

Yao-dong
as a Spiritual Shelter for the Young Peasants

by
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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

A yao-dong is a vernacular architecture in northern China. “Dong” means a cave. A cave is one of the earliest human shelters. In thousand years of Chinese history, caves evolved into yao-dongs. A yao-dong is the spiritual shelter for the elderly. They live in the yellow soil, eat what is planted from the soil, and call themselves sons and daughters of yellow. But for the people unfamiliar with them, yao-dongs may be just caves or even slums.

This thesis aims to demonstrate that the problem is much more complex than the association of the yao-dong with poverty. Every year 90 thousand natural villages disappear, including yao-dong villages. More importantly, culture disappears at a fast rate, as China urgently seeks to synchronize itself with the contemporary world and time.

Through the investigation of yao-dongs, the thesis posits that the contemporary crisis is related to the growing inability to ground experiences and memories. Through field research, I investigated yao-dongs’ geography, culture and construction to better understand what living inside a yao-dong may feel like. I conclude by suggesting a design that can provide a simple and poetic life for young peasants.

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*For my mother, Yunping Xiao
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Intro



YAO-DONG

FIG 0.0 "Yao-dong" in Chinese Calligraphy

Yao-dongs are abundant in northern China, and in the 1990s, 30-40 million people lived in yao-dongs.¹ “Yao” means places for firing ceramics. “Dong” means caves. A cave is one of the earliest human shelters. In thousands of years of Chinese history, caves evolved into yao-dongs. Yao-dong culture mature and sediment slowly, fusing with the landscape, the soul of the country, and with the lifestyles and the personalities of the people. A yao-dong is a spiritual shelter for the elderly who lived in this region. They live in the yellow soil, eat what is planted from the soil, and call themselves sons and daughters of yellow (yan-huang-zi-shun). But for the people unfamiliar with it, yao-dongs may be just caves or even slums. This thesis aims to demonstrate that the problem is much more complex than the association of the yao-dong with poverty. During my research trips, I visited villages that are remote from the central cities, reachable by buses for a couple of hours from train stations. Their position on the fringes which have not been conquered by consumer society, preserves their regional identity. The first impression that I got in these villages are the lack of young people. There are a few elderly who appear to wonder in the villages. Many yao-dongs have returned to wilderness due to a lack of inhabitation. They are part of the countless “inner-decaying-villages/ Kong-xin-cun” in China. In addition, I observed quite a difference between the peasants when they work in the city and when they live in the villages. In the city, the peasant workers are considered as outsiders and the weak ones. However, in the villages, our privileges as urban dwellers disappear. They welcomed us warmly and often invited us for lunches in their yao-dongs. The first part of the thesis briefly discusses the large socio-political sphere where the migrant/peasant workers, are situated within. In the second part, I describe the natural geography of the land and the culture where yao-dongs have traditionally been built, accompanied by a visual essay- the story of Gou-di-village- a village dwelling deep in the gullies. Understanding the farmers’ harsh living conditions, their ancient roots in hunting, and their remoteness to the Central Plain help understanding yao-dongs and why it was a farmer’s life-time dream to build a good yao-dong. In the third part, I describe yao-dongs’ construction methods. Yao-dong craftsmanship shows

how human hands can do things that machines cannot, and how intimate the craftsman's relationship to the earth and all the other forces in nature is, which is becoming rarer due to our immersion in mechanics. It is fortunate that my research trip coincide with Professor Wang Jun's field research for a book about yao-dong construction, in Xi'an University of Architecture and Technology. During the research trips with the students from the Chinese university, I was able to interview local craftsmen, and document construction tools on site, in their homes, in folk museums, in local governments' cultural department offices, and in local Television Bureau with a permission certificate from the university. During my own trips, I encountered artists who document and preserve yao-dong traditions with their skills such as paper cut-outs, Chinese ink paintings, buffed lacquer and singings. The documentary "YAODONG, a little treatise on construction" by researcher Caroline Bodolec and director Elodie Brosseau, Dr. Gideon Golany's books on Chinese cave-dwellings and various Chinese books dated from 1982 to 2014, all contributed to the content in this chapter. A visual essay on craftsmanship follows. In the fourth part, I describe the social structure of villages. Yao-dong's village social structures shows how village architecture plays the key role in the implementation of "Buon Governo" (good government), and what we lack today in the villages after these social structures disintegrated. My participation in the Qi-kou town's annual temple festival really helped me feel how this rural culture is being lived. A visual essay – the mountain roads in Li-family Mountain, follows as well. In the last part, I go in detail about what yao-dong life is like. Yao-dong's lifestyle bring us closer to the earth, the sky, the rain, the trees, the animals and ourselves.

By telling the story of a grandma's yao-dong life, I am searching for answers to the question: "How does it feel to be a human being in this world?"² What would happen if the basic infrastructures were added? Would not yao-dong be an architecture that should be preserved and a qualitative life being lived? The yao-dong lifestyle I am conceiving is both ancient and new at the same time. It is a spiritual shelter for the young peasants. It is of vital necessity because a spiritual shelter provides concrete impulses and effective instru-

ments for a prosperous village and resistance against bare-life which I will talk about now.

From 2000 to 2010, 0.9 million natural villages disappeared³, including yao-dong villages. Culture disappears at a fast rate, as China is synchronizing⁴ with the contemporary world. Contemporary lifestyle is becoming a universal culture, a new “machines for living in”.⁵ It is also becoming more and more engaged in the economics as Realtor in Beijing points out: “Selling houses is not selling a commodity but a contemporary life-style designed by professionals”.⁶ However, Juhani Pallasmaa argues that an “authentic culturally differentiated architecture can only be born from differential patterns of culture, not from fashionable ideals in design.”⁷ He also questions the possibility of an authentic culture in our time.⁸ Our time is a time with deep contradictions. For example, the huge migration of peasants from the rural to the urban, while creating economy through urbanization, creates tension for both the urban and the rural society. While most architects create architecture for the consumers, what role do they play in regard for these underrepresented group, for example, the peasants in China, who migrate to the cities but do not really belong there? To illustrate the challenges yao-dong villages and villagers are currently facing, I will start by briefly describing the large picture of what is happening in general about the rural China.

1. Story of the migrant workers

“A zone of indistinction between the human and the animal lies a werewolf, a condition in which everyone is bare life... [...] This lupinization of man and humanization of the wolf is at every moment possible in the dissolution civitatis inaugurated by the state of exception.”⁹

- Giorgio Agamben

The story of migrant workers started in Shenzhen, the first



FIG 0.1 New opportunities for rural sociology studies in China



FIG 0.2 Working Conditions for Chinese Factory Workers

Special Economic Zone in China. This was widely interpreted as a green light for deepening market reforms.¹⁰ Peasants migrate to the city following the slogan “let the few become rich first”. However, in order for some to become rich first, the majority have to become poor or as philosopher Agamben described—they become werewolves. A werewolf is a wolf-man who is banned from society. A condition in which “man is a wolf to men,” (*homo hominis lupus*)¹¹. Today this new group of peasants called “migrant workers” or “peasant workers” have accumulated to such a degree that there are almost no farmers in a straight sense in contemporary China. Peasants are called werewolves because of both the land tenure system and the household registration system (Hukou) in China, which divide people from rural and urban dwellers. They do not belong in the city, and their villages are decaying. They belong to neither. In all this, architecture plays key roles, linking political and economic structures in China.¹²

With the development of 21st century energy bases in Northwest China, energy resources are replacing agriculture as the dominant economic source in a region that had many yao-dong villages. The Chinese reporter Chai-jing, in her documentary “Under the Dome”, said that 20 years ago Shanxi was a beautiful province with blue sky and clean rivers, something the current children in the villages have never seen.”¹³ According to BBC news reporter Reynolds, the rate of birth defects in this region is six times higher than the national average.¹⁴ “First pollute then remedy” is a popular slogan, which signifies that the economy comes before a clean environment. Jason W. Moore rationalizes the phenomena that are happening as the “normal” operations of capitalism’s world-ecological reorganizations.¹⁵ In other words, signs like climate change and smog are how nature responds to the expansion of capitalism.¹⁶ In 2013, 104 cities in China underwent serious air pollution.¹⁷ The atmosphere of the Earth is what Jason W. Moore described as “waste frontier”.¹⁸

This zone of “free and juridically empty space”¹⁹ is the state of exception. Special Economic Zones are in fact, zones of exception.

The massive influx of the floating population supplies the

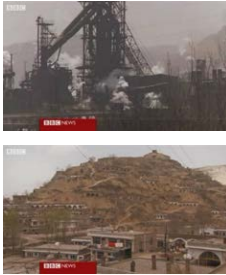


FIG 0.3 Mining factory and miners' yao-dong homes in Shanxi

SEZs with cheap labor for the huge factories that produce consumer goods for the global economy.²⁰ Aiwaha Ong in an essay on zoning technologies in East Asia, pointed out that unlike state enterprise workers (who are highly organized under the workers' unions), zone workers are considered peasants unprotected by China's labor laws and are not entitled to social benefits typically due to workers elsewhere in the country.²¹ The Hukou, according to Smith and Pun, is a complicated cartography of a political economy of production.²² Hukou strategically allows peasant-workers the "freedom" to sell their labour and ties them to their mothers' place of birth.²³ According to Ong, workers holding a rural Hukou are often discriminated against by authorities as if they were foreigners.²⁴ Agamben says, "He bears a wolf's head from the day of his expulsion."²⁵ A large majority of Chinese population holds rural Hukou, a wolf's head. In China, they are described as "farmers not farmers, workers not workers", which means they are neither farmers, nor workers. The migrant workers are thus in a state of indeterminacy coined by Agamben.

"The life of the bandit, ... is not a piece of animal nature without any relation to law and the city. It is, rather, a threshold of indistinction and of passage between animal and man, physis and nomos, exclusion and inclusion: the life of the bandit is the life of the loup garou, the werewolf, who is precisely neither man nor beast, and who dwells paradoxically within both while belonging to neither."²⁶

That is to say, the peasant workers belong to neither the city nor the village, and neither the livelihood as farmers nor workers could give them satisfaction of living.

An exit from the state of indeterminacy²⁷ is the migrant workers' train ride home during the Spring Festival. It is what the migrant workers have been fighting for the whole year: the chance to go back home to reunite with their families. *"Without the warmth of a family life, all year's labor is harder to bear."*²⁸ However, when a new year starts, peasant workers also start their endless cycle of village-factory-village²⁹. Migrant workers are mostly accommodated in a temporary dormitories that are tied to their employment.³⁰ While their home village has been deterritorialized, their dormitory in the city is a panopticon, "deployed a series of hard disciplines



FIG 0.4 Zhejiang Prov.
Spring Travel Season
220million travellers



FIG 0.5 Diya's Workers'
Dormitory in Huizhou
Danshui Town, Da Ya Wan
District

as well as subtle surveillance technology of everyday lives in a Foucauldian sense".³¹

This is how Chinese writer Lu Yao described the life of miners in Shanxi:

*"In the coldest and dampest depth of the earth, with dark coals all over their faces, the reason that keep them working eight or nine hours a day, every day, is their warm and happy families. Therefore, they lay the hukou of their family back in the villages, build slums around the mines, or dig some Yao-dongs in the cliffs. They bring their wives and children, sustaining them with their hard work, while at the same time, enjoy the family's warmth and care."*³²

With the urban slums demolished, migrant workers can no longer afford to bring their families with them. According to Ong, peasants are not entitled to urban citizenship and residential rights, education for their children, and access to various subsidies that such citizenship entails.³³ Even though just a couple years ago, rural children could start attending schools in the city, stay-behind children are still social issues up to date. The children left behind in the villages with the elderly, while their parents worked in the cities, often see their parents once a year during the Spring Festival. To date, there are 60 million stay-behind children, 50 million stay-behind women, 60 million stay-behind elderly, reaching one third of the rural population. On June 9, 2015, the suicide of four stay-behind children in their home has raised the attention from the public towards the stay-behind phenomena again³⁴. Suicide in mainland China shows unique demographic patterns with age: the over-65 age group has the highest rate of completed suicide. Rural suicide rates among the elderly are three to five times higher than the urban rates.³⁵ Similarly, suicide rate in factories is so high that the term "suicide waves" are used. Suicide almost becomes a manifestation to bring public attentions to the werewolf lives that are being lived.

2. The housing market

What is preventing peasant workers from living together with their families?

Today the totality of urban space³⁶ has become the most regulated commodity in China³⁷ affecting the whole society through what You-Tien Hsing (Professor and Pamela P. Fong Family Distinguished Chair in China Studies) called “the great urban transformation”. High profile projects by international Star architects create an “economy of spectacle”. Additionally, the “generic city” by the “normal” architects boost property values by attracting investors and visitors.³⁸

Since land prices have gone up dramatically, developers tried to gain as much land as they could. However, empty land lots have become rarer. Therefore, during this real estate booms, historic fabrics and housings that are only twenty to thirty years old were demolished, and new constructions stand up like bamboo shoots. Neil Smith explained the logistics behind this massive demolitions by first outlining the three kinds of developers typically operating in recycling neighborhoods: (a) the professional developers who purchase property, redevelop, and resell it for profit; (b) the occupier developers who buy and redevelop property and inhabit it after completion; and (c) the landlord developers who rent to tenants after rehabilitation.³⁹ Since there is already an intricate pattern of property rights laid down, it is not always easy for the professional developer to acquire a piece of property big enough for investment. The fragmented structure of property ownership has given the occupier developer an advantage that is not given in the construction industry.⁴⁰ But the dominant capital does not like competition and they want to gain sufficient land and properties to make involvement worthwhile. So they sabotage the smaller companies and villages.

For example, during the 2008 Olympics, development companies backed up by government agencies used the Olympics as a necessity that requires massive demolition of historic Da-zai-lan Hu-tong and its neighborhood to ease the inner city traffic pressure, together with massive demolition of outskirt Wali Township in Beijing’s fifth ring for the Olympic park. The inner city residents are relocated to cheaper housing sites in the inner ring of the urban fringe, and the villagers at the urban fringe are relocated to even more remote areas at



FIG 0.6 Construction site near San-men-xia Train Station, Henan

rural fringe of the metropolis or maybe in urban slums. This is known as the great urban transformation.⁴¹

According to Nitzan and Bichler, by keeping the lesser capitals, in this example, the Hu-tong dwellers and the Wali Township villagers, “out of loop”, the capitalization process can be sustained and extended, while their successful sabotage gives their relative performance a double boost.⁴² In other words, by demolishing the existing order of ownerships, new ownerships can be drawn, which would make the investment worthwhile. Additionally, these mass production of instant cities requires mass consumption. As the majority of these projects is residential, through massive demolition of old homes, a demand for new housing is created, known as the “economy of demolition”.⁴³

This seemingly perfect cycle of economy is achieved by sacrificing the organic cycle that Chinese spirit dwells upon. Farmers called matured earth “cooked” earth, because earth-sheltered architecture can be recycled back into fertile soil. Today primary development companies “turn the so-called ‘raw’ land into ‘cooked’ land, which entails relocation and compensation negotiation with current land users, as well as investment in site clearing and infrastructure installation to prepare the site for new construction.”⁴⁴ Architectural critics Zhu Tao, points out that during the economic boom, architecture is being passively utilized by the economy: “*nothing alternative can be done and, therefore, anything goes.*”⁴⁵

During this great urban transformation, local governments use urban redevelopment as an excuse for demolishing historical fabrics and villages. The municipal authority argues that urban planning is fundamentally about realizing the exchange value of land in the market and about allocating land in market-efficient ways. Therefore, the use that generates the highest profit will be deemed as the most efficient.⁴⁶ The historical districts with their precious location in the heart of the city, hosted a huge population of migrant workers living on cheap rent and supported the livelihood of local residents. This is then regarded as inefficient for contemporary Chinese urban planning. Villages at the urban fringe were regarded as “inefficient”. Since these villages were physically adjacent to and economically connected with the existing metropolitan center,⁴⁷ they should be developed into outskirts

high-end condos. Demolition in a short time creates high demand of housing, thus helping to push higher the potential ground rent suddenly, widening the rent gap.⁴⁸

While the peasant workers contribute to the growth of urban economy, they do not really belong in the cities. Chinese cities are clear divided by social conditions and income classes. Many of these so called “peasant workers” have worked in the cities for twenty or thirty years but their social status remains unchanged. Peasants leave their hometown but cannot find satisfaction in the new social order of the city. Then what is preventing them from going back to their home villages? To answer this question, we have to go back in time to the Special Economic Zones, which was originally considered temporary.

*“The fact is that the two essential criteria of absolute necessity and temporariness contradict what Rossiter knows perfectly well, that is, that the state of exception has by now become the rule ...”*⁴⁹

- Giorgio Agamben

3. Home-village “Jia-xiang”

*“It is almost as if, starting from a certain point, every decisive political event were double-sided: the space, the liberties, and the rights won by individuals in their conflicts with central powers always simultaneously prepared a tacit but increasing inscription of individuals’ lives within the state order, thus offering a new and more dreadful foundation for the very sovereign power from which they wanted to liberate themselves.”*⁵⁰

- Giorgio Agamben

The SEZs are like “a country within a country, a technology that over time spreads its industrial, labor, and social gains throughout the nation.”⁵¹ This strategy is called from point to surface by Deng, where once the practice within the economic zones proves successful, the same strategy will be applied throughout the country. To date, there are 54 national-level

el ETDZ (economic and technological development zones).⁵² Moreover, development zones modeled after the SEZs reached over 6000 in 1993, occupying 15000 sq. km of rural land, exceeding the total built up area of all cities in China.

By 2003, development zones had doubled.⁵³ According to the *China White Paper on Employment Situation and Policies Statistics*, in 1990 there were only 15 million migrant workers; in 2003, there were 98million, and by the end of 2006, 200 million.⁵⁴ As all the young people have gone into the cities, the village is hollowing inside. The media calls them “Inner Decaying Villages” (Kong Xin Cun). Once people are gone, no matter how hard heritage protection tries to protect the villages, they deteriorate on their own. Jia Pingwa (1952-) cries:

“Home village, since now you lose your memory.”⁵⁵

When the home of a werewolf loses its memory, the werewolf loses its root, thus he or she is exiled.

But could they go back? Is the village the same as they left it?

You-Tien Hsing explained that the rising property value indicates the success of urbanization and the performance of local government leaders.⁵⁶ As old structures represented by old fragmented ownerships are torn down and new structures represented by the development companies supported by governments are built, “the physical boundary of municipal authority is redrawn and its proprietary and regulatory power is reclaimed over valuable urban land”.⁵⁷ China’s rural-oriented territorial governance shifted to an urban-centered one in the early 1980s. Provincial governments converted rural counties and prefectures to urban status in a similar way to how companies do merger and acquisition. Thus the control over rural resources shifted from rural to urban.⁵⁸ A set of legal and administrative institutions were also set up recently to reinforce the control.⁵⁹ First is the regime of land tenure, where those who represent the state, under the vaguely defined “public interest” are able to requisition rural land. Second is the urban government’s monopoly of the land market, which illegitimizes the individual villagers’ right during land-lease sales.⁶⁰ The new land management regime, Ministry of Land Management, established in the mid-1980s, has the authority to draw national annual land-use plans and allocate quotas for farmland conversion to individual provinc-

es. Townships at the bottom of the hierarchy are usually left with little allocation for farmland conversion.⁶¹

Since then, the control of land has become a power struggle between the urban governments and the townships.⁶² In recent years, in order to obtain construction land issued outside the plan, local governments are increasingly considering reclaiming homesteads dominated by rural construction and transforming them into new arable land. All over the country, slogans like “new rural construction”, “new residential construction” and “urban and rural unify” are put up to promote the withdrawal of villages, separating the farmers from their land and putting them into collective housing, on large scales. Villages were forced to submit village land to township development zones.⁶³ For example, in Constructing New Socialist Villages in 2006, smaller and poorer villages were abolished and merged with larger and richer “central villages” and “central towns”. According to Hsing, the concentration of resources in fewer prosperous townships and villages will help win the cooperation of powerful rural brokers and motivate them to penetrate the rest of the rural area,⁶⁴ which is also an explicit strategy of business. Hsing concludes that rural politics is urbanized, as rural power brokers defend their power position through urban projects and rural development follows urbanistic aspirations.⁶⁵

In an essay titled “Chinese rural land reform’s mis-understandings and approaches” by Tao Ran (professor of school of commerce, People’s University of China) and Wang Hui (professor of school of public management, Zhejiang University), the field surveys showed that both the homestead relocation compensation level and the collective living standards are basically set up by the monarchy of the local government, with a lack of public participation.⁶⁶ In other words, peasants became irrelevant during the power struggles between different agencies, in regards to their homes. Just as Pallasmaa predicted that when “the art of architecture turns into production of commodities for the consumer society, it loses its poetic and metaphysical content and sees as its duty the mere fulfillment of popular desire.”⁶⁷ For farmers, despite the convenience of lifestyle, agricultural production has been greatly affected. Some local governments argued that farmers

are compensated by the hundreds of thousands yuan's market value of new housing. But farmers consider that the market value of owner-occupied housing does not make sense, especially when the land tenure system makes it difficult for them to sell their properties.

When there is only a one-way communication, the people at the bottom of the society have no leverage against "a property rights regime" dominated by the state representatives.⁶⁸ According to Hsing, land-related protests tend to be larger and feature more frequent clashes between peasants and police forces.⁶⁹ You-Tien Hsing calls these struggles of social actors to claim their territory "civic territoriality", the politicization of place.⁷⁰ The home of a werewolf becomes political, just like how Karl Lowith predicted about the politicization of life, which implies "a total politicization of everything, even of seemingly neutral domains of life"⁷¹. Agamben in reference to Foucault's biopolitics writes that "every apparatus implies a process of subjectification, without which it cannot function as an apparatus of governance, but is rather reduced to a mere exercise of violence."⁷²

4. Yao-dong villages

After introducing the general context of Chinese villages, I will discuss specific issues facing yao-dong villages and their inhabitants. Yao-dong villages used to be scattered like constellations deep in the loess gullies or loess yuan. However, as most young people migrate to the city to find work, under the original distribution of dispersed rural homestead, to provide public services and rural infrastructure for the staying populations (mostly elderly and children) has become costly. The abolition of agricultural tax in 2006, while lowering the burden on farmers, also led to a lack of resources for village collective farming to provide public goods. This resulted in the lack of funding or cut-off of existing construction for needs such as rural roads, small water conservancy facilities, pre-school, and other public infrastructures.⁷³



FIG 0.7 Guo Gui-bao and his yao-dong



FIG 0.8 A villager checking the cracks of the land after mining have cause land instability in Shanxi Ling-xian Pang-pang-ta village, 2011 Aug.19, photographed by Xin-hua News reporter Zhan-yan

In addition, as I mentioned earlier, the energy bases in Northwest China provided about one third of China's total coal consumption. The environmental pollution and abusive mining caused by rapid economic development, have posed serious challenges to yao-dongs. On the one hand, the heavy mining industry boom in Shanxi and Shaanxi provinces provide electricity and energy to the cities in China, sustaining the "lifestyle" real-estate promotes. On the other hand, excessive and abusive mining has damaged the structural stability underground in Shanxi, which has led to numerous disastrous landslides. Affected areas include 5000 sq km, with 3000 sq. km of landslides, and an affected population of 2.3million people.⁷⁴ Guo Gui-bao, aged 68, from Nan-gou village, Shanxi, sleeps in a 1m (L) x 0.7m (W) x 0.65m (H) stone box inside his yao-dong in case his yao-dong collapses. In 2009, a mining company extended their mines beneath his village. Since then, the sound of machine drilling were heard coming from the earth below during countless quiet nights. Soon, cracks were found inside villagers' yao-dongs. When it rains, water would leak from these cracks.

*"Throughout the whole night, he keeps the light on. From time to time, he will peek through his stone box. There are numerous cracks in his yao-dong's arch and walls. He used old newspapers to cover these cracks, like covering scars."*⁷⁵

Also, life in the underground mines as I described earlier, is bare-life. They suffered from dangerous working conditions, harsh living conditions in the slums, and prolonged health impact due to the chemicals and toxic airs. In contrast, the symbiosis with nature, through agriculture and yao-dong homes, provide healthy lifestyles.

Another challenge to yao-dong construction is the sudden change in precipitation due to climate change. In July 2013, Communist Revolution's holy city Yan'an experienced heavy rains, and 13 other counties were also hit by the storm. Concentrated rainfall in a short amount of time resulted in severe soil moisture saturation.⁷⁶ The downpour destroyed more than 70,000 yao-dongs, leaving more than 220,000 people homeless.⁷⁷ Floods provide an opportunity for creative destruction and government propagandas. The city will relocate the people into apartments with modern technology, producing high quality cave-style buildings.⁷⁸ "Bid farewell to old

earth cave” seems to be the peasants’ standard farewell to poverty.⁷⁹ According to the news report, in three to five years, the government plans to rebuild 42000 houses, focusing on solving the 18000 household, 4.3 million people’s housing resettlement to achieve the goal to completely eliminate yao-dongs.⁸⁰ Yao-dong’s abundance in northern China for thousands of years, is evidence of the climate for thousands of years. This recent abrupt climate change, alarms us through yao-dongs. However, the propaganda of relocation with a yao-dong façade, seems to be able to make us forget that the Loess Plateau has always been threatened by the Yellow River, the Sorrow of China, and that despite numerous water invasions, yao-dong villages were able to rebuild themselves.



FIG 0.9 New relocation yao-dong

5. To make a simple and poetic shelter

Agamben uses the story of Bisclavret's final transformation back into human, to illustrate the proximity of tyrant and wolf-man, saying that it is the sovereign decision to make a werewolf. The foundation of the modern constitution is "continually operative in the civil state in the form of the sovereign decision."⁸¹ Hsing used the term "state apparatus" to describe today's authority-building.⁸² Nitzan and Bichler points out that Capitalization enables an apparatus of ownership that controls potentially every aspect of human society.⁸³ It is known as the "mega-machine", or the "state of capital", that comprises both corporations and government organizations.⁸⁴ Land is one of the decisions that impacts state-society relations⁸⁵ and regulates the exit and entry to the state of indeterminacy.

In comparison, peasants seem powerless. Ching Kwan Lee(2007) thinks that contradictions we are seeing today exist because "decentralized legal authoritarianism has in fact deradicalized migrant workers in China's sunbelt."⁸⁶ Villagers' physical removal from their civic territory causes their economic degradation and organizational disintegration. With the breakdown of the peasants' civic territoriality and village spirits, the state's control over their land emerges as powerful as ever.⁸⁷ If "bare life" is a life without any opportunities for resistance, can architecture mediate and bring this possibility of resistance back?

Zhu-li-mao-she (thatched cottage with bamboo fence) was considered the most sacred architectural thinking in traditional China and only the highest cultivation of mind can enjoy such lifestyles. This simple and spiritual shelter also attracts scholars back to their home villages, building a two-way communication between the villagers and the central power. However, the decades of shame during the war period and the relentless growth of economy followed, have left a deep scar in the Chinese people's soul that poverty means shame. Even though the traditional spatial hierarchy is disrupted, Chinese people still tend to associate social status to places. It is sometimes harder for people living in yao-dongs to find a marriage, not because of their economic situations but because of bias towards yao-dongs. A yao-dong is deeply associated with backwardness and poverty, and

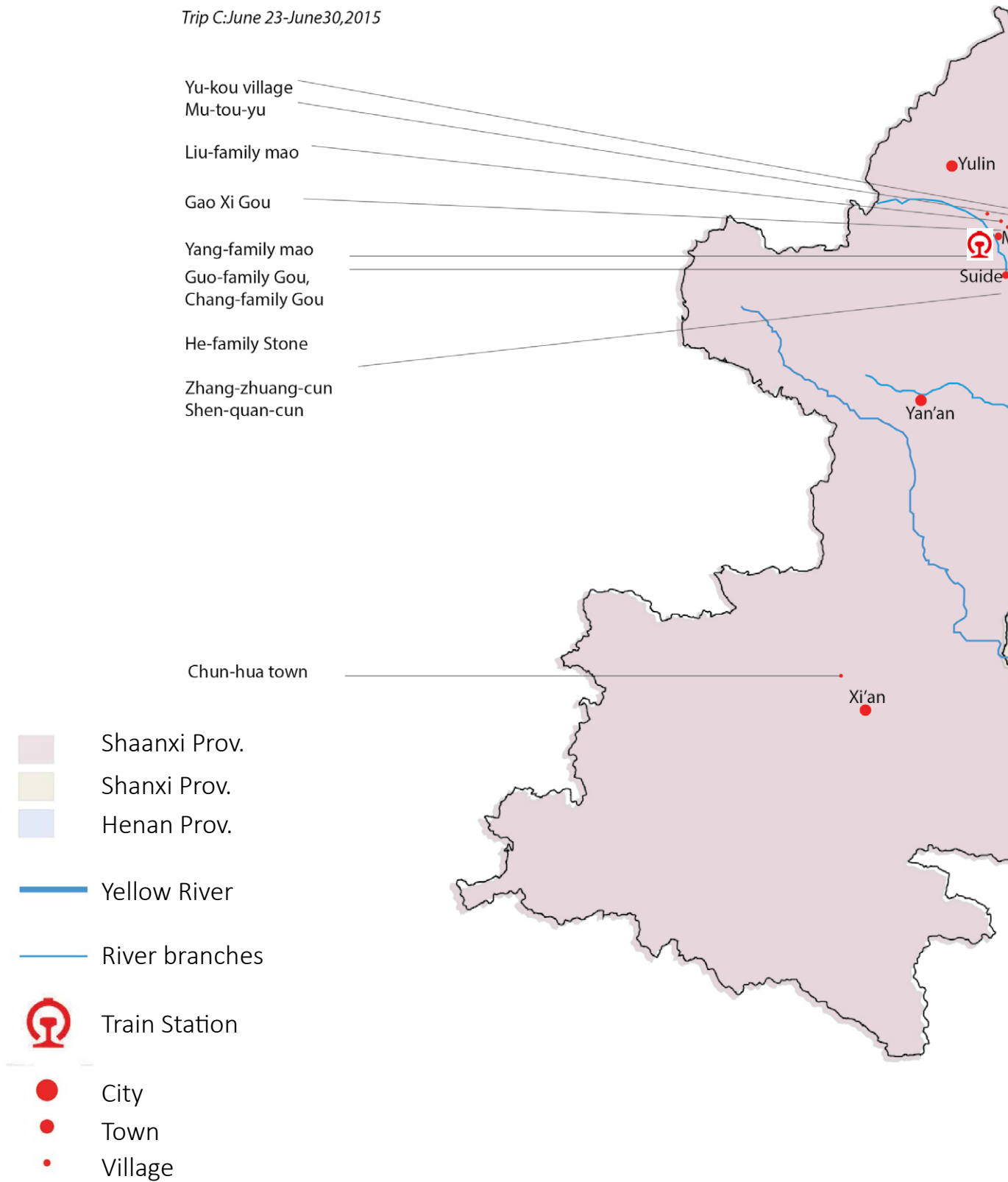
so are the people living there. In the countryside, a modern house and a car are the symbols of well-being. For those who have not come home for a number of years, the ambition is to drive home. At New Year, the village is over-crowded with cars. The organic longing and homecoming of a peasant has today become a commodity show. The impact of commodity economy not only overshadows the original village ethics and culture, but also makes the village hollow by taking people away to make more money. How to make a simple and poetic shelter for the young peasants is the underlying theme this thesis tries to explore. As Pallasmaa writes: "In a culture that tends to turn into a Sargasso Sea of too many goods, too much information, too many ideologies, too much of everything, the idea and aesthetics of noble poverty have a new moral value."⁸⁸

In addition, if the werewolf is going back to human, how might they live? As Bernard Rudofsky thinks that the philosophy and know-how of the anonymous builders presents inspiration for architects, for it touches the increasingly troublesome problem of how to live and let live.⁸⁹ I believe yao-dong traditional lifestyle may inspire the young peasants on living.

With these questions in mind, I started my research in yao-dong villages.

Trip A: May 25- June 2, 2015

Trip C: June 23-June 30, 2015



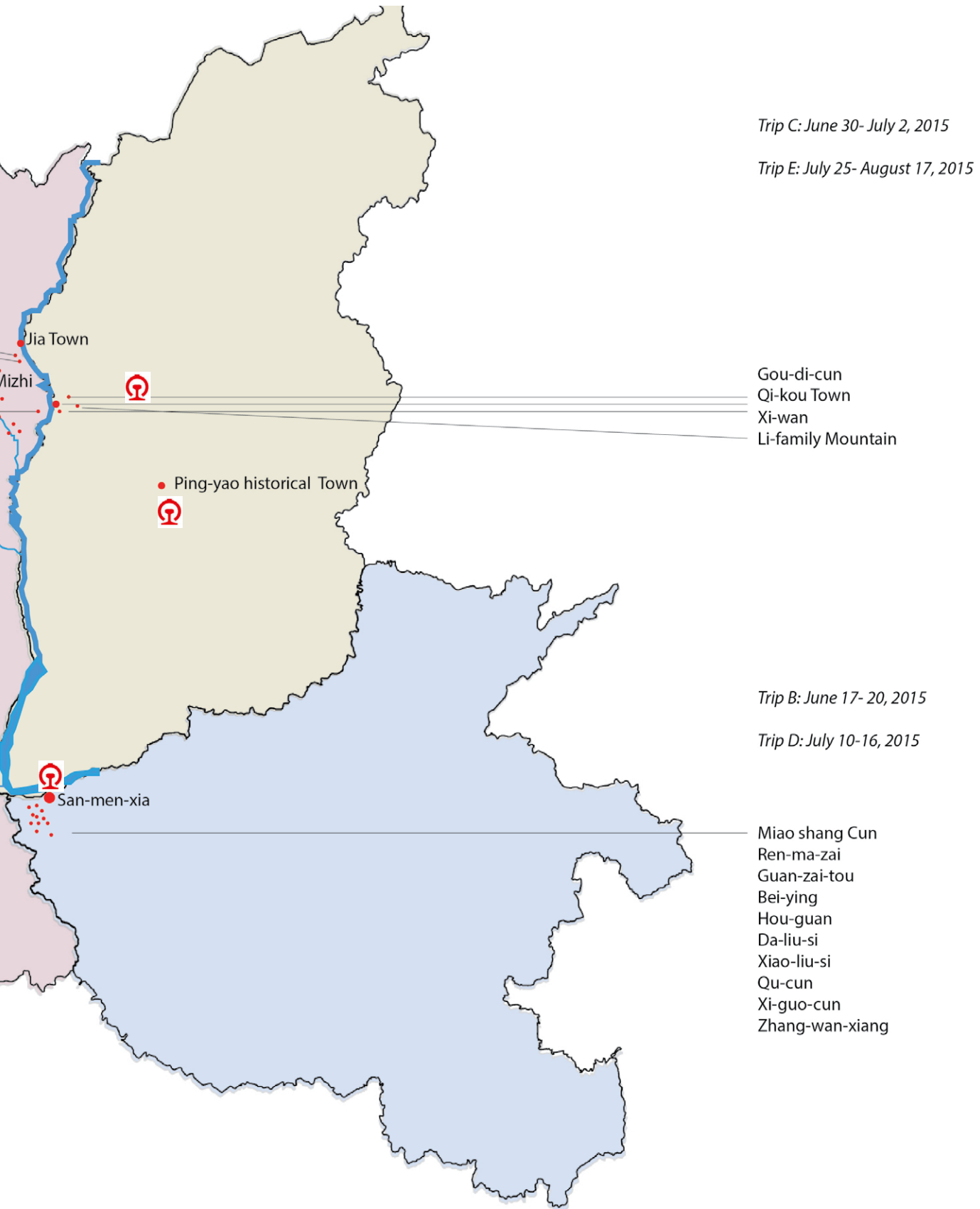


FIG 0.10 Map of areas researched in Shanxi, Shaanxi & Shanbei

Natural
and
Cultural
Background

A yao-dong is embedded in the loess soil and thus the Loess plateau. Without this type of soil, there would be no yao-dongs.

Between 34°-41° north latitude, and 101°-114.5° east attitude lies China's loess plateau¹, with a total area of 1.63million square kilometers.² The plateau covers eight provinces: Hebei, Henan, Shanxi, Inner Mongolia, Shaanxi, Ningxia, Gansu, and Qinghai.³ The middle of the Yellow River cross this loess land.

Loess soil is typically yellow. Because of loess soil's special properties, it is easily eroded by water. In two to three million years, this land changed from forest into broken valleys, wrinkled like an old man's skin. Every year the erosion carries 16 billion tons of loess soil into the Yellow River, making it yellow.⁴ Because of the same special quality of the loess soil, yao-dongs are carved out of this wrinkled landscape.

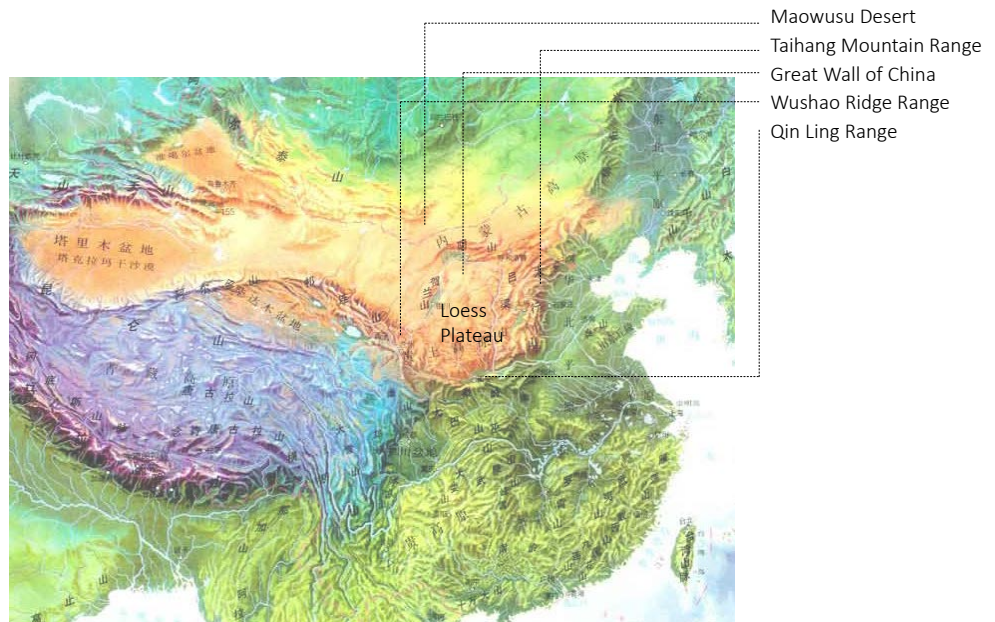


Fig 1.1 China Terrain Map

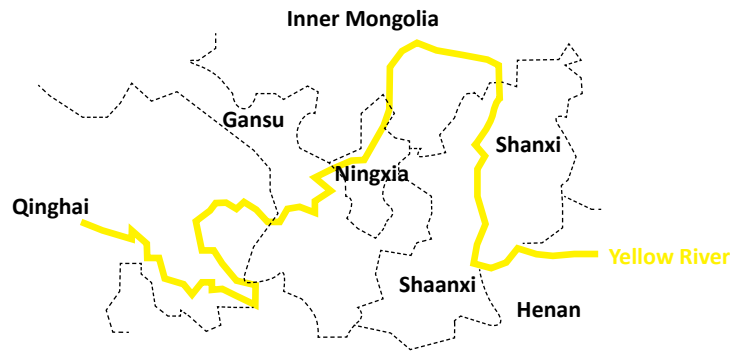


Fig 1.2 Provinces and the Yellow River

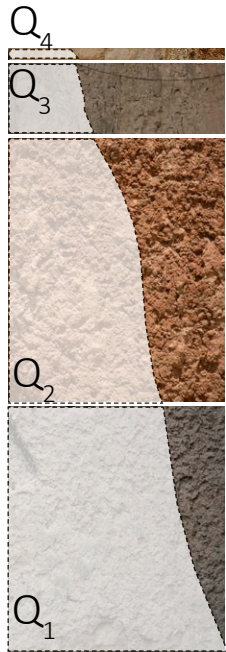
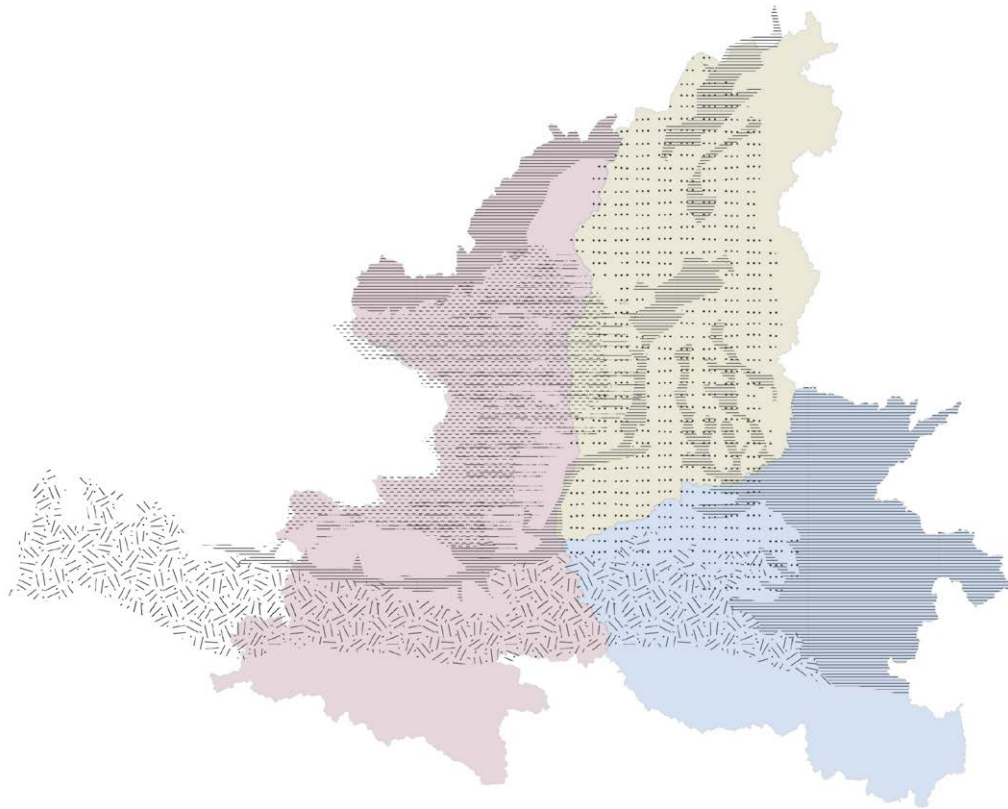


Fig 1.3 Loess Soil Types

There are different theories about the formation of this plateau and one of the most popular theories considers loess as an eolian deposit.⁵ While the seasonal North-west wind carries loess soil from the desert regions of Asia to the South-east for millions of years, the Taihang Shan range to the east and the Qin Ling Shan range to the east forms natural barriers causing the sand to be deposited in the loess region.⁶ According to researcher Guo Binglu, each year, there is a one centimeter deep loess soil depositing in the Loess land.⁷ Today, China's Loess Plateau is the largest loess soil deposit in the world.

As wind carries the lighter and finer particles further south and east, the loess soil quality improves, and yao-dong becomes more stable.⁸ Thanks to the soil's special property, which enables straight even cutting⁹, with sufficient time to dry up, the loess soil can maintain its own stability. Thus yao-dong becomes the ideal shelter in the region abundant with free building materials.

Chinese loess soil was first deposited millions of years ago.¹⁰ Loess soil is categorized into four layers according to its time of formation: Q1 early Pleistocene layer, Q2 middle Pleistocene layer, Q3 late Pleistocene layer, and Q4 Holocene loess. According to Golany, generally the older the loess, the more dense it is. Moving from the upper layer to the lower, the quality of the loess improves. It becomes more stable, stronger, denser, and has a lower degree of moisture.¹¹ According to Shanbei folk custom researcher Guo Bing-lu, most of yao-dongs are constructed in Q2, also known as "Li Shi" loess layer, and Q3, "Malan" loess layer. Q1 is the hardest soil to carve out and often buried deepest, therefore, with the limited technology villagers have, few yao-dongs were carved in this layer. Q4, the youngest layer, is not good for yao-dong construction, but makes fertile farmland.¹²



Shaanxi Prov.
 Shanxi Prov.
 Henan Prov.

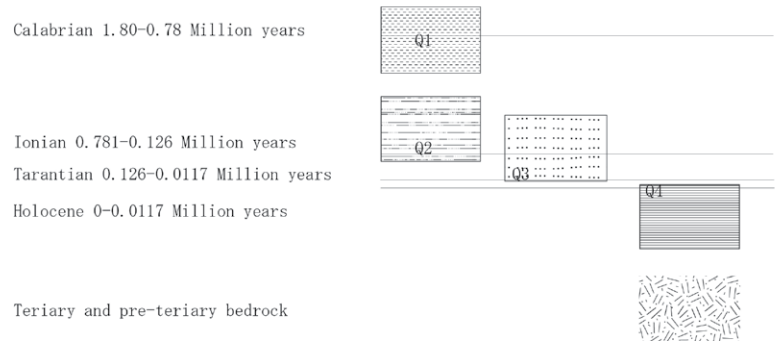


Fig 1.4 Loess Soil Distribution

While Q2 is the most ideal soil for yao-dong, it is usually buried deep beneath the earth's surface. That is when the factor of erosion becomes critical. From July through September, warm and moist wind from the southeast coast increases the high relative humidity in these areas,¹³ and the process of erosion increases.¹⁴ The brief, torrential, and sparse rainfall, causes flooding and erosion of the loess soil. Lack of vegetation cover also detracts from the soil's capacity to absorb rain runoff and intensifies the erosion process.¹⁵ Erosion happens also because of loess soil's propensity for vertical erosion.

According to Guo Bing-lu, people utilize these deep cuts of erosion to construct yao-dongs along the cliffs, where they benefit from the depth as natural shelter, and from the ideal layers of loess soil exposed after erosion.¹⁶

Fifty per cent of the Loess Plateau is loess gullies, also known as "Gou", forming intricate river valleys.¹⁷ The intricate system of rivers in the loess plateau reflects its intricate landforms. The proximity to water resources also makes gullies the ideal place to dwell. One fifth of China's farm land lies in the Yellow River basin.¹⁸



FIG 1.5 Stages of Loess Gully formation

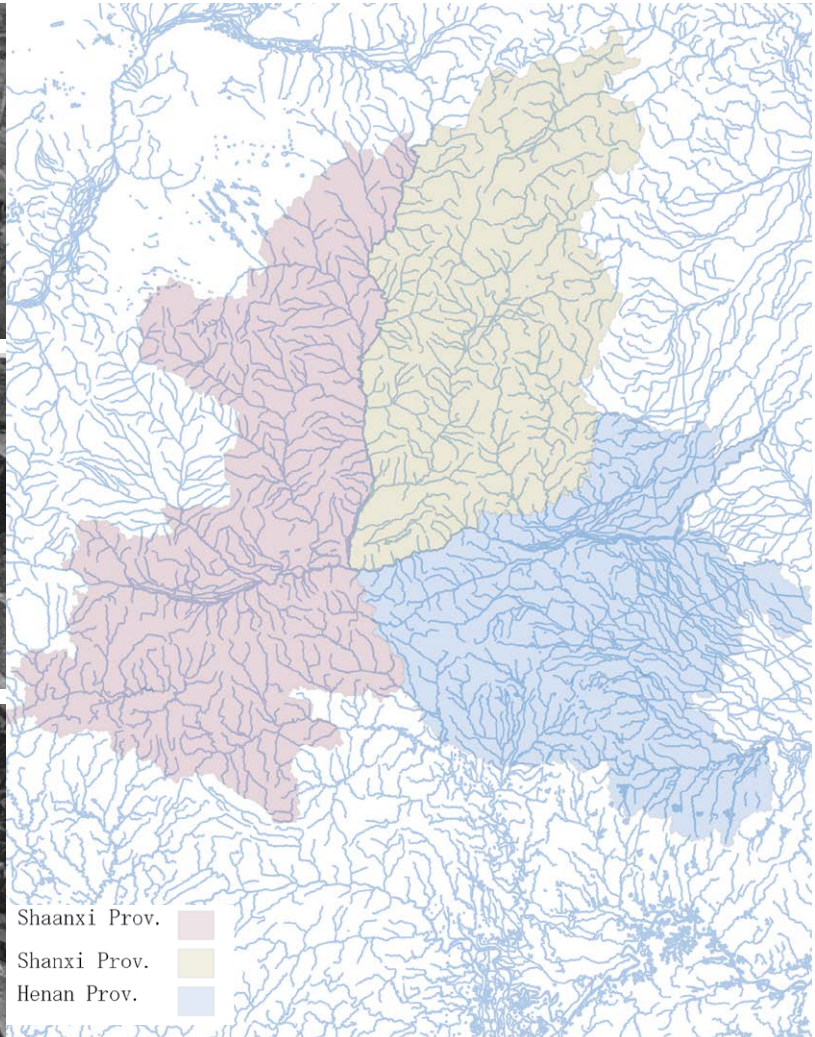
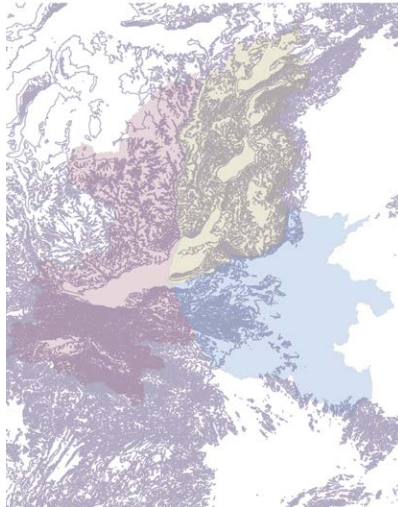


FIG 1.6 River System in Shanxi, Shaanxi, and Henan Prov.



Shaanxi Prov.
 Shanxi Prov.
 Henan Prov.

FIG 1.7 Terrain Map in Shanxi, Shaanxi, and Henan Prov.

Loess region's average altitude is 1000-2000 meters, with a depth varying between 100meters to 300 meters.¹⁹ Shaped by the wind and the rivers, there are numerous types of loess forms.

According to architecture professor Hou Ji-yao, urban planning professor Zhou Qinghua, and Dr. Golany, the remaining big flat rolling site after erosion is called Yuan. There is usually a slope of 5° on Yuan. The edge of Yuan is rather steep due to erosion. When Yuan is divided, the remaining long ridge is called Liang. Its length usually reaches a thousand or ten thousand meters, while its width varies from ten meters to hundreds of meters. Mao refers to loess hills in variegated shapes. Liang-Mao is a combination of Mao and Liang.²⁰

When a yao-dong tries to adapt to the different landforms, it varies in typologies, as well. There are mainly three types of Yao-dong: the cliff yao-dong (Kao Shan Yao), the underground yao-dong (Di Keng Yao), and the above-ground yao-dong (Du Li Shi Yao). On the sunny side of gullies, cliff yao-dongs are typically carved out. The subtractive construction method makes it possible for people who do not own the land properties to find their personal site in the high lands and mountain side. On a flat Yuan, when there are no cliffs to be carved, yao-dongs are excavated horizontally from a square hole in the earth which serves as a sunken courtyard. From the terrain map of three provinces, we can see that Henan province where most underground yao-dongs are seen, is also where the large flat rolling land is. When there is no Yuan nor Gullies to excavate a yao-dong, villagers build an above- ground yao-dong, which is similar to an earth berm house.

During construction, the soil removed from a hill can be reused. After the yao-dong's time is up, it is buried again and returned to nature without a trace as time passes. Villages are integrated into the environment with low impact.



Underground Yao-dong



FIG 1.8 Yuan

FIG 1.9 Mao

FIG 1.10 Liang

FIG 1.11 Liang-Mao

FIG 1.12 Underground Yao-dong

FIG 1.13 Cliff Yao-dong

FIG 1.14 Above-ground Yao-dong

FIG 1.15 Three types of yao-dong

According to Golany, Qin Ling range not only makes the loess soil settle down in the loess region, but also prevents the summer's moist ocean air to penetrate deep into this region.²¹ The loess region has an arid and semiarid climate with an economy on the dry farming of wheat.²² It is characterized by long, cold, and dry winters and short, hot, and rainy summers.²³

According to Golany, due to the lack of high mountains, the region is frequently threatened by sand storms from the continental desert region in the neighboring north, for as high as twenty or more days per year.²⁴ Dust particles abrade above ground houses and weaken their foundations.²⁵ Yao-dongs, on the other hand, are not harmed by the dust because it is either shielded underground or by surrounding loess hills.

According to Golany, the loess region's winter temperatures drop as low as -18°C while summer temperatures reach as high as 28°C.²⁶ The frost-free period is from five to eight months.²⁷ There is also a marked difference in temperatures between day and night.²⁸ An above-ground house without loess soil covered would be very cold during the latter half of the night, especially in winter, and baked hot during summer afternoons.²⁹ Yao-dong, on the other hand, releases the heat it stored in the daytime, warming the interior at night. In hot summer days, together with the amount of soil above, acting as heat retainer, Golany added that yao-dong has a hard and dry crust which prevents the escape of moisture from lower soil strata, promoting a cool space within.³⁰ This hard and dry crust, according to Guo, also gives yao-dong the ideal humidity of 35%-50%³¹, in this region with a deficit of humidity.³²

Hua Xia culture was born on this Loess land. However, frequent devastating floods and river course changes have also earned the Yellow River its unenviable name "China's Sorrow". Perhaps, this harsher conditions in the north stimulate the growth of positive forces of civilization with more intensity, bursting with latent possibility.³³



FIG 1.16 Loess farmer



FIG 1.17 still from film
"Huang Tu Di" (Loess Soil)

The three elements: the Yellow River, the loess soil, and the arid, semi-arid climate, correlate to construct a hostile environment where a yao-dong becomes the ideal shelter. Using all that is given from nature, and gaining relatively high living conditions at small cost, the people inside yao-dongs are extremely content. They worship the loess soil and express their bitterness and happiness through folk customs strongly attached to the land.

Loess region's art has the ability to penetrate very far into the depth of loess valleys, and take the whole loess plateau as its stage. According to researcher Duan Shuang-yin, in the two thousand years between Shang- Zhou dynasty (1600 – 1046 B.C.) to Shi-guo Chun-qiu Dynasty (1046 – 256 B.C.)³⁶, loess region's special cultural background is formed through the merge between the nomadic tribes and the farmers of Han.³⁴ Duan thinks that the loess people still kept a clear memory of the primitive way of living. For example, as Book of Rites describes "people from the north are called Qiu, wearing white feathers, cave-dwelling, not eating rice".³⁵ Today the farmers in this region still wears white towels over their heads, live in yao-dongs, and eat noodles and potatoes. People living on the loess have to cope with the harsh living environments, which make farmers relatively poor. Together with the bravery of the nomadic tribes from ancient times, the loess peasants form a special longing for spirits.

An-sai drum dance is one of the most famous loess region art. Duan thinks that the An-sai drum dance is related to the Ancient nomadic tribe Di-qiu's witchcraft³⁶ :

*"Groups of warriors dressed like drummers, accompanied by thunder deadening sounds of percussion, and yellow waves of loess raised under the dancers' feet. An ancient scroll depicting the spectacular scene of warriors fighting in battles was unrolled. The 'fo-chen' (evolved from cow's tail) in the hands of 'Biao-xiang' and 'Shan-tou' (a lead dancer, evolved from witch), together with the timing of old ritual worshipping earth gods, give a strong ritual atmosphere."*³⁷



FIG 1.18 Rain Praying Song (2008)



FIG 1.19 still from film "Huang Tu Di" (Loess Soil)

According to artist and Professor Wang Qi-jun, ancient witchcraft is a spiritual folk custom. It is how humans wish to communicate to the gods.³⁸ According to Chen and Li, this relationship is not all in total respect. For example, when the days are dry, villagers will pray for the rain. If there is a drought, the villagers will leave the Dragon gods, who governs rain, under the sun and in the almost dried water well, to make him feel the pain. Thus humorously, humans blur the boundaries between the divine and themselves.³⁹

Xintianyou, a tradition folk song in the loess region, literally means rambling in the sky. Usually people are spread afar in the valleys plowing land, and Xintianyou is a way of communication and entertainment. Chinese writer Zhao Bo describes:

*"Walking along the dust covered loess road, [...] Xintianyou with its light and bright tunes, will make one forget one is walking; sometimes, it makes you feel that you are a bird.... Also, in sunny days, hiding behind a willow tree, one hears the women singing while picking wild vegetables; or standing beside yao-dong window, one listens to women singing to each other or alone on Kang¹ while sewing. At these moments, they usually sing in Xintianyou tune, to express their longings. Only at these moments, will one realize how much charm Xintianyou has lost when it became written words."*⁴⁰

After a lifetime's hard work at the farm, farmers tell stories in Qin-qiang (Shaanxi Opera). According to novelist and short story writer Jia Pingwa, Qin-qiang is memorized by singing. Even for farmers who know little words, literature still comes out of their mouth. They sing "kuai-ban" (fast tunes), when they are happy as if they are going to explode. They sing "man-ban" (slow tunes), when they are sad as if the beauty of Qin-qiang can ease the wrinkles of misfortune.⁴¹ Jia wrote in his short story Qing-qiang:

"When I walked alone in the field, [...] erhu's long sound, together with the strong Qin-qiang, shocked me. I found that I

1Kang is a traditional long platform for general living, working, entertaining and sleeping. It is connected to stove and chimney. When the heat from stove goes through Kang, Kang is warmed up, and then the exhaust air goes out through the chimney.

was given a strong soul....”⁴²

When women are not busy doing housework or farming, they sit beside the window on Kang, making clothes, shoes, toys, pillars, bed sheets and so on for the whole family. Women also invented their art of paper cutouts. They express their wishes for better lives through those colorful paper cutouts.



FIG 1.20 Paper cut-outs by Guo Feizhen



FIG 1.21 Xiao huhu, mama, lulu made by grandma in Li-family Mountain Village



FIG 1.22 Cliff yao-dong in Gou-di village, Shanxi

Taoism has deep-root influence in Chinese rural culture, related to witchcrafts. The hermits from Zhongnan Mountain in Qinling whose physical proximity to the loess region, keep the primitive memories of witchcraft as the peasants living in yao-dong. According to American author Bill Porter, these hermits who preferred the wilderness to civilization, are offered the “high status in the society they supposedly left behind”.⁴³ In China, the ideal Taoism lifestyle is to return to the most primitive way of living in nature. Xiang-xi is the place of inspiration, where the Chinese poet Tao Yuan-ming wrote his famous utopian piece the *Peach Blossom Spring* (Tao-hua-yuan Ji). In his writing, this place is isolated from the world, and it is quiet and peaceful. This is one of the most popular utopian dwellings in ancient China. This tradition continues on to this day with the Taoist hermits, who live in nature to enjoy a simple and ideal lifestyle, and with the villagers in China’s countless natural villages who live in harmony with nature.

Chinese paintings record these lifestyles. According to writer Andrew Juniper, the literate’s painting “Wen-ren-hua” in Song dynasty (960-1279) shows brevity and simplicity, which enhanced the sensation of open space and suggested infinity.⁴⁴ Yao-dongs are embedded in the loess gully or Yuan, which are part of the loess plateau, whose soils come from afar. Through these limitless connections, a yao-dong becomes infinite. According to Juniper, Tao is like a river that never remain still. This fundamental principle of Taoism later is adapted by Zen.⁴⁵ Zen monks strove to produce environments that use an object or expression that bring about, within us, a sense of serene melancholy and a spiritual longing, to elevate one’s state of mind.⁴⁶ Yao-dong, often exposed to nature, has this sense of nostalgia. The eroded loess wall left by the flow of nature shows the innate beauty of mother earth. When people die, they are buried in caves near their homes; when people marry, their first night of marriage is called “into the caves”. Same as its inhabitants, Yao-dong has its life and death. When Yao-dong aged, its skin wrinkles and peels off; when yao-dong reached a certain age, it matured into the

fertile soil and return to earth.

Yao-dong dwellers are also closer to myths, spiritual customs, and ancient cultures because of their harsh living conditions, their ancient roots in hunting, and their remoteness to the Central Plain.⁴⁷ Yao-dong can be of Tao at its most natural status as a spiritual shelter. It can also be of Confucianism as it became charged with social hierarchies and ideologies. However, most common is the yao-dong we see in every villages, where the newly born are born on the loess kang, where mothers make dinners in the stove with feng-xiang, where fathers smoke pipes on the kang listening to Qing-qiang, where farmers come back with their tools at their shoulders, singing Xintianyou afar. Documentary director Jiao Bo said:

*“Peasants even though they are not rich, they have a dream. Even though their life is full of bitterness, they learn to bear the burdens. These are passions for life, are the spirits that should be acknowledged and respected from Chinese peasants in thousands of years, and the spirits that we lack today.”*⁴⁸

Few people know what yao-dongs were like 30 years ago. People who never lived in the Loess Plateau, who grew up separated from the land, may regard yao-dongs as ancient caves or the slums often depicted in the newspapers. It is hard to imagine that, only a few years ago, having a good cave was a farmer’s dream and a lifetime’s hard work, or that rich landowners once lived in large yao-dong compounds with beautiful courtyards. As Chinese writer Lu Yao wrote in his novel *Ping-fan de Shi-jie (the Ordinary World)*:

*“Poverty and discrimination have left too deep a scar in our heart. Yao-dong’s good or bad, represents the well-beings of the farmers, and directly relates to one’s dignity. [...] Building two or three new yao-dongs is nothing special for the rich. However, for the poor, it realizes a dream, creates a history, and builds a monument.”*⁴⁹

Story 1

Dwelling deep in the gullies

空谷幽蘭

Fig 2.1 Kong-gu-you-lan/ On the road to heaven



Fig 2.2 Google Map



Fig 2.3 Looking towards the Yellow River from a Gou (gully)

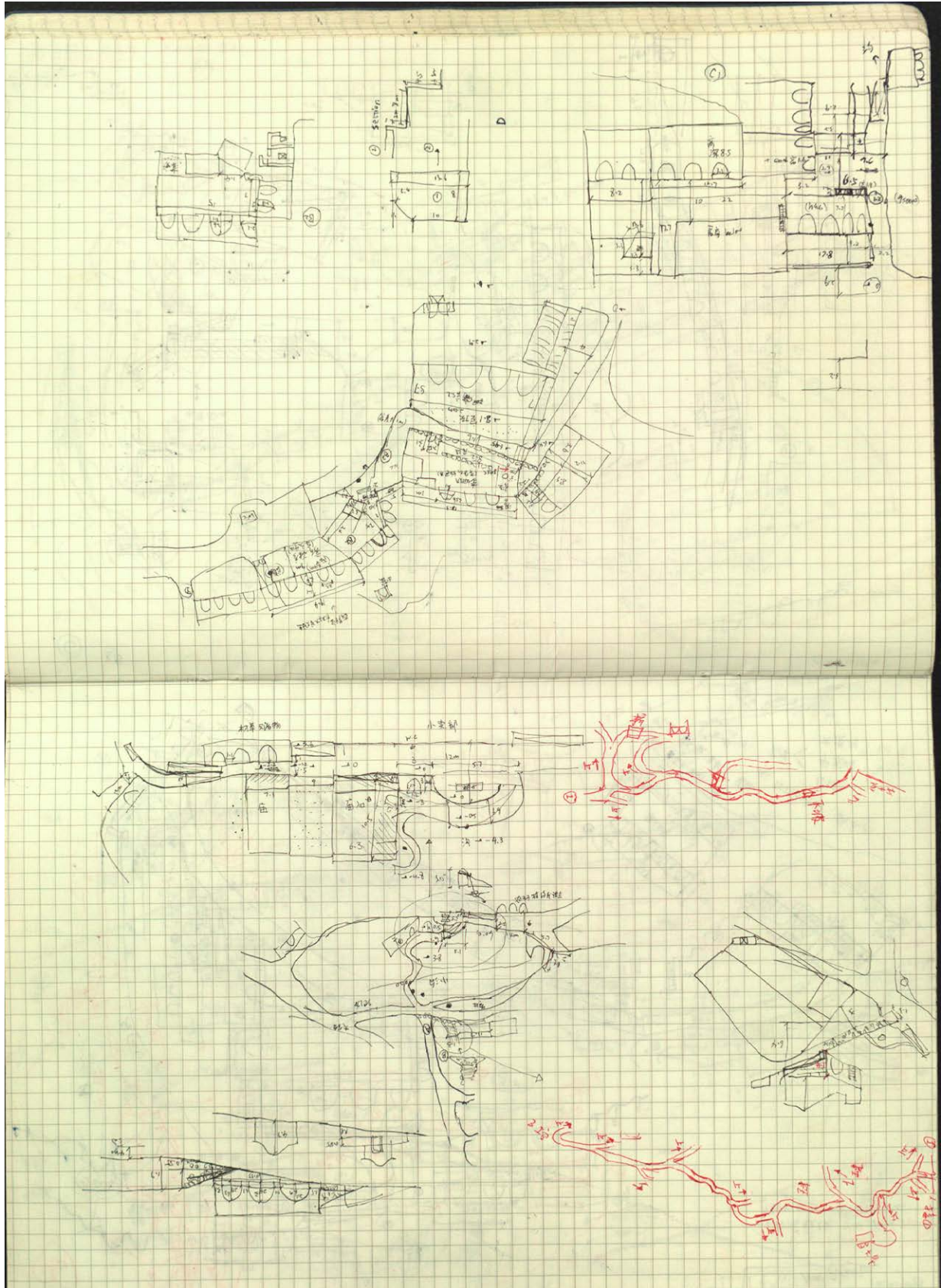


FIG 2.4 Sketches from Gou-di-cun village center, August 4,7,8 2015

五沟村 沟东村 中学社村 2.7

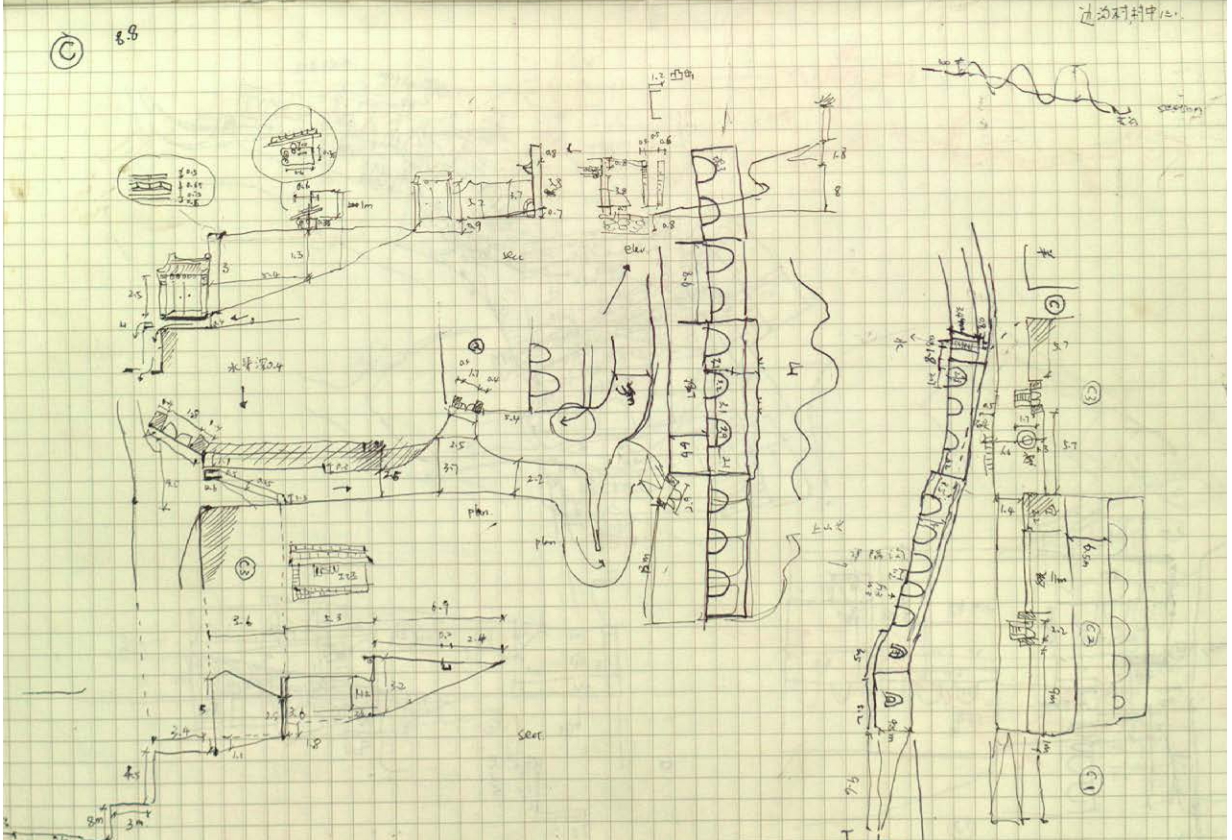
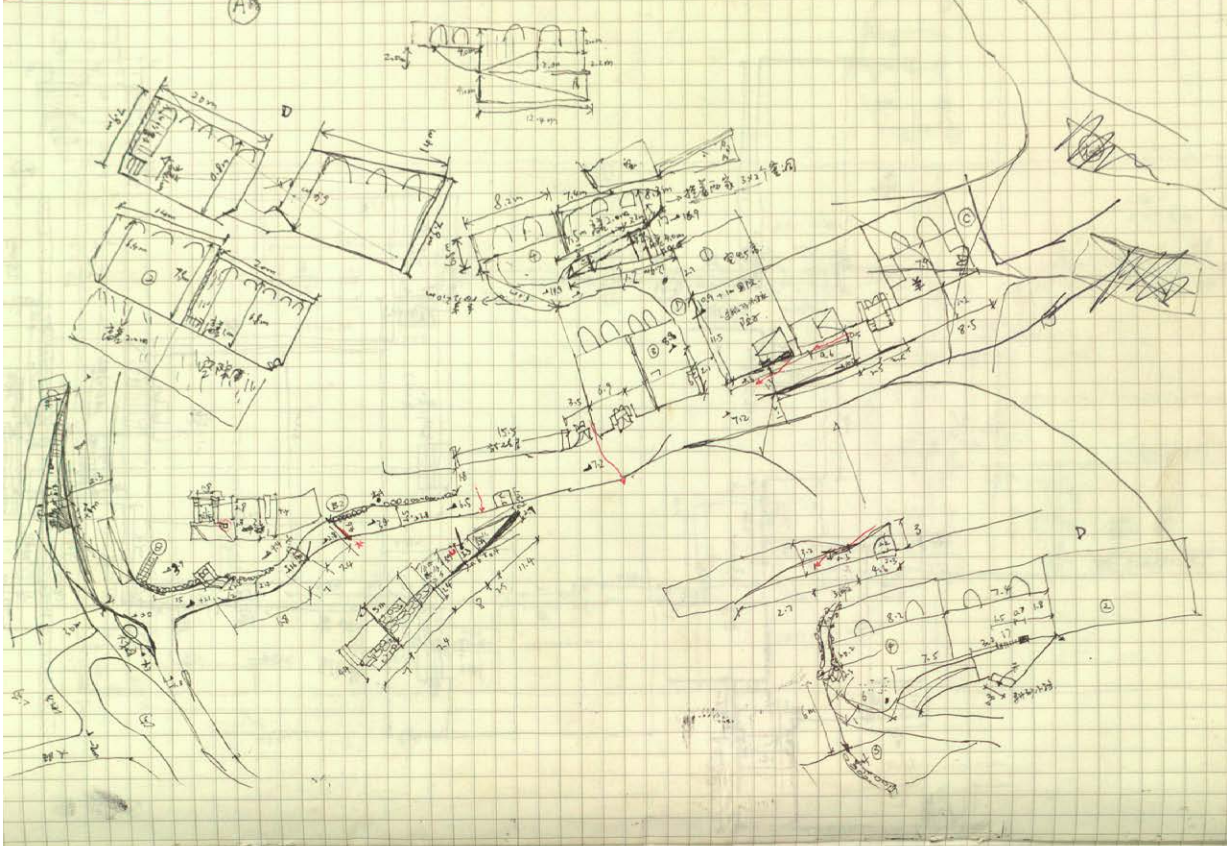




FIG 2.5 View from village center
View of the village center from the other side of the main gully

Gou-di village means the bottom of the gully. The village center is built along the main gully. Then there are numerous scattered yao-dongs along the smaller branches from the main gully. Villagers will gather in the village center, playing cards. There are also two convenience shops, where we can buy water and food. Villagers often invited us for watermelons and lunches at their yao-dongs. There was a bus route connecting the village with Qi-kou town, which was cancelled couple years ago.



FIG 2.6 Village center and inside villagers' courtyard and yao-dong

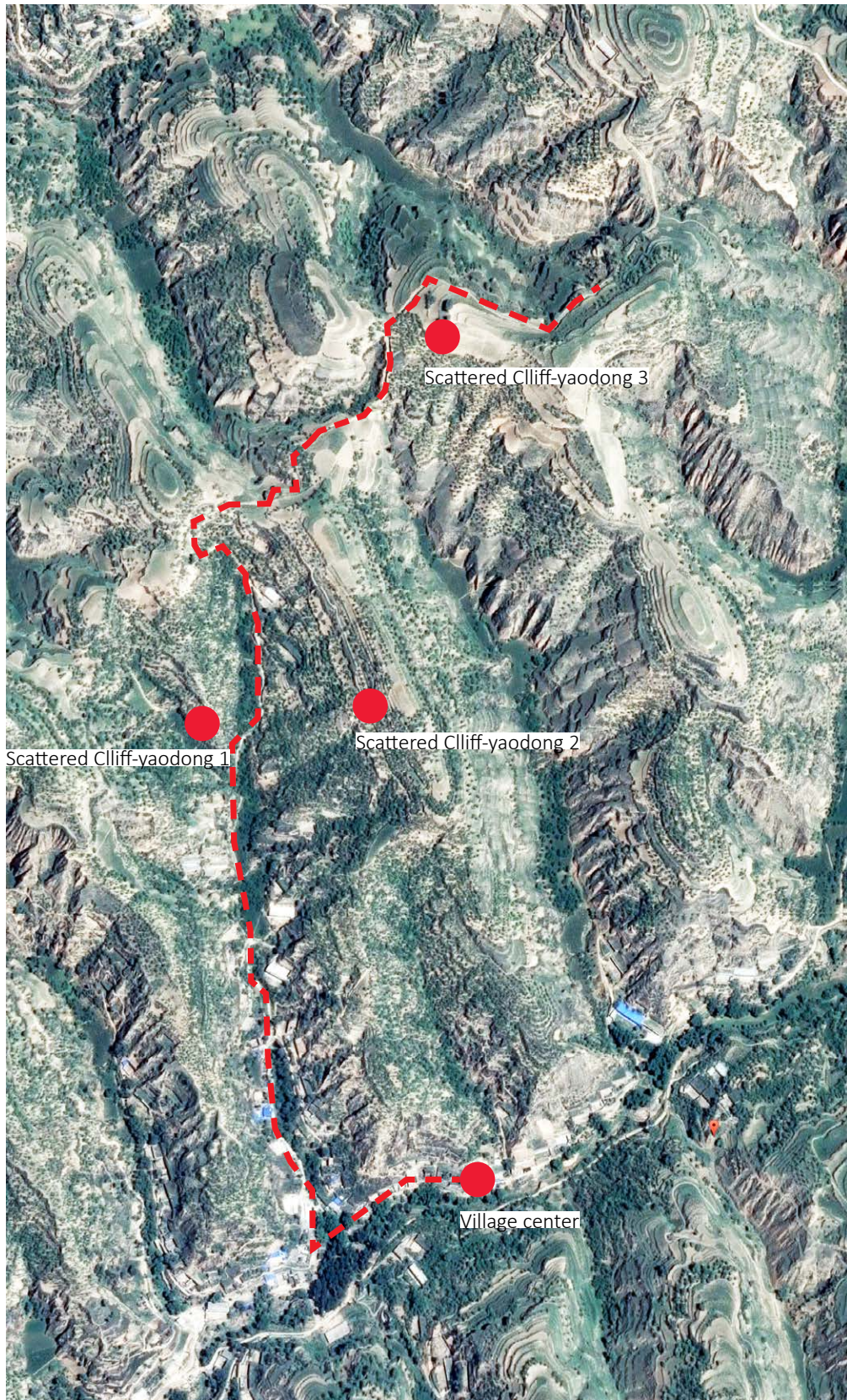


Fig 2.7 Google Map

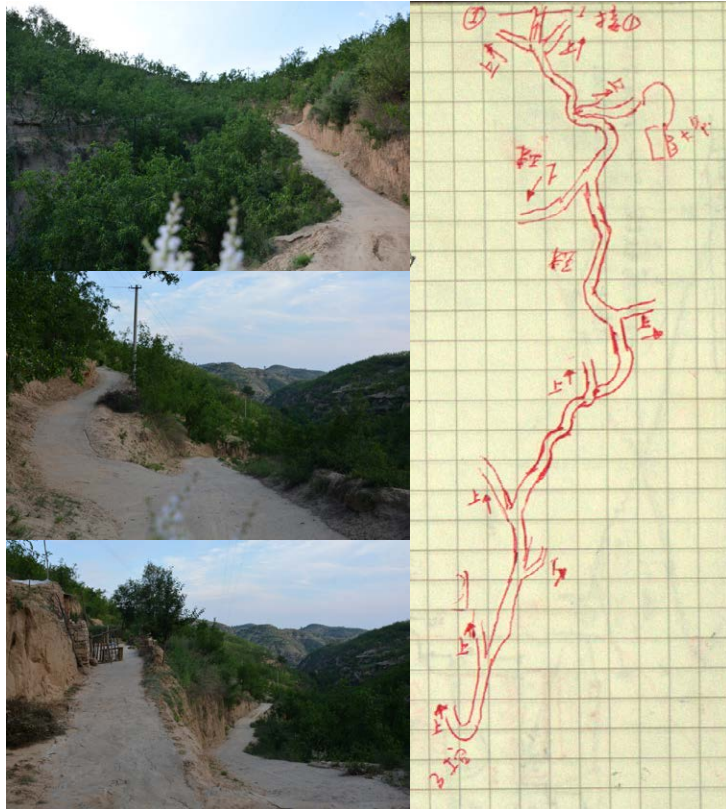


Fig 2.8 Views and sketches going down one of the gullies from village center

Scattered cliff-yao-dong at the bottom of the gully :

Grandpa Chen's father lived here alone when he was taking care of the goats and the farm. His family lived in the village center. This year, due to the lack of rain, the peach trees all have smaller peaches. Grandpa Chen picks some from his peach tree to us. They are very sweet.



FIG 2.9 Scattered Cliff yao-dong in one of the smaller gully branches

Scattered cliff-yao-dong on the top of the gully:

Grandpa and Grandma Chen lived on the top of the gully, with a great view. From the road at the gully bottom, one cannot find their yao-dong. Thanks to their neighbors at the bottom of the gully, we find their yao-dong.



FIG 2.10 Cliff yao-dong on the top of gully branch

Scattered cliff-yao-dong at the end of gully branch:

A cliff yao-dong at end of the road, and overlooking the neighboring village -Ren-jie-yan-village. A family of five lives here. We first visited their neighbor below, and hearing them speaking to each other. It is common to talk to friends far away in the gullies, and hearing farmers singing Xing-tian-you from afar.

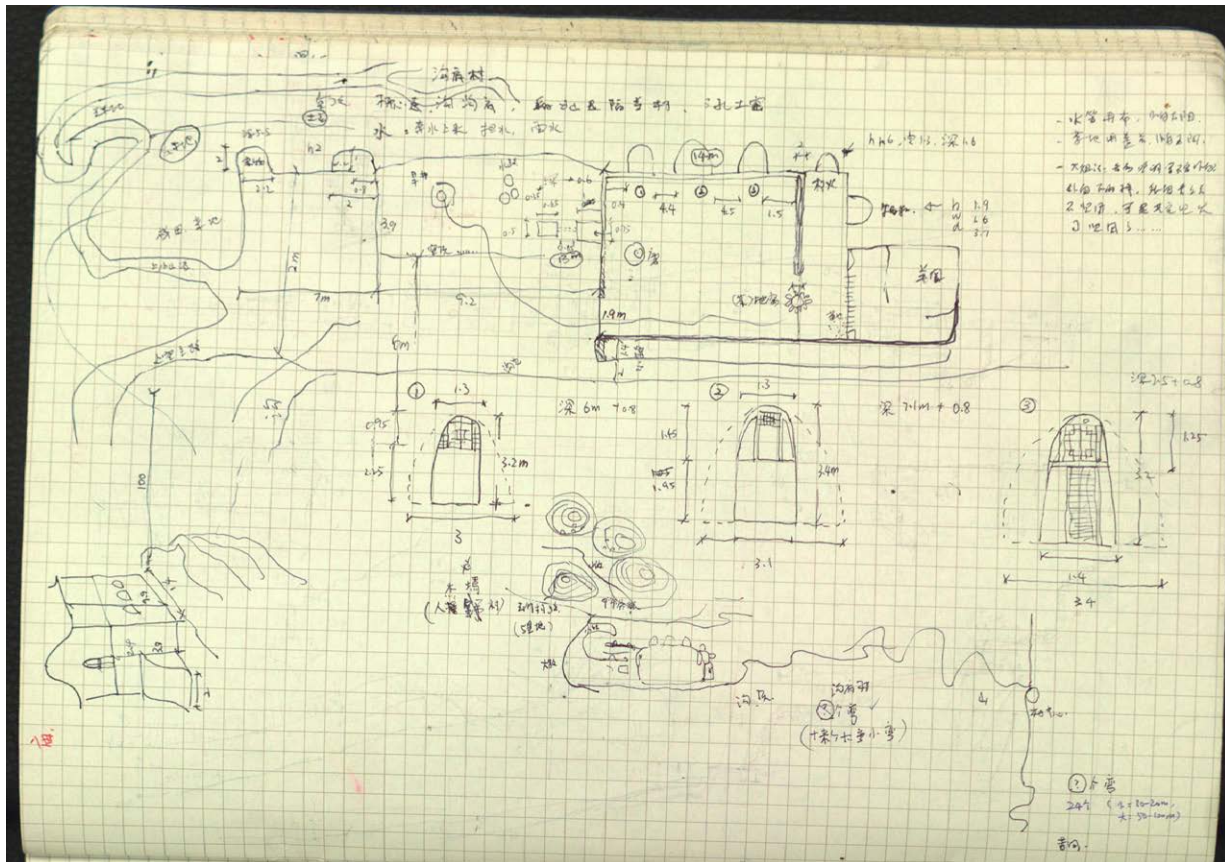


FIG 2.11 Sketches from Gou-di-cun village, August 16, 2015



Fig 2.12 Cliff yao-dong at the end of the small gully branch



Fig 2.13 Yao-dong



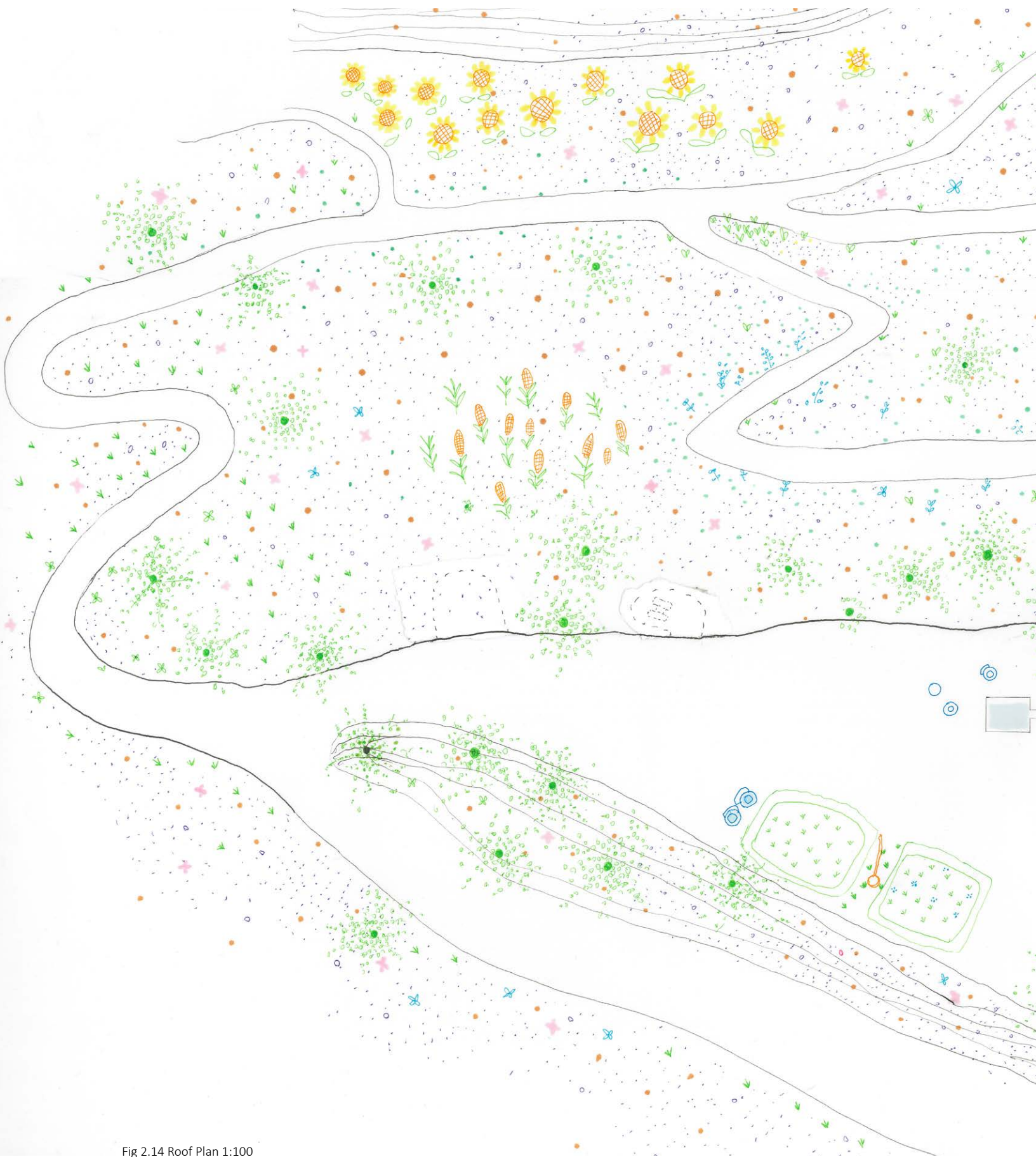


Fig 2.14 Roof Plan 1:100

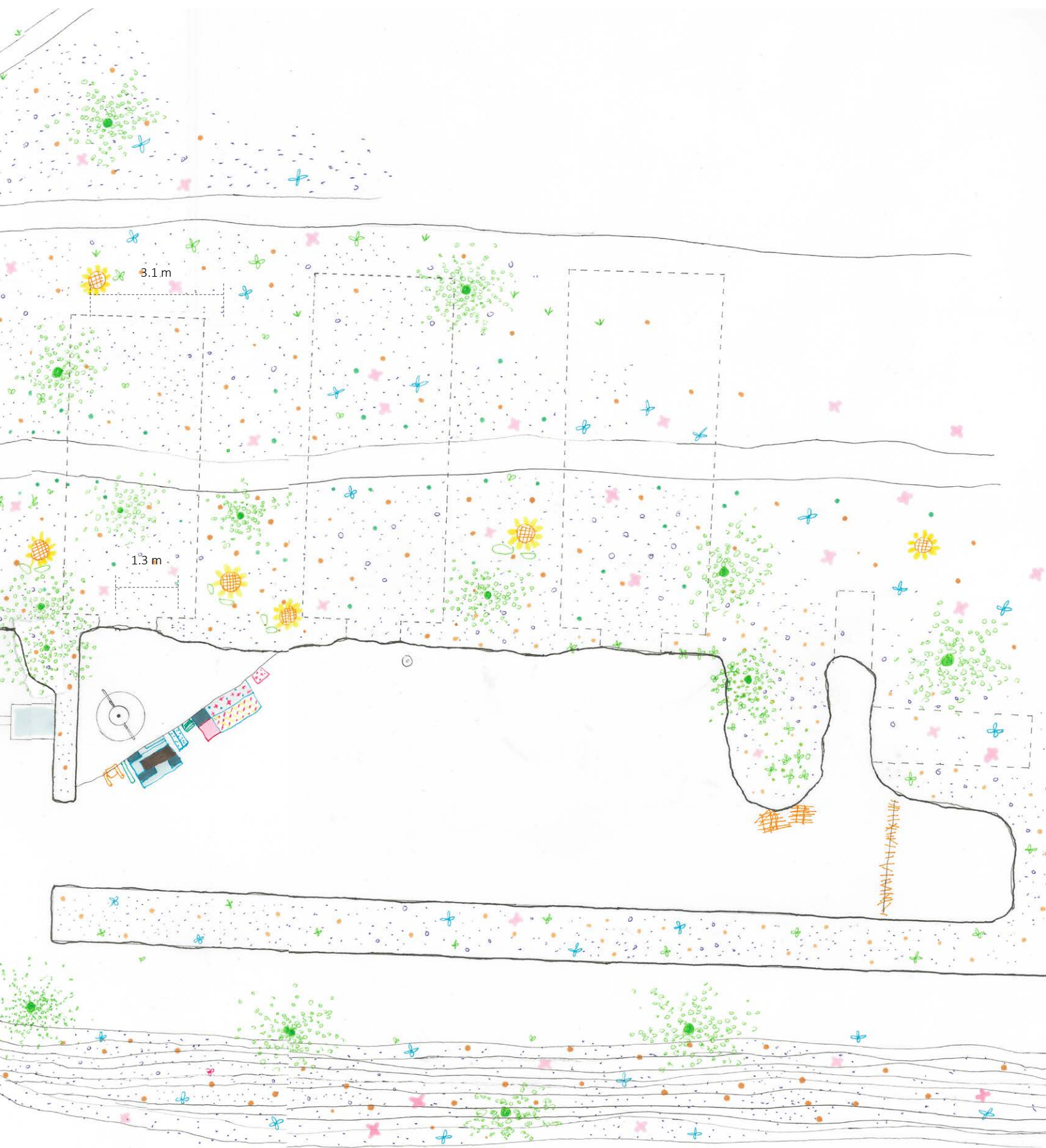




Fig 2.15 Gou-di-village's cliff yao-dong





Fig 2.16 Section 1:100





Fig 2.17 Facade exteriors

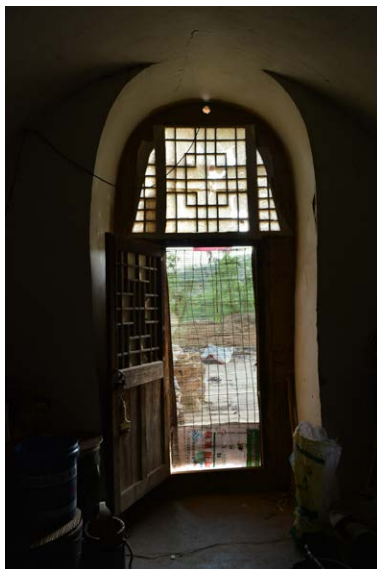


Fig 2.18 Facade interiors

Yao-dong
Construction

The Loess Soil

The discoveries of archeology sites prove that yao-dongs played an important role in the loess region along the Yellow River, as the birthplace of Chinese civilization.¹ Cave is one of the earliest forms of human shelter. According to Dr. Golany, the plain around the Wei He River in Shaanxi province was the center of the Yang-shao culture where cave remains were found. The Yellow River valley region in general is considered to be the center of the earliest Neolithic culture of China as a whole.² In the *Classic Book of Poetry* (11th to 7th centuries BC), people predicted the coming of rains by observing the high humidity in their caves (Li 1985, 213-214).³ According to Northern Shaanxi folk customs expert Guo Binglu, discovery of Huang-long Homo sapiens in Shanxi Province, proves that in 30 thousand years ago, primitive Homo sapiens were living in the loess region. Their skulls were found in the layers of Q₂ and Q₃ which are the ideal layer for yao-dong, which means that these primitive Homo sapiens were able to choose the layers of loess soil for construction.⁴

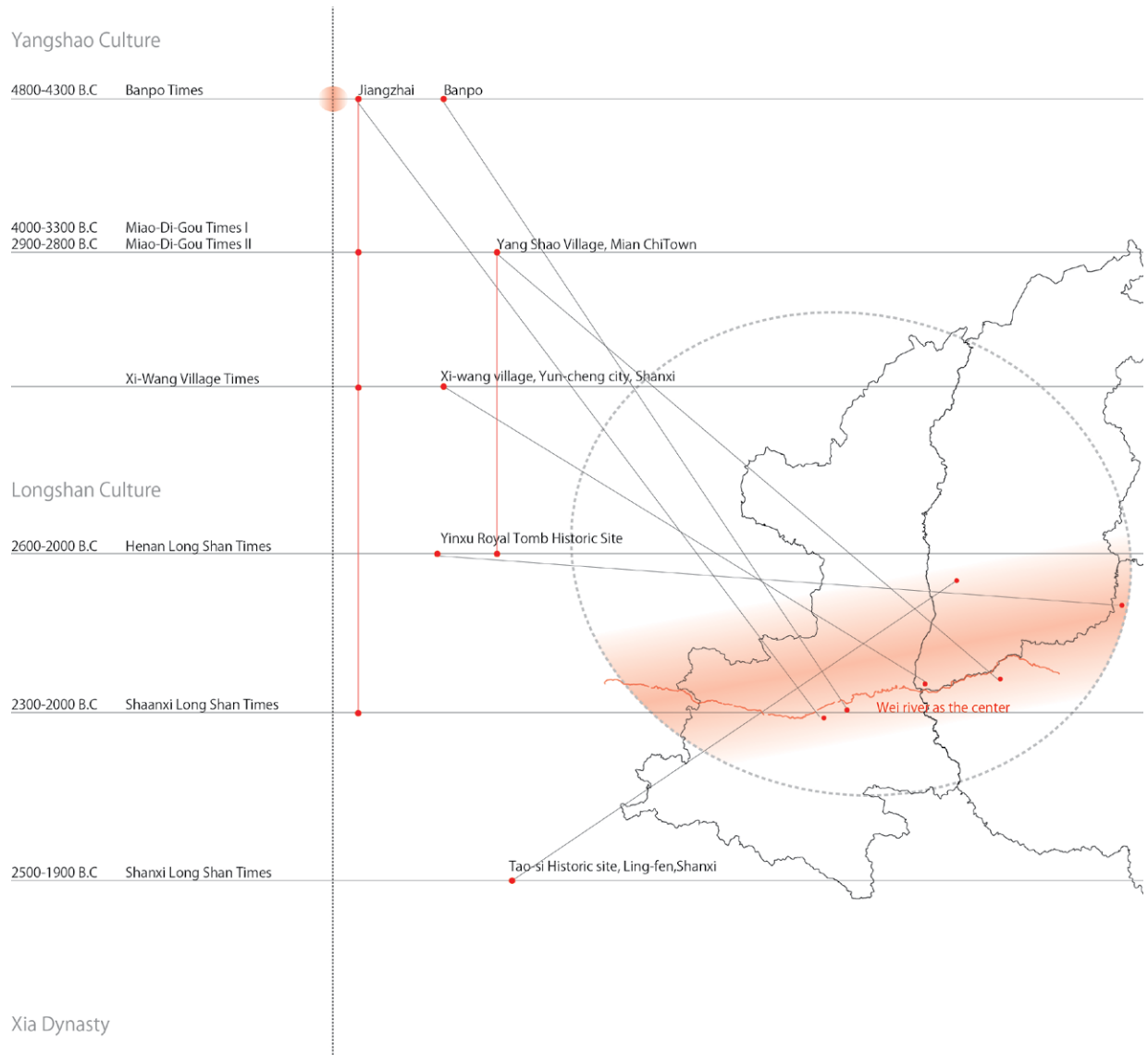


FIG 3.1 Typical Historic Site near Wei-river



FIG 3.2 Lab test of Loess soil in Xi'an

According to the Deputy Secretary of the Yao-dong and earth sheltered architecture society of China, Ren Zhiyuan, the loess soil must be loess soil deposited from Tertiary-I or Quaternary-I or II age (Q3-I, Q2-I/II)¹, with a minimum depth of 8 meters, and a high water table, less than 20% of moisture in the soil.⁵ The moisture content in loess soil influences Yao-dong's compressive strength. According to Professor Hou Ji-yao's research, lab tests show that loess soil with its natural consistency $\omega = 21\%$, has a resistance in compression of $R_{max} = 46 \text{ kg/cm}^2$. If the moisture content decreases: $\omega = 13\%$, the compressive strength lessens as well: $R = (1/8) R_{max}$. Q3 and Q2 loess soil's ω is around 20%, thus with high compressive strength.⁶ Lab tests also show that when the sand particles and the clay particles in the loess soil form a ratio of 1:3, the $R_c = 47 \text{ kg/cm}^2$.⁷

However, the type of soil alone is not the only determining factor. According to the council of the Yao-dong and earth sheltered architecture society of China, Wang Fu, from a macro-scale, one must be able to distinguish reason for the loess soil's formation, its tectonics, age, burial layer, and fissures; from a micro-scale, one must sample the loess clearly to assess its structural mechanism, and chemical components.⁸ According to Hou Ji-yao, loess soil contains more than 60 mineral elements, and among them 50% are sands made of Quartz (SiO_2). Thus loess soil has great potential in structural stability even after Yao-dong excavation. Due to influence of geography and loess formation, loess soil sizes, mineral compositions, thickness varies. In addition, climatic conditions such as temperature, humidity and the amount of rainfall, all have a factor in the loess soil performance.⁹

Local craftsmen's experience is also important. The locals named the two kinds of soil most suitable for Yao-dongs: Li-earth and Ping-earth. According to the council of the Yao-dong and earth sheltered architecture society of China,

¹ Q3-I : lower part of Q3 called Ma-lan loess soil, upper part of Q3 is not suitable for Yao-dong

Q2-I or Q2-II : upper and lower part of li-shi loess soil

Nan Yingjin, ping-earth is a red-brownish color, Q_2 loess soil with a horizontal fissure. Li-earth is a Q_3 -I loess with vertical fissure.¹⁰ In addition, when one understands the primary and secondary direction of the soil's fissure, the depth of the yao-dong should be excavated parallel to the primary direction. The primary fissure's cracks may provide warnings of landslides.¹¹ According to Wang Fu, locals use Wo-earth to refer to the kind of soil with more cracks, and is less stable. Such places with possibilities of landslides should also be avoided, because the integrity and stability of the land may have already been disturbed.¹² According to both Wang Fu, the old saying "with the stone-plate in yao-dong above, a yao-dong made by one's grandfather can still be lived in by the grandsons" has its scientific truth. The stone-plate means the calcium concretion in the soil, a layer which has great structural stability, and cohesiveness. If yao-dong has this calcium layer above, it will be situated in the main body of loess soil; thus it will not be in the burial layer, which is easily eroded by wind and water. This layer known as stone plate is usually found in the bottom layer of Q_3 -I and Q_2 loess soils.¹³



FIG 3.3 An abandoned yao-dong in Mizhi (Above)

FIG 3.4 Basehabitat workshop in Austria (Right)



Construction Tools

According to Guo Binglu, near the end of Paleolithic times, people were able to use big and sharp edged stone tools to excavate loess caves, proved by the discovery of the stone axe (46cm in length, 24cm in width, 9 cm in depth, 10kg in weight) in Huang-long Town, Shanxi province.¹⁴ This stone axe slowly evolved into Pan-Jue and Man-Jue (FIG 3.35) which has a wide edge, enabling them to excavate great amount of earth.¹⁵

Iron tools were invented during the Warring States period (403 B.C.-221 B.C.), that improved agricultural production and architecture. During the Qing dynasty (221–206 B.C.), brick and wa (roof shingles) were invented. The techniques of arch construction were continually improving, shaping the foundation of a yao-dong's earthen adobe, stone and brick arch constructions.¹⁶ According to Golany, it is assumed among Chinese researchers that widespread construction of yao-dong began only during the Han Dynasty (206 B.C.- A.D.220).¹⁷ According to Hou, in the Jin dynasty (A.D. 265–420) and the Northern and Southern dynasties (A.D. 420–589), stone crafts reached a very high level. Grotto temples were everywhere, such as Yun-gang Grottoes. The stone cave construction was also applied in above ground yao-dong and Jie-kou Yao (an earthen yao-dong with a stone or brick facade).¹⁸ According to Golany, yao-dong techniques reached a mature stage only by the time of the Sui (A.D. 591-618) and Tang (619-907) dynasties. The large-scale proliferation of cave dwellings in the loess soil zone did not occur, however, until the period of the Ming and Qing dynasties (1368-1911).¹⁹

Today, yao-dong construction involves earthen craftsmen, brick/stone craftsmen, wood craftsmen, and a Feng-shui master. For earthen craftsmen, simple tools are needed to construct a yao-dong.



FIG 3.5 Yao-dong construction tools in Mizhi

Xiang-di

In addition to the development of tools and craftsmanship, during the development of yao-dongs, Feng-shui played an important role pushing yao-dong villages into prosperity. Xiang-di means site selection according to Feng-shui principles. The owner or the Feng-shui master looks for a suitable land that will accommodate the whole family. There are some fundamental principles that relate to agricultural production and everyday living:

1. II and III levels of terrain is chosen to avoid land slides and flooding, and these levels are where the ideal soil Q3 and Q2 are found (FIG 06)
2. Usually 20-30 minutes of walking between home and farmland constitutes the ideal length of commuting time. Sometimes, a village is far from a river, in order to be closer to their farmland, which they have to commute to and from three times a day, carrying dung and crops.²⁰

When in the loess region of broken valleys, most yao-dong villages are built in the middle of cliffs, considering the ideal soil type, ideal sun exposure, minimum wind invasion, reservation of farm lands, agricultural production, danger of flooding and landslides, proper drainage, and the proximity to both water and farm lands.

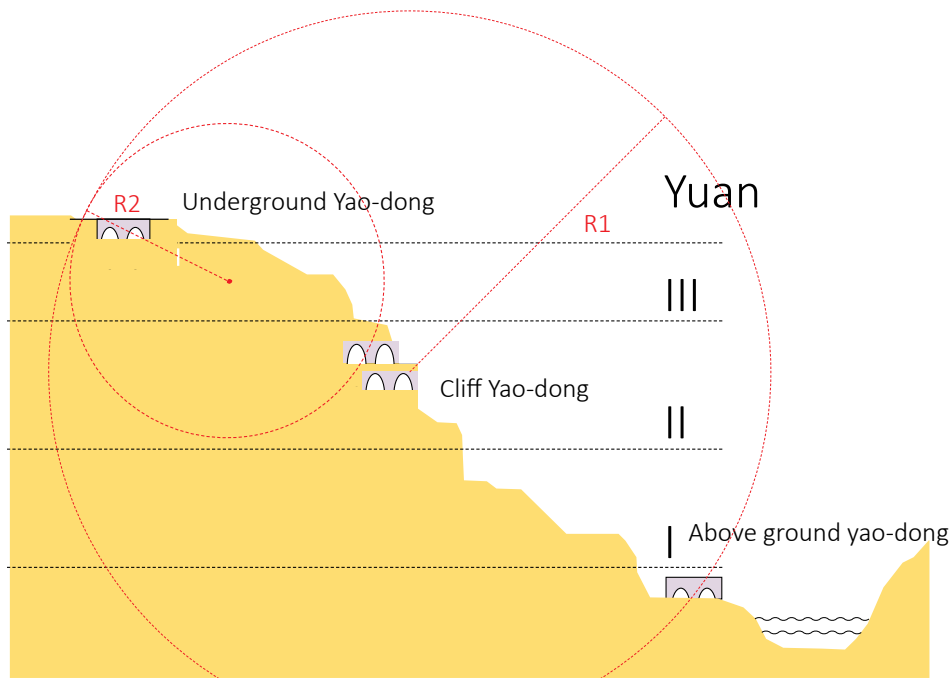
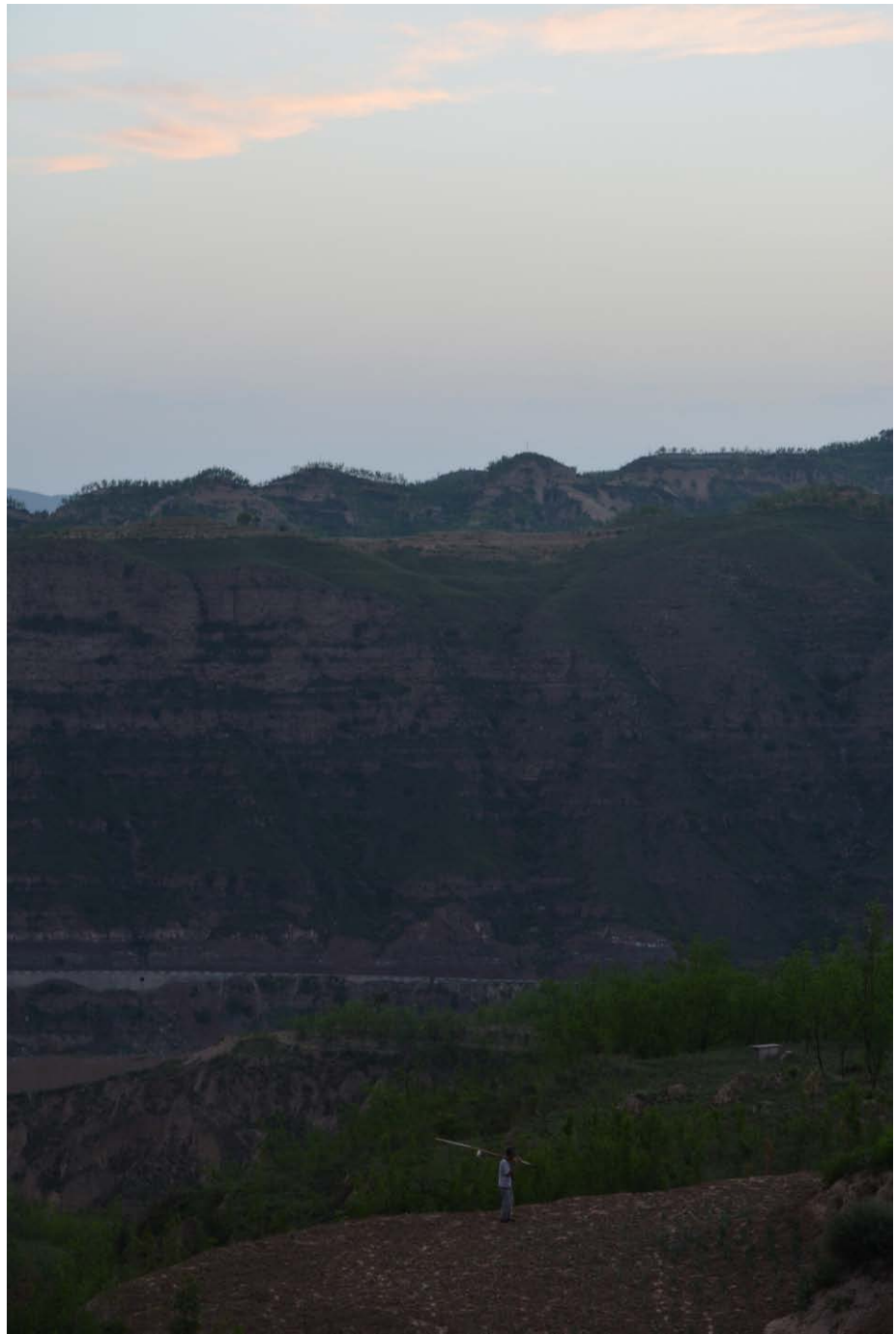


FIG 3.6 Loess Yao-dong Distribution in Geographical layers & Farmers on their farm overlooking the Yellow River near Li-family-mountain Village(right)



Everyday after sunset, farmers carry their tools from the yellow river, back to their home village in the mountains. Li-family mountain is 20 minutes away by foot from the river.

Slowly, feng-shui went beyond these basic requirements, and evolve into the art of Kan-yu. According to Guo Binglu, Kan means the movement of constellations; Yu means geographical locations. The two words together mean the relationship between the movement of the constellations and the locations on earth.²¹

1. The key of Kan-yu is to look for “Long-mai” (dragon’s vein). Lin Yutang explained wisely that a Chinese dragon, is not just a mythical nor an ancient creature. Mountains and rivers are sacred, and their twisting shapes look like dragons. The belief that everything has a soul is the foundation of Kan-yu.^{22 23} Yao-dong’s Kao-shan (mountains at the background) should be giant and spectacular, with long veins of mountains, looking like a dragon.²⁴

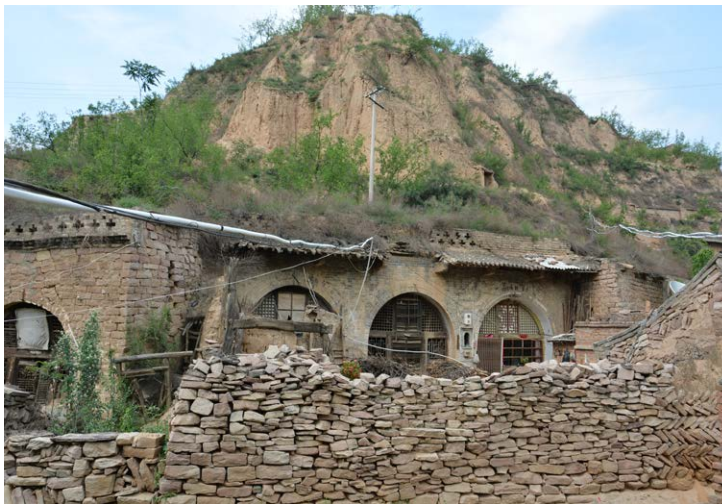


FIG 3.7 Yao-dong in Gou-di-family Village with a strong “kao-shan” (background mountain)

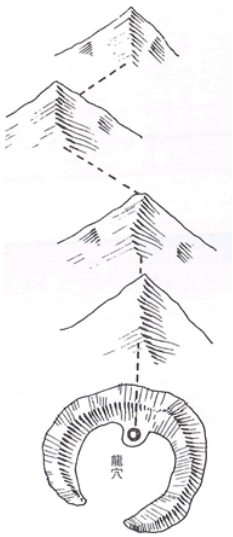


FIG 3.8 Dragon Vein



FIG 3.9 Loess Plateau

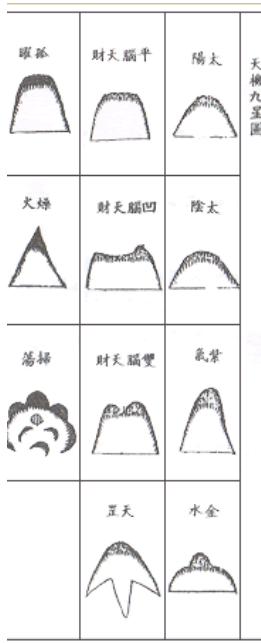


FIG 3.10 Secret Nine Star Diagram

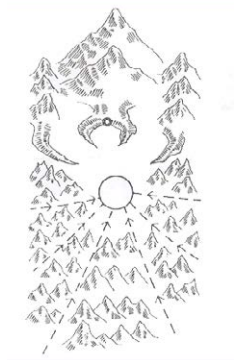


FIG 3.11 Ming Tang

2. According to Guo, yao-dongs should not be situated in sharp mountain fronts, mountain tops, or the backbones of mountains that look like a knife. These are places where the wind is too strong to be healthy.²⁵

3. A Huai-shan (mountains in front) cannot be taller than the yao-dong mountain. According to Guo, Huai-shan should be round and flat on top, signifying luckiness. It also cannot have been destructed due to natural landslides or artificial excavation, because destruction is not aesthetic and may imply potential dangers.²⁶ If Huai-shan is a Qian-tou-shan (a Mao that appears behind the Liang), it is an unlucky Feng-shui site.²⁷

4. Yao-dongs should not be located near temples, tombs and ruins.²⁸

Firstly, temples and tombs create a mysterious and frightening living environment. Secondly, temples are usually built opposite to homes, on a higher level and steeper sites exposed to wind.²⁹ Thirdly, temples and tombs usually house many activities which are too noisy to be around residential buildings, and they may cause fire hazards because of the incense. In yao-dong villages, we sometimes see a ruin between two yao-dong homes. These ruins may occupy excellent site locations. Such places are homes whose inhabitants have died out.³⁰ These sites are considered ominous.

5. The vision looking from courtyard should offer a broad vista.³¹



FIG 3.12 View from Yao-dong courtyard in Gou-di village

FIG 3.13 View from a Yao-dong in Gou-di village



FIG 3.14 Ideal Site

6. The surrounding environment must be harmonious. Chinese writer Lin Yutang said: "Chinese architecture's utmost and final principle is always to be harmonious with nature."³²

The ideal environment must have rivers on the left as a green dragon, long roads on the right as a white tiger, water in the front as a red bird, and hills at the back as a turtle. In mountains where there is no river, mountain road represents green dragon. This does not necessarily mean each dwelling needs to have such relationships, but the whole village does. Since neighbors share the same ideals, neighborhood relationships thus achieve a harmonious state. For example, if the dwelling site is too high, one can excavate it lower, to fit the feng-shui principles. Yao-dong villages arranged through feng-shui look evenly distributed and harmonious.³³



FIG 3.15 View from above a yao-dong in Gou-di village

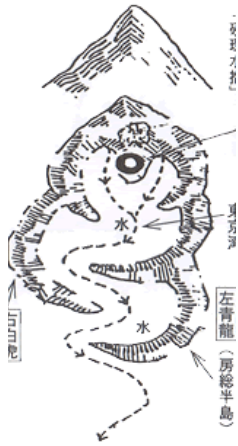


FIG 3.16 Huan Shan Bao Shui (embraced by mountain, embracing water)

7. A U-shaped gully facing the sun is the ideal place to dwell, embraced by a U-shaped river. Inside a U-shaped place, with three sides enclosed, the loess soil is older and with less possibility of landslides and other natural disasters, while ensuring great sun exposure.³⁴ Such sites, with mountains and rivers both embracing the dwelling, satisfy the ancient ideology of “fu Ying, bao Yang”.³⁵

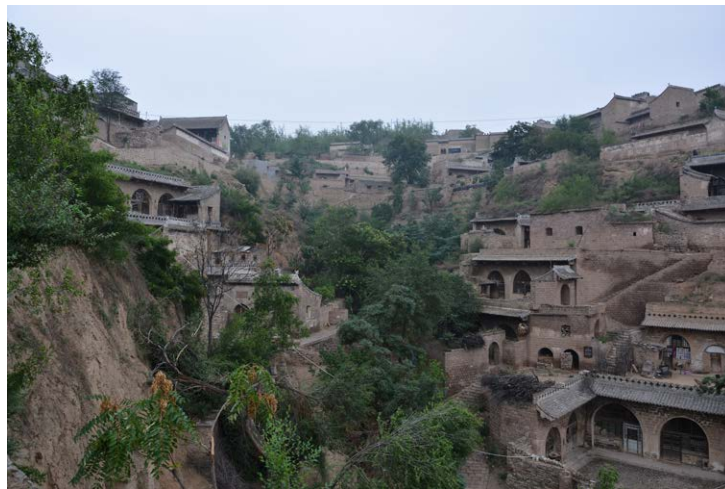


FIG 3.17 Li-family Mountain Village

8. Yang means ideal sun exposure.

Local peasants think that the construction of Yao-dong is vital to the family's fate. Therefore, before construction starts, a Feng-shui master must be invited with a Luo-pan (Feng-shui compass).³⁶

Twenty-four characters written on Luo-Pan (the Feng-shui compass) came from different traditional rules: four characters from Ba-gua, eight characters from Tian-gan-zhong, and twelve characters from Di-zi-zhong.³⁷ Each character represents a different locations. The four words which represents north, south, east and west, can only be used by temples and governments.³⁸ Therefore, the remaining twenty characters can be occupied by a yao-dong.

China is located in the northern hemisphere, and the Loess plateau is in the North Temperate Zone. Harsh winter winds are from north-west; thus most characters represents orientation of north-west facing south-east, and north-east facing south-west will be used. In fact, these characters are arranged according to the amount of sun exposures. When the elderly say one character is Yang, it means the direction this character represents have longer sun exposure.³⁹



FIG 3.18 Luo Jing (Feng-shui compass), in Ren-ma-zai village, Henan Prov.

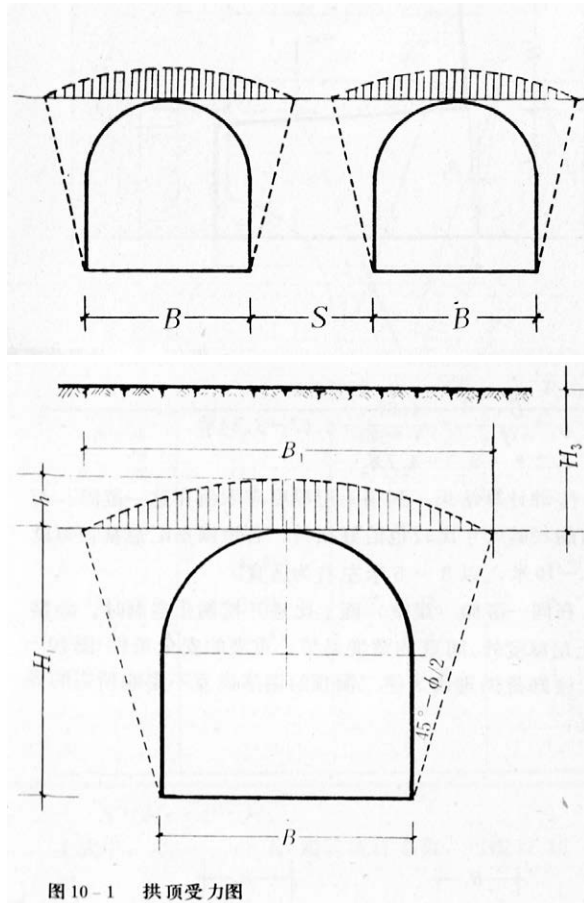


图 10-1 拱顶受力图

FIG 3.19 Arch Force diagram

Construction Types

According to Guo, until the 20th century, the Lingbao County Annual records that:

“Most cliff yao-dongs were earthen yao-dong. For hundreds of years, villagers did not know what houses were. Until 1989, Zhi-dan Town still had 10200 brick yao-dongs and 46440 earthen yao-dongs. In Yan-chang Town, until 1985, there were 38399 earthen Yao-dongs, 4066 stone Yao-dongs, 2398 houses. Houses accounted for 5.8% of the total number of dwellings, stone yao-dongs accounted for 8.6%, and earthen yao-dongs accounted for 85.6%. In 1978, 8123 new yao-dongs were built. We can see that earthen yao-dongs were the main dwelling type in the 1980s.”⁴⁰

If an earthen yao-dong’s span is B , (FIG 3.19) the width between two yao-dongs is S and the minimum depth of soil above yao-dong is H_3 ,

then to construct a good yao-dong, $H_3 > 2h$.

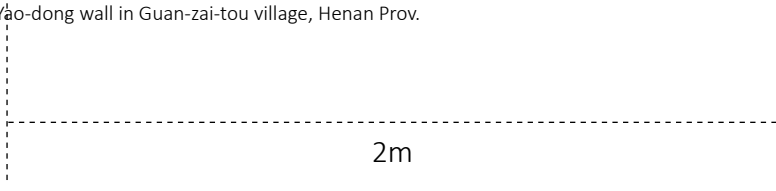
H_3 is usually 3-5 meters.

S is usually 3.1-2.2 meters.

Because water always erodes the spaces between two yao-dongs, villagers usually increase the space in-between. Usually $S=B$, but in cases of dry loess soil, $S < B$ is possible.⁴¹



FIG 3.20 Yao-dong wall in Guan-zai-tou village, Henan Prov.



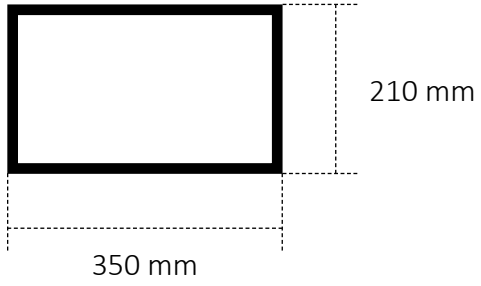


FIG 3.21 Stone wall of yao-dong in Shanxi



800 mm

FIG 3.22 Stone wall of yao-dong in Shaanxi

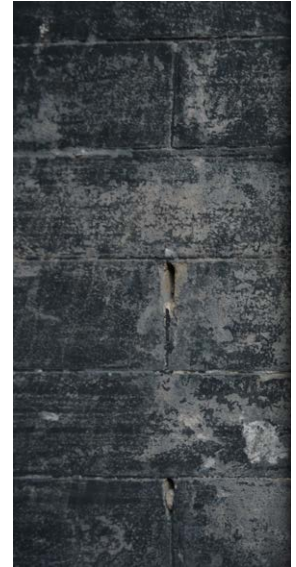
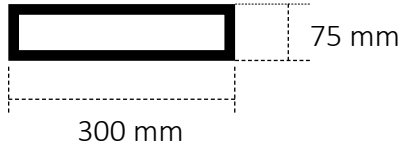
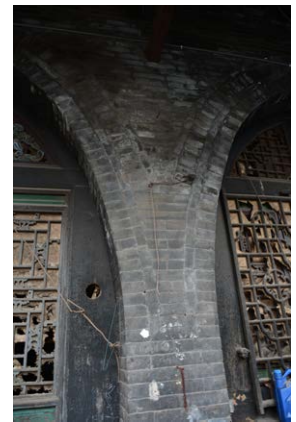


FIG 3.23 Brick wall of yao-dong in Ping-yao Historical Town, Shanxi



530 mm

FIG 3.24 Brick wall of yao-dong in Ping-yao Historical Town, Shanxi

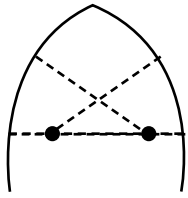


FIG 3.25 Framing the arched roof, calculating the arrows- building the vault

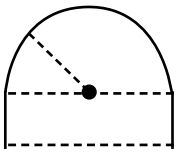
According to authors of the *Di-keng-yuan-Ying-Zhao-Ji-yi*, Wang Hui et al., the old saying “good earth has a round arch, bad earth has a sharper arch” has its scientific truth. From the force distribution point of view, the parabola is great, and from construction point of view, pointed saracenic are better.⁴² (FIG 3.26) Therefore, an earthen yao-dong usually has a sharper arch. For yao-dongs reinforced by bricks or stones, round arches are deemed more aesthetic due to cultural influence, and construction means. According to Wang Hui, there are basically two types of yao-dong cross sections: one is of a smooth curve, similar to a horse’s hoof, and the other is an arch with two vertical walls. The horse’s hoof shape gives more structural integrity, but the ones with vertical walls make it easier to arrange furniture on both sides, and to utilize the space more efficiently.⁴³ (FIG 3.27)

In general all yao-dong construction can be described as follows:

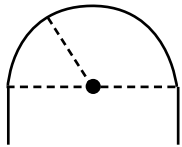
Procedures in the old times started with the owner proposing the idea of building a new yao-dong to the kinship or village head. After getting support from the village, the owner started the construction.⁴⁴ Throughout the construction process, the owner acts as the architect, construction manager, and laborer. The owner will prepare the materials and money, organize the construction team, managed the project, and performed other relative activities.⁴⁵ Today, we have three main types of yao-dongs: underground yao-dong, cliff-yao-dong and above ground yao-dong. Their construction processes also differ.



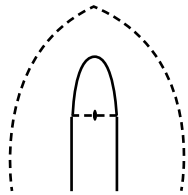
Pointed Saracenic



Semicircular stilted



Semicircular



Yi-zhu-xiang

FIG 3.26 Diagram of Yao-dong arch



FIG 3.27 Collage of yao-dong facades from Shanxi, Shaanxi, Henan Provinces

Underground Yao-dong construction

Earthen yao-dong generates space by pure excavation.

Step 1: Fang Yuan-zi by a Feng-shui master:

Fang Yuan-zi literally means to square a courtyard. It situates a yao-dong in relation to the environment according to Feng-shui, and measures the sizes of the Tian-jing (the courtyard opening).⁴⁶ A normal underground yao-dong courtyard opening requires 110 m², and the total area that the underground yao-dong takes up is 1020 m² including the courtyard opening, 10 yao-dongs and the entrance tunnel.



FIG 3.28 A ruler with meanings for fortune and misfortune on specific dimensions (Ren-ma-zai Village, Henan)

The Feng-shui master will usually spend half a day with the help of 3-5 people to do the following things:

1. Assign the type of underground yao-dong that matches the owner's birth signs. ⁴⁷

2. The Feng-shui compass is used to set the central axis known as Ding Xiang.

According to Wang Hui, the Feng-shui master will place the compass in a center point on the site, and propose an axis with relationship to the surroundings including the terrain and the road. This axis usually varies from 5-22.5°. ⁴⁸ According to Yuan, this first step is of utmost importance for, if the cardinal direction is wrong, everything that follows will be wrong. ⁴⁹

3. Using the compass point as the center, one will put another line above the compass perpendicular to the axis that has just been set up. The earthen rule will then be used to measure the distance in four directions. ⁵⁰ Four points will be measured and marked with a piece of wood sticking into the ground. (FIG 3.29)

4. Lines will be connected between these four points. A square plate with a perpendicular angle that every household has, will then move outward on a line that connects two points, until they form the same right angle as the plate. The point of right angle will be one of the four corners of the underground yao-dong courtyard. Using the same technique, the four points of the yao-dong courtyard will be set up. A white powder line is drawn on the ground following the lines connected by the four corners. ⁵¹ (FIG 3.30 & 3.31)

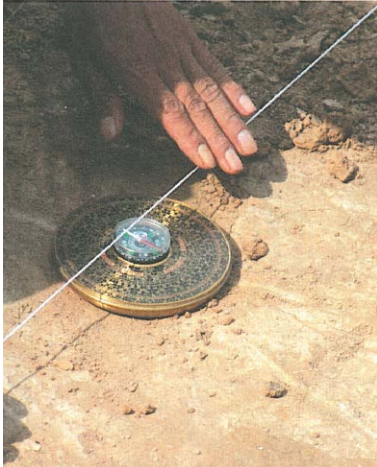


FIG 3.29 Dikeyuan and Feng-shui

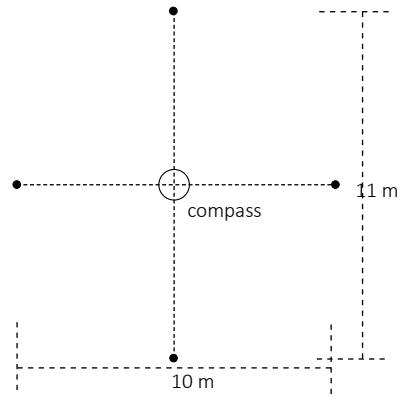


FIG 3.30 Using right angled template to set up the four corners of courtyard

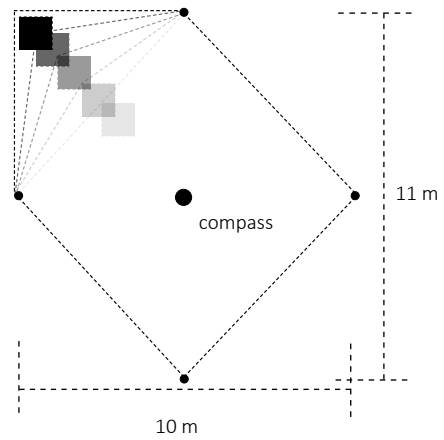


FIG 3.31 Spread white power lines

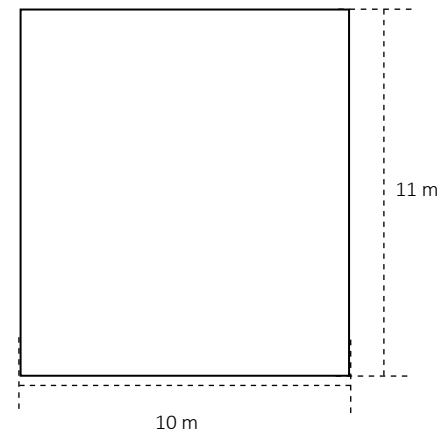


FIG 3.32 Diagrams on yao-dong courtyard opening construction



FIG 3.33 Pray before construction
 FIG 3.34 Construction starts

Step 2. : Xia Yuan-zi:

Xia Yuan Zi literally means down the courtyard, representing the start of the courtyard excavation.⁵² According to Wang Hui, a good time in a good day, “Liang Chen Ji ri”, in the ecliptic calendar must be chosen to conduct a ritual prayer to the earth god before starting the construction. The good time is usually chosen before the day breaks, and the owner will arrange a long chair topped with food for the gods, light three incense candles, kneel and pray to the ground, saying:

“My name is xxx, there are xx members in my family, we lived in xxx township xxx village xxx street. Now we are building a yao-dong courtyard here, please bless us!”⁵³

Then the family will dig out a patch of earth in the center of the site, symbolizing the breaking of the earth. On each corner and the center, they will dig out three patches of dirt each. The excavation thus starts. This ritual not only acts symbolically but also tests if the soil is evenly distributed. Offsetting 1 chi (0.33m) from the white-powdered outline, the excavation starts.⁵⁴

Guo observed that this ritual before construction proves that yao-dong’s construction is not only a labor activity, but also a religious one.⁵⁵



An average courtyard requires about 600m³ of soil volume to be dug out. This does not require much craftsmanship; thus the family members usually do it on their own.⁵⁶ According to Wang Hui, excavate the shallow earth layer which is above the 2m depth requires only simple farming tools. The excavation border must be offset from the outline to be cautious and with a slope of 3 degrees to settle the earth. The earth excavated can then be placed on the landscape above a yao-dong to adjust the landscape.⁵⁷ Slowly the excavation of the deep layer starts. An underground yao-dong is usually 5-7 meters deep. Because the earth gets harder at this level and the transportation of earth gets harder at this depth. Lu-lu² (FIG 3.35) is often used to move earth upward. There usually needs to be two persons above to operate the lulu and to carry the earth away.⁵⁸ Also a slope will be left on one side of the courtyard for transportation up and down. Wang Hui estimate that Xia Yuan-zi requires 10-30 days based on a ten person team.⁵⁹

² Lu-lu is a tool that by rolling the handle, vertical movement is created. It is usually seen above water well to carry water basket up.

FIG 3.35 LU-LU
Pan-jue
Man-jue

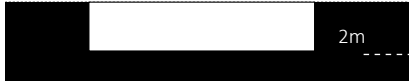


FIG 3.36 Diagram of constructing shallow earth



FIG 3.37 Diagram of constructing deep earth



FIG 3.38 Excavation of shallow earth



FIG 3.39 Excavation of deep earth with a lu-lu



确定天井院基本地面



未完工的渗井

FIG 3.40 The courtyard's floor roughly done, and the unfinished drainage well

Then it is time to level out the ground of the courtyard. A Tu-gong-chi (spirit level) will be used to see whether the ground is to the right slope. The earthen craftsman will put the ruler on the ground pointing toward the direction of the water well, and fill the ruler with water. By observing the difference between the levels of water with the numbers on the ruler, the craftsman can determine the slope needed for the courtyard ground. A water well directs water away if there is a heavy rainfall. On normal rainy days, the loess soil can absorb a fair amount of water.⁶⁰

Craftsmen with a tool called Si-zhua-xiao-tie-pa (four claw iron rake) (FIG 3.42) will be invited to shave the courtyard walls into a 10:1 smooth slope, preventing the wall from collapsing. The four-claw iron rake forms beautiful traces on the earth.⁶¹

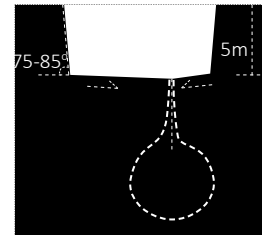


FIG 3.41 Diagram of water well construction



FIG 3.42 texture of loess wall and a “Si-zua-pa” (four claw iron rake)

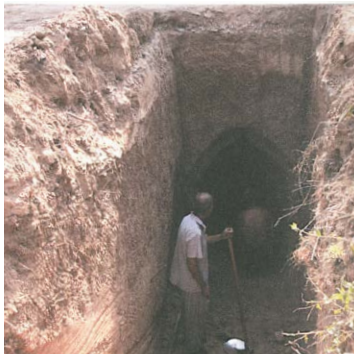


FIG 3.43 Excavations of entrance tunnel

Step 3: Entrance cave

After the excavation of the courtyard, and allowing sufficient time for the courtyard walls to be dried. The first cave to be made will be the entrance cave.⁶²

According to Wang Hui, earthen craftsmen will first lay white-powered lines on the ground indicating the outline of the entrance cave. The excavation starts on both sides. One group starts from above ground into the earth, called the Ming-dao (light tunnel). The other group starts from the courtyard to the above, called An-dao (dark tunnel). The two groups will meet up at the turning point. There are three points to be remembered in the entrance cave construction:

- Judging by experience and sight, the direction of the tunnel is adjusted so that both ends will meet up at one point;
- The first construction will be excavated half “chi” (17cm) smaller for future adjustment;
- The slope is excavated according to the original plan.

⁶³

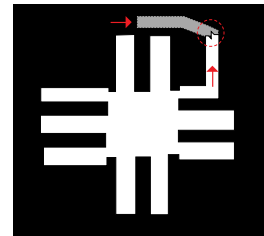


FIG 3.44 Diagram of entrance cave construction



FIG 3.45 Ying-tou

Step 4: yao-dong

The second yao-dong being constructed is usually the elderly's yao-dong, also known as Zhu-yao.⁶⁴ In the traditional Shao-mu system, left has a higher status than right. Therefore, after Zhu-yao is excavated, yao-dong on the left of Zhu-yao will be excavated.⁶⁵

A skilled craftsman will use a Ying-tou (FIG 3.45) to carve the profile of yao-dong on the courtyard wall.⁶⁶ Then the craftsman starts digging into the earthen wall, 10-20cm offsetting from the cave profile. After a yao-dong is 2 meters deep, the craftsman cannot go further until the earth is properly dried and hardened.⁶⁷ The time it takes to dry is usually 10-30 days or more. This period is called Ge-yao (waiting time), for moisture in the soil to evaporate, and for the forces within the earth to redistribute and adapt to the new structures.⁶⁸

During this waiting period, another yao-dong will start its first 2 meters of excavation.

After a yao-dong is roughly carved into shapes, skilled earthen craftsman will be invited to modify the shapes and smooth the surfaces with a tool (FIG 3.46).⁶⁹



FIG 3.46 Construction tool

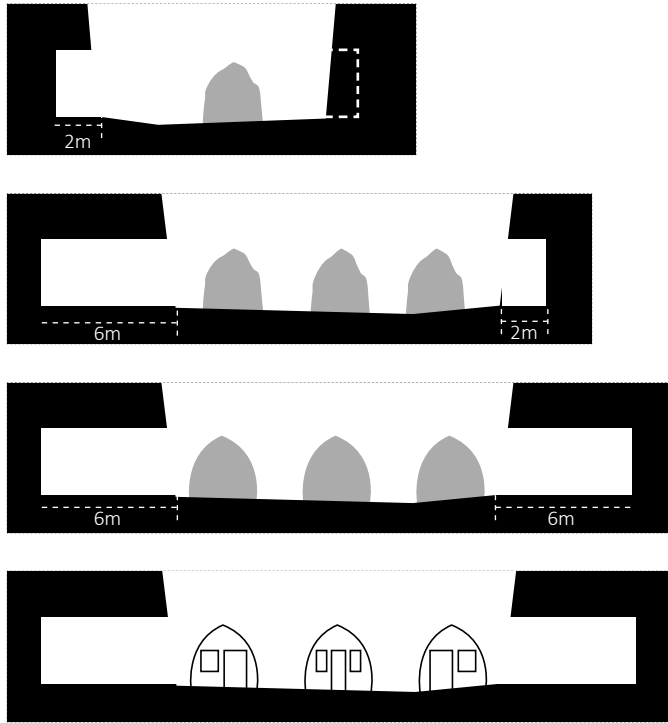


FIG 3.47 Construction process diagram

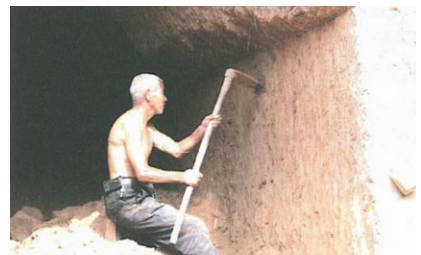
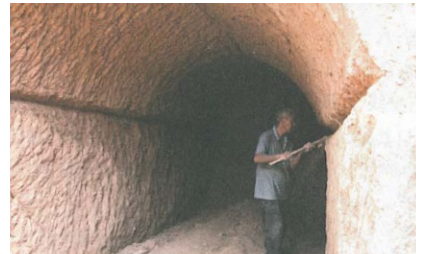
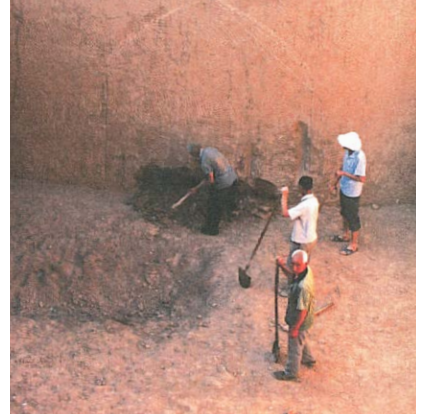


FIG 3.48 Carving yao-dong outlines, Carving other yao-dong outlines, Adjusting yao-dong sizes, Making the waist line of yao-dong

Step 5 Horse eye chimney:

After a yao-dong is constructed, it is time to make the chimney.

According to writer Zhang Bo, to dig an earthen chimney is a miracle. Beside the yao-dong, a 2m hole that can accommodate a person will be dug. The craftsman will use a tool with a sharp shovel head that can be extended continuously by adding more sticks (FIG 3.49).⁷⁰ According to Guo Binglu, a 20cm wide, 1m long wood piece will be used as the stepping paddle, with one side attached to a movable stick. As one repeats the paddling, through leverage, the sharp shovel at the top is continuously used to excavate soil. Since farmers cannot know the exact height of the mountain, they extend the tool by adding one stick after another, until reaching the top.⁷¹ A craftsman can also climb along a tunnel, to excavate the chimney (FIG 3.50). This takes experience, especially in high cliffs.⁷²

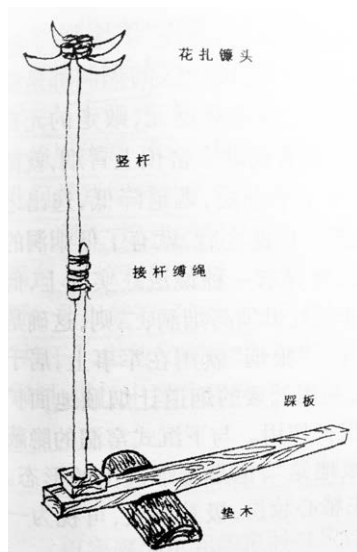


FIG 3.49 Chimney construction tool



FIG 3.50 Chimney construction diagram

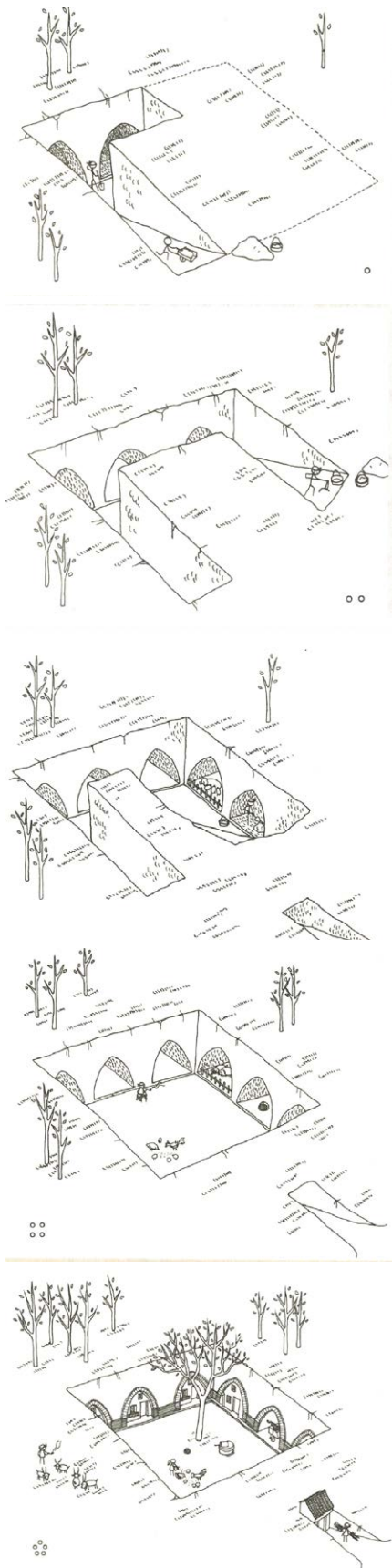


FIG 3.51 Construction process diagram

Working schedules

There are three ways of working.

First is the fast way, when neighbors and distant family members are all invited to help out.⁷³ In return, the family will help out when others are building a yao-dong. Second is to hire labors. These two options have been preferred since the 1970s, when the collectives were working closely together.⁷⁴ Third is the gradual way when the family members excavate the yao-dong courtyard whenever they are free from the farm. Usually, the family will move after the first one or two yao-dongs are done and keep constructing other yao-dongs. This is a long process, usually taking 3-5 years before everything has been accomplished.⁷⁵

When the family is making their own yao-dong, the procedure is different. According to Professor Li Qiu-xiang⁷⁶, the family will usually start by digging a 3 meters wide trench, up to 6 meters deep, and then shave the wall surface so that it is continuous and smooth. The yao-dong cannot be dug on this earthen wall until it has been dried for 3-4 months. During this time, family will keep excavating the other sides of the courtyard. When the courtyard is fully formed, the earthen walls will be dried enough as well.⁷⁷ A yao-dong is carved in the first walls that are dried, and then other yao-dong follows. (FIG 3.51)

Cliff Yao-dong Construction

While an underground yao-dong is excavated from the wall of a sunken courtyard, a cliff-Yao-dong is excavated from a cliff face. The soil excavated will be recycled to level the courtyard space. A yao-dong - courtyard - village is a continuous whole belonging to the same mountain.⁷⁸

A cliff Yao-dong is leaning against a cliff of a loess Liang or Liang-mao, with a broad gully or river in front which is the ideal condition in Feng-shui. While an underground yao-dong is limited to expansion horizontally or through connecting different courtyards, a cliff yao-dong can expand vertically, horizontally and three-dimensionally. Villagers utilize a natural or artificial carved cliff face to excavate a yao-dong, forming step-terrain yao-dongs. The roof of yao-dong becomes the courtyard of the yao-dong above.⁷⁹

There are three types of cliff yao-dong in terms of materials employed during construction:

1. earthen yao-dong directly excavated from the cliff (FIG 3.52)
2. earthen yao-dong with a brick or stone facade called Jie-kou Yao (FIG 3.53)
3. stone/brick yao-dong constructed into the cliff (FIG 3.54)



FIG 3.52 yao-dong in Li-family Mountain Village



FIG 3.53 yao-dong in Li-family Mountain Village



FIG 3.54 yao-dong in Chang-jia-Gou, Shanbei

A step-terrain cliff yao-dong is when cliff yao-dongs are stacked on each other, whose major characteristics is that it is arranged according to the shape of the mountain. (FIG 3.55) A gully cliff-yao-dong is carved into small cliffs along a small gully, similar to the yao-dongs on the cliff of Yuan. (FIG 3.56) The top of the yao-dong usually is used as Chang and roads. Yao-dong along the gully, as a type of cliff yao-dong, benefits from maximum exposure to sunlight, shelter from wind, and proximity to water, and farmland.⁸⁰

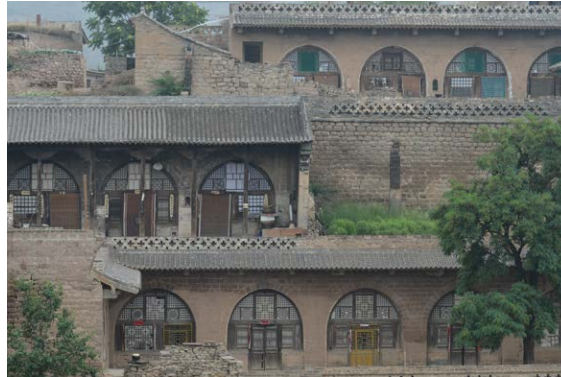


FIG 3.55 yao-dong in Li-family Mountain Village



FIG 3.56 yao-dong in Guan-zai-tou Village, Henan

Above ground yao-dong Construction

An above ground yao-dong is not attached to a cliff like cliff-yao-dong, nor embedded in the land like underground yao-dong. It is more similar to earth-berm architecture we most often see. It is usually made up of adobe bricks, stones if there are rock layers exposed in the areas, or fired-bricks made by the dwellers themselves.



FIG 3.57 yao-dong made of adobe in Guan-zai-tou village



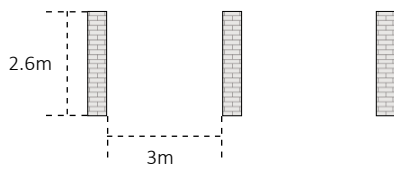
FIG 3.58 yao-dong made of bricks in Ping-yao
yao-dong made of stones in Mu-tou-yu village



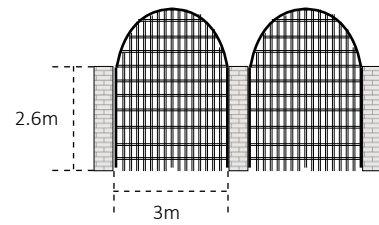
FIG 3.59 Detail of yao-dong wall in Ping-yao Historical Town

For owners who want to build above ground yao-dongs, firing their own bricks, is a typical self-sufficient way of living. The family will hire a specialized brick maker to instruct the family in the processes. Other labors that require less experiences will be done by the family alone. In winters, dwellers will accumulate a lot of dried woods for brick-firing later on.⁸¹ A brick constructed yao-dong arch usually has two layers of arch to reinforce the strength. Traditionally, bricks were fired into a dark-blue color and layered with sticky rice so that there is little gap in-between each layer.

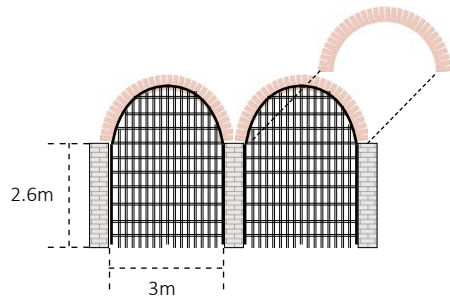
Step 1: build the supporting walls



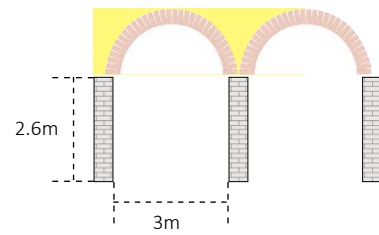
Step 2: make the scaffolding



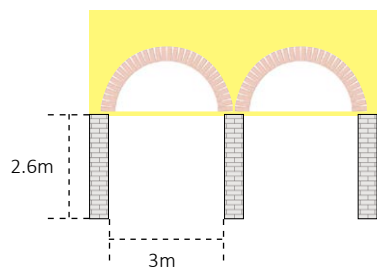
Step 3: lay the brick arch upon scaffolding



Step 4: fill with earth



Step 5: ram earth



Step 6: erect awnings and facade

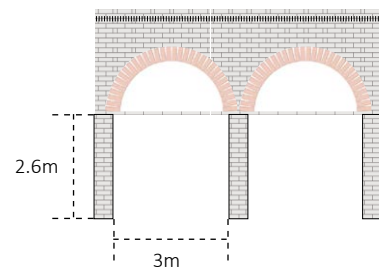


FIG 3.60 Above-ground yao-dong construction diagram

Adobe bricks are made up of a mixture of weed, loess soil and water. After being well mixed, it will be placed in a wood mold. (FIG 62.2) A stone attached to a handle will be used to compress the soil into an adobe brick. (FIG 62.1) After a sufficient time of drying in the sun, the form will be taken apart easily, and the adobe brick is finished.



FIG 3.61 yao-dong entrance in Guan-zai-tou Village



FIG 3.62 A stone attached to a handle, used to compress the soil into an adobe brick. (Bei-ying Folk Museum, Henan)



FIG 3.63 Wood module used to make adobe (Ren-ma-zai village, and Bei-ying Folk Museum, Henan)

If there are stones exposed in the region, farmers will carry stones usually near the river up to their yao-dongs. Finer stones with stone-craftsmen's carving will be put on the outside of a yao-dong facade, while other stones are piled up with mud and smaller stones in-between.



FIG 3.64 Stone-cutting for the facade, Putting the first stones in place, building the walls supporting the vault



FIG 3.65 Detail of Stone facade in Shanxi



FIG 3.66 Shanbei Above-ground Yao-dong

Arch-framed templates will rest on stone pillars on each side. When there is no template, craftsmen will pile up stones and wood to form an arch. Stones will be arranged according to the template. Templates will be put down after the stone arch is stable. He-long-kou is a ritual where the key stone will be placed in the arch. Farmers usually puts objects like chicken feathers, brushes and so on, as a symbol for the well-being of the family.

According to Zhang Bo, the back of a yao-dong is called “Zhang-Yao”, which means the palm of yao-dong. Loess yao-dong with a stone wall at the back will reinforce the yao-dong, preventing it from collapsing at the back.⁸² The front of yao-dong will be left open. Wood framed windows and doors will be added later on as the yao-dong dries. The window and door frames will be done by wood craftsmen. Numerous big and small pieces of dry wood need to be prepared, since only with dry wood can there be no distortion.⁸³

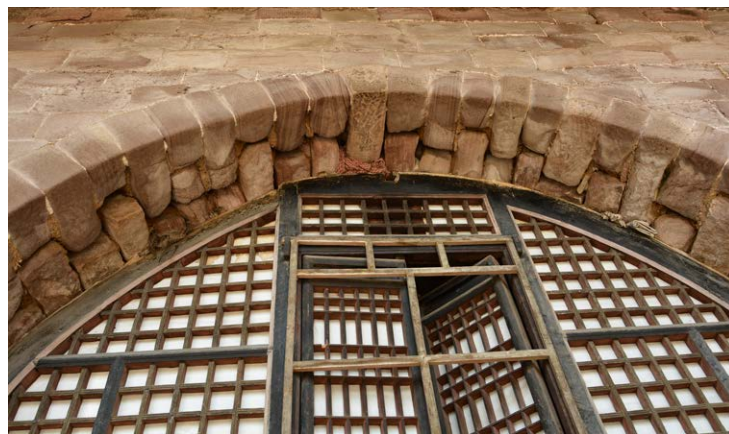


FIG 3.67 Shanbei Above-ground Yao-dong



FIG 3.68 Shanbei Above-ground Yao-dong

Soil is then placed and rammed on top, and between the walls. Stone eaves will be placed into the rammed soil or rested on top of the stone facade, with 1 meter of its total length sticking outward. Then between each stone eave, one or two long wood pieces will be placed and then tiles or stone plate rested on top.⁸⁴ There are different kinds of awnings. Other than stone eaves with tiles or stone plates, wood verandas are popular to provide extra spaces, a shield from wind and rain, and storage in Shanbei and Shanxi.⁸⁵

Rammed earth walls utilize loess soil's advantage of cutting and clay-like coherence, to make strong adobe walls. According to Guo, the earliest adobe walls can be traced back 6000 years ago. Banpo sites's earliest stove is made of adobe. The *Shi-Jing* (classics of poetry) also record the rammed earth architectural craftsmanship, proving that in the Zhou dynasty (1046 BC–256 BC), the craftsmanship of adobe was widely practiced and matured. To be part of nature is an aesthetics that such craftsmanship passes down.⁸⁶ In order to be delicate, beautiful and strong, the tools to compress the adobe must be fine granite stone with a smooth head, 28 cm in diameter. The cobblestone from the river side, with a greenish-dark shine is best.⁸⁷

For the chimney, the above-ground yao-dong craftsman will leave a 1m space beside yao-dong.⁸⁸



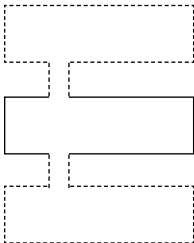
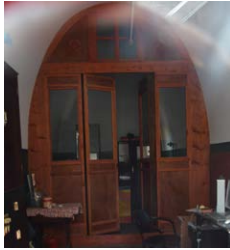
FIG 3.69 Shanxi Above-ground Yao-dong Interior



FIG 3.70 Shanbei Above-ground Yao-dong



FIG 3.71 Packing down the Yao-dong foundations



Organized lifestyle

The evolution of yao-dong has been postulated as:

- (1) nomadism;
- (2) nest shelter (a man-made niche or pit dug in the earth for protection);
- (3) troglodytism (habitation in natural or artificial caves);
- (4) yao-dong as an organized lifestyle.⁸⁹

Once single caves could no longer satisfy the different functions of life and the society's requirement for spatial hierarchies, spatial expansion helps make yao-dongs into an organized lifestyle. Vertical expansion usually occurs in cliff-yao-dong, while horizontal expansion occurs in areas with shallow loess deposits.

Horizontal expansion is divided into two kinds:

One is to deepen the yao-dong, forming another yao-dong behind the one at the front. Due to constraints on natural lighting, the back yao-dong could be used only for storage⁹⁰;

Another type involves expanding along the sides, "In Shanbei, the excavated caves had developed a two-bedroom suite, in shape of the Chinese character " 呂 ", with stone plated floor, white powdered plastered walls, and the earliest stove."⁹¹ It is also known as "one light and one dark". A yao-dong with window and door is the light one, called Tang (living room). Tunnels between two yao-dongs connect the living room with the bedroom, the dark one.⁹²

FIG 3.72 Yao-dong interior in Ping-yao

According to Professor Wang Qi-jun, Xi'an Banpo heritage's large house was the villagers' living and public area. The large room for public activities is called the Tang in Chinese traditional architecture. Si-he-yuan (courtyard houses) is in fact a spatial system made up of the plan for Qian-tang, Hou-shi (Living room in the front and bedrooms at the back).⁹³

The courtyard is the peasants' living room. They chat in the courtyard, make food in the courtyard and play in the courtyard. According to architectural historian Zhang Xin and Chen Jie, si-he-yuan (courtyard housing) satisfies the dwellers' physical needs, and solves the formal problems such as Mu-shao rules. Thus under the influence of Confucianism, China became a world of Si-he-yuan.⁹⁴ According to art professor Dong Xiaoping, courtyard creates a boundary that determines the spatial re-division between interior and exterior, indicates inheritance, and influences the lifestyle of a family.⁹⁵ From such perspectives, the meaning of a courtyard lies in kinship and economy."⁹⁶

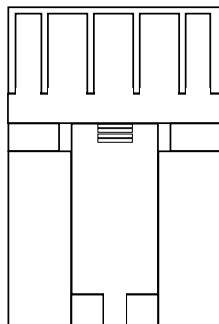
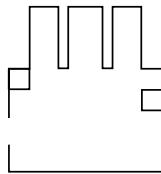
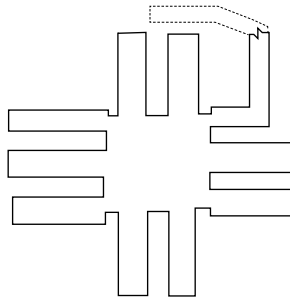


FIG 3.73 Yao-dong courtyards in Da-liu-si-village, Henan;
Li-family-mountain Village, Shanxi;
Ping-yao historical town, Shanxi



FIG 3.74 Courtyard wall in Guan-zai-tou Village
 Courtyard wall in Gou-di Village
 Courtyard wall in Ping-yao

In Confucian society, contacts between people were more restricted; thus tall walls were built for enclosure. In villages, poor farmers are less restricted by rules; thus, their courtyards tend to be more open for daily convenience. In underground yao-dong courtyard, the sunken space creates a boundary. In cliff-yao-dong courtyard, trees and terrains creates a boundary. Simple courtyard walls made of stones and wood fences are also popular.

According to Guo, wet Chinese sorghum is compressed and then mixed with loess soil into the wall, as tension reinforcement similar to steel in concrete.⁹⁷ In Gou-di village, villagers mixed used fabrics into the rammed loess wall as a tension member. Tiles or bricks cover the top of the loess walls preventing rain erosion. (FIG 76)

In everyday life, opening a door means regenerations. Doors also have its social meanings because “Men-feng” (literally meaning door wind) represents a family’s reputation. The door therefore holds an important position and represents the characters of the family.⁹⁸ Therefore, families will try their best to make their doors beautiful. If one enters the imperial examination successfully, one’s door will be decorated with signs of such success thus bringing glory to the whole family.

Some literati prefer simple doors weaved in firewood for its poetry.⁹⁹ They look aboriginal as if from a Chinese ink-color painting. According to Guo, wood fences in Gansu and some northern provinces near the Gobi desert are made from tamarix shrubs, while other areas use arbor wood abundant nearby.¹⁰⁰ (FIG 75)

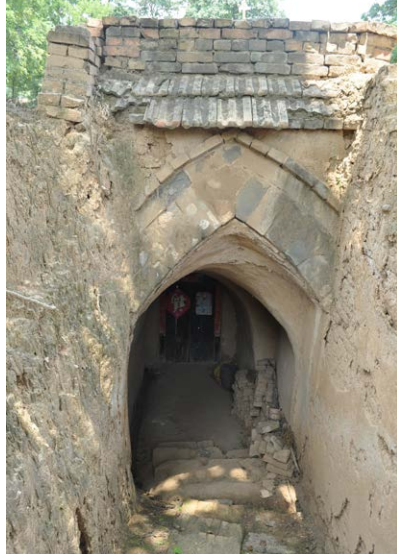


FIG 3.75 Yao-dong entrance in Xi-guo-village, Henan
Yao-dong entrance in Gou-di village, Shanxi
Yao-dong entrance in Mu-tou-yu Village, Shanbei



FIG 3.76 Courtyard door in Li-family Mountain village
Courtyard door in Gou-di-village, and Li-family Mountain village

Celebration

After yao-dong construction is finished, yao-dong dwellers will invite villagers for a dinner party, known as Nuan Yao (warming the yao-dong), expressing gratitude towards the villagers who helped out during the construction.

This activity is called warming the yao-dong, because the cold wind from Siberia makes the winter extremely cold, and dwellers hope their yao-dong will be warm enough to resist the harsh winters.¹⁰¹ Guests will laugh and talk loudly during the party, to drive away the evil forces and the coldness. Friends and neighbors will bring simple gifts to the party such as chicken eggs, paper cutouts, wine, meat, peppers, chopsticks and so on, which proves the old saying “neighbors are better than distant relatives”.¹⁰² Through a series of folk customs, dwellers express their hopes for the new life.¹⁰³



FIG 3.77 Courtyard wall in Gou-di Village

According to Guo, the Luo-yang city construction department yao-dong research shows that:

“A regular underground yao-dong requires 1.8 workers every square meter, and costs 12 yuan. For a twenty-seven square meters loess yao-dong, earthen craftsman will be paid 324 yuan, plus wood craftsman’s five days’ work, so the total cost would be 500 yuan for one yao-dong. In 2004, a yao-dong will cost 2000 yuan, and an underground yao-dong with 6 yao-dongs will cost 9000 yuan. The traditional construction team in loess regions is composed of neighbors who help out as a favor. Despite some necessary salary for experienced craftsmen, and costs for materials, the owner family will only need to provide food for the team. This way, the cost per square meters is lower than an apartment in the city.”¹⁰⁴

Story 2
Craftsmanship

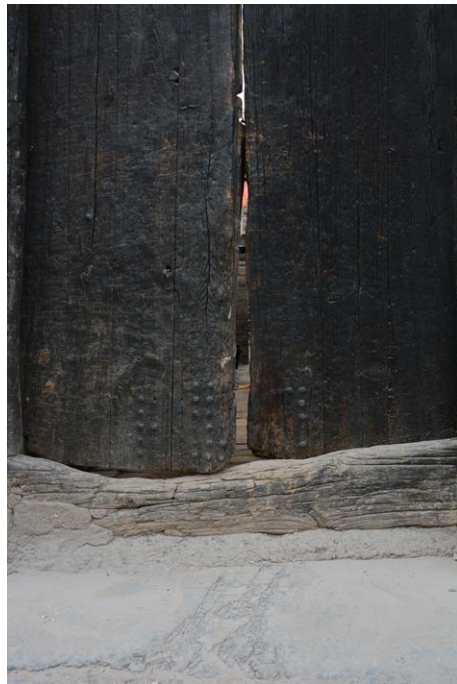


FIG 4.1 Qiang-ren/ craftsman

FIG 4.2 Entrance in Ping-yao



FIG 4.3 yao-dong in Ping-yao



FIG 4.5 Yao-dong veranda detail



FIG 4.7 Ping-yao yao-dong viewed from the city wall



FIG 4.8 Ping-yao historical photo from Ping-yao museum



FIG 4.9 Wall in Ping-yao

There is the old Chinese saying “the highest virtue is like water”. Yao-dong roof is covered by tiles called “wa-dang”. Wa-dang are shaped to make water flow and together with other creatures on the roof, to pray for the rain.

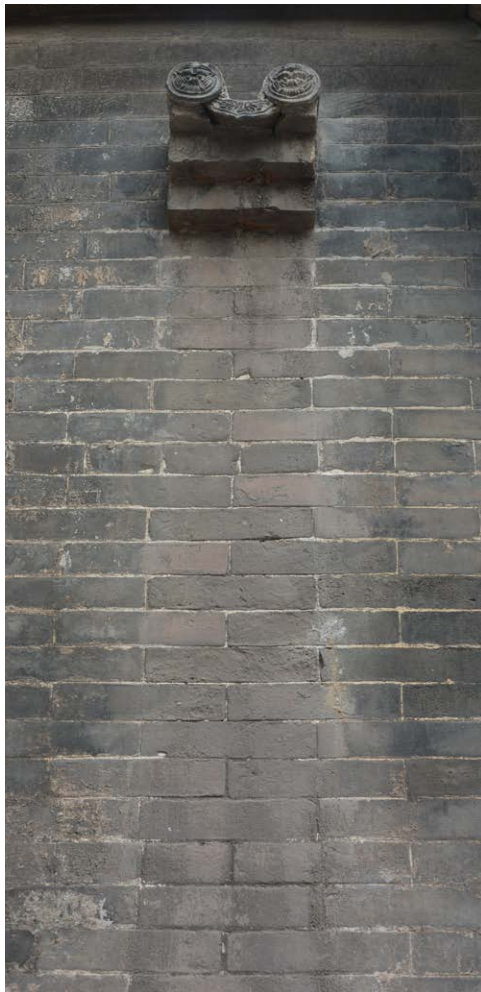


FIG 4.10 Drainage detail



FIG 4.11 Yao-dong ruin (Chun-hua village, Shaanxi)

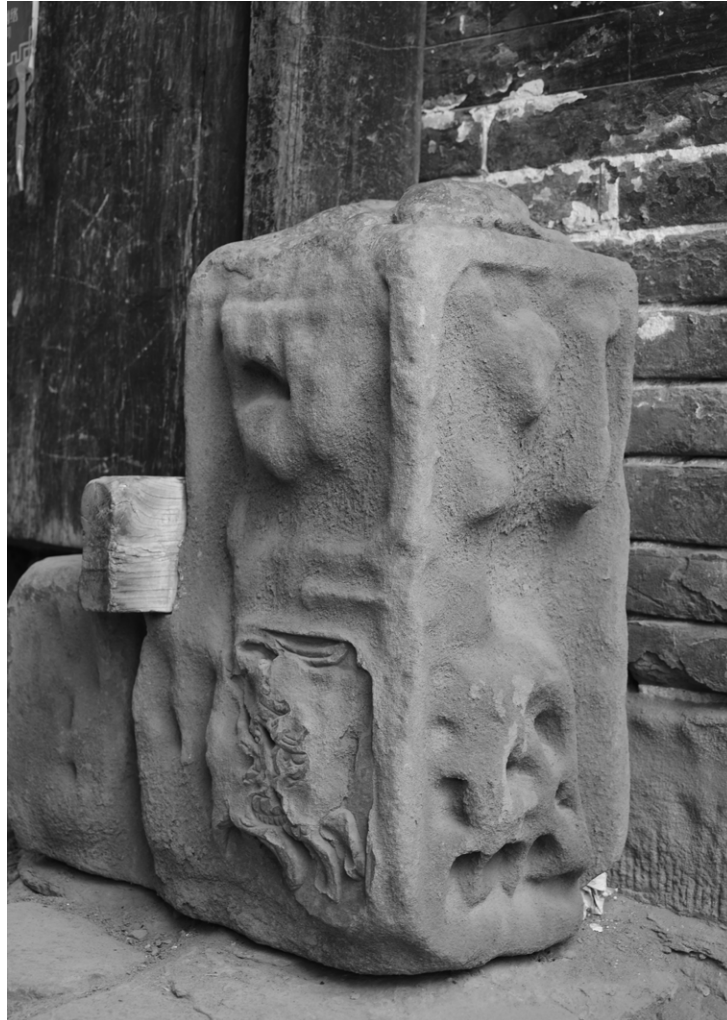


FIG 4.12 Stone in front of entrance (Mizhi, Shanbei)

Earth becomes mature earth after being nourished by the sun and the rain. When its life as yao-dong is done, it becomes fertile soil for plants to grow. Everything goes back to nature like fallen leaves return to the tree's root.

Village
Social Structure



FIG 5.1 Miao-yu
FIG 5.2 Temple in Li-family Mountain village

While a courtyard wall is the boundary of a family, and a city wall is the boundary of a city, the boundary of a village (Cun-jie), is often indicated by rivers, temples, kinship halls, or other spectacular buildings to create a sense of place, identity, and belonging. In the loess region, most temples are located in the entrance of a village guarding the village's dragon vein (long-mai) in Feng-shui.¹ This is also the last stop to say farewell to the friends and families travelling afar.² In the old times, only villagers inside the village boundary could enter the temple to worship the gods, thus drawing an invisible boundary for outsiders.³ Temples are maintained by "She" (a religious organization when there are mixed family names) or kinship (if the village belongs to the same family name). Slowly, as villagers pay tributes to the temples for they believe that the many gods can protect them, "She" and kinship begin to manage the finance of the village and become the heart of village's social organization. The kinship or the "She", the spiritual beliefs in many gods, the imperial education system together weave an organic cycle to organize a village. Architecture professors Chen Zhihua and Li Qiuxiang gives a perfect example:

*"(The three systems) form a cultural entity, for example, prosperity of the kinship relies on the success in the imperial examination, the success of the examination depends on the intellectual gods, and the temple for such gods is funded by the kinship. Peasants live by cultivating their farm land, which needs farm animals. If farm animal gets ill, Ma-wang-ye (the Horse gods) will cure them. To build a temple for Ma-wang-ye needs a scholar to choose a good day and a piece of Feng-shui land. This scholar's knowledge gains from the kinship sponsored school, which is sponsored by public farmlands, which are cultivated by the peasants."*⁴



FIG 5.3 Xiang-lu-si Temple, Jia-xian town, Shanbei

Kinship

A majority of yao-dong villages are kinship villages. According to China's famous sociologist and anthropologist Fei Xiaotong, in the rural villages, the merging of kinship and place is a sign of an aboriginal society.⁵ Historical yao-dong villages such as Li-family Mountain, are all based on kinship. Fei Xiao-tong thinks that:

*"Chinese generations grew like a tree from the soil, the proximity of places reflecting the proximity of family-blood relationships. Hierarchy of space was socially determined. The Chinese invented their own system of spatial hierarchy: left is better than right, south is better than north, these are the marks of bloodlines."*⁶

Cliff side yao-dongs firstly spread out on the same contour lines, along a river branch or a gully. First, there is one or two yao-dongs, then their descendants and future generations continue to build around these yao-dongs. On large flat Yuan, first there is an underground yao-dong, then their descendants continue to build on their left and right, front and back, forming a checker board.⁷ New villages are born on adjacent sites when the original village population exceeds the capacity of the land, which usually comes with a new kinship order. According to Chen Zhi-hua and Li Qiu-xiang, the new and the old exist individually but in an emergency, they support each other.⁸ Such union of kinship is reinforced by three factors: the respects toward the same ancestor, the benefits from daily production and life, and the necessary public management of the village.⁹

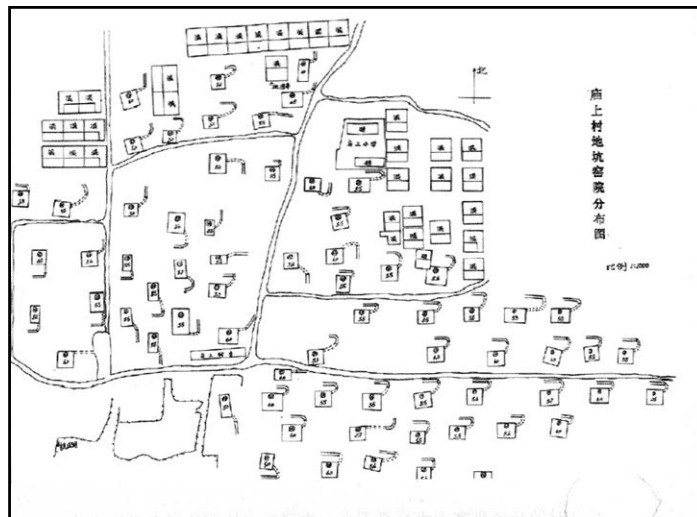


FIG 5.4 Plan of Miao-shang-village, Henan

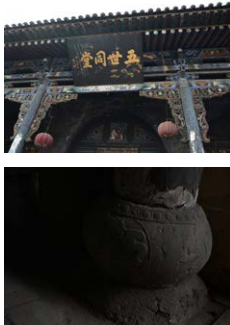


FIG 5.5 Ping-yao yao-dong detail

The Chinese rural villages were autonomous, and governed by kinship because the imperial control only reached down to the level of county and big towns.¹⁰ The requirement of kinship organization is farmers' attachment to the land for generations. Confucian "Li" ensures that "Zong-zi" the son of the Zong (kinship leader) is a representative of the kinship when his father retired, while the eldest and most respected persons in the kinship hold the real responsibilities. Together, they form the management organization of kinship.¹¹ As Fei explained, "Li" means admitting one's own social status, obeying one's social roles, and limiting oneself. A system based on kinship works with the Confucian social activities of Li. Though not a law, Li requires voluntary co-operations that must be learned under intimate habitual living conditions, like social skills. It needs long-time co-operations that help everyone understand each other intimately. Traditionally, Li is best learned in a family environment and best applied in the social network.¹² According to professor Luo Chaohui et al., courtyard is a place where spiritual teachings are passed down from generations. They contain ancient knowledge and silent warnings.¹³

As Fei Xiaotong pointed out that while space is originally neutral, tradition divides the space into hierarchy according to social status.¹⁴ According to architecture professor Huo Yao-zhong and Liu Pei-ling, Mizhi Jiang-family yao-dong has such a clear spatial hierarchy, represented in harmony with the site topography:

“The living space of the family leaders is located in the upper courtyard, following the traditional layout of five light yao-dongs, four dark yao-dongs, and six side yao-dongs. Five south-facing light yao-dongs provide bedrooms for the elderly. Two dark yao-dongs on the east of the light yao-dongs, houses kitchen, and the cook’s bedroom. The cooks’ status is relatively high because they are in close relationship with the owners. West has a higher status than east. Thus, two dark yao-dongs on the west of the lighten yao-dongs, provide small storages. Three east-facing yao-dongs, and three west-facing yao-dongs, offer living spaces for the young.”¹⁵



FIG 5.6 Jiang-family village, Shanbei



FIG 5.7 Zong-ci in Xi-wan village, Shanxi

Zong-ci is the place to worship the ancestors, and usually a village's entertainment center with a stage for public opera performances. This hall is a place to host discussions, to punish the evil, and to hang a red lantern if a boy is born.¹⁶ According to Chen and Li, the kinship also sponsored educations by providing public schools, putting up fame plaque, memorial arch, and spread the good news about the exam results. The kinship owns the public farm lands which support the old, the infants, the ill, the disabled, the nursing home and the orphanage. The kinship is also responsible to build village's public infrastructures.¹⁷

In Mu-tou-yu village, the union of kinship is expressed through the village structures. Yao-dong like arches form the village archways that reinforce the structures of yao-dong homes on each sides. Since yao-dong is likely to slide on one side of its walls, by connecting two yao-dongs with archways, it lessen the possibility of side sliding. These archways also represent bondings between different families.



FIG 5.8 Mu-tou-yu village, Shanbei

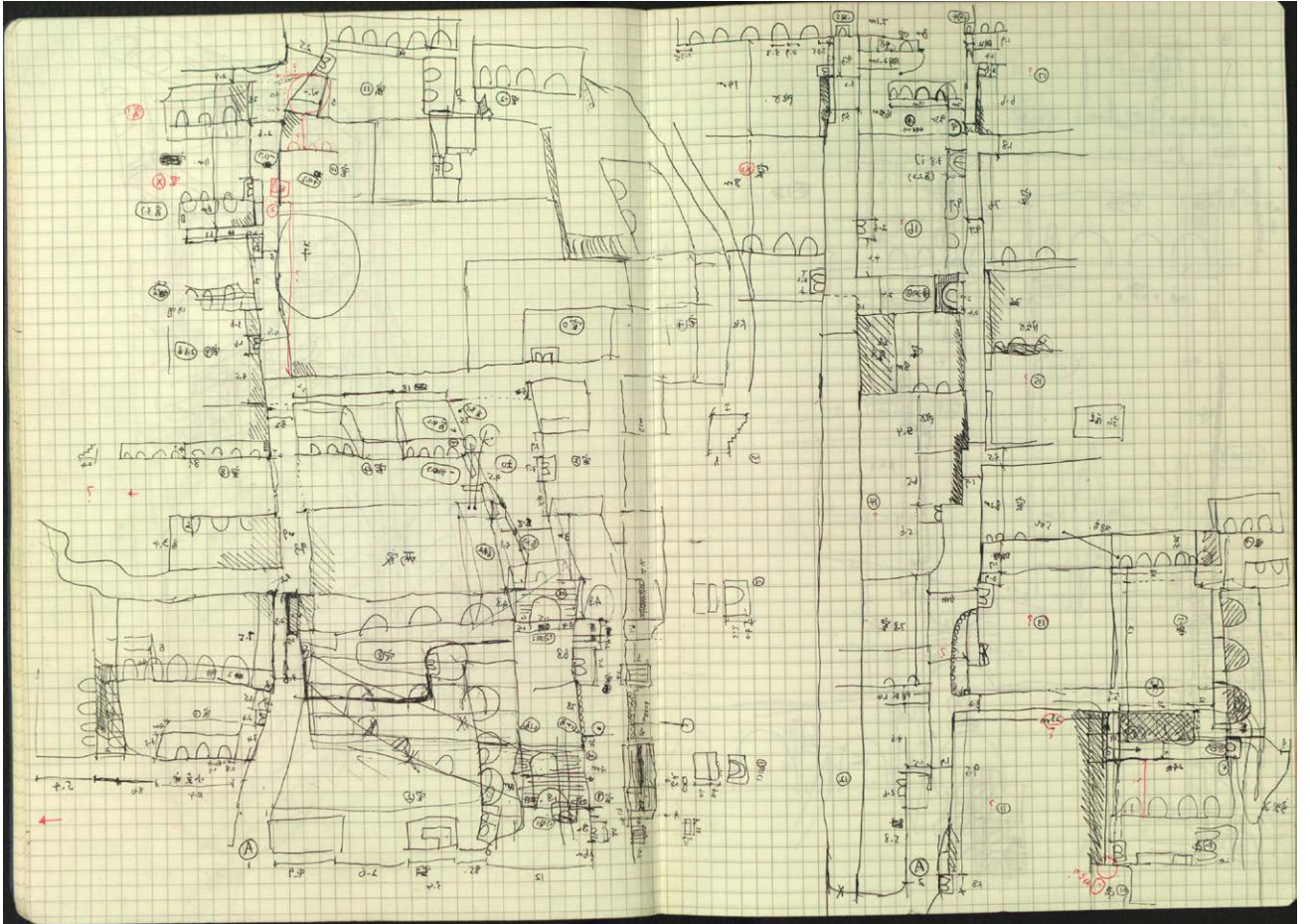


FIG 5.9 sketches from Mu-tou-yu village, Shanbei, June 26-30, 2015

In a self-sufficient village there is little population flow, kinship also means place. Children's folk rhymes goes like "swings, swings, swings to grandma's bridge". Grandma's bridge means a place.¹⁸ Such place is home village that contains nostalgia and a special organic longing like "fallen leaves return to the roots" (the proverb: Luo-ye-gui-gen). "This organic longing system starts from a farmer's picking up shits in the morning as fertilizer until a dying person's coffin went through mountain ranges and oceans and back to his/her hometown. This spirit is what keeps Chinese historic culture alive through thousands of years."¹⁹ Today the organic flow is disrupted through the great urban transformations and the physical destruction of places. "Where is my home village?" The Chinese writer Yu Qiuyu questioned in 2002, when he could not find his old address because it has been altered by the officers in planning department.²⁰ Urbanization and migrant peasant workers not only create tensions for urban societies but also leading to the decline of rural villages. Elderly and "stay behind children" have become a norm. The once unified village now become broken like the loess land they live on.

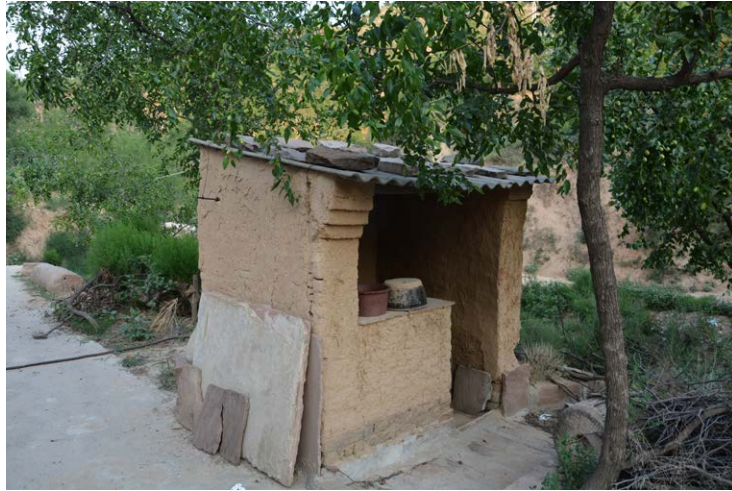


FIG 5.10 Gou-di-village public toilet (Top)

FIG 5.11 Public storages (Middle and Bottom)



The Many Gods System

In the old times, when the kinship is disturbed, temples become a village's social organization. In the loess region, due to constant warring states and the nomadic hunting culture, villages usually have mixed bloodlines, with small Zong-ci. During Chen and Li's field research in Shanxi, they found the simplest Zong-ci with a drawing of the bloodlines in a small room.²¹ In such villages "She" becomes their basic social units. A village has several "She", with 25 houses per unit. Every "She" has a temple called "She-miao", and the gods in residence are local gods, governing the specific regions.²²



In the rural China, temples are for countless rural gods created by peasants, out of respect for natural forces that influence their well-beings, and out of admiration for heroes and saints, sometimes even the evil.²³ One do not really know how many rural gods there are, because everything can become the rural gods. In fact, there is no great teachings nor enlightenments in the rural temples, only the most ordinary parts of village lives, about Qi-qing-liu-yu (the seven emotions and six desires) of being human. These pains are expressed in temples, trying to be released,²⁴ and Gods are created for such emotions.²⁵



FIG 5.12 Shen-kan in yao-dongs, in Ping-yao, Zhang-zhuang village, Li-family Mountain village



FIG 5.13 Water temple in Guo-family-gou village, Shanbei



FIG 5.14 Niang-niang temple in Yu-kou village, Shanbei

Like humans, the gods' dwellings are different according to their roles. Stove gods, door gods, washroom gods, water well gods and so on, who are needed every day, will stay inside villagers' homes. They dwell in a piece of red paper or wood with their names on and then put in front of the places they bless. More formal is to make a shrine,²⁶ then it is the temple. Smaller temples inside villages are homes for gods who are intimate to villagers.²⁷ These three gods are most popular: San-guan Miao, who spread happiness, Tu-di-ye (earth god) who punish crimes, Water god who brings peace. They are either in the middle of a village, at the front of a field, or beside a river where women wash clothes.²⁸ Villagers not only make gods look like human, they are given human emotions.²⁹ Take Niangniang Miao (right) as an example, characteristics of the mother are given to the gods who protect women and children, the family well-being and other things mostly prayed by women.³⁰ Temples are also public buildings. During the market days, small business, dealing with drugs, meats, teas, snacks, and entertainments such as gambling and operas."³¹ The archway street below the Niang-niang Miao (temple) is a business street. The villagers said that their fathers sold things under this temple, years ago.

Temples usually have opera stages, as well as yao-dongs for opera artists' residence. These yao-dongs belong to the temples, while sometimes serve as shelters for travelers, migrant workers and students on their way to the town for examinations. For those who died in a foreign village, temples will provide burials for them.³² Temples are also cultural centers of villages. Operas often tell stories about "Li" thus kinship build temple stages.³³



“Miao Hui”, the Annual Temple festival

-August 14,15, 2015, Qi-kou Town, Shanxi



FIG 5.15 Black-dragon temple, Qi-kou town, Shanxi

According to Chen Zhi-hua and Li Qiu-xiang, opera origins from witchcraft’s Tan-xi. People imagine that gods are like them, who are entertained by operas.³⁴ Thus on the memorial days of the most important gods (Miao-Hui), operas are played from day to night as a celebration, to make gods happy. Miao-hui happens once a year, lasts for two to three days, and is the biggest festival in the rural society.³⁵ These gods dwell in big temples that are often in mountain tops, and near big towns where small villages will all come to attend the Miao-hui.

The Black-dragon river god in Qi-kou town is the main god in the region because Qi-kou is a very important dry water wharf where the Yellow River becomes more threatening afterward. So most goods are loaded here from ships and onto camels, horses, donkeys for road transport. Nearby villages such as Li-family Mountain, Xi-wan Village, Sun-family Gou, Gou-di Village, etc. all benefit from Qi-kou’s prosperity. Like Chen and Li perceptly observed, one place has its own geographical or economical specialties, thus the gods there will be unique. Qi-kou town’s river gods for example, reflect the social scenes of the dry water wharf.³⁶

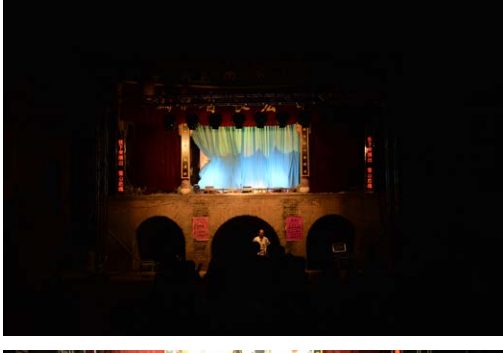


FIG 5.16 Opera stage in Black-dragon temple, Qi-kou town, Shanxi

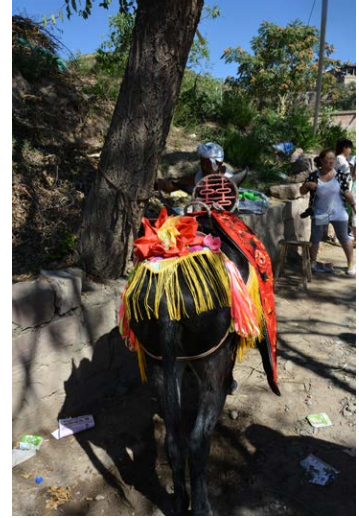


FIG 5.17 Festival Animals in Miao-hui, Qi-kou, Shanxi

During Qi-kou's Miao-hui, villagers from villages near by all come to the Hui. They come either by foot, motorcycles, bikes, buses, or cars. Hui is also market days where foods and daily goods are sold. Villagers saved up the whole year, to buy things they want in the Hui. Hui is also a party, where everyone socializes with old friends from nearby villages, plays games, and watches operas. I was fortunate to attend the Miao-hui, and meet villagers from Gou-di village and Li-family village that I did my research on. The young people feel the Hui is boring. Also stages with pop-singers were more popular than the operas in the temples, which makes one worry about the future of the traditional arts, crafts and organizations.



FIG 5.18 Food stand in Qi-kou



FIG 5.19 Jia-xian town streetscape



Color Plate 4. Shen Chou: from "Album of Landscapes with Figures, for Chou Wei-te." Dated 1442. Album leaf, ink and light colors on paper, 11.8 x 19.7 cm. Cheng Hong Ge collection.

FIG 5.20 Shenzhou, "Album of Landscapes with Figures"



FIG 5.21 Yao-dong entrance in Jia-xian town, Shanbei

Imperial Education System

The Chinese imperial educational system began in Sui Dynasty (A.D.581–618) and ended in Qing Dynasty (A.D.1644–1911). Its influence reached down to the most remote and poorest rural villages. By studying hardly the “si-shu-wu-jing”, anyone can enter the examination system and gain entry into the government. This system encourages peasant children to study³⁷.

The ideal Taoist lifestyle is to return to the most primitive way of living in nature. Chinese architect Han Baode thinks that Zhu-li-mao-she (thatched cottage with bamboo fence) is the most sacred architectural thinking, and only the highest cultivation of mind can enjoy such lifestyles.³⁸ For example, Tao Yuanming, the fourth-century Chinese poet, went back to his hometown to be a farmer after his resignation from government. These literati who return to their home villages, pass down their knowledge to the next generations, thus building a cultural cycle.

This tradition of scholars going back to home villages is also the foundation of country squire culture. In fact a majority of generations of scholars have all come from the villages, called “the grass-root class”. “This last till the late-Ming Dynasty, where there was already a significant gap between the towns and the villages. Still then there is 42% of scholars coming from rural villages.”³⁹



FIG 5.22 Mind Landscape of Xie Youyu (Youyu qiu he)

Since the traditional Chinese empire had limited power in the rural,⁴⁰ every rural house hold is a social unit, an economic unit, as well as a political unit.⁴¹ According to Fei Xiao-tong, “in traditional rural China, country squire (Xiangshen) plays an important part in communicating villagers’ ideas to the central government, making sure the government not only applies what they want to the villages but the villagers have a say in the rural society. Country squires utilize every possible social relationships to send villagers’ messages to the upper society, making it a two way system between the central power and the public.”⁴² This “state- country squire (Xiangshen) – villagers” forms a mutual constraint and support system. Historian Prasenjit Duara used “cultural network of power” to explain how the state’s authority is shaped in the bottom society.⁴³



FIG 5.23 Yao-dong classroom in Guo-family Village

Village school is a place in the village where cultural and public discussions happen. Today the rural education reform destruct the existing rural ethic and order.⁴⁴ The abolition of the village school has meant lost of nourishing grounds for the young, and a center for the village. As the center is moved to the township, the village community starts to decay internally.⁴⁵ Children lost their attachment to the villages when schools are relocated in the town. During my field researches, I asked villagers whether there is schools in the villages, they said that schools had all moved to the towns, along with children. Village spirits include neighborhood cares and family bonding. Once this village spirit is lost, we feel like an astronaut drifting in the space. When village spirit disperses, bullying forces enter.



FIG 5.24 Yao-dong classroom in Shen-quan-bao village, Shanbei



FIG 5.25 Yao-dong library in Mi-zhi town, Shanbei



FIG 5.26 School in Gou-di village, Shanxi

Story 3
Mountain Roads



FIG 6.1 Long- Mai / Dragon's vein



FIG 6.2 Li-family-mountain Village 1:400



Li family mountain is shaped like a pheonix. This is the right wing of the pheonix. Delicate mountain roads are paved connecting different levels of cliff yao-dongs.



FIG 6.3 Li-family-mountain Village



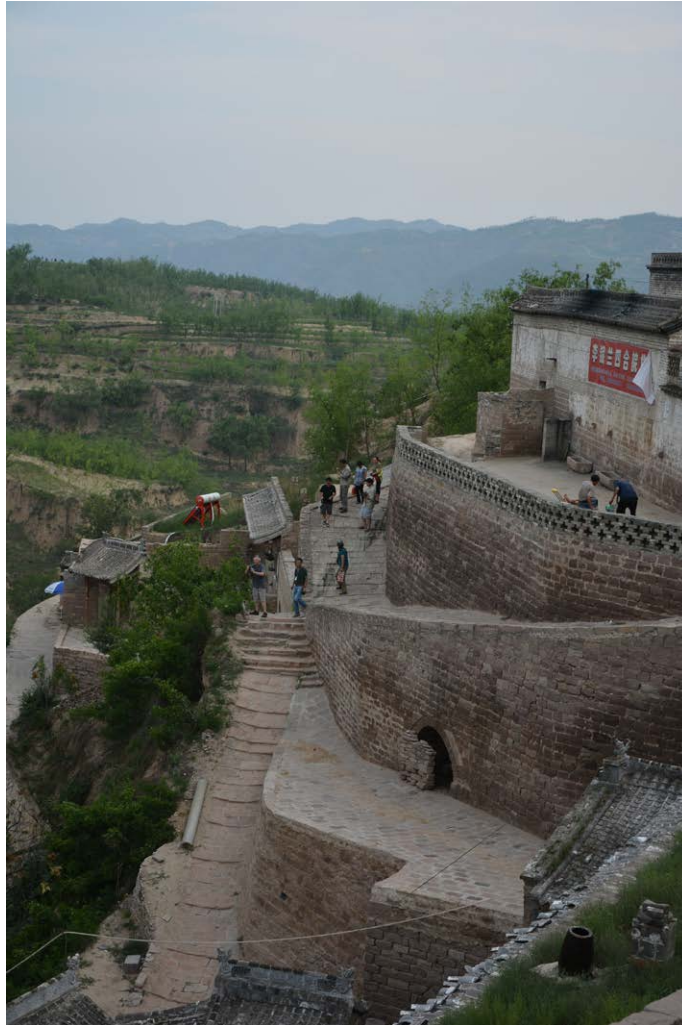


FIG 6.4 Li-family-mountain Village detail

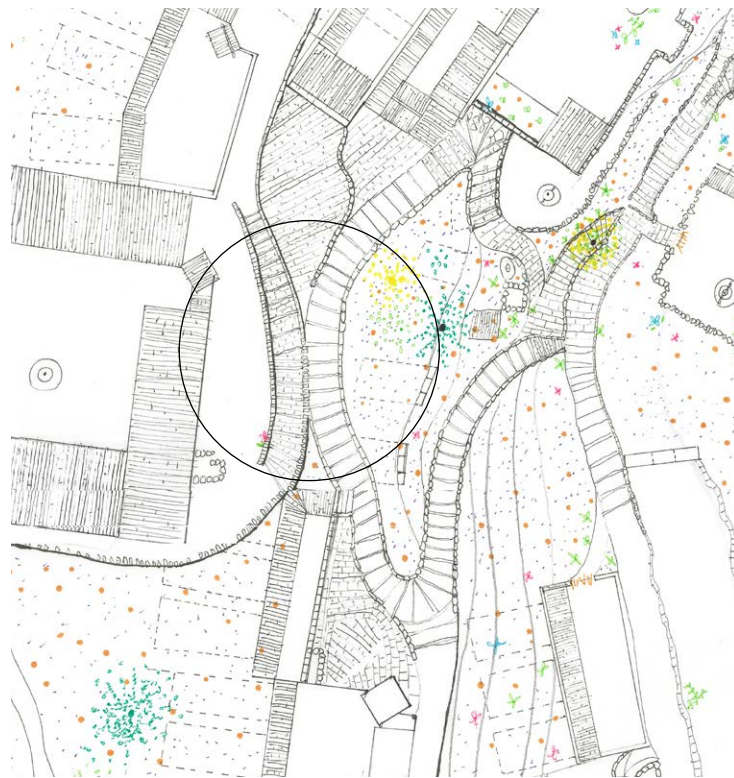


FIG 6.5 Li-family-mountain Village detail



FIG 6.6 Li-family-mountain Village detail

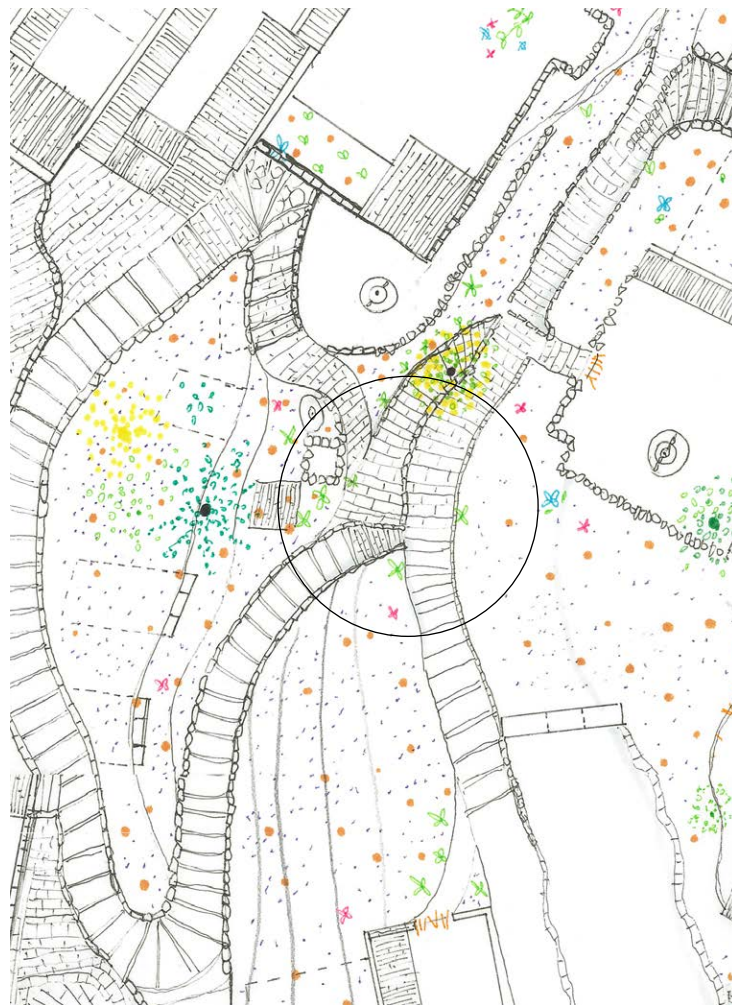


FIG 6.7 Li-family-mountain Village detail



FIG 6.8 Li-family-mountain Village detail



FIG 6.9 Li-family-mountain Village detail

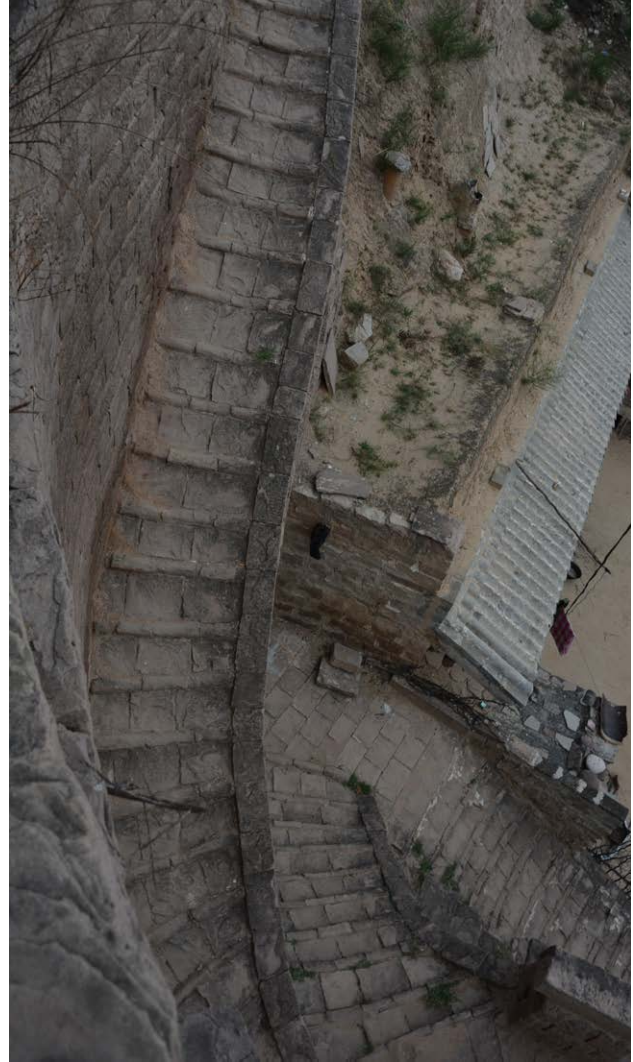
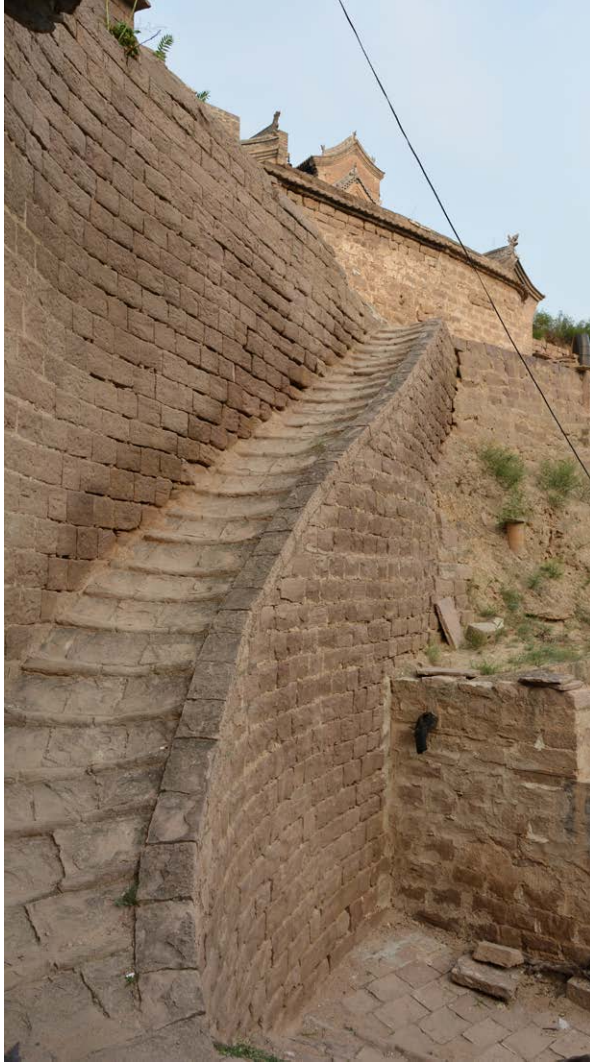


FIG 6.10 Li-family-mountain Village detail

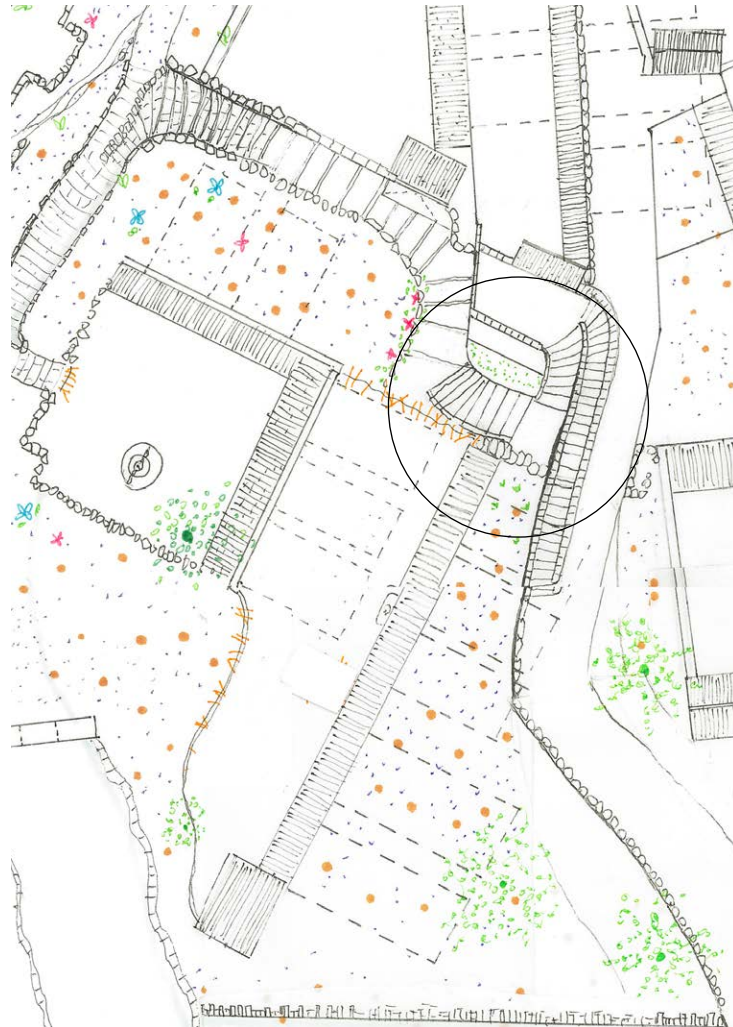


FIG 6.11 Li-family-mountain Village detail



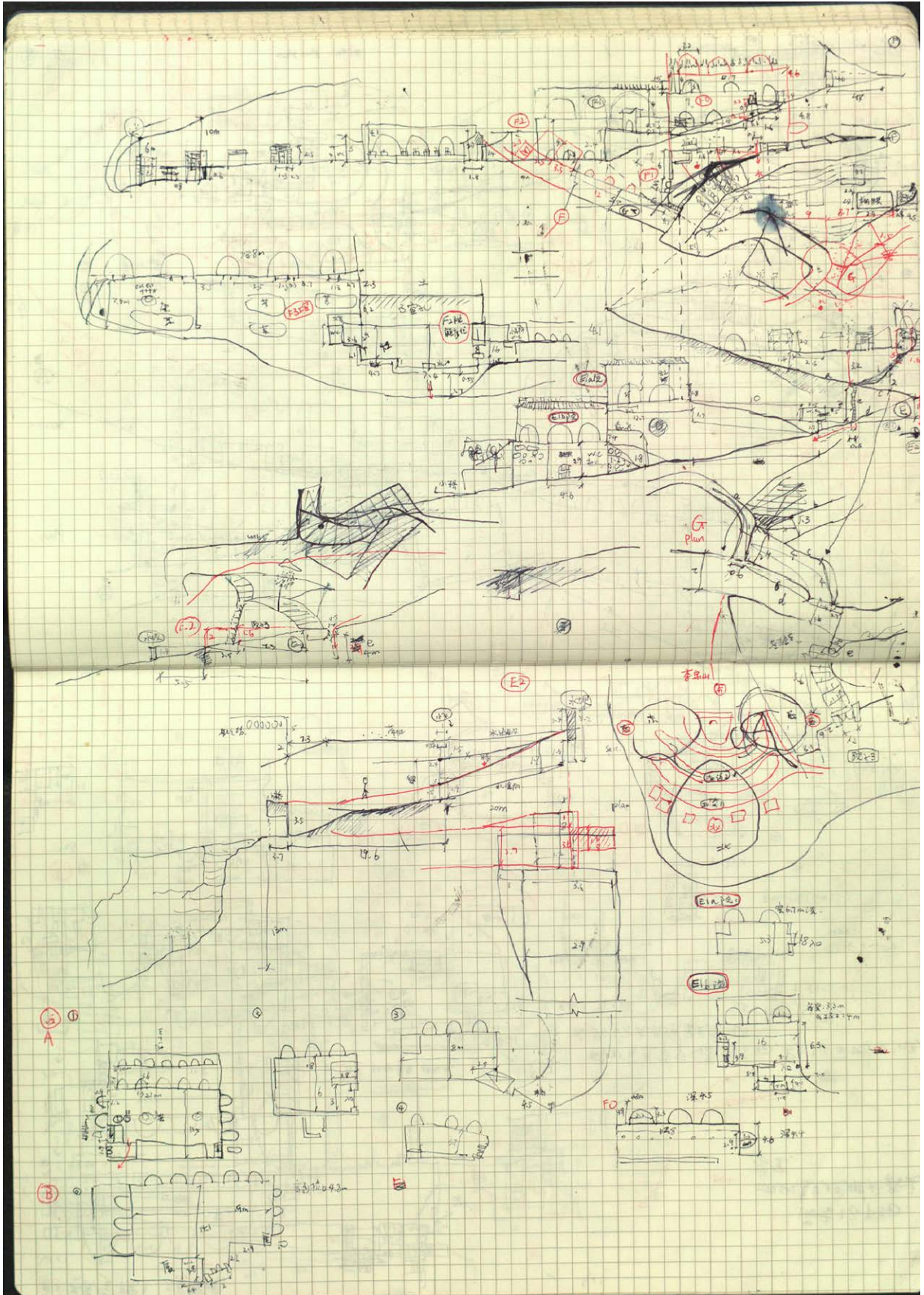
FIG 6.12 Li-family-mountain Village drainage plan

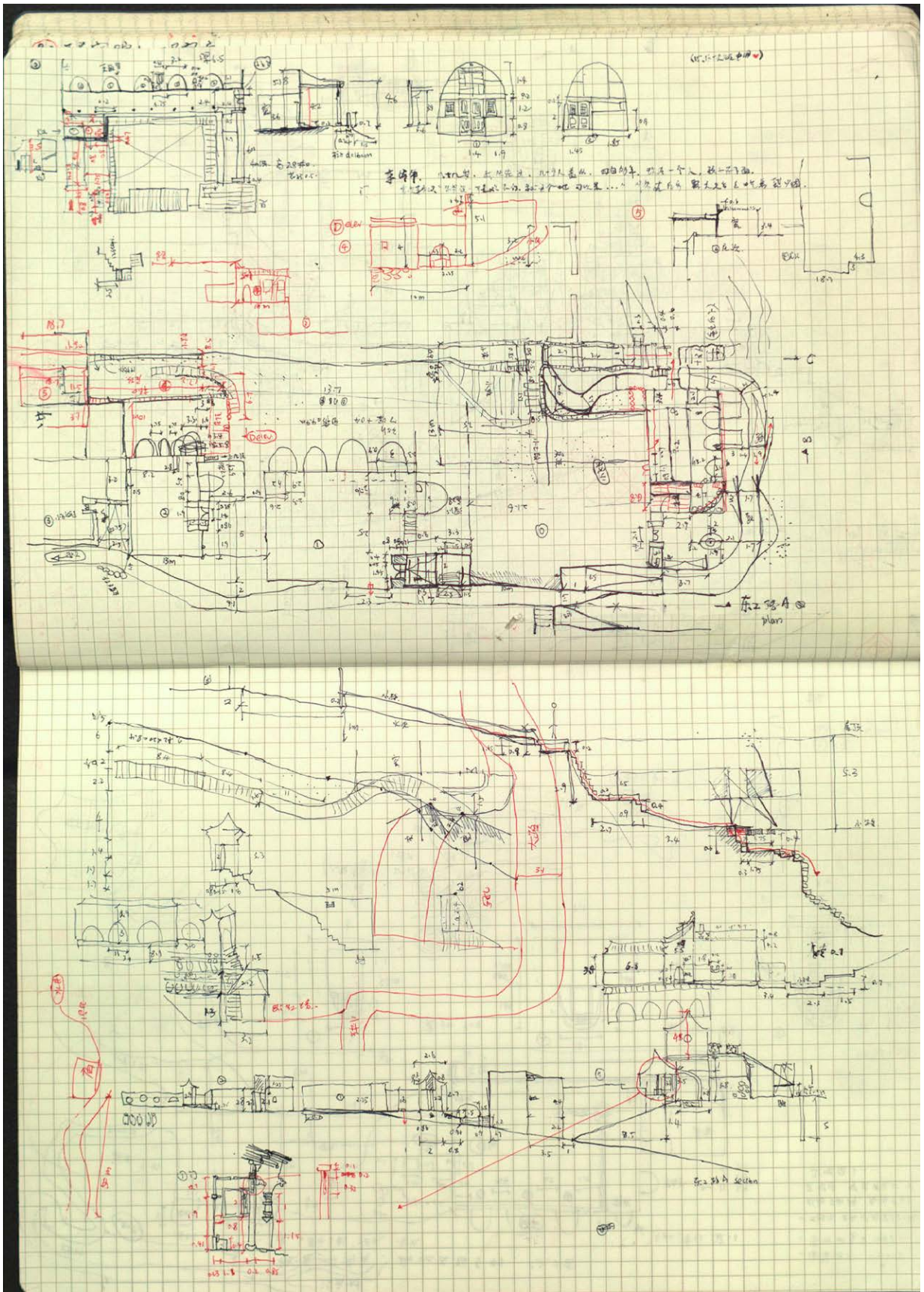


The mountain road system also serves as water drainage. They direct water into the gully, nurturing the plants, and then excess water drain away through the drainage channel at the bottom into the river.



FIG 6.13 Li-family-mountain Village drainage details





Story 4
Grandma's Underground Yao-dong



FIG 7.1 “Sheng-huo” Life



FIG 7.2 watercolor drawing from above of grandma's yao-dong courtyard

We take a bus to grandma's village. There is no sign for each stop but I know it is Grandma's village for there is a blooming sunflower field. A paved way among fields of wheat, pear and apple gardens, leads to Grandma's Village. The pavement slowly became uneven earthen road. Brick houses have replaced most of the underground yao-dongs in this village, unlike in villages that have become the cultural preservation sites for yao-dong culture such as Ren-ma Village and Miao-shang Village.

On our left side the apricot, pear, and apple gardens are blooming. Uncle Du invited us to eat as much as we can in his apricot gardens. Uncle Du is grandma's nephew. Their yao-dongs are side by side. In the beginning, their family lives along the gully with other villagers. According to Wang Hui et al., in the old times, underground yao-dongs were often situated near the cliff side of Yuan, because of the limited technologies to dig deep water wells above. As the technology of digging water wells advanced, villagers started moving up to the Yuan.² Uncle Du now lives in as a vacation house, renovated by Professor Wang Jun. Grandma and her husband built their yao-dong next door.



FIG 7.3 view from grandma's village

FIG 7.4 view from above Uncle Du's yao-dong

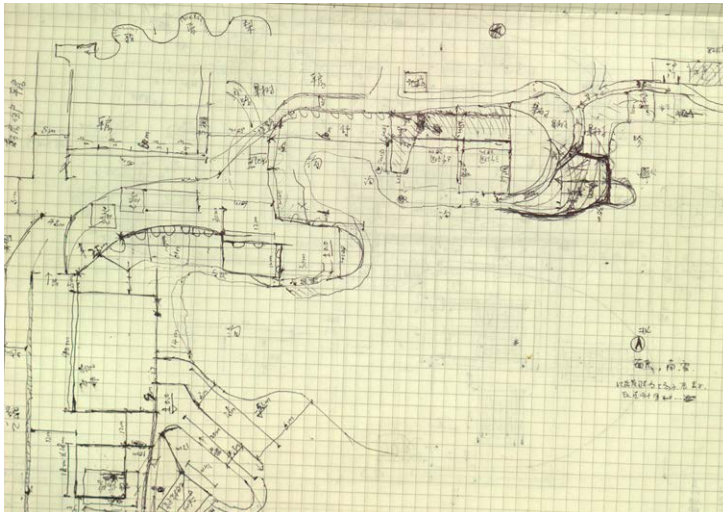


FIG 7.5 Sketches of grandma's village



FIG 7.6 Watercolor drawings of old yao-dong sites

Shan-town is renowned for its historical heritage sites of Yang-shao culture. We will pass by Miao Shang village with its latest underground yao-dong built in 1967. Very few people can identify how long their yao-dongs have been, and the common answer one would get is “it is past done from our ancestors.”¹

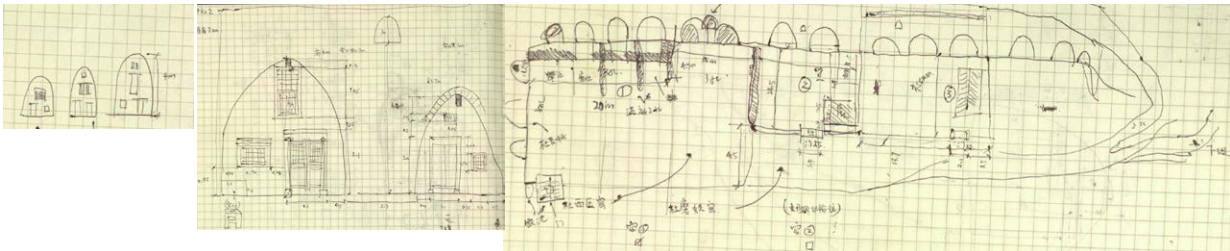


FIG 7.7 Sketches of the old yao-dong sites



FIG 7.9 Watercolor drawing of Grandma Du's yao-dong along the gully



FIG 7.10 Grandma Du's yao-dong and entrance



FIG 7.11 Aerial view of an underground yao-dong village

*Grandma's village from the sky
may look similar to the village
Rudofsky showed in his book
Architecture without Architects.*



FIG 7.12 Aerial view of an underground yao-dong village



FIG 7.13 Waving to grandma from above

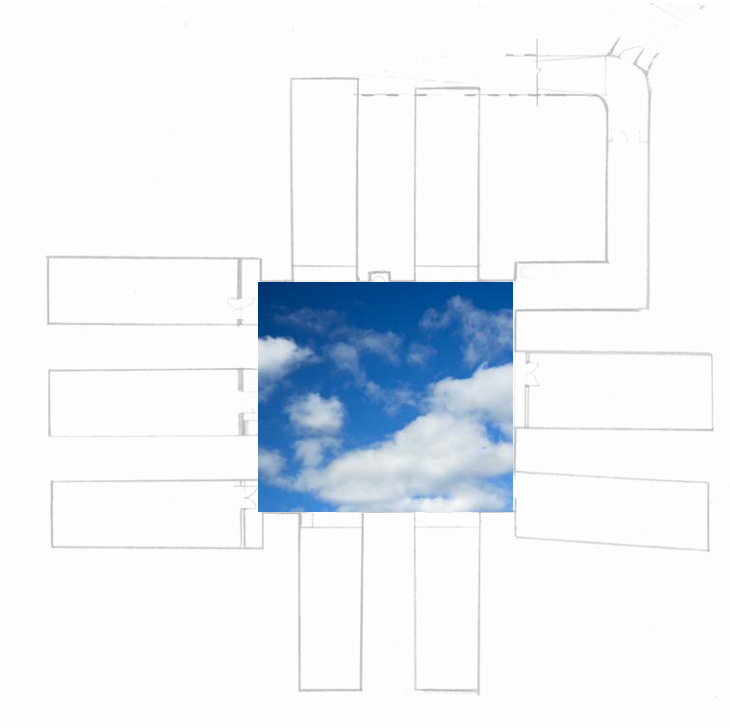


FIG 7.14 Diagram

*Grandma's courtyard frames
a square sky in 10.5meters by
11meters. We wave to grandma
from above, before we go to the
yao-dong entrance cave.*

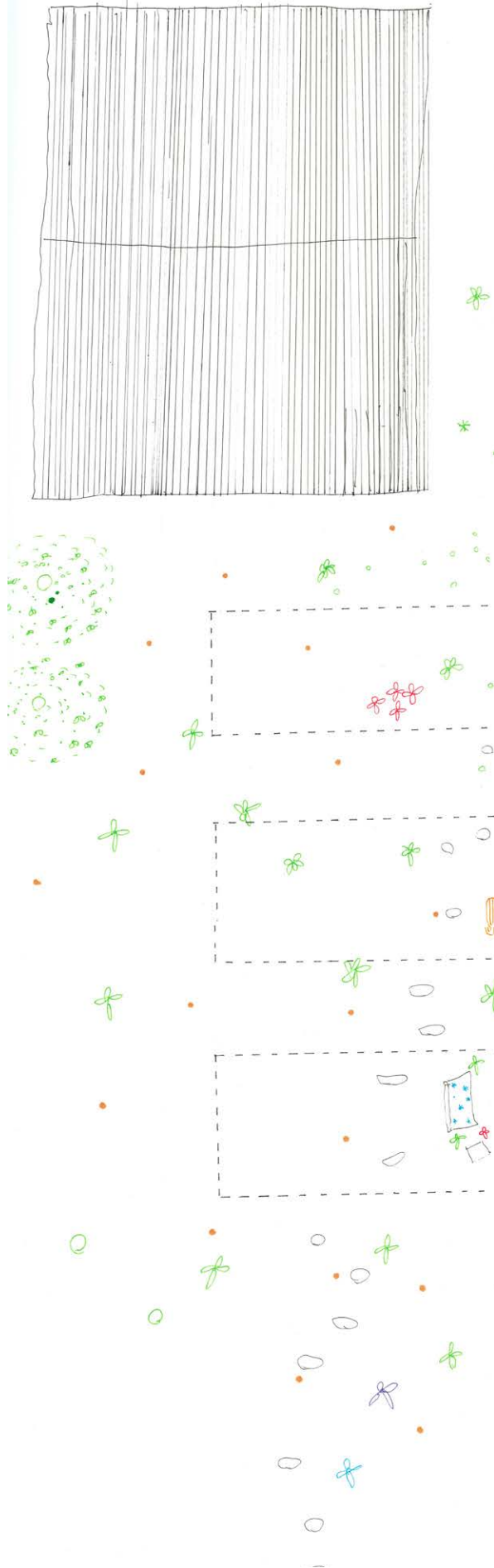


FIG 7.15 Roof Plan 1:125





FIG 7.16 Cast model- view from above 1:75



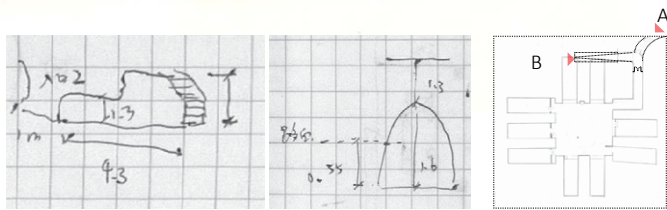


FIG 7.17 Entrance A

Entrance A is so humble that we almost could not find it.



FIG 7.18 Entrance B

*Entrance B is the ramp entrance
is near the courtyard opening.*



FIG 7.19 Inside entrance cave

*But once I carefully stepped down
the earthen stairs and crossed
the "second door" frame, I felt as
if being embraced by earth.*



FIG 7.20 Inside entrance cave

*All the summer heat is gone, air
is filled with the fragrance of the
earth, and everything gets qui-
eter here. On the earthen wall,
light left its fingerprint*



FIG 7.21 Intersections between two entrances

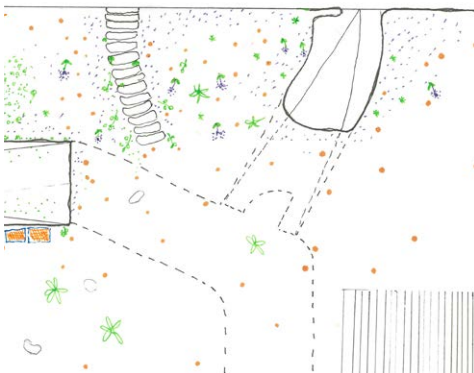
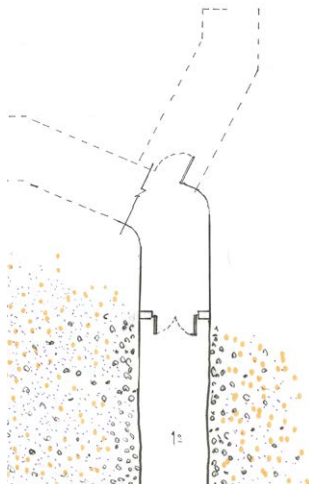


FIG 7.23 Entrance A



There are two locked door in the door cave: the Big Door "Da-men" and the Second Door "Er-men". "Da-men-bu-ru, er-men-bu-chu" is a proverb which means women are limited to stay behind the second door and so with no need to enter the big door.³

FIG 7.24 Inside Entrance Cave

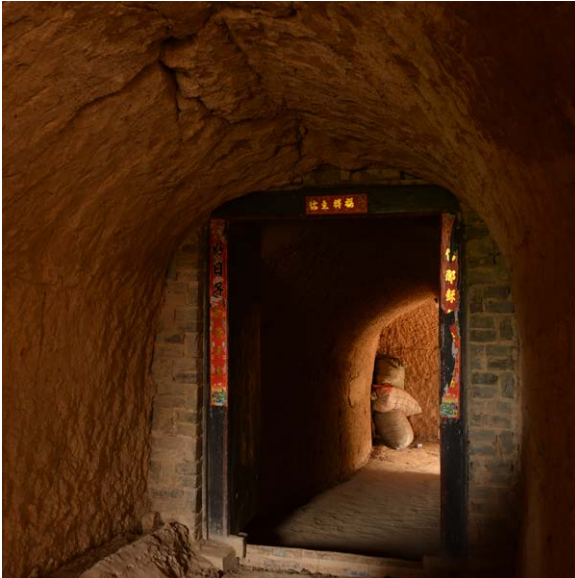


FIG 7.25.1 View Inside Entrance Cave

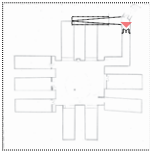


FIG 7.25.2 View Inside Entrance Cave

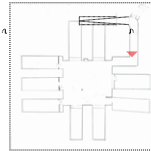




FIG 7.25.3 View Inside Entrance Cave

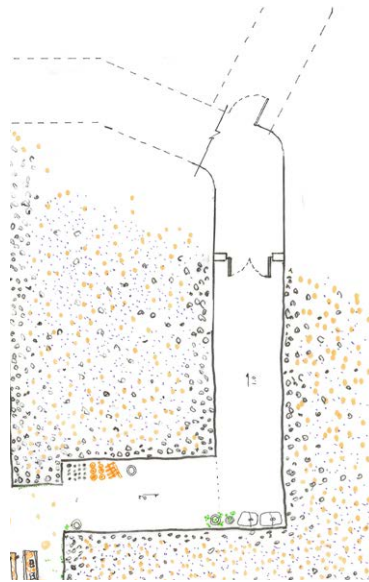
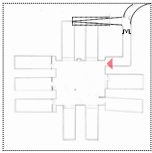


FIG 7.25.4 Plan detail of Entrance Cave

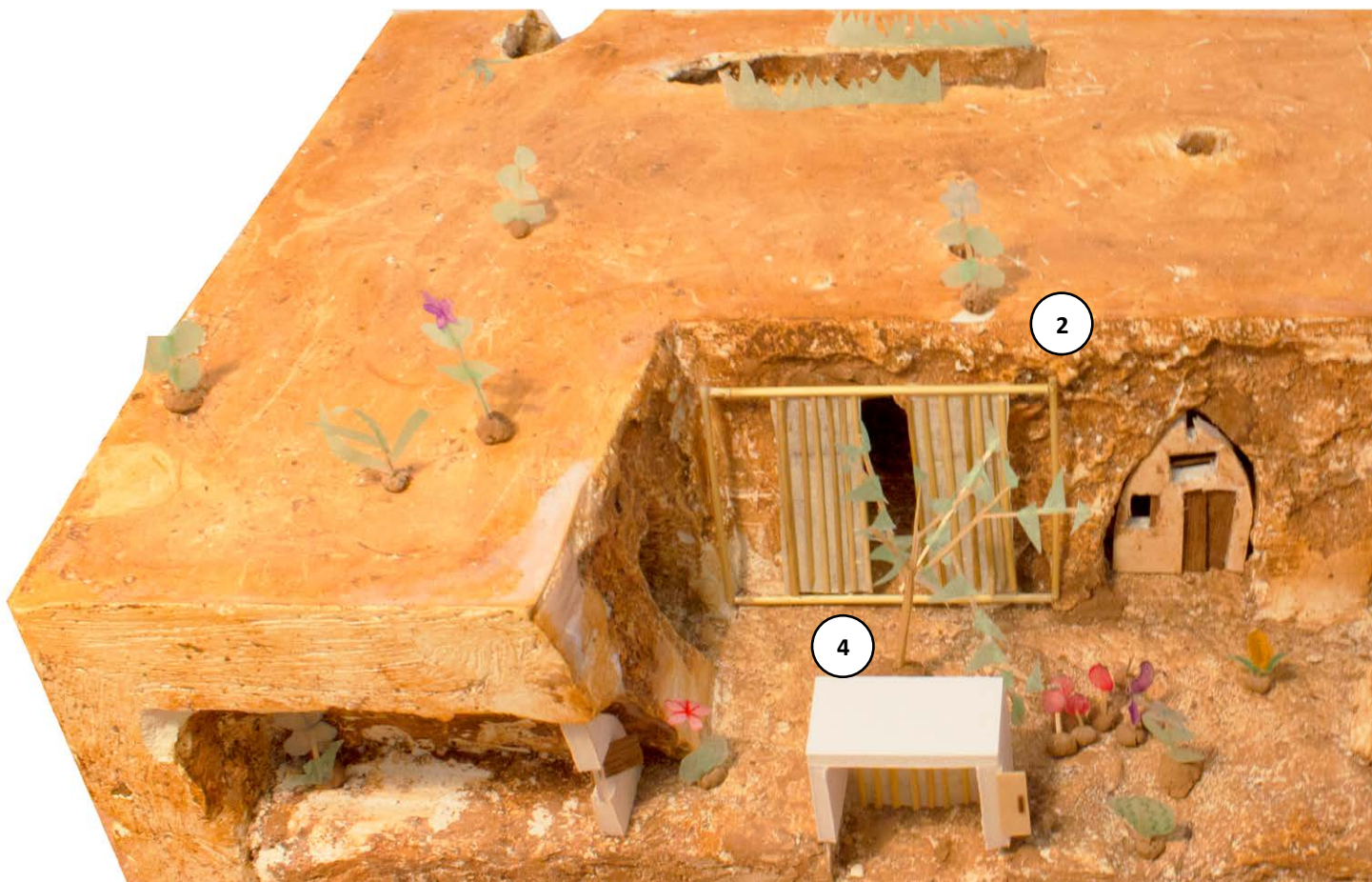


FIG 7.26 Physical model 1:75

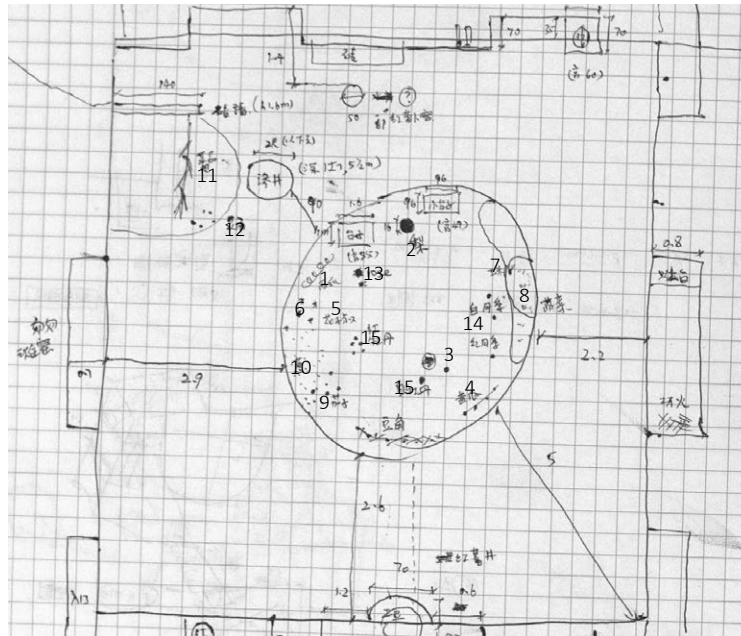
Bernard Rudofsky writes in his book *Architecture without Architects*:

“Vernacular architecture does not go through fashion cycles. It is nearly immutable, indeed, unimprovable, since it serves its purpose to perfection.”²⁶

Since yao-dong achieves its pragmatic and spiritual role as a shelter to its perfection, what needs to be change is minor qualitative upgrades for the new farmers. I propose in grandma’s underground yao-dong five architectural elements:

1. light shafts,
2. new façade design,
3. a new plan for a decreased rural population- the modern rural family,
4. a urine and feces divergent toilet that connects to the natural water filtration using plants in the courtyard.





1. watermelons
2. pears
3. figs
4. cucumbers
5. spicy peppers
6. unque peppers
7. corns
8. leek
9. eggplants
10. green onions
11. tomatos
12. beans
13. roses
14. chinese roses
15. peony

FIG 7.27 sketches of grandma's courtyard

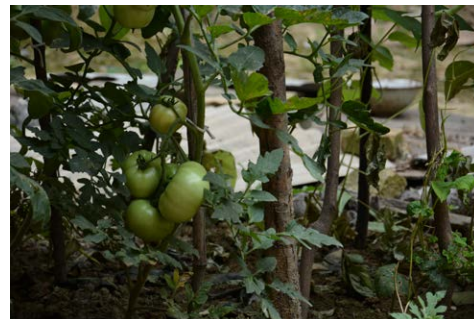


FIG 7.28 pears and tomatoes from grandma's courtyard

In summer, grandma's courtyard is in bloom. Grandma's Courtyard has different kinds of vegetables, flowers and fruits. There are 13 kinds. For today's lunch, grandma picks fresh vegetables from her garden.

“House shelters day- dreaming,
the house protects the dreamer,
the house allows one to dream in
peace.”

- G. Bachelard



FIG 7.29 watercolor of grandma's courtyard

*We stay under the shed of the
pear tree in the courtyard.*

The courtyard of an underground yao-dong usually has one to two pear trees because pear in Chinese sounds like luckiness, or pomegranate trees which is metaphoric to many descendants.⁴ However, a paulowniaceae tree is the most preferable tree because it makes great musical instruments, grows fast, and is deep-rooting and late-leafing. Its wood is light but strong; its flowers are rich in nectar; its leaves make good fodder for farm animals, and its canopy is quite sparse so that crops below it get both light enough to grow and be sheltered. At last, it is abundant in this region.⁵



FIG 7.30 Yao-dong in Da-liu-si village, Henan



FIG 7.31 Yao-dong in Jiang-family Villa, Shanbei

Villagers believe that a tree has a great soul and children would take a tree or a millstone as their god fathers, in good wishes that they will be as tall and as strong.⁶ Courtyard is a production field housing home animals such as sty, sheep, chicken, rabbits, bees, and so on. There are also two millstones there.



忙腊月
甲寅年
张福高画

FIG 7.32 Mo-mo

Swallows like to stay inside yao-dong or under the veranda. Cats have their special entrance called “cat door” embedded in yao-dong’s front facade. Cats have an important role inside the household, and that is to catch rats who like to dig holes, creating leakage.



FIG 7.33 Chicken house in Dang-family village

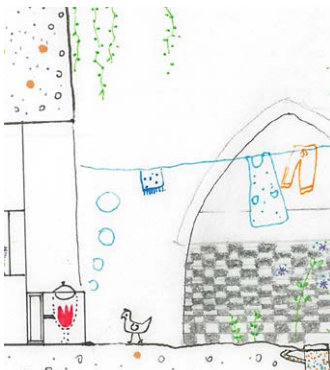


FIG 7.34 Section detail



FIG 7.35 Cat's hole in Dang-family village

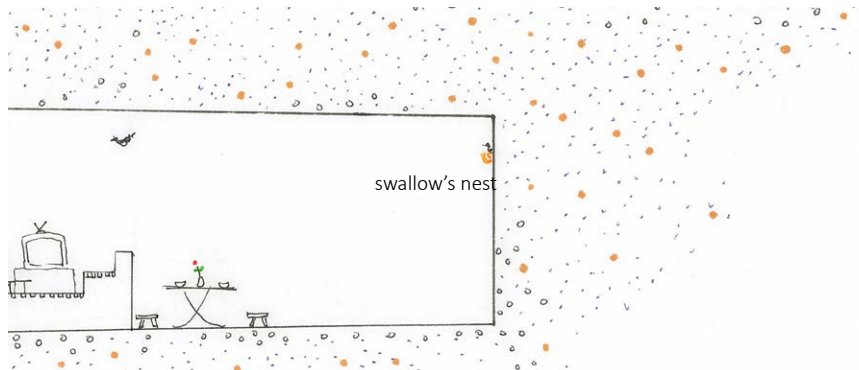


FIG 7.36 Detail section of swallow's nest

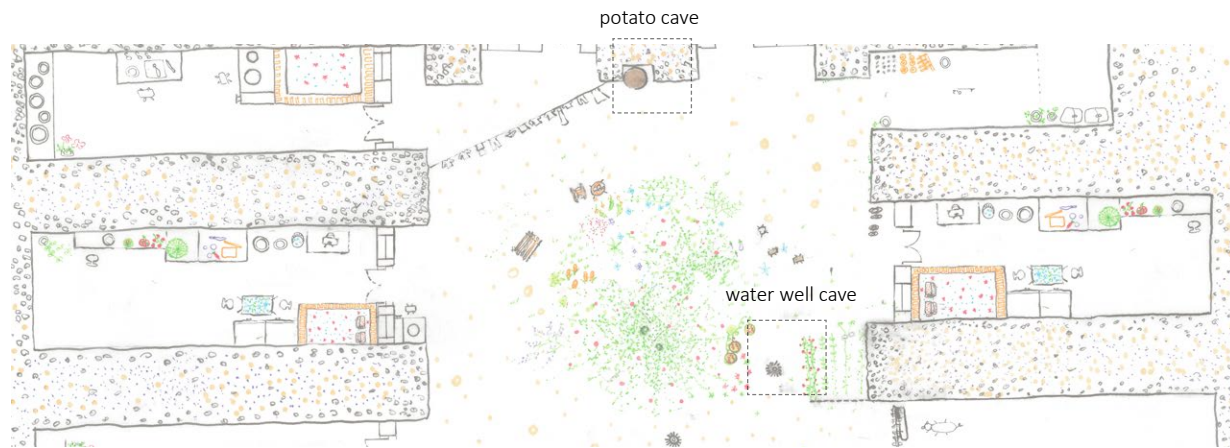


FIG 7.37 Plan detail

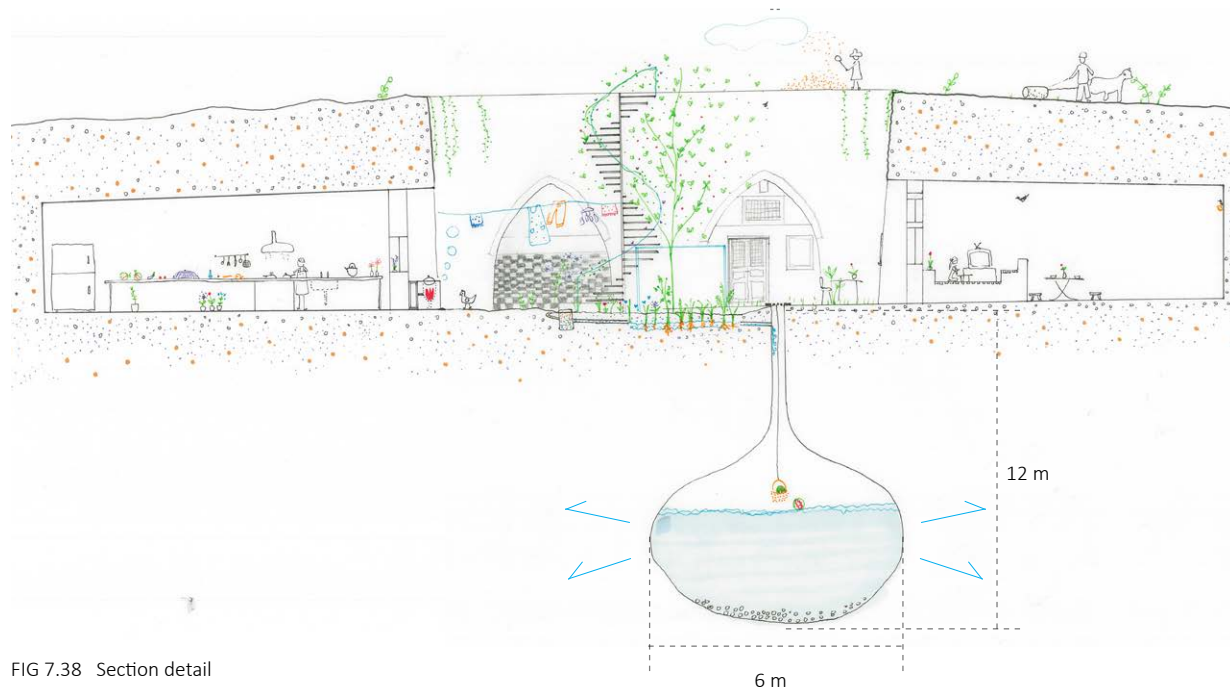


FIG 7.38 Section detail



FIG 7.39 Water well
0.5m

There are two secret caves beneath our feet. One is the water well cave, and the other is the vegetable cellar.

A well cave is located at a specific corner of the courtyard according to Feng-shui. The water well is dug 6-12 meters deep with a diameter of 5-7 meters. Then it is bottomed with gravel and covered by a stone plate on the 50 centimeters wide opening. Because of loess soil's collapsible nature, yao-dong drainage is extremely important. In heavy rainfall, the loess soil can absorb some rainwater while the water well can store up to 800ml which is the maximum amount of rainfall annually. Locals had never seen the water well been filled.⁷ Usually water penetrates into the underground water system, but when a water well becomes too old to absorb water, a new one will be constructed.⁸

Grandma tells me that watermelon is sometimes placed in a basket attached with a rope and slowly put inside the water well. This way watermelon will be tastier and cool while water becomes sweeter. In summer, they also put buns, and vegetables in the baskets.

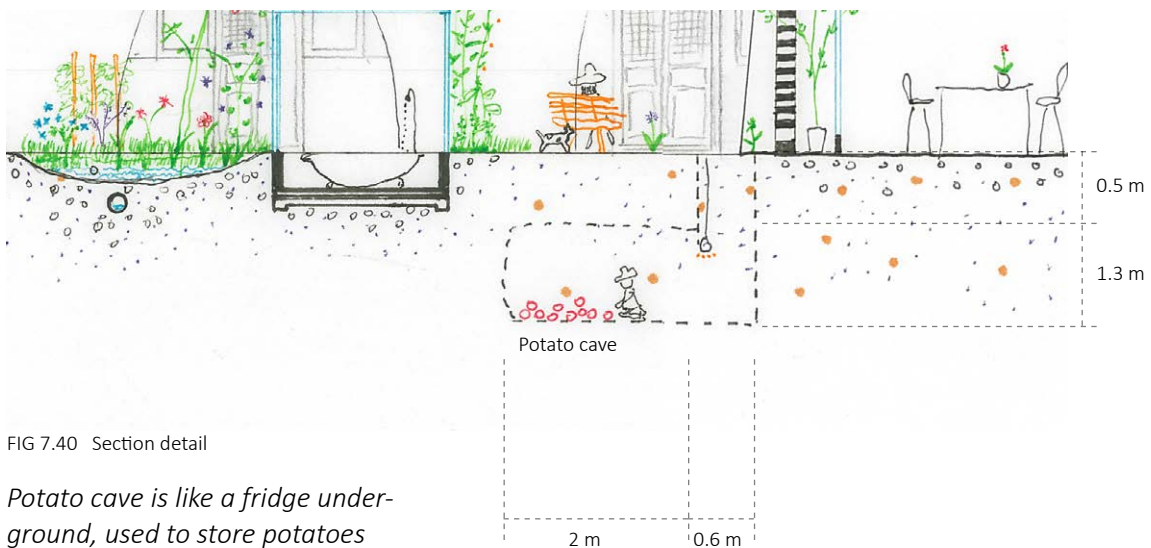


FIG 7.40 Section detail

Potato cave is like a fridge underground, used to store potatoes and so on. The tunnel to the cellar is 60cm in diameter, and around 1.8 meters deep. Inside the cellar, it is around 1.3 meters high, so one has to bend to move around. It is 2.5 meters long, keeping a little distance to the root area of grandma's vegetable garden.



FIG 7.41 Cast Model of Potato Cave & Photo of Grandma's Potato Cave

If there is a rainstorm, the potato cave will also become a water well. During the spring festival, villagers begin to check their sweet potato cave, carrot cave, and potato cave. They get rid of the roots that have grown on carrots and potatoes. Afterward, they put them all back into the cellar as food preserve for this year. The entrance for potato cave is carved on yao-leg, the space between two yao-dongs.

In Qingqiang/Shaanxi Opera, Jia Ping-wa vividly describes how the main character Yin-sheng enters a vegetable cellar:

"I lift the cellar's cover and go down. The wall of the cellar is slippery. I miss one Deng-wo-zi [small holes on the wall for climbing] and fall down- 'pu-tong' (sound). I find the basket of potato [...] I stand inside the cellar and listen to what's going on above. Indeed, there is a sneeze, and Snow saying 'Mother, who is missing me?' [...] I begin to imagine again. Snow enters the kitchen with a baby in her arms. She saw mist coming out of the cellar, so she puts the baby down on the straw above the earthen stove. She then steps down along the Deng-wo-zi. Her feet come down first, her left foot steps on a Deng-wo-zi, while her right foot suspends in the air, with a red shoe on. I grab the red shoe [...]"⁹



FIG 7.42 Yao-leg



Grandma's yao-dong leg is 2-2.5m wide.

Earthen yao-dong has a wide yao-leg because it together with the arch structure, are the structural support of a yao-dong. Yao-legs mainly resist compression and lateral forces. Since the yao-leg is wide enough, little earthen caves are also dug in the Yao-leg, to house small creatures such as chicken, swallows and tools. The old saying goes "rabbits and chickens live in yao-dong, grow in longevity and nice features, with lots of eggs." On the surface of yao-leg, nails are seen everywhere, to hang things such as peppers and corn. Corn is usually dried here and then when villagers are not busy with the farm, they will sit in the courtyard to make corn granules.



FIG 7.43 Plan detail

Villagers protect yao-leg with bricks from erosion of rain,¹⁰ known as the shoes of yao-leg or Jian-jiao. Poor farmers who cannot afford brick shoes, like grandma, use earth.

Meanwhile, the cornice and eave is the hat of a yao-dong, also known as eye lashes.¹¹ Brick cornices, eaves and water drainage channels could only be afforded by the rich. While poor farmers plant shallow roots and vines that grow along the Ya-face, forming a natural protection layer from erosion.

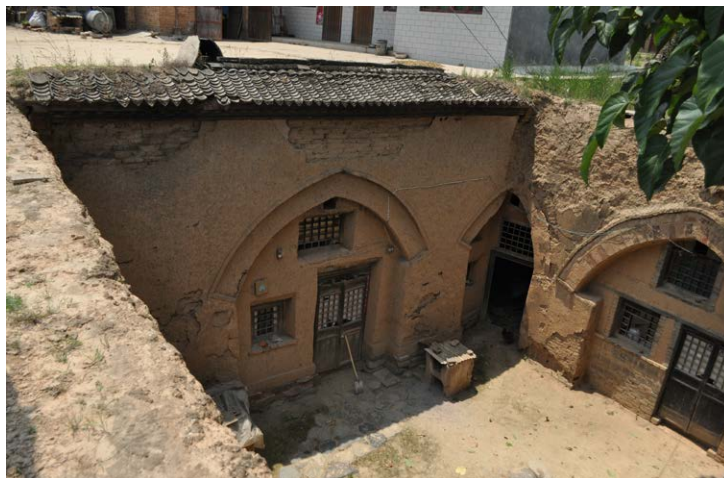


FIG 7.44 "Eye-lashes" of yao-dong in Liu-si Village

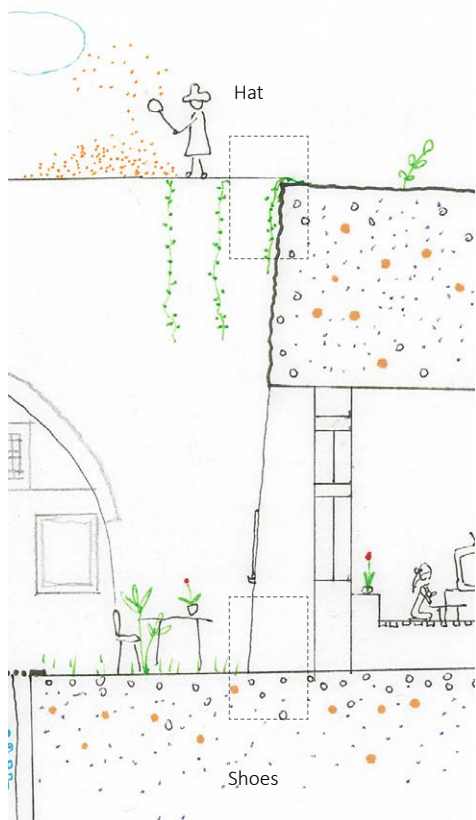


FIG 7.45 Section detail



FIG 7.46 Yao-dong hat
Yao-dong shoe

Grandma asks us a folk puzzle:

*“My home lives in a house without roof shingles. It is warm in winter, and cool in summer. What is it?”¹⁶
The answer is yao-dong.*

Underground yao-dong is so deep because it has a thick layer of earth on top known as yao-bei (the back of yao-dong). It is mostly 3 to 5 meters deep, depending on the annual rainfall and the type of soil. If it is too thin, rain will sink through to the interior, but if it is too deep, the arch-structure cannot support such weight.¹⁷

Guo also outlined three functions of yao-bei:

Firstly, yaodong’s stability mainly is controlled though casing it with soil, making it more and more stable as constant pressures are applied.

Secondly, yao-bei is a great insulation layer.

Lastly, yao-bei can modulate humidity. Yao-dong provides constant temperature and humidity which fits in human’s physiological adaptation range and keeps dust and bacteria away.¹⁸

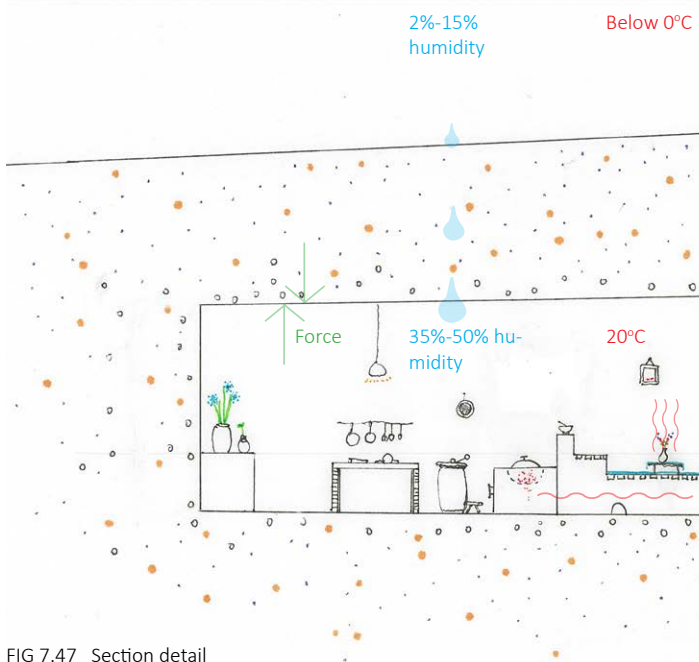


FIG 7.47 Section detail

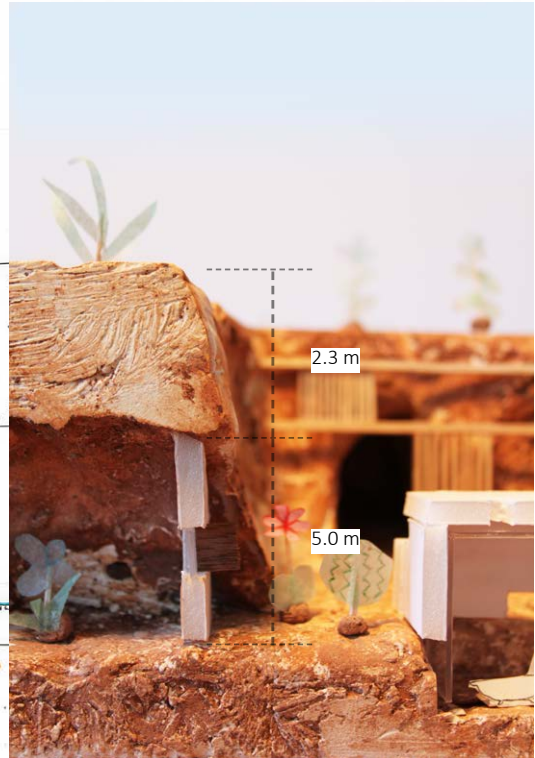


FIG 7.48 Yao-bei

1.light shaft



FIG 7.49 Cast model-light shaft detail



FIG 7.50 Cast model-when it rains



FIG 7.51 Cast model- Interior



FIG 7.52 Cast model-light shaft detail viewed from aboveground



FIG 7.53 Chang in Da-liu-si village, Henan



FIG 7.54 Liu-zhou

Grandma's "liu zhou" is sitting idle above the yao-dong courtyard. After rain, yao-bei needs to be rolled flat with a "liu zhou", a tool every household has.²² This way yao-dong will become stronger as the soil become compressed and hardened.

In the old days, villagers utilize this empty space as "Chang" during the times of harvest, to process and dry farming products such as wheat. Each chang above each yao-dong courtyard can be connected into a bigger chang. "Liu-zhou" will pass through each chang, making grains out of wheat.

Every year before spring and in the rainy season, yao-dong residents will carefully exam and flatten the drainage slope on Yao-bei. Someone will fill in the worm or mouse holes, get rid of wild plants, and cut the grasses but without affecting the roots, and then compress the earth hard with a lu-lu. The old saying goes "on sunny days, one fixes the yao-dong roof so that on rainy days, one does not have to worry."¹

1 Wang Fu, "First look at Loess Yao-dong's Safety Issues", in China Yao-dong and Earth-sheltered Research Essay Collection, ed. Gansu Research Team, (Chinese Architectural Yao-dong and earth-sheltered research team, Gansu Research team, 1982.8) 122

According to Wang Fu, shallow root trees can be planted, such as Oriental Arbor-vitae. The root of oriental arbor-vitae not only strengthen the earth, preventing land erosion, but also through photosynthesis, absorb the water in the soil, making soil dry.¹⁹ Flowers such as medicago are also planted to attract butterflies and birds, and as food for animals.²⁰ However, plants with deep roots cannot be planted, in case water seeps through the underground. Therefore, it cannot be used as farm land. Washroom cannot be placed here, either.²¹

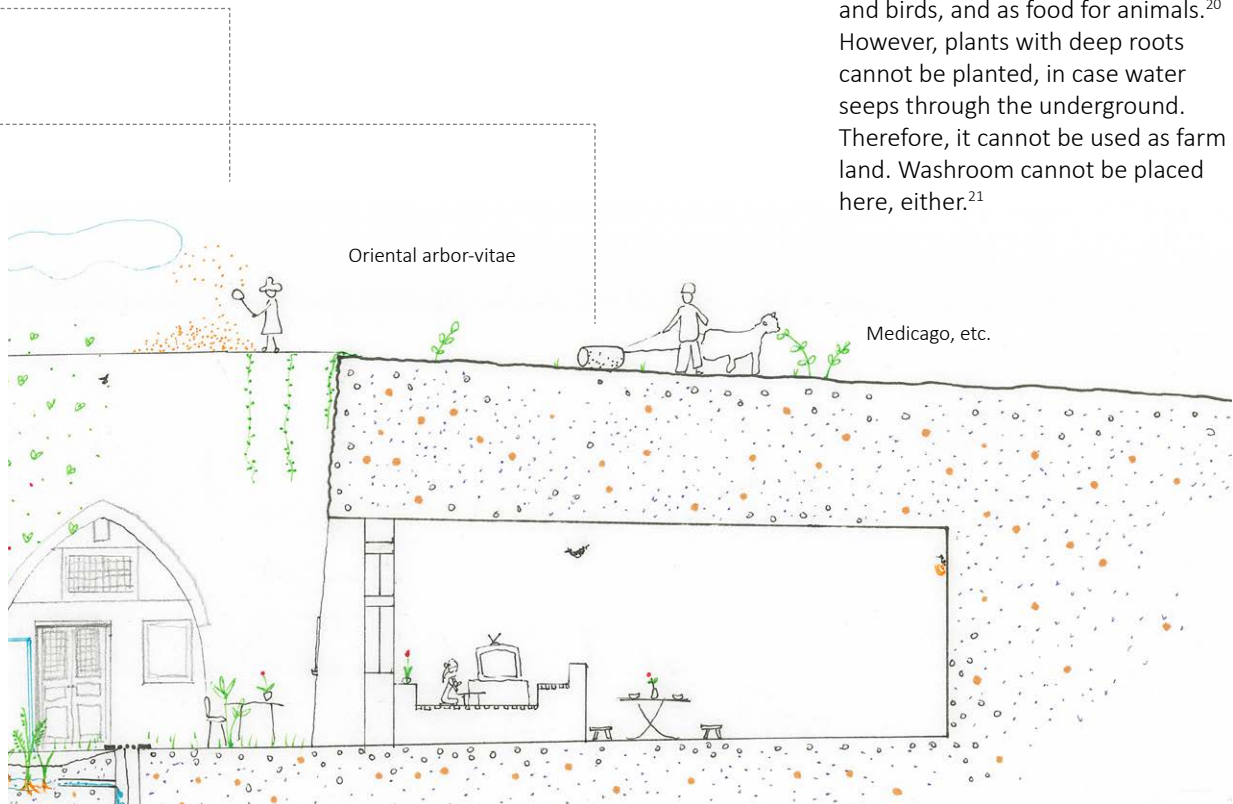


FIG 7.55 Section detail

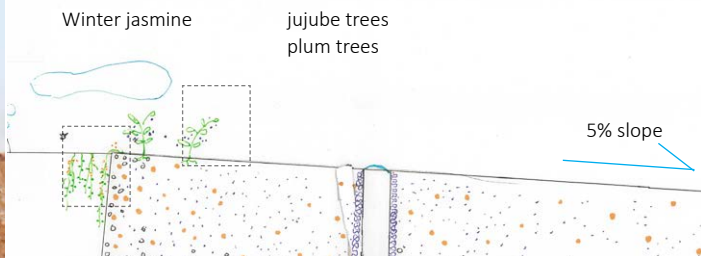


FIG 7.56 Cast model detail & section detail

Winter jasmine¹² and small shrubs such as jujube trees and wolfberry trees are great examples to protect cliff-face from erosion.¹³ Also Jujube trees and plum trees with thorns and dense leaves, are planted to prevent human and animals from approaching.¹⁴ These signs of life also remind people above the sunken courtyard below. There is also a slope of 5% for the yao-bei, sloping outward to the periphery for drainage.¹⁵

There is a slope for the cliff face (courtyard walls) of 75 to 85 degrees in relation to the ground²³, to stabilize the walls known as ya-mian.

This angle cannot be too big, otherwise the static pressure of the soil creates lateral pressure, and a landslide will happen in times of rain. At the same time, this angle cannot be smaller, otherwise rain will erode the cliff surface too much.²⁴

On the ya-mian, there are yao-dong openings known as yao-mian. An earthen or brick wall is usually constructed with windows and a door. This yao-mian (yao-dong façade) retreats 0.7-0.8 meters back from the ya-main (cliff surface). This way keeps the rain and wind from eroding the façade while creating a grey space for stove and feng-xian. In summer, Grandma cooks our lunch in this space.

Every ten or more years, one can shave off 0.5-1.0 meters of soil from the yao-dong cliff face, to get rid of the layers that have eroded and loosened. This process is called “xi-ya”, washing the yao-dong cliff face. Big maintenance usually happens between 50 years to 100 years. When the yao-dong façade has been worn down through time, and a large volume of earth has collapsed, villagers will cut the old exposed surface away and extend the depth further into the earth. The new yao-dong façade will be 2-5 meters offset from the original one.¹

¹ Nan Ying-jing, “Brief look at Qing-yang Yao-dong structure and construction”, 69

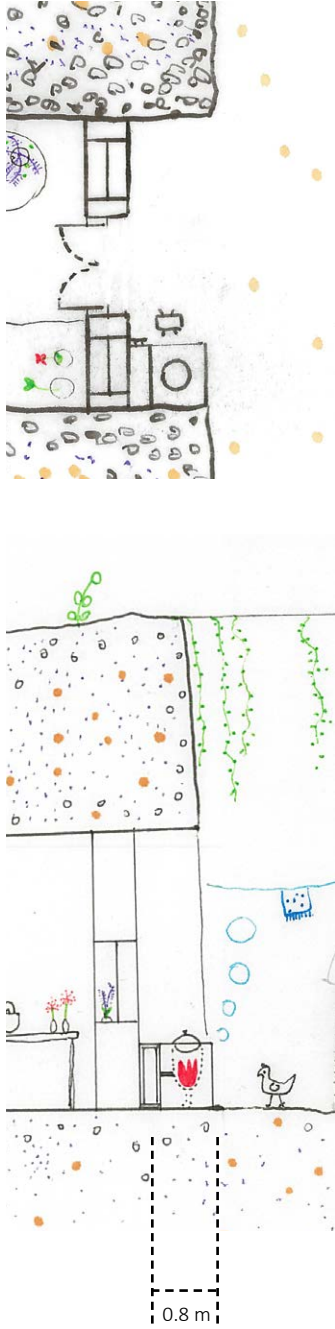


FIG 7.57 Plan & Section details

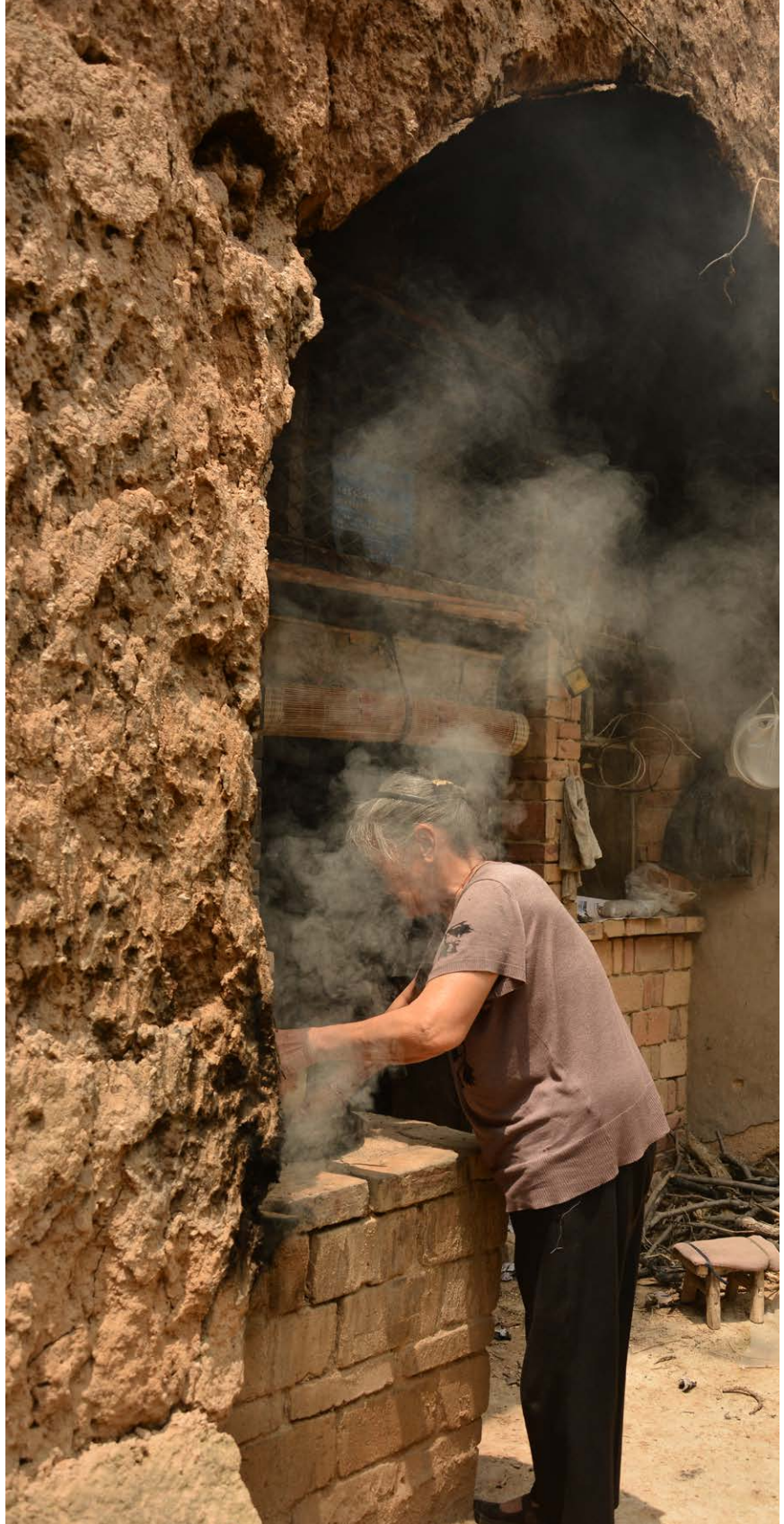


FIG 7.58 Photo of grandma cooking outside her yao-dong



FIG 7.59 watercolor of grandma's cooking stove



FIG 7.60 photo of grandma cooking

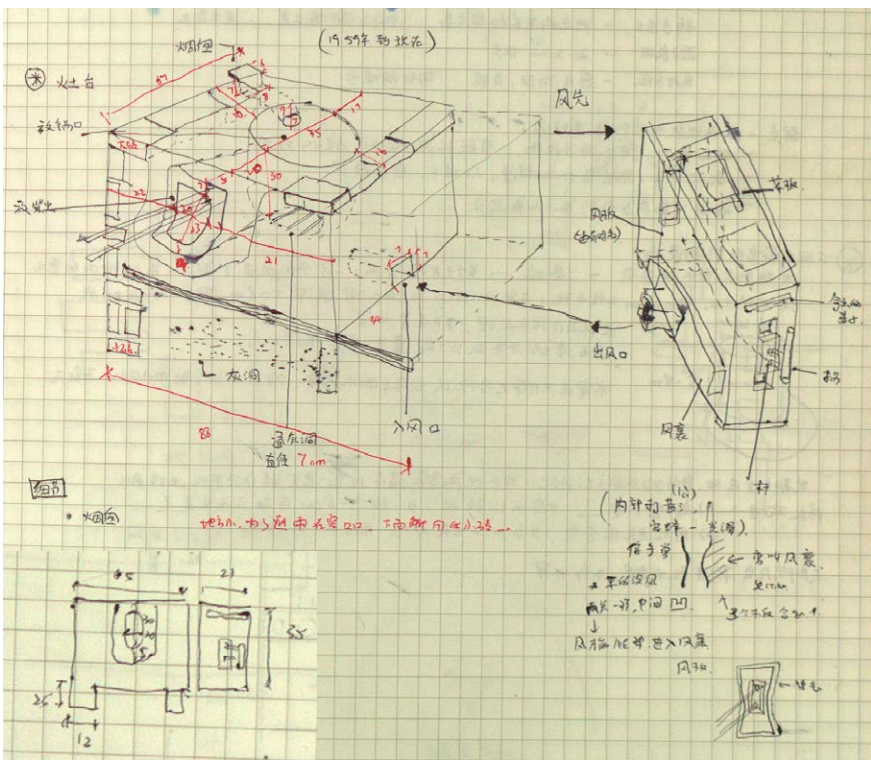


FIG 7.61 photo & sketches of feng-xian

Our lunch is done in 20 minutes of cooking. Time passes quickly as we busy ourselves by putting firewood into the fireplace, pushing and pulling the handle of feng-xiang to generate a bigger fire. Grandma tells us that the feng-xian, a bellows connected to the stove, requires great craftsmanship. A craftsman will practice for three years as an apprentice. Grandma's feng-xiang is 20 years old now.

Feng-xiang is composed of a bellows with openings on each end and curved in the middle of the box. A handle attached to a wooden piece glued with chicken features around. The chicken features lessen the amount of friction when the panel moves, while making it air tight.

As one pulls the wooden handle, negative pressure is created, sucking air from the two small openings into the box. The air enters into the box, and flow through the small opening attached to the stove, into the fireplace. In this opening, a wooden "tongue" will swing so that the air will into the fireplace. The box is also curved into a smooth terrain that maximizes wind gain. As one pushes the handle, the process is reversed as air now enters from the opposite end.

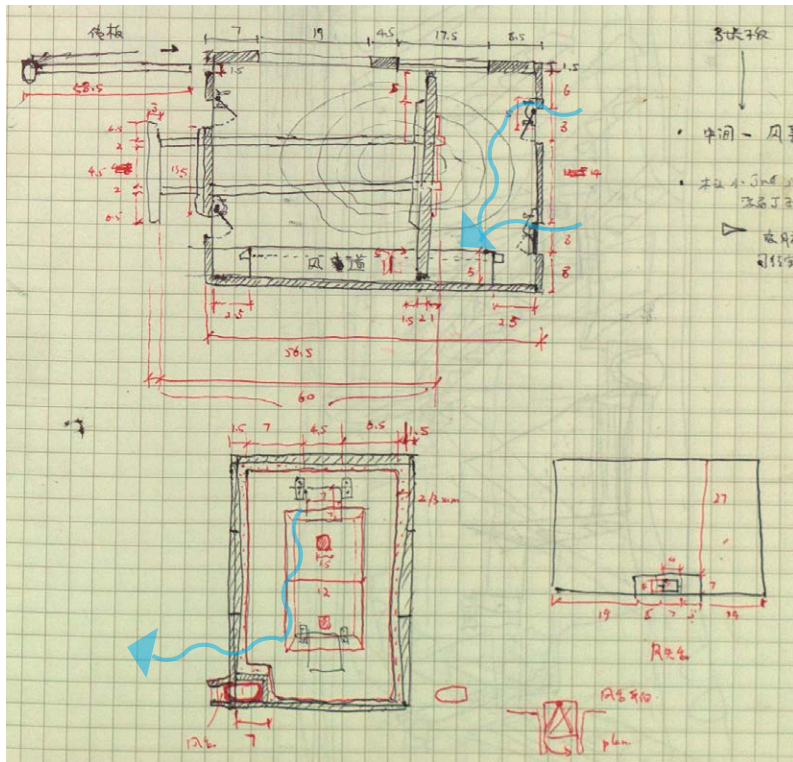


FIG 7.62 photo & sketches of feng-xian

Grandma opens the door of her yao-dong. Most Yao-dong doors have two panels, made in ash tree or Chun tree, painted black with red outlines. On the side of the door, a smoke hole for the Kang and stove will be left open. The earthen chimney will sometimes be placed outside the facade.²⁵

A wind-shield door known as wind door, adds protection to the door and can be taken out in summer. It is covered by weed-paper and hinged on either side.



FIG 7.63 wind-door detail

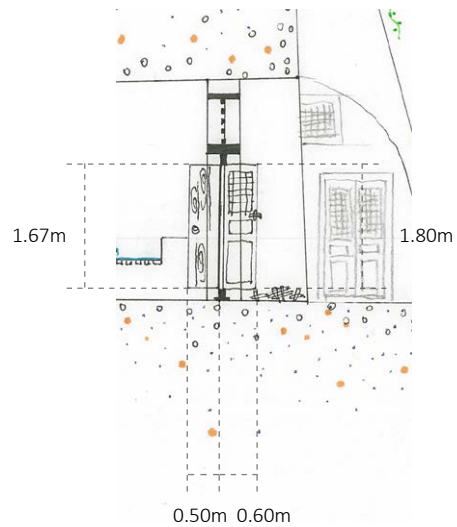


FIG 7.64 wind-door section and Grandma opening a wind-door

Windows are grid squares, covered with hand-made weed paper with great insulation value. The beautiful paper cutouts on the windows were put on the 28th of the rural New Year.²⁶ In this place of China, people are not afraid of black, despite black means ominous in China. Historians think that since Xia dynasty's national color is black and San-men-xia is the birth place of Xia, the love of black shows yao-dong's deep connections with ancestors.²⁷



FIG 7.65 Window paper cutouts in Miao-shang Village, Henan

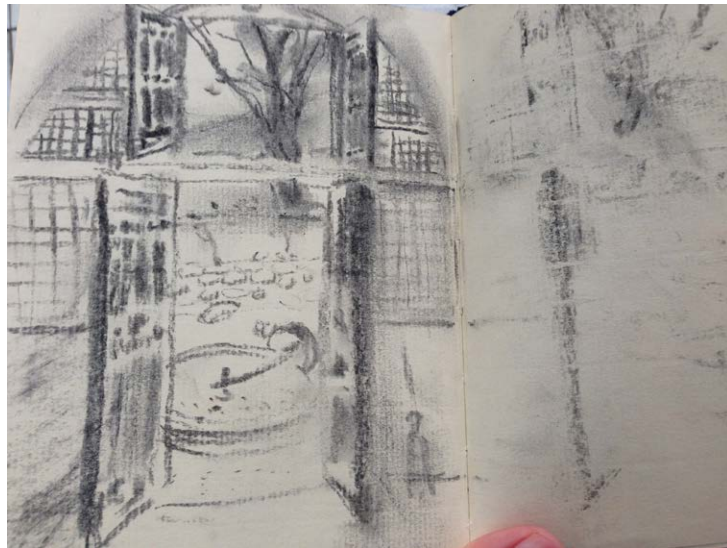


FIG 7.66 sketch of facade in Yu-kou-xiang village, Shanbei



FIG 7.67 facade cast model & elevation (left to right)

Grandma's yao-dong has a big upper window for lighting. Above this upper window there is a ventilation window, usually kept open. In different parts of the loess region, there are different types of ventilation window.

It not only ventilates air but also keeps the hot air and cold air circulating inside yao-dong. This way it helps drive out the damp air and humidity, keeping the yao-dong dry.²⁸

The ventilation window, together with the horse eyes and kang are the breathing system of yao-dong.



FIG 7.68 picture of grandma's yao-dong interior

In heavy rain, a yao-dong's opening façade will usually wear out, especially above the ventilation window. Therefore, a new straw and earth mixture needs be repainted on the façade to prevent further damage. In a serious situation, the loosened soil around the opening needs to be replaced with adobe bricks and then covered by straw and earth.¹

¹ Nan Ying-jing, "Brief look at Qing-yang Yao-dong structure and construction", 68-69



FIG 7.69 Cast model close-up





FIG 7.70 Cast model



FIG 7.71 Cast model



FIG 7.72 Paper making studio in Yu-kou-village, Shanbei

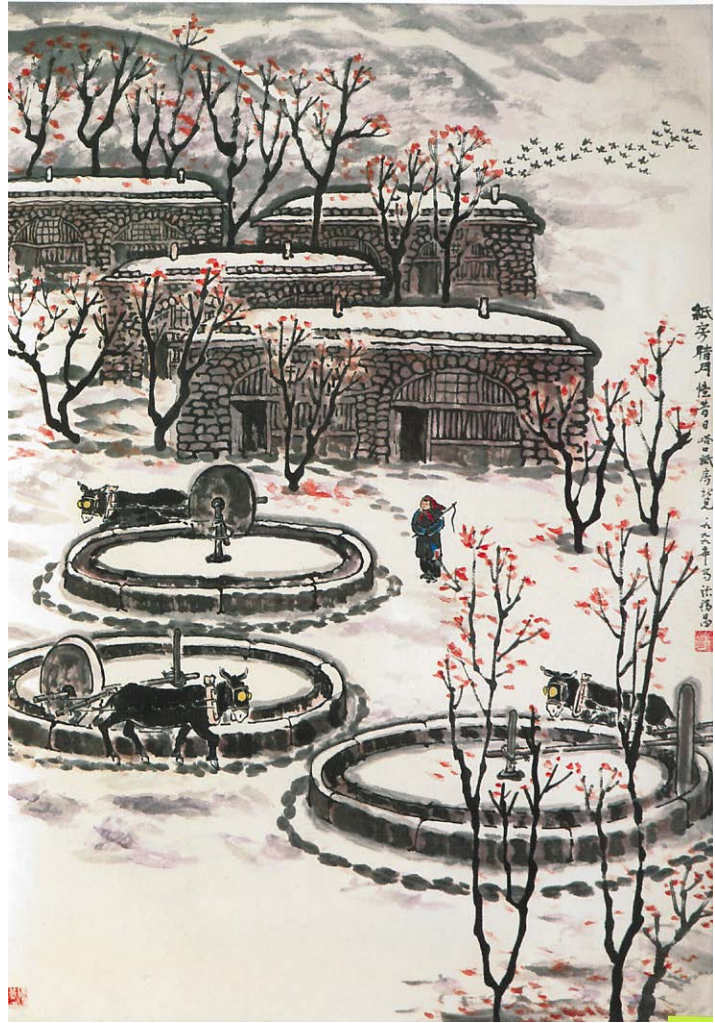


FIG 7.73 Drawing of Paper making

Paper for yao-dong windows and doors are made by hand in villages like Yu-kou village. These papers are made from weed. Such papers have a relatively high insulation value while allowing a special quality of light through. Villagers change their window paper twice a year. Everyone rips off the old paper on the window and wind-door during the Spring festival. Jia's Qing Qiang:

"Xia Tianzhi ask Xia feng, Xia yu to rip off the old paper on the windows. One small wood grid by one small wood grid, they rip off all the paper and paste new paper on. Then they write the spring couplets. ..then put on the courtyard door, the living room door, kitchen door, chicken and sty's door, washroom door..."¹

¹ Jia Pingwa, *Qin-qiang*, (Zuo-jia Publisher, 2009)

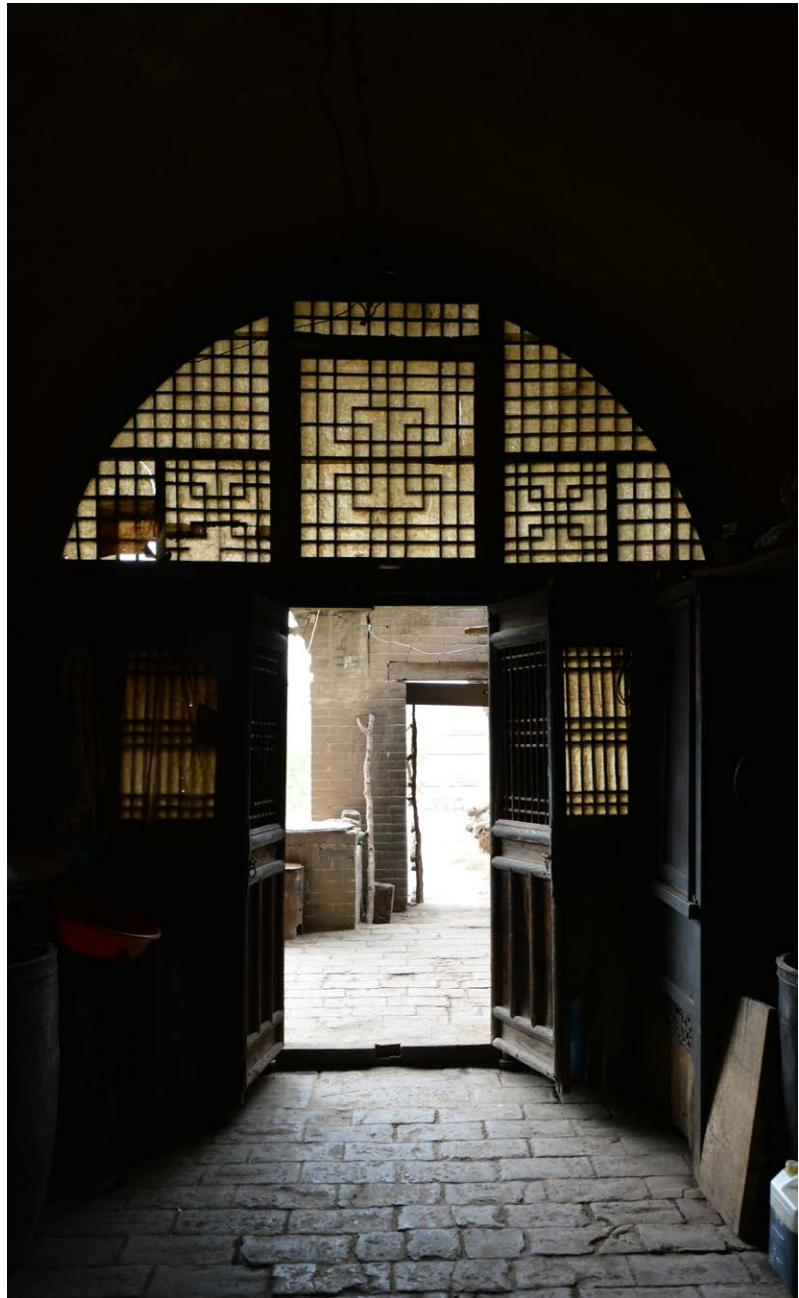


FIG 7.74 Yao-dong interior in Li-family-mountain village



FIG 7.75 Cast model interior (left) & section (right)

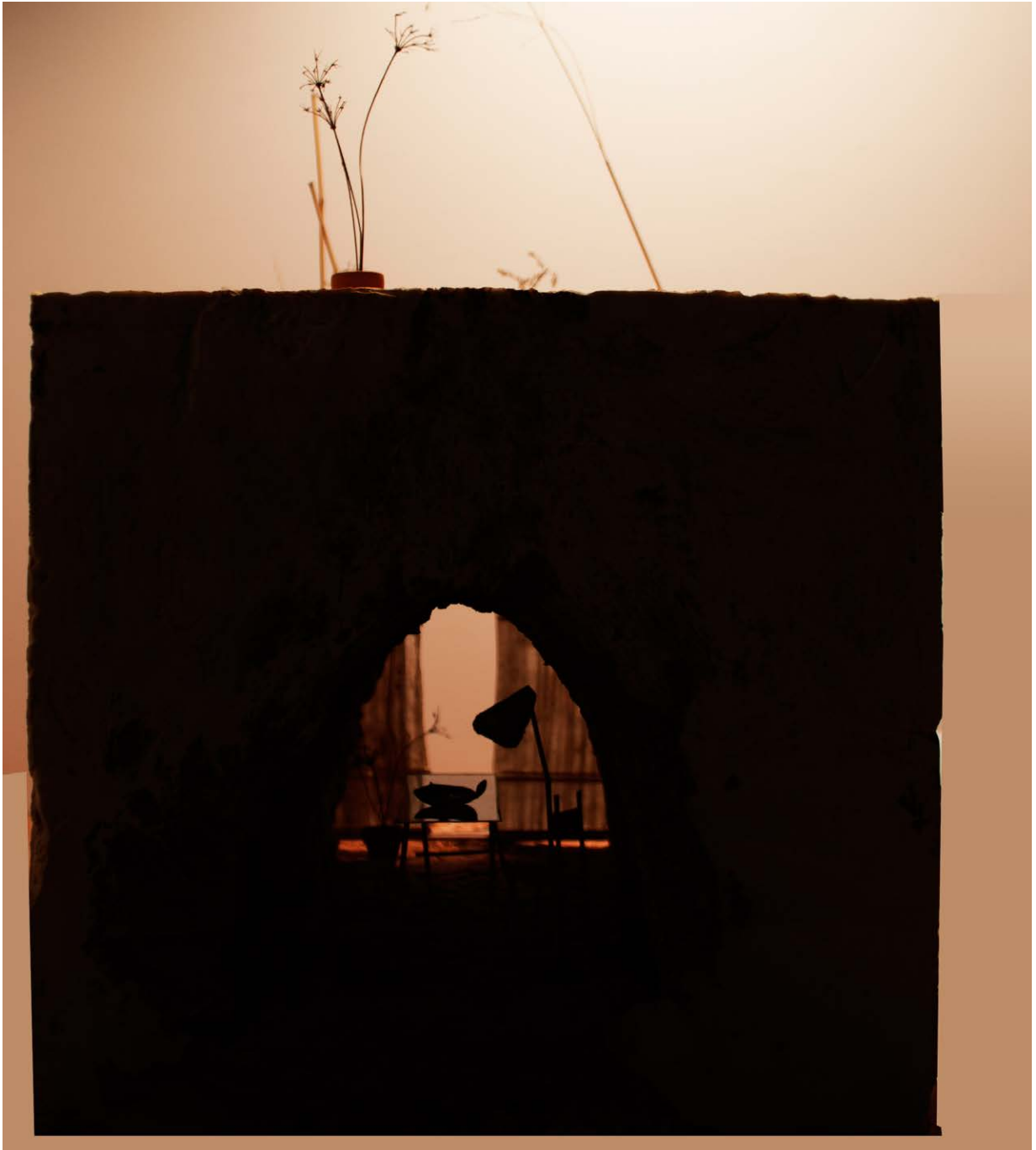




FIG 7.76 yao-dong chimney in Guo-family village, Mizhi



FIG 7.77 Yao-dong chimney construction



FIG 7.78 chimney

Horse eyes are like eyes connecting life underground with life aboveground. It is a chimney and a tunnel constructed in the earth.

Many villagers use broken vessels as chimney cover for the horse eye tunnel. Its shape is great to direct smoke upward, while preventing exterior air to flow inside. Even more artistic and scientific is to cover these holes up with a wood plate which is attached to a string. One in the underground courtyard can thus control the string to open and close the horse eye²⁹, when it is raining or snowing outside.³⁰

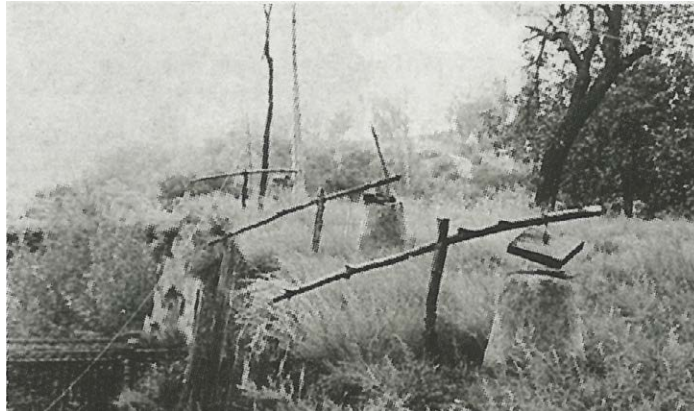


FIG 7.79 chimney

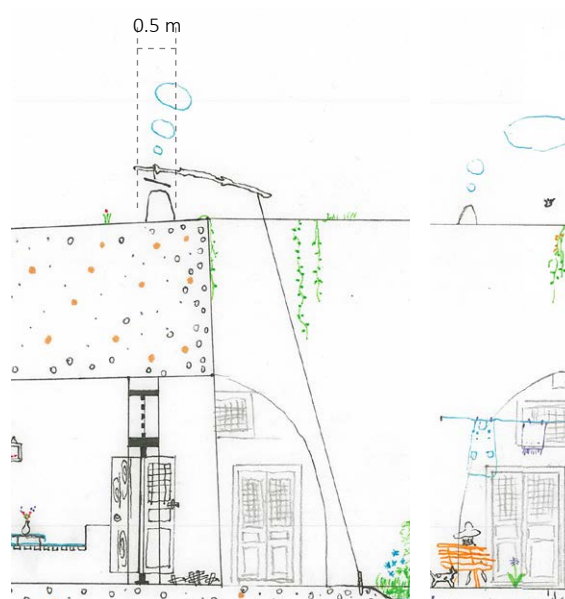


FIG 7.80 Section detail of chimney

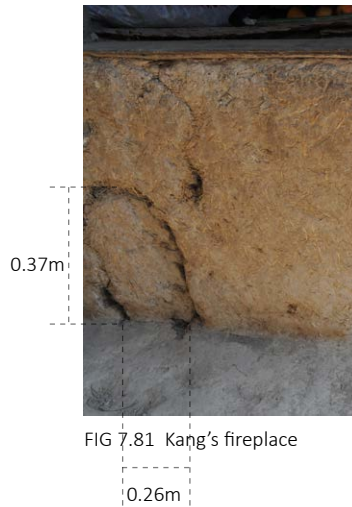


FIG 7.81 Kang's fireplace

Horse eye chimneys are connected to Kang. Kang was the most important part in yao-dong life. Without Kang, yao-dong cannot be so warm in winter. The old saying goes "cooking, heating Kang, getting warm all in one fire". Earthen Kang because it always housed fleas, is also seen less and less today. Grandma today uses a wooden bed in place of Kang. In Jia Pingwa's *Qing-qiang*, he describes:

"...even though there are not many fleas in the summer, I still caught one. I sealed it into the wall with mud. The flea is the most ancient bug, I want to keep my flea."³¹

Along the longer side of the Kang, a hole of 36.5cm by 26 cm will be opened as additional fireplace where one adds more straws to heat up the Kang if needed.

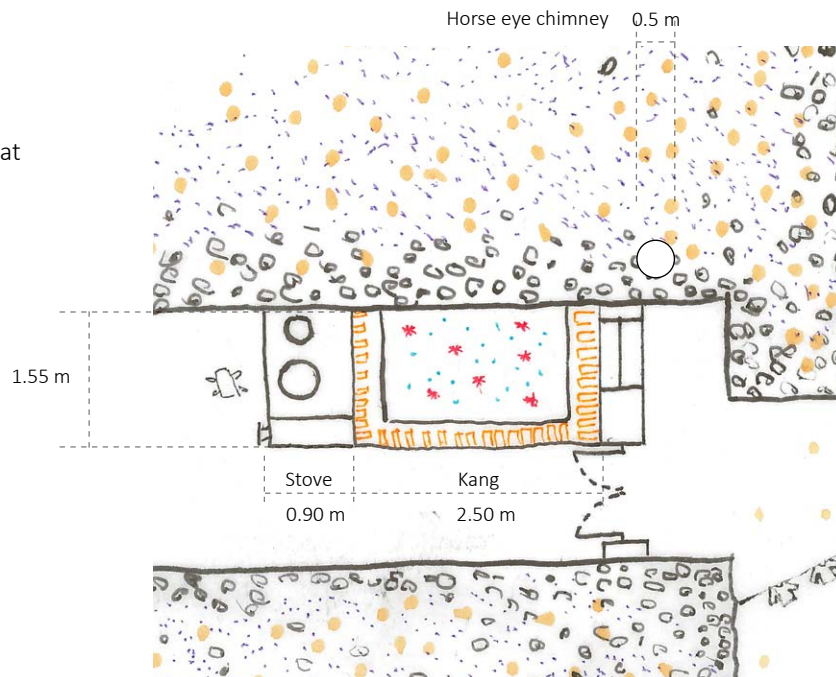


FIG 7.82 Plan detail of Kang

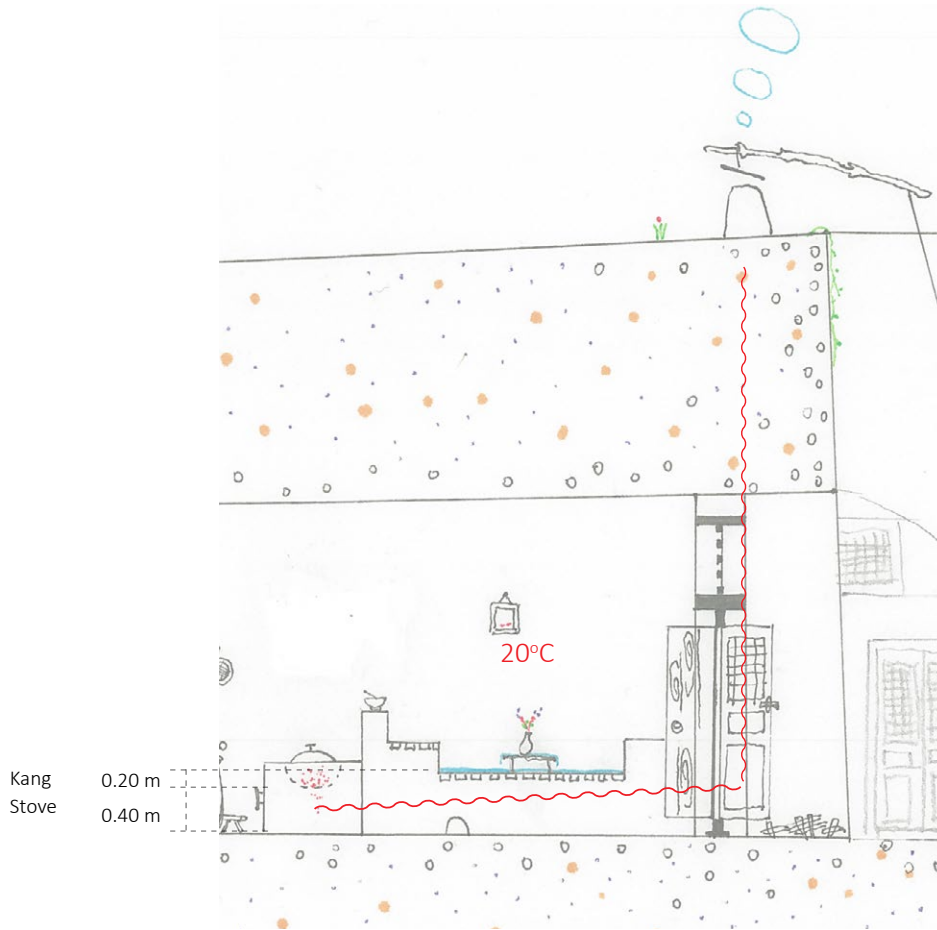


FIG 7.83 Section detail of Kang

Kang on one side is connected to the stove and feng-xian, known as “throat”, like a human throat. The proportion of height between stove and kang is “chi eight stove, two chi kang”.³² (picture) Kang is two chun taller than the stove to allow only hot air to raise.³³ Then, the heat from stove directly passes through the earthen Kang and thus warms up the Kang as one cooks. This heat is radiated over a period of time.

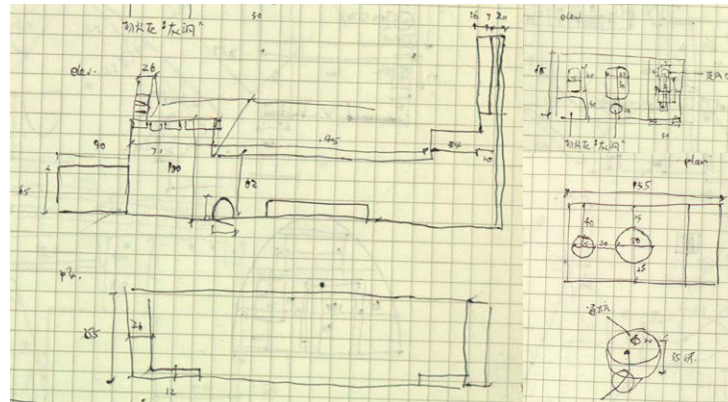


FIG 7.84 Sketches of Kang

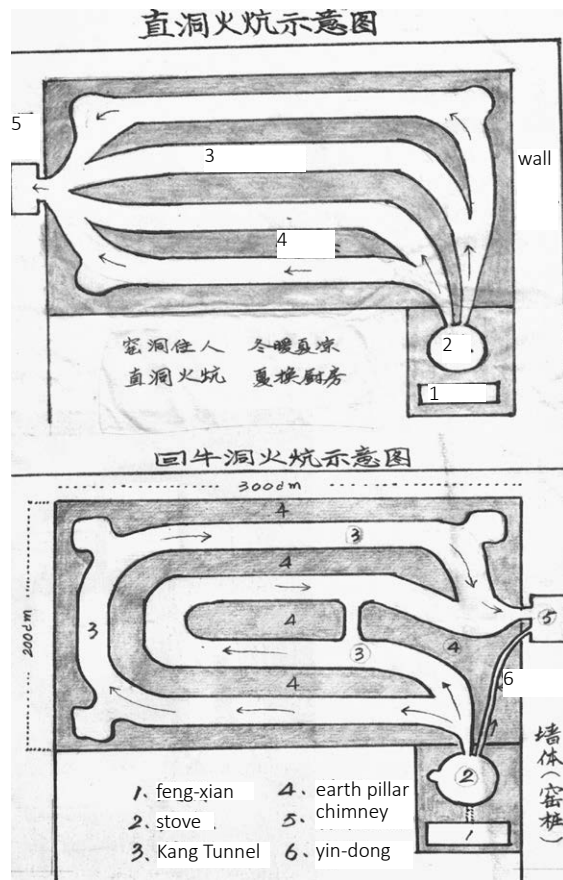


FIG 7.85 Kang circulation diagram

People call the process of building a Kang Pan-Kang. This also requires great craftsmanship in order to make the Kang even temperature, and the fire at the stove be strongest. One measures a 2.4m by 1.7m space to lay the foundation with three layers of brick. On top of the foundation, two 24cmx24cmx50cm tall earthen pillars will divide the space into six equal squares. Around the periphery of the foundation, a 50cm wall will be built.³⁴

The circulation of heat inside Kang is divided into two types. These tunnels are known as “yan-huo-dao” which means hot air tunnels. Guo says big kang has three tunnels while small kang has two. Above these air tunnels are stone plates, with mud and weed applied on top.³⁵

After adding the horse eye chimney to funnel exhaust air upward, the Kang is finished.³⁶ This connection between Kang and horse eye chimney is called “dog’s house”, where suction force is applied.³⁷ There is a control panel between the stove and the Kang, so that in summer, one seals the connection, the heat will escape from another tunnel to the chimney.³⁸

Stove, kang and horse eye chimney utilize the principle where hot air rises, to achieve natural air circulation inside yao-dong. In harsh winters, where the door and windows are closed, with quilt hang around to keep warm, people use Kang to keep warm while at the same time through suction of hot air upward, fresh air sips in from cracks between windows and door, supply yao-dong with fresh air, keeping constant temperature inside. Also the humidity inside yao-dong being heated by kang, becomes

*hot air rises through the horse eye upward and outward.*³⁹

One key element of this system is a hole on the wall where the chimney is behind. This hole is called “tou-zhao-er” covered with a 5 cun (16cm) stone plate. Usually, when there is a big gap between inside and outside temperature, such as strong winter winds outside, the suction works best, and the kang is heated best. But in hot summers, where the exterior temperature is higher than inside, the hot air from cooking usually will stay indoors. At this situation, a piece of paper lighted with fire will be throw into the tou-zhao-er. The hot air will go through the horse eye tunnel upwards, and one must close the tou-zhao-er with its cover immediately, so that the air circulation is started up again.⁴⁰ Thus tou-zhao-er is a craftsmanship that decides the well-being of the breathing system of yao-dong.

Grandma and her family spend most of their time on the Kang, eating, chatting, watching TV and sleeping. When we enter her yao-dong, she invites us to sit on Kang. “A little hot air in the Kang is like a mother”, the peasant says.⁴¹ Kang saves lots of coal and straw resources, and Kang plays a symbolic role in life.

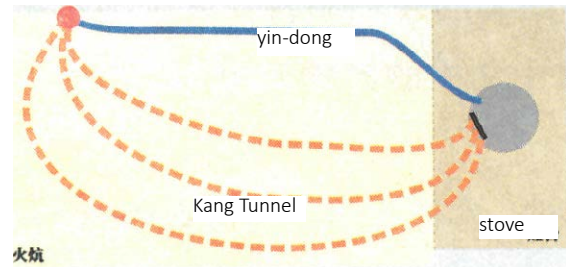


FIG 7.86 Kang circulation diagram

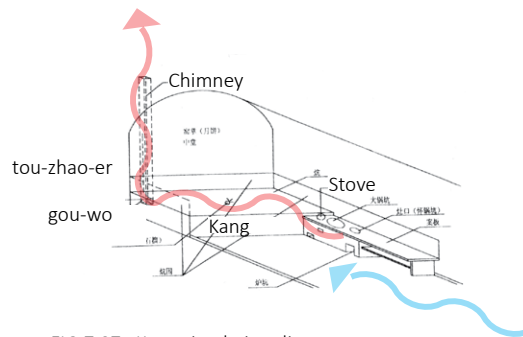


FIG 7.87 Kang circulation diagram



FIG 7.88 Grandma Du sitting on Kang in Xiao-liu-si village

Kang has two parts, the upper Kang and the lower Kang. The side near the window is called lower Kang, while the other side is called upper Kang. When newlywed, the wife has to sleep in the lower Kang, and the husband sleeps in the upper Kang. During their first night, the light cannot go off, namely “Chang-ming-deng” meaning longevity. This is tradition from the times of feudal society.⁴² Before a woman gives birth to a child, she always sleeps in the lower Kang, until after giving birth. Then she moves up to the upper Kang and her husband moves down, meaning she has done a great contribution to be on top of her husband now.⁴³ Quilt has to be placed on Kang near the window, this way in summer, it will not get too damp.⁴⁴

The last three days before a woman gives birth, she has to lay on straw on the Kang. Henan peasants are very poor therefore, they try to save everything even during child birth. They worry the blood in child birth will dirty the quilt and Kang sheet, therefore they put everything away and lay straw on the bare Kang. When the baby is born, it will be called “baby falls on straws”. After three days, they will put the dried straw away, and put quilts and Kang sheets back on again. This is called “baby raises from the straw”. The three days are required for the mother’s blood to drain properly.⁴⁵ The yao-dong where a child was birth will have red paper covered in windows, and on the wind-door, warning outsiders not to enter.⁴⁶

In the further north almost near the desert, people put a really soft sand instead

on Kang during child birth. This sand is called “Mian-mian Earth”.

Niu Han wrote in *Mian-Mian-Tu* :

“Children are born on the thick layer of Mian-mian earth on Kang. We call these soft sand Mian-mian Earth. ‘Mian-mian’ is the softest word I ever know in my whole life. It cannot be found in a dictionary, even if you find it there, it doesn’t mean what I want to say.”⁴⁷ “The moment I was born, I landed on sand, the warm sand being baked on Kang. My wet little body shined with a golden bright light like a mature wheat, because I was covered with the golden earth. My aunt who delivered me, cleaned me gently with Mian-mian Earth. She put her nose near me, and said ‘only earth can wash away the smell of blood’. She says this a lot.[...] The elderly also say that our world is cold, thus the newly born cries. But once the baby touches the warm earth similar to mother’s warmth, life falls asleep as if it has returned to its mother’s body. I believe that there is nothing mysterious in these poetic sayings. Only the sand on the window frames is the holy earth from the sky. Even sparrows know to clean their features using the Mian-mian Earth on the Chuang Ling.”⁴⁸

People are born on earth and therefore, when they are dead they must return to the earth. “People most often die on their Kang. When people die, the dirt on the Kang can be directly wiped onto the floor, meaning wipe the death out of the door. Therefore, in everyday life, people are forbidden to wipe the dirt on Kang directly onto the floor. When they died, they will move into the burial yao-dong known as mu-yao.”⁴⁹

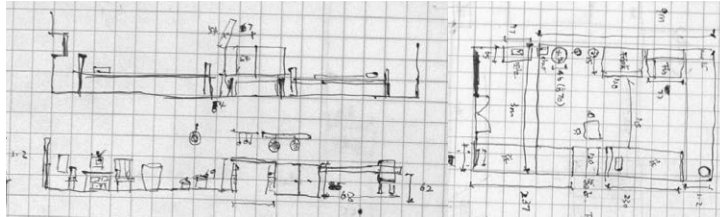


FIG 7.89 sketches of grandma's yao-dong

Before, grandma lives with her whole families, with her parents and her three sons' family. Therefore, each yao-dong has to become both living space, bedroom, kitchen and dining room at the same time.



FIG 7.90 watercolour of grandma's yao-dong



FIG 7.91 watercolour of grandma's yao-dong

Inside a yao-dong, one usually finds moisture and water drops on the interior surfaces. This phenomenon, especially obvious in a young yao-dong, is caused by the “damning effect”. The “damning effect” occurs when the moisture in the earth is constantly supplemented by surface water.¹

¹ Nan Ying-jin, “A brief discussion about future for ‘Han-Yao’”, in China Yao-dong and Earth-sheltered Research Essay Collection, ed. Gansu Research Team, (Chinese Architectural Yao-dong and earth-sheltered research team, Gansu Research team, 1982.8) 112



FIG 7.92 Watercolour of Grandma's yao-dong



FIG 7.93 Grandma's third son's yao-dong



FIG 7.94 watercolor of grandma cooking outside zhu-yao

Grandma and her husband used to live in their old Zhu-yao. The owner's cave called zhu-yao which has two windows on each side of the door, while the rest all have just one window beside the door.

According to Yuan, zhu-yao is also called "jiu-wu-yao" (nine-five yao), because it is 9 chi 5 cun (3m) tall, 9chi (3m) wide. Other yao-dongs are all "ba-wu-yao" (eight-five-ya) because they are 8 chi 5 cun tall and 8 chi wide.⁵⁰ Under the Confucian and kinship influence, the senior's yao-dong is always the biggest yao-dong, the zhu-yao. In sequence according to the ancient Shao-mu rules, the zhu-yao is the center, the yao-dong on its left is for the next senior members, and on its right for the younger.⁵¹

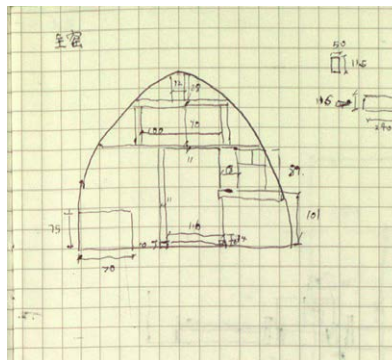


FIG 7.95 Sketches of Zhu-yao

Grandma's first son Grandma's second son



Kitchen yao-dong



Zhu-yao

Grandma's daughter



Entrance cave

Children's yao-dong "Xia-zhu-yao"

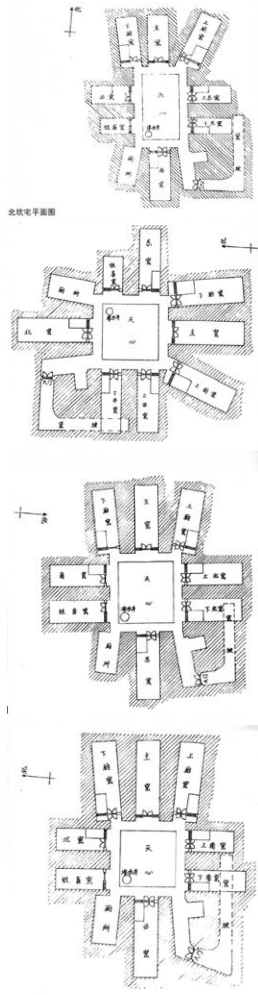
Wash-room cave



Grandma's third son Animal cave



FIG 7.96 Existing floor Plan & elevations



With the location of the owner's cave, one can thus know the type of yao-dong. There are four types in Feng-shui Ba-gua: south-li-zai, west-dui-zai, north-kan-zai, and east-zhen-zai.⁵² Grandma's owner's cave is on the west side, therefore, it is a west-dui-zai.

According to Yuan, west-dui-zai is assigned in fengshui to the owner who is governed mainly by earth or water. Dui belongs to the west, which is gold, and earth can bear gold which can bear water. If owners live into such house, they will be blessed with many generations with prosperity and happiness. It is most common to be found with a rectangular courtyard. There are ten cave openings in the courtyard. West side is higher than the east side of the cliff⁵³, because according to fengshui, water must flow from the more senior to the less senior, therefore, zhu-yao which has a higher status will have a roof taller than the other three sides.

There are ten cave openings in the courtyard.

The entrance cave is located at the north-east corner, owner's cave in the middle of the west side, cooking cave at the north-west corner, washroom cave at the south-east corner, children's cave Xia-zhu-yao locates in the middle of the east side, animal cave at the south-east corner, the cave on the south-west corner, and the two caves on the north side can all be used for the younger generations.

FIG 7.97 south-li-zai, west-dui-zai, north-kan-zai, and east-zhen-zai

3. Layout



FIG 7.98 New Ground Floor Plan 1:125

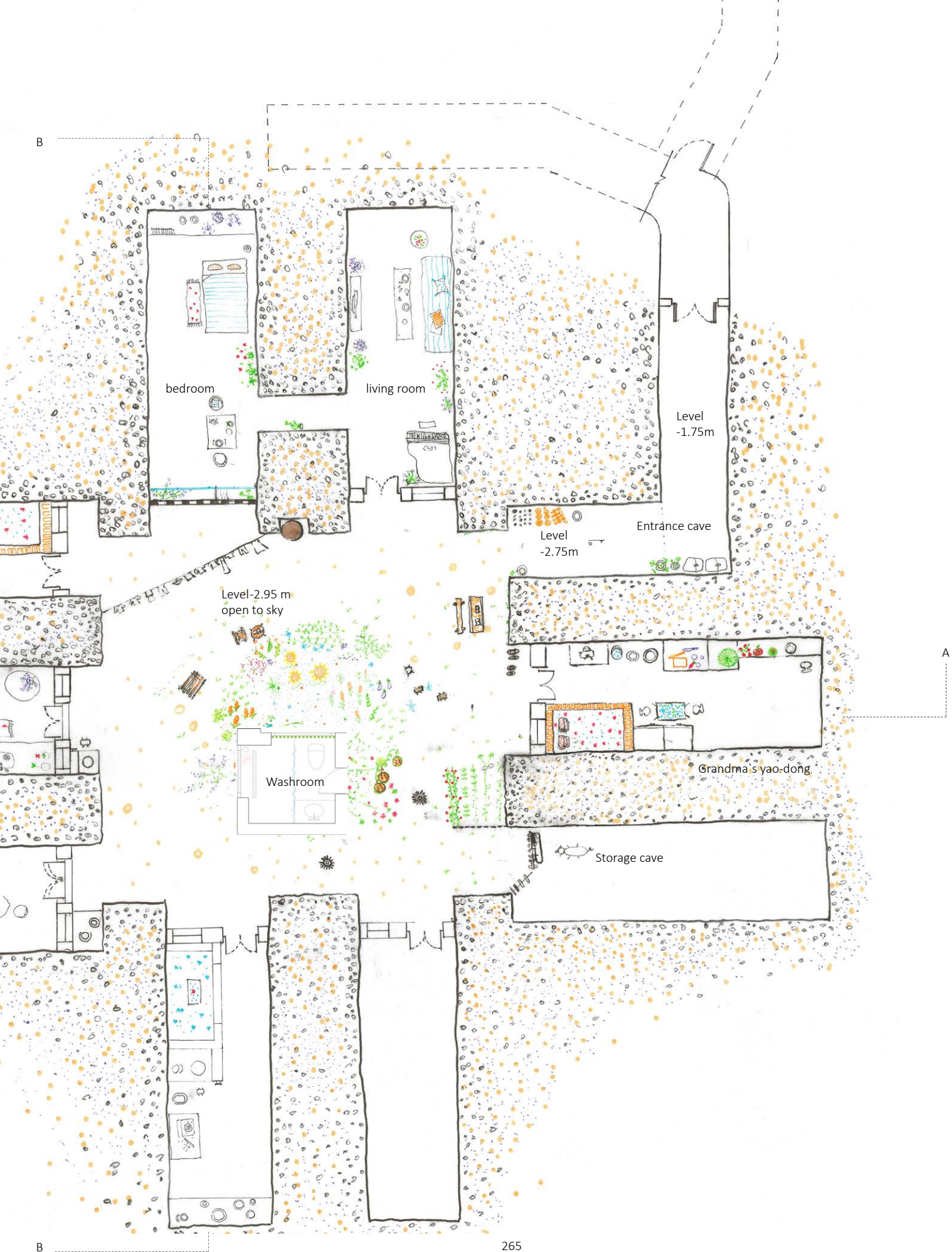




FIG 7.99 Cast model interior

Cracks on yao-dongs' ceilings and walls are unavoidable and natural, due to the property of the loess soil and the state of compression and tension yao-dong is in. There are three reasons for cracks: firstly, the formation of loess soil and its micro-structure; secondly, the excavation that disturbs the structure of the land, creating a second structural re-formation; thirdly, the change and movement of moisture content in the soil. Not all the cracks inside a yao-dong are harmful. Judging by the situation when cracks happen, the location of cracks, and their depth and size, one can tell whether the crack will affect the structure as a whole.¹

In some yao-dongs, we see the ceiling has worn out. This is just a minor indication of wear. Once we scrape off the fallen earthen surface and repaint it with mud and straw, the yao-dong will be restored. This process is called "xi yao" washing. After a long time, a yao-dong's earth ceiling will wear down, especially in the parts that are deeper into the earth. Sometimes, due to excess accumulation of water on top, the earthen ceiling will fall down in pieces, but usually not in a small area of 1-2 square meters. (picture of ceiling) In such cases, wood reinforcement is needed, to strengthen the structure of the arch. The area that collapsed, will be patched up with adobe bricks.²

¹ Nan Ying-jin, "Dui Han-yao Qian-tu de Qian-yi/A brief discussion about future for 'Han-Yao'", 113

² Nan Ying-jing, "Qing-yang Di-qu Yao-dong jie-gou, gou-zhao ji shi-gong chu-tan/ Brief look at Qing-yang Yao-dong structure and construction", 69

The longer yao-dong is lived, the more stable it becomes as earth harden. An exceptional yao-dong can last up to 800 years.



FIG 7.100 Floor of grandma's yao-dong

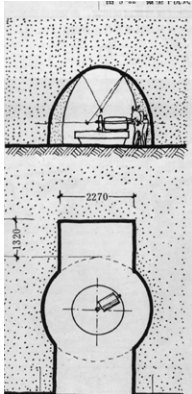


FIG 7.101 Animal cave with a mill stone/ momo



FIG 7.102 Animal Cave



FIG 7.103 Grandma's old Animal cave, washroom cave, and entrance cave

Animal yao-dong has to be located at the position of fifth-gui. Washroom yao-dong must be at sixth-sha. This is because of a folk legend.

The god sends down four immortals to bless human beings, and the evil sends up four ghosts in resistance. The four immortals become Yan-nian who guards the entrance, Tian-yi who provides food, Sheng-qi who guards the house, while the fifth-gui turns into a cow who guards the animal yao-dong, and the sixth-sha turns into dirt who guards the washroom. Sometimes, there is also a millstone in the animal yao-dong, to punish the evil with labor.⁵⁴

Today it is rarely seen to have animals in yao-dong dwellings because of the sanitation problem. Shi-Li-Pu vividly describe that inside the animal cave, loess

soil will be layered on the floor. After ten days they will be mixed with the animal waste and used as great land fertilizer.

During construction, villagers use loess soil dug from a constructing cave. This way, they layered the animal cave, make land fertilizer, and excavate a new yao-dong.⁵⁵

Washroom yao-dong although today rarely seen in underground yao-dong because of the sanitation problem associated with it.

In the old days, washroom yao-dong has a horse eye for ventilation and as a tunnel to layer dry loess soil. This way, the loess soil covers up the human waste and in time become a great fertilizer.⁵⁶ That is why when the "sixth-sha" turns into dirt, its location becomes washroom.

4. Bath

“Heightened experiences of intimacy, home and protection are sensations of the naked skin”

- J. Pallasmaa

“We have lost our sense of intimate life, and have become forced to live public lives, essentially away from home”

- Luis Barragan

Grandma’s underground yao-dong will have a bathroom in the courtyard, among the roses and green onions, with a bamboo veil glass wall covered by rice paper.



FIG 7.104 Grandma’s courtyard



FIG 7.105 Washroom Plan 1:50

- | | |
|---|---|
| <p>1 Stone tile-clad services duct with hand held shower fitting over bath</p> <p>2 Translucent glazed operable with bamboo strips and rice paper</p> <p>3 Floor drain for ceiling mounted shower over</p> <p>4 Shower screen</p> <p>5 Ceramic basin in polished stone countertop with cupboards and</p> | <p>drawers under</p> <p>6 Urine and feces divergent toilet</p> <p>7 Door to courtyard</p> <p>8 Dried faeces</p> <p>9 Urine tank</p> <p>10 Grey water entrance</p> <p>11 Pre-treatment tanks</p> <p>12 Micro-organisms, main treatment system, filtering</p> <p>13 Treated water</p> |
|---|---|

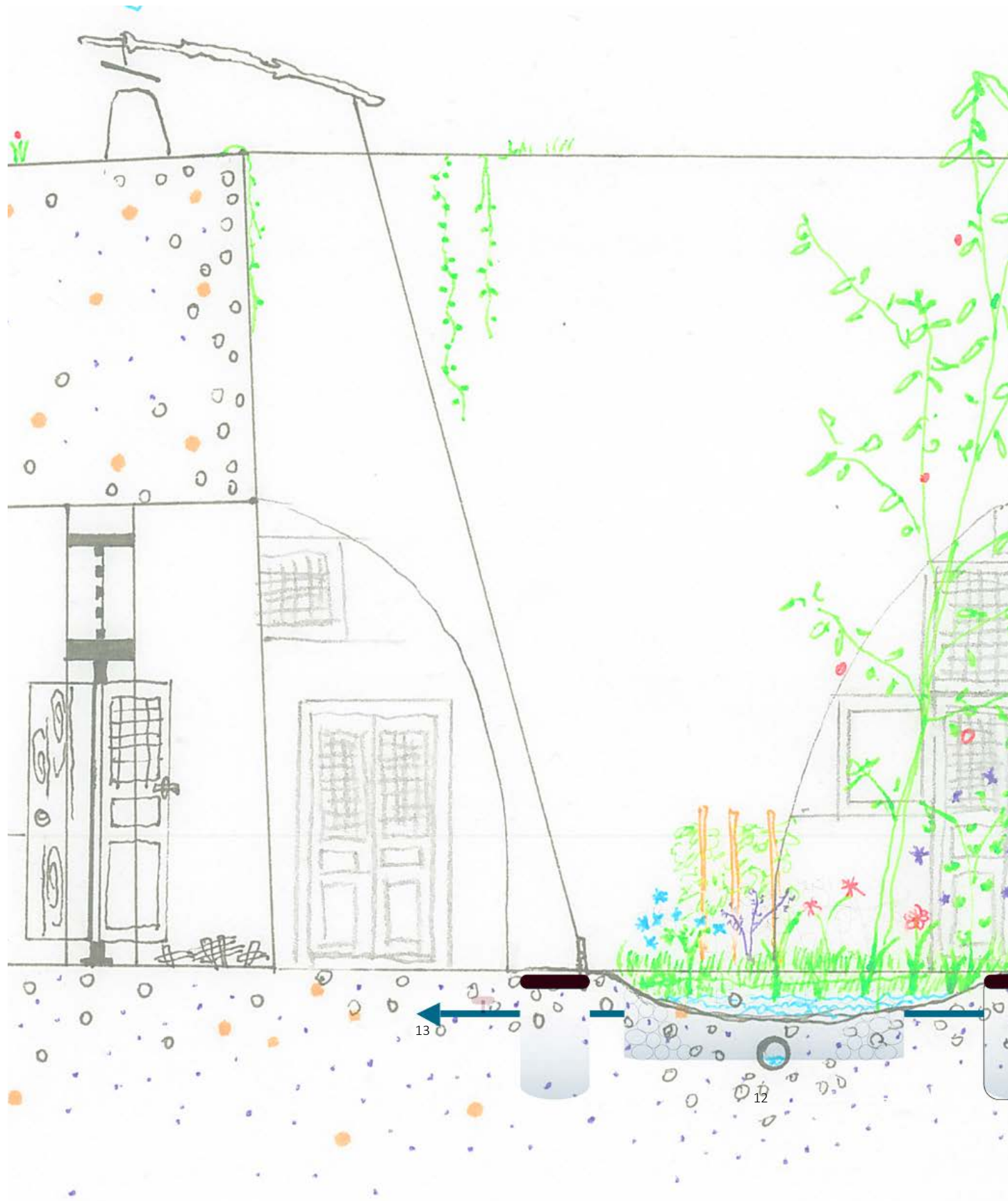
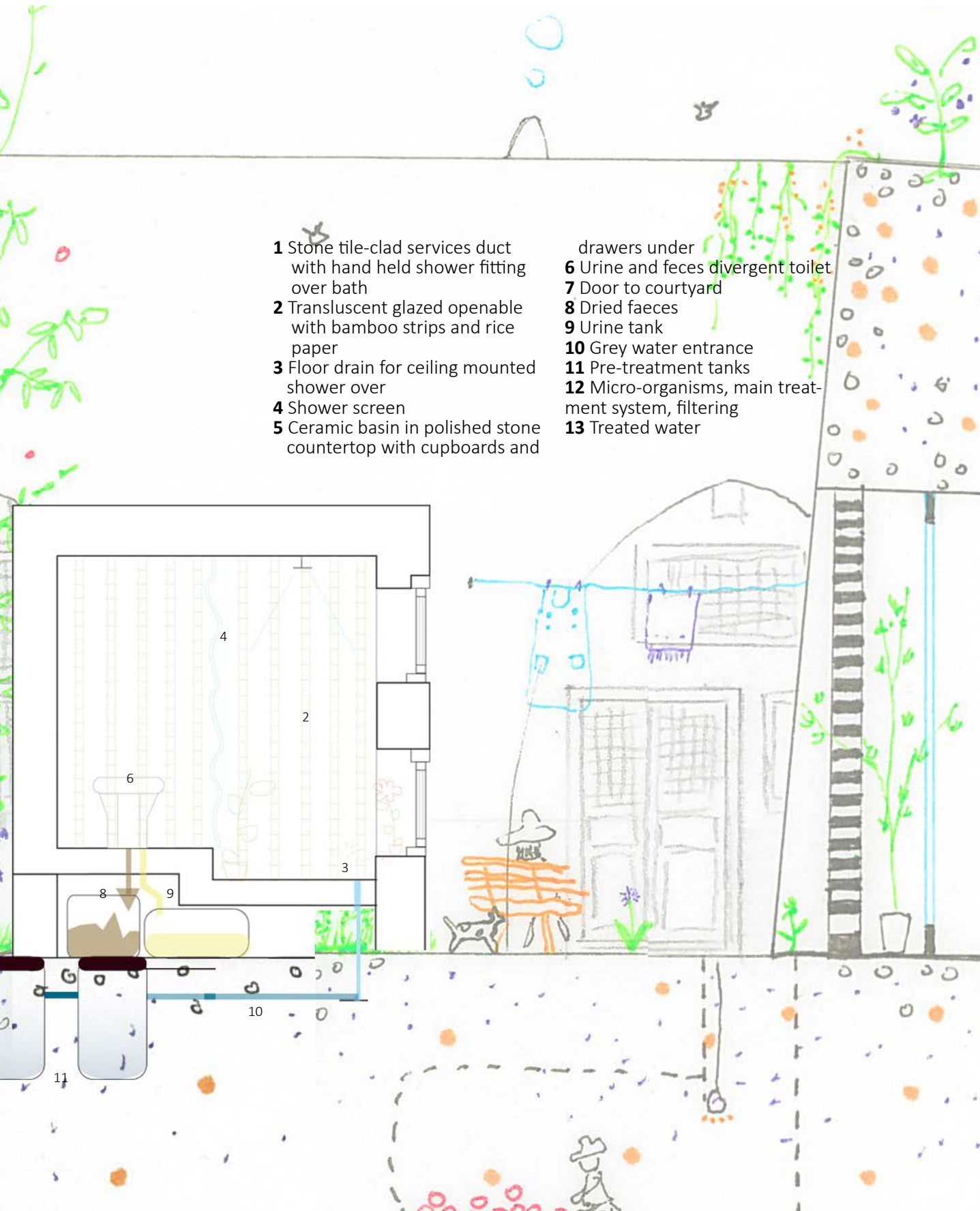


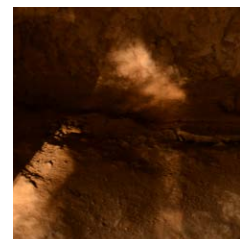
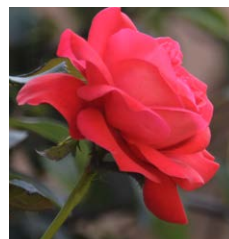
FIG 7.106 Washroom Section 1:50



- 1** Stone tile-clad services duct with hand held shower fitting over bath
- 2** Translucent glazed openable with bamboo strips and rice paper
- 3** Floor drain for ceiling mounted shower over
- 4** Shower screen
- 5** Ceramic basin in polished stone countertop with cupboards and drawers under
- 6** Urine and feces divergent toilet
- 7** Door to courtyard
- 8** Dried faeces
- 9** Urine tank
- 10** Grey water entrance
- 11** Pre-treatment tanks
- 12** Micro-organisms, main treatment system, filtering
- 13** Treated water



FIG 7.107 Cast Model Section



Horse eye is also found in storage cave to send harvest down after it is dried.⁵⁷ According to Shi-Li-Pu, inside the storage yao-dong is a food storage basket, hand-woven by wicker and wood.

It is elevated from the ground with wooden legs so not to get damp. On the bottom of this basket, mud and 20cm deep bran will be applied. An operable opening will be attached at the bottom of the basket. Sometimes, villagers seal the basket with mud, to store for as long as three to five years, without being infected by vermin or being rotted.⁵⁸

Storing food for emergency has been a long tradition for peasants in China since ancestry. Once next year's food is settled and the worries in mind are gone.⁵⁹

In the old times, if a woman was looking for marriage, her matchmaker would first look at the man's cooking yao-dong for her, checking whether the vessels were filled with food, and covered by dust to see if they were wealthy and hardworking.⁶⁰ Today grandma's cooking yao-dong is all covered up by spider webs.

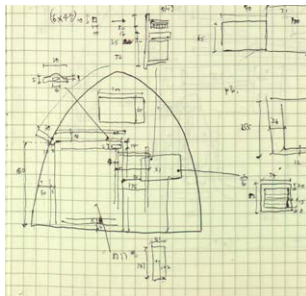


FIG 7.108 sketch of Grandma's Kitchen yao-dong (above)

FIG 7.109 watercolor of Grandma's Kitchen yao-dong (right)



Qia Pingwa writes that “In rainy days, farmers can sleep very well for a whole day.

[...] The second day, sun shines in the sky again. The cracks in the courtyard brick floor flourish with grass. The 30-40 years old earthen wall is soaked in half, its skin peels off, but some broken tiles cover the wall, so it doesn’t collapse. Between the tiles, black mosses turn green, and amidst the green, a small red flower flourishes. Qingfeng Street’s earth is such good earth, once there is water, it will give birth to green and flowers!”⁶¹

*Yao-dong after it rains everywhere flourishes liveness. Indeed, yao-dong’s soil is so good the folk saying goes: “wind blows the old wall into maturity, fire cooked the old kang to maturity, and sun warms the head to maturity. House doesn’t last long, but yao-dong lasts.”*⁶² That is why near the death of Xia Tianyi, he starts to eat the earth on the Kang, in <Qing Qiang>:

“He feels hungry, so he digs out the dry earth pimple on the front

*of Kang/“Kang-tou”[...] After one bite, he feels it is so tasty, like cooked beans, since then, he likes to eat the earth on the Kang.”*⁶³

Fei Xiaotong also describes at the beginning of his Rural China that:

“City dwellers can use the word Tu, which means earth to disdain the peasants, but in the rural, earth is their life root. In quantities, earth gods outnumber other gods. These earth gods are more similar to a human being than a divine. They are an old couple, who solves the conflicts of everything on earth. They symbolize the precious earth. When I first went abroad, my mother secretly put a parcel wrapped in red paper, into the bottom of my luggage. Then she told me in private that if I could not adjust to the water and food there, or if I missed home, I could cook the thing wrapped in the red paper into soup. This thing is earth from Kang.”



FIG 7.110 Grandma's Kang detail



FIG 7.111 Cast model- existing section 1:75





FIG 7.112 Cast model- new section 1:75



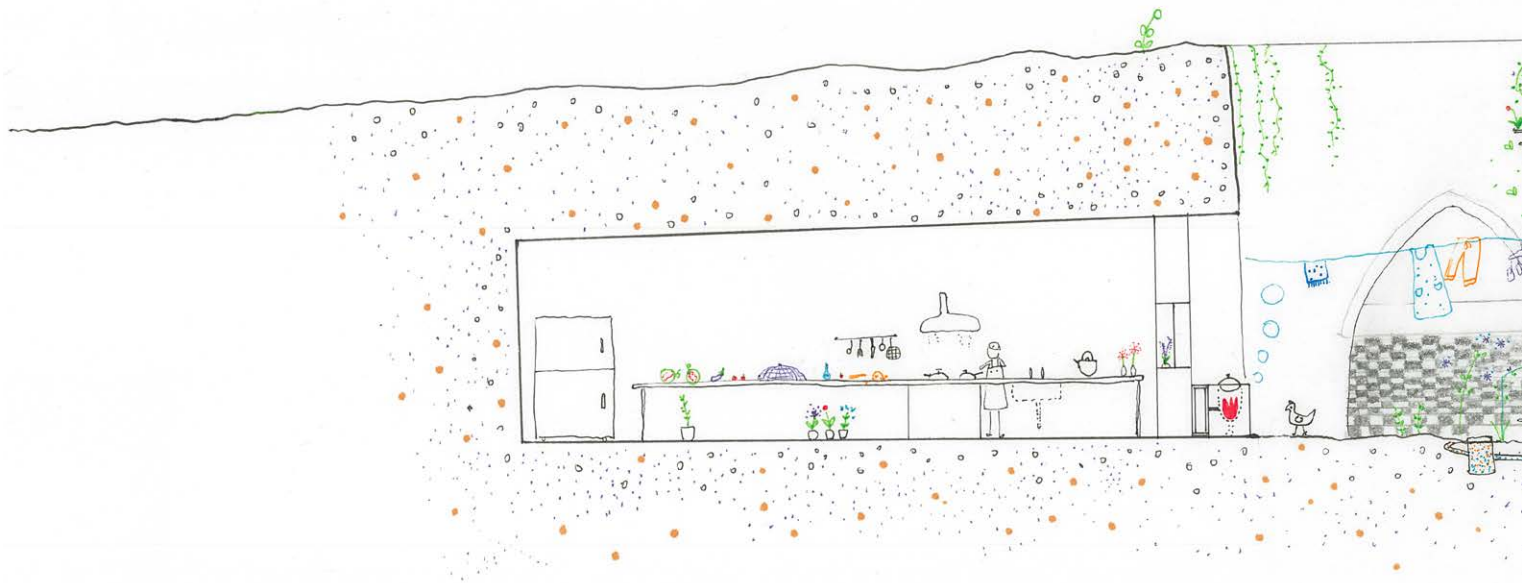


FIG 7.113 Section A-A 1:100

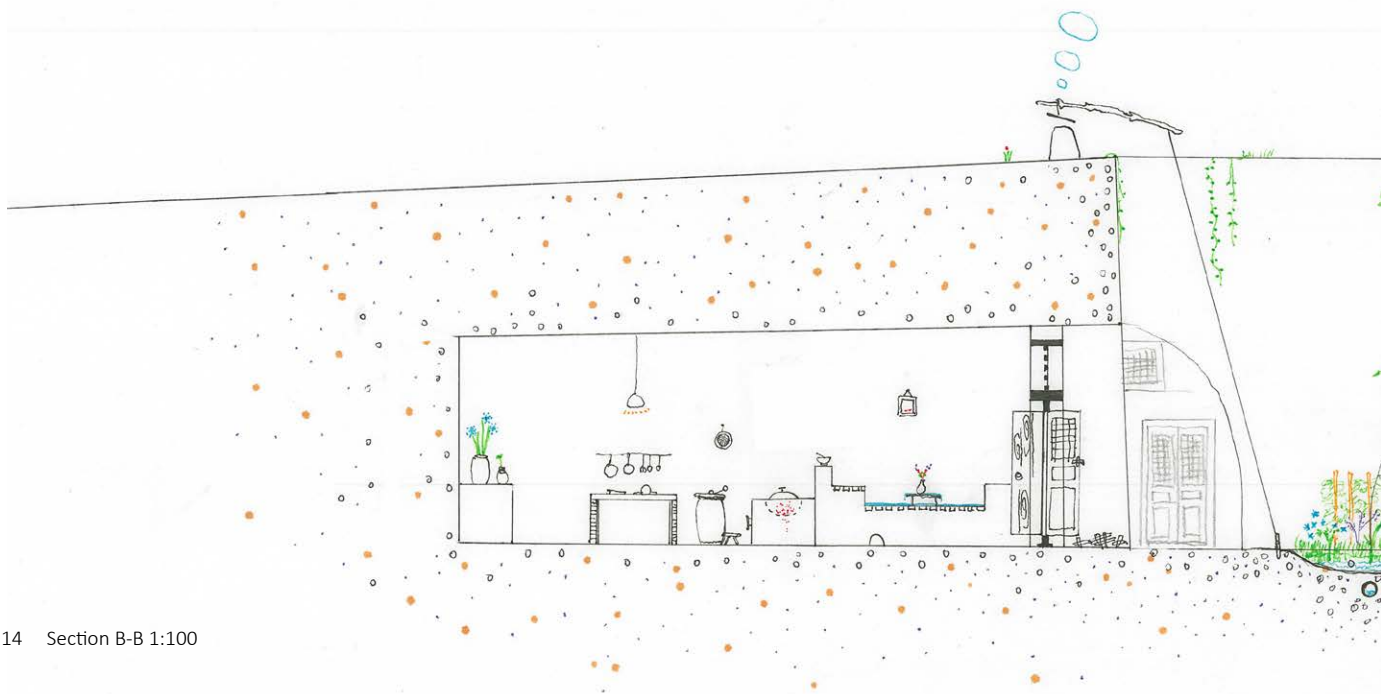


FIG 7.114 Section B-B 1:100

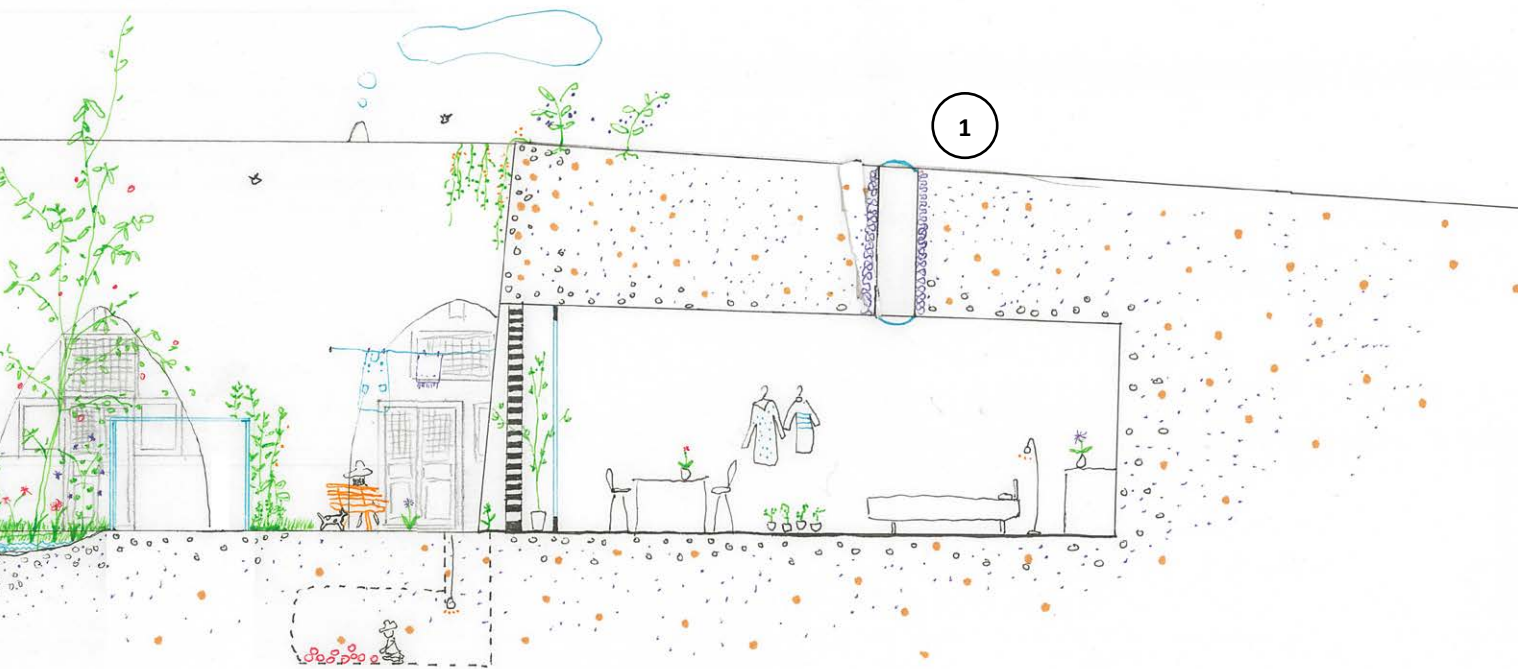
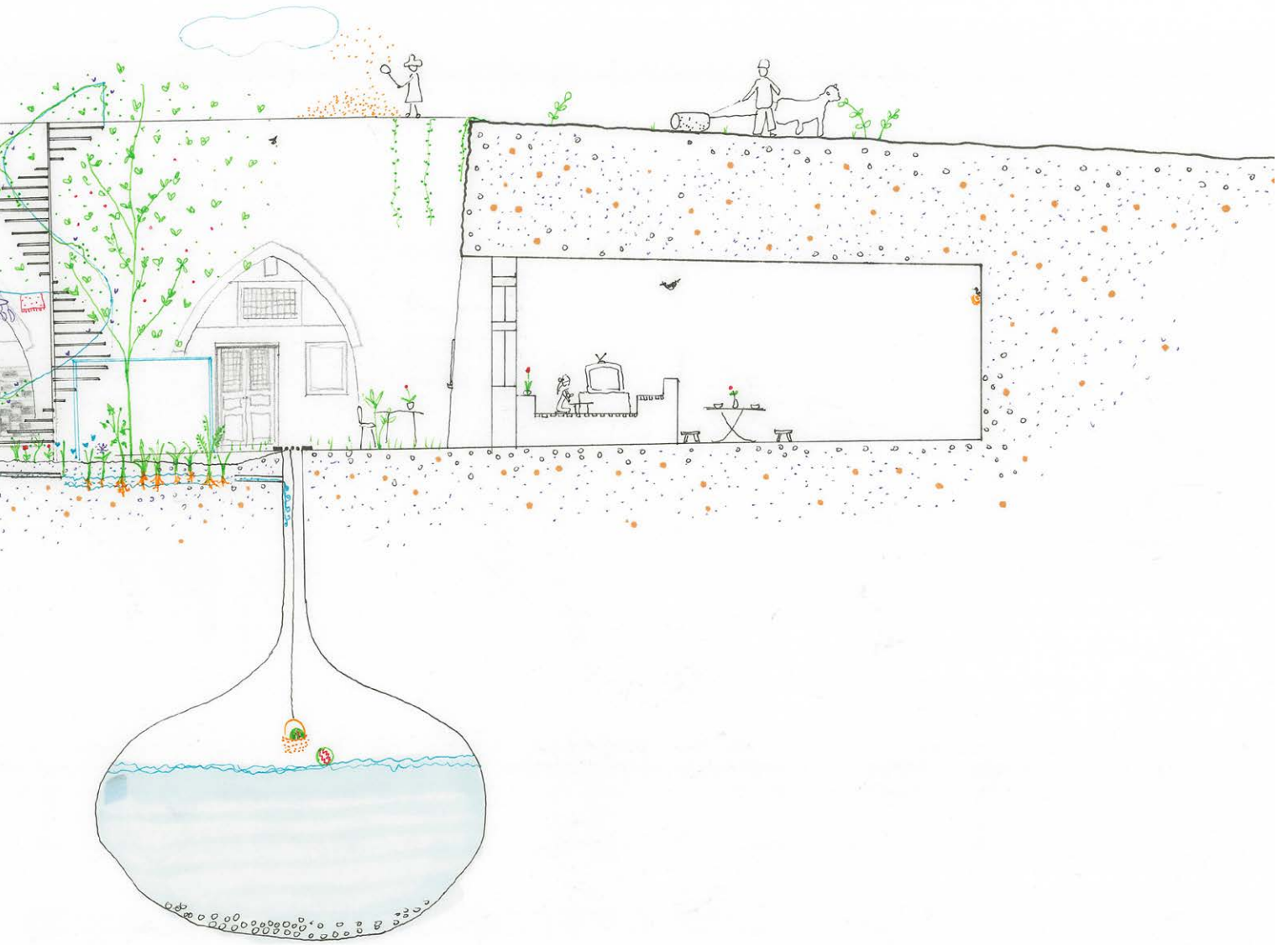




FIG 7.115 Stair proposal



FIG 7.116 Stair proposal

New Farmers' Future

Today, as village planning receive huge funding, a lot of planning offices have shifted their attention to the rural. According to Professor Duan De-gang, there are five types of village planning today: Village planning under the government's policy such as "beautiful village planning", "new village community planning", etc; urban and rural integrated development planning; upgrading according to resources; reconstruction after disasters, ecological migration, and relocation plans; and heritage village preservation. There have been 2500 villages being classified as the heritage village and among them 300 villages will receive 10 hundred million grant for village planning and preservation.¹

Activities trying to revitalize Chinese villages goes back as early as the 1900s, by Y.C. James Yen, Liang Shuming and others. According to statistics, until 1934, there were 600 rural rebuilt organizations, and more than 1000 experiment villages.² According to Chinese researcher Wen Tie-jun, there are five main directions in rural rebuilt today: first is rural ecological agriculture corporative; second is organic products sales corporative; third is post-industrial services; fourth is attracting young students back to the villages; and the last is to revive rural culture.³ Among these, people are the key. According to the Deputy director of the National Academy of Social Policy Research Center, Yang Tuan, there are four main groups of people engage in rural rebuilt: the peasant workers, young enterprisers in agriculture, urban hermits, and NGOs. Yang Tuan mentioned that the changes these people want to bring are not villages alone, but agriculture⁴, and I would add-lifestyle, as well.

Researcher Li Changping who specializes in rural China, thinks that in the future 30 years, Chinese rural villages will have the following transformations: 10% will become part of the cities, 60% will become inner decaying villages, while 30% will become centralized village or towns. It is these 30% of villages that we are designing for the new rural. The main economy for these 30% will be service industries for rural economies, and "Half farmers, half- X" life style termed by Naoki Shiomi (the representative of the Half Farmer, Half X Institute) will

be the future lifestyle.⁵ According to Shiomi, “Half-farmer” refers to “a lifestyle with a touch of farming,” and the X in “half-X” refers to an individual’s social mission or natural calling. “Farming” forms the foundation of the concept, but not large-scale farming. It refers to “small scale farming” for self-sufficiency which he believes will become an important activity in the future.⁶

“I want to value sensitivity, receptiveness, and the sense of wonder (the ability to be sensitive to the mysteries and the wonder of nature). A life with “farming” will help nurture such sensitivity, and give way to ideas that create a zest for life. I believe that there is a type of “body that generates ideas.” If the body is too stiff or too hardened, it won’t be able to generate great ideas. I believe that a place or time that will help you realize that you can have a more flexible, lithe lifestyle for your body and spirit is very important.”

-Shiomi

Educated graduates have come back to villages, bringing new ventures and community development, lessening the gap between rural and urban⁷, such as Bo-xue village’s “Bees Republic”, organized by Chen Tong-Kui in the “Famers 4”.⁸ They built a bike road in the village spending 70000 yuan mortgage. After the road was completed, they organize a New Year bike competition which makes the village popular, and the government funding eventually came after several month, helping to pay the mortgage. Then they received more funding to build lecture hall, basketball court, roads, and so on. Similar to F4 who starts their ventures in the rural through internet. In Japan, more and more offices choose to have a satellite office in the rural because of the cheap rent and quality of life in the villages. Take a decaying town- Kamiyama- in Japan as an example. When choosing ventures to incorporate, they choose ones that will help community development. For example, after the IT industries open their satellite offices, Kamiyama also attract other service industries such as restaurants, and other cultural facilities to make sure the diverse economy in the village. The NGO

also opened the Kamiyama school, providing trainings about community organization, village development, and managements. Graduates stay afterwards opening ventures that help community developing.⁹

Designer and Professor Yu Kongjian pointed out that Chinese suburbanization is unique because of the combination of strong internet coverage, intricate high speed train systems, with China's rich agricultural history. There is a lot of potentials that satellite offices will take place in China, attracting diverse culture to prosper in the villages and through internet, the platform for farmers' products widen. In China there are now 212 Tao-bao¹⁰ villages, 19 Tao-bao towns where electronic and IT industries are changing the rural economy. In five years, Tao-bao villages increases from 5 to 212. In the next 3-5 years, Alibaba will invest 100 hundred millions to build E-commerce service system for 1000 towns, and 100,000 villages. The E-commerce service system gives village consumers easy access to on-line products, and the Tao-bao village provide platforms for village sellers.¹¹ In addition Chinese premier Li Ke-qiang emphasized in the 2015 State Council executive meeting, that in 2020, 50000 remote villages will be covered by internet access, 30 million rural homes will have enhanced Wi-Fi accesses, covering 98% administrative villages. In addition, governments will encourage financial institutions to innovative online payment, supply chain loans and so on.¹²

In the next couple years, China is facing an increasing population of retired people. For the group of people born in the 1960s, most of them came to the cities after the Chinese revolution. Together with the groups of students who were sent down to the rural known as "Zhi-qing" in the 1950s-1970s, they share the same attachment to the rural. When these groups of people reach their retirement age, rural becomes an ideal place to spend the rest of their lives. Rural thus will be defined as a place where one gets fresh air and clean water, engages in rich cultural, spiritual and leisure activities, and so on.¹³ In the same year as "Bees' Republic", in 2009 Li Chang-ping's "Hao-Tang Experiment" started. Li Chang-ping



FIG 8.1 Basehabitat workshop lecture by Martin Rauch, and field trip picture

has a nickname as China's Agricultural Secretary. His "Hao-tang Experiment" is renowned for its economic success that transform a village from zero economic accumulation to that of 20 million¹⁴. "Hao-Tang" uses an internal financial model that gain development funds from the Collateral circulation of villagers' lands, forests, ponds, houses and so on.¹⁵ The experiment first is circulated within the village, then opens up to external capitals, in order to make sure these benefits stay in the village.¹⁶ The initiatives are taken by the villagers, and organized by the villagers, lowering their investment costs. These benefits are then contributed to the elderly and help the village collective economy re-circulate. Once there is a financial foundation for the village, more opportunities will come.¹⁷ In Li-du-kou village's financial precedent, the elderly also participate in the design of the system, rebuilding the kinship bondage.¹⁸

In 2020, the Communism's first goal of the "Two hundred years" plan will be achieved. According to 2014 National statistics, there are 70.17 million people in the poor class, and in 2020, they will all have to escape the poor class.¹⁹ Since most of these poor class people are farmers, we are expecting to see a dynamic transformation in the rural industries. Additionally, in 2015, China officially ends one-child policy, signing into law bill allowing married couples to have two children". Where and how will these increased population live, will be questions architect need to figure out. The increasing population can be both opportunities and difficulties, and architecture plays an important role.

There have been an increasing number of architects in China involved in the vernacular architecture. The wide-ranging social problems in China may or may not be solved, and definitely not by architecture alone. But architecture should mediate. Among them are Chinese architects including Li Xiaodong, He Wei, Xu Tiantian (DnA), Xie Yingjun and so on. Among international and Chinese architects, local materials are often utilized. For example, Martin Rauch in Austria experiment with



FIG 8.2 Tanikawa House by Shinohara

ram-earth designs, whose scales span from residential house to industrial buildings, pushing the boundary of vernacular architecture into mass production. Shigeru Ban's paper church in Taiwan's Taoyuan village, after the earthquake, help attract tourists and provide a spiritual center for locals, using paper's weakness and strength to symbolizing the spirits. Li Xiaodong's bamboo library in the outskirts of Beijing, creates a poetic cultural space as if in a Chinese ink- painting. Kazuo Shinohara's Tanikawa House hints at the birth of a Third Style, where tradition styles and his second style the "cube" and "fissure" as anti-space, amount to. He uses "concreteness" that the word savage brought in its wake.²⁰

*"What defines the savage mind is a motivation to symbolize, fierce and without precedent. At the same time, it entails a downright and delicate attention to concreteness and a tacit belief that the two attitudes are in effect one and the same."*²¹

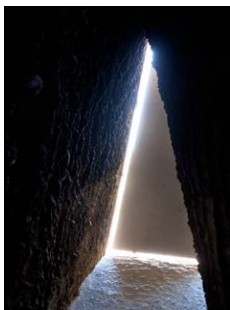


FIG 8.3 Bruder klaus field chapel by Peter Zumthor

Shinohara's poetic space that is both anti- organic and organic at the same time, maybe be the best example a house could offer for the new farmers, with a life style of "Half farm, half-X". Peter Zumthor, in fact, also have his own third style, because "make it typical, then it will become special" is Peter Zumthor's working philosophy.²² Juhani Pallasmaa shares both architects' viewpoints: "the strongest architecture is new and ancient at the same time." He believes that the natural elements reinforce the erotic desire because they have enormous primordial poetical strength – they are like a hidden treasure chest that just needs to be opened. They support fantasy and daydreaming that technological world lacks.²³ Aldo van Eyck says that "Architecture must facilitate man's home coming." A yao-dong cannot be taken anywhere else. It is very much about the "root"- the earth. Therefore, I believe yao-dong has the strength to become both a new and an ancient spiritual shelter for the young peasants and an instrument that support rural rebuilt.

The loess region may not be as comfortable to live in as the other regions with fertile lands. But the fact that this land is the origin of Chinese culture may indicate the vitality of it.

“Development of technology and economy of scarcity are both causes and effects, keeping China alive for thousands of year. This situation is definitely not caused by Chinese’ stupidity, but because the economy of scarcity and Confucian doctrine of contentment work together to make people ignore the conflicts between human and nature. Instead the society under Confucian influence focus on adaptation between human beings. In the economy of scarcity, the main attitude is contentment, the limitations of desires, a power for social adaptation.”²⁴

-Fei Xiao-tong

Thousands of years’ social adaptation is represented in the historic villages and villager’s lifestyles. For example, yao-dong’s material is not permanent nor valuable. It is just earth that can be found everywhere. Yao-dong’s construction also does not require any advanced technologies nor mechanics. It is just carved with experienced hands. The locals always said “a yao-dong needs people to live in it for it to be maintained”. A proper-built yao-dong, inhabited by people, can be lived in for hundreds of years. However, if yao-dong is devoid of life, it will collapse in ten years. This is the same with yao-dong craftsmanship. Professor Wang Jun said that it is very hard to find yao-dong craftsmen today in comparison to twenty years ago. When young peasants migrant to the city or build “contemporary” houses in villages, yao-dong craftsmanship is also dying. Villages used to cultivate spirits to make sure the village prosper like a tree. A yao-dong have always been a spiritual shelter for the elderly. However as urbanization intensifies and inner decaying village phenomena worsens, how to make a simple and poetic shelter for the young (both the peasants and the urban dwellers) and keep villages alive is becoming more and more urgent.

The thesis aims to show both the fragility and strength of yao-dongs embedded in details. These details tell stories about the relationship between human beings with their environment. As we become more and more immersed in mechanics, our life accelerates. These small details slow our time down, and embed it with qualities and meanings. By reconnecting the modern audience with the old yao-dong, I wish to bridge between past and future, tradition and modernity. As the society becomes more and more restless, culture may be the spiritual force that calms the restless souls down. Yao-dong is sculpted in time and by culture. By knowing how to live inside a yao-dong, I learn about Chinese culture and spirits in these simple and poetic details. These details murmur to us what our tradition means. These organic cycles keep our culture alive. These lifestyles contain such simplicity that can almost drive away complexities we encountered in modernity. When I was sitting inside Jiao-tong Cha-guan (Traffic Teahouse) in Chongqing, playing go, drinking tea and talking with friends, I felt how trivial life really was. Life consists of small details, fragmented memories, and fleeting sensitivities. Inside the old teahouse and the old yao-dong, every object, every individual seem to belong there, because they have been together for a long time. Time is what creates belongings. Architecture that can endure time, will be the spiritual shelter that creates belongings for its occupants.

“This historical sense, which is a sense of the timeless as well as of the temporal and of the timeless and of the temporal together, is what makes a writer (architect) traditional and it is at the same time what makes a writer (architect) most acutely conscious of his place in time, of his own contemporaneity.”¹

-T.S. Eliot

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That is why I want to keep yao-dong alive. By trying to accommodate some modern amenities into yao-dong such as washroom, light shaft and sliding doors, I hope to attract young peasants back to the “spare life” of yao-dong. A spare life echoes the minimalist lifestyle and Taoist ideology. However, peasants abandon their “spare life” for “bare life” when they migrate as peasant workers to the cities. They have no say in their everyday environment even though they are the builders and occupants of the city.

“Typically, we are dealing with the discourse of authorities – professional, institutional, economic, political. Their discourse may be ‘enlightened,’ ‘progressive,’ ‘utopian,’ ‘egalitarian,’ ‘radical;’ but to the extent they retain a monopoly on the definition of those concepts, speaking for and about others, not to them and not with them, their discourse both reflects and reproduces their authority and power.”²

-Markus, Thomas A.

Since Brunelleschi’s Florence Cathedral, the general public and craftsmen are excluded from the discourse of architecture, dominated by the master builder/ the architect. By bringing yao-dong into architecture, a vernacular architecture built by the ordinary people, I wish to bring more freedom of speech for the public with no professional trainings.

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