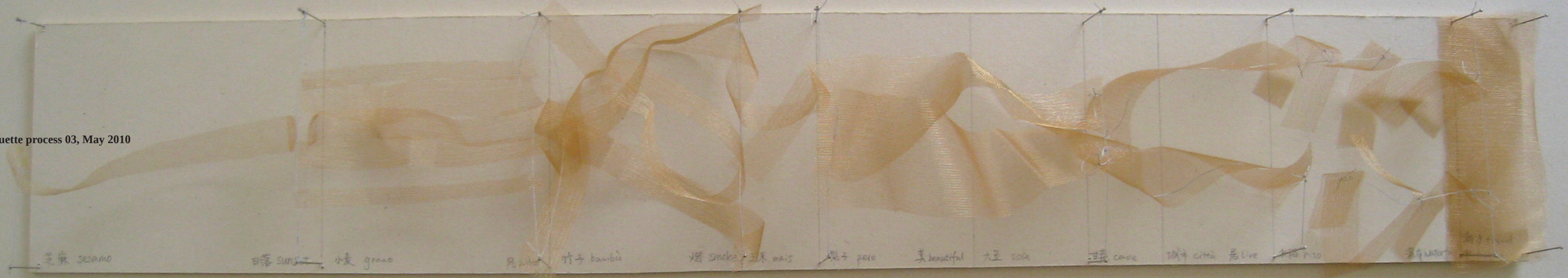
Maquette process 01, April 2010

Fig. 4.1

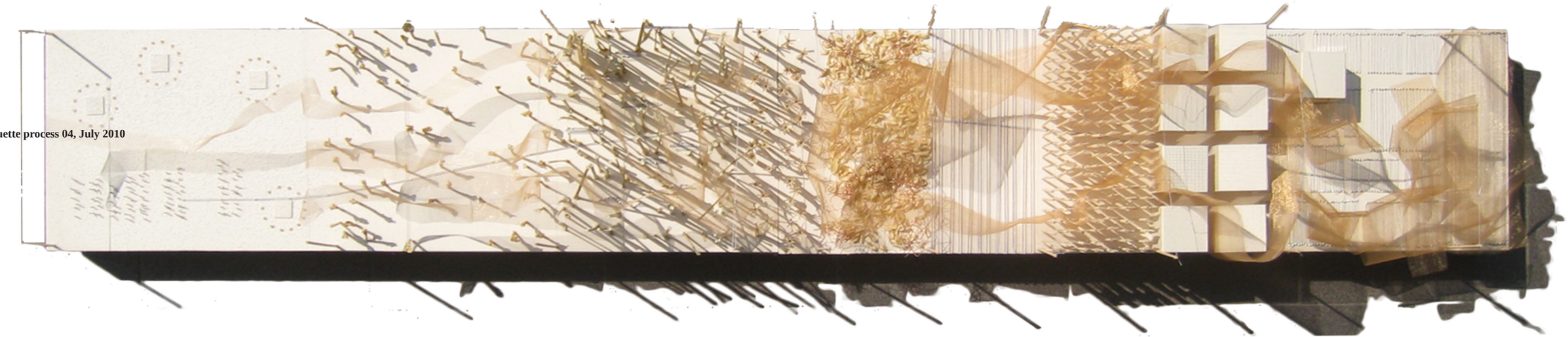


Maquette process 02, May 2010

Fig. 4.2



Maquette process 03, May 2010



Maquette process 04, July 2010

Fig. 4.5

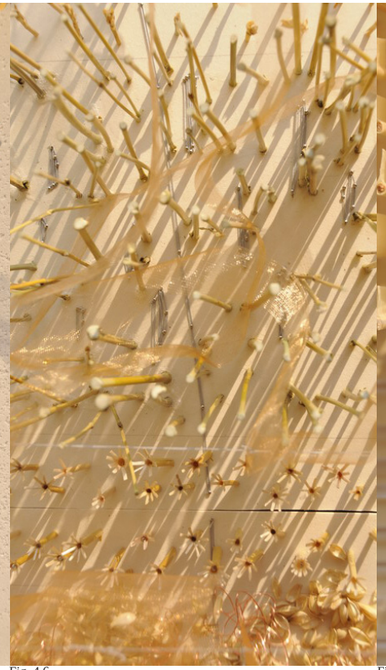


Fig. 4.6

Fig. 4.7

Fig. 4.8

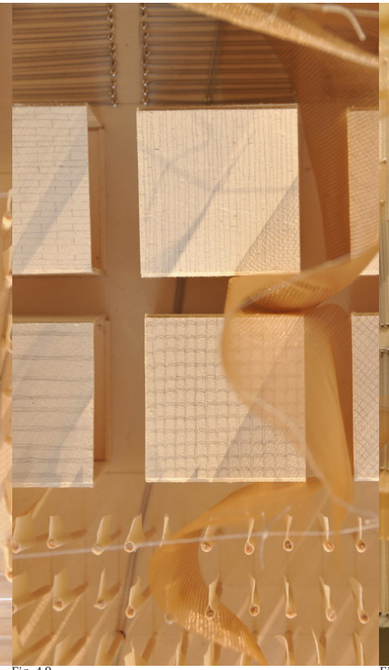


Fig. 4.9

Fig. 4.10

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