

Chapter 2

“Houses” Cases

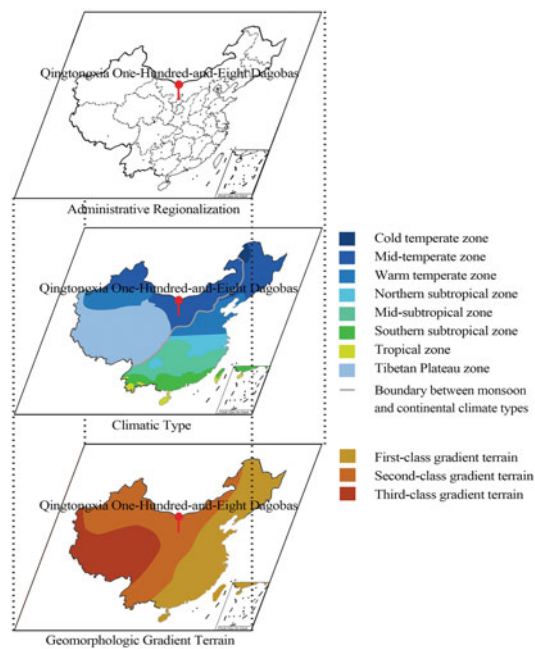
2.1 Aba Tibetan Villages: Home at the Foot of Snow Mountain¹

Location: Aba, Sichuan Province

Key Geographical Concept: Cultural communication between minority nationalities

Although the Aba villages are located in Tibetan inhabited areas, the influence of the Qiang nationality culture has contributed features to the Tibetan villages, such as a strong defensive system.

¹The original manuscript for this case was published in *Community Design*, 2009 (2): 86–91, (in Chinese). Now, its content in this book is improved.



Note The base maps in the location map are from the websites of the National Administration of Surveying, Mapping and Geoinformation. (See <http://unn.people.com.cn/mediafile/200607/14/F200607141610331489926345.jpg>, <http://unn.people.com.cn/mediafile/200607/14/F200607141540432633643981.jpg>). The same base maps are also used in the following location maps for other cases.

Geomorphologic Features

Aba Autonomous Prefecture of Tibetan and Qiang Nationalities in Sichuan Province is located in the southeast Tibetan Plateau. The plateau surface terrain is almost smooth, although the canyons are more rugged. For the convenience of water acquisition and to avoid the danger of flooding, the Tibetan villages are always located approximately 10 m above ground level on the terraces by the sides of rivers (Fig. 2.1).

Climatic Features

Aba Autonomous Prefecture has a typical plateau climate, the features of which include abundant sunshine, low levels of rainfall, dry weather, and wide temperature



Fig. 2.1 Below the mountain area where the Aba Tibetan villages are located lies a valley stream and the snow-capped mountain above. The area is plagued by frequent natural disasters such as landslide activities and mudslides due to the location of the lifting section of the Tibetan Plateau. To avoid this type of catastrophe, local inhabitants often choose ridge sites for their villages' location. For the purpose of effectively utilizing the available arable land, and following traditional principles that dictate long-cultivated land should lie fallow, the Aba Tibetan village settlements are concentrated at the edge of cultivated land. Dwellings built on the slopes thus appear to be relatively dispersed and scattered among the mountains. *Source* Photograph by Fan Yin



Fig. 2.2 The villages enjoy abundant, strong sunshine and significant evaporation rates. Additionally, they are featured with the microclimate and a large amount of convective rainfall. The weather changes dramatically in a single day. In autumn, plants all over the mountain turn red, echoing the color of the Tibetan village buildings. *Source* Photograph by Yuping Zhang

differences from day to night, along with cold winters and cool summers (Fig. 2.2). Architectural measures adaptive to such a climate include terrace roofs, thick walls, small windows, and separate rooms for winter and summer (Figs. 2.3 and 2.4).

Fig. 2.3 This image shows the traditional production technique of a typical Tibetan village watchtower. Most of the buildings in Aba Jiarong Tibetan villages incorporate viscous yellow mud, lumbers from local trees, and stones from the surrounding area as the main construction materials, together with yellow mud and rubble for the thick walls. With the small windows placed together, the thick walls are used to defend against cold. *Source* Pan (2001: 87)

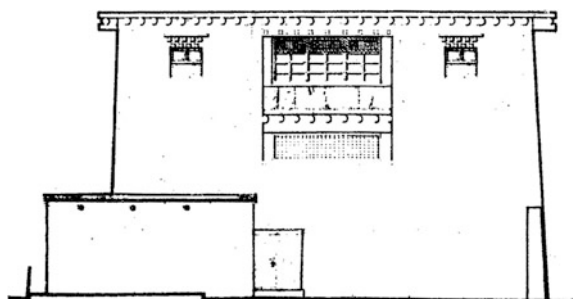
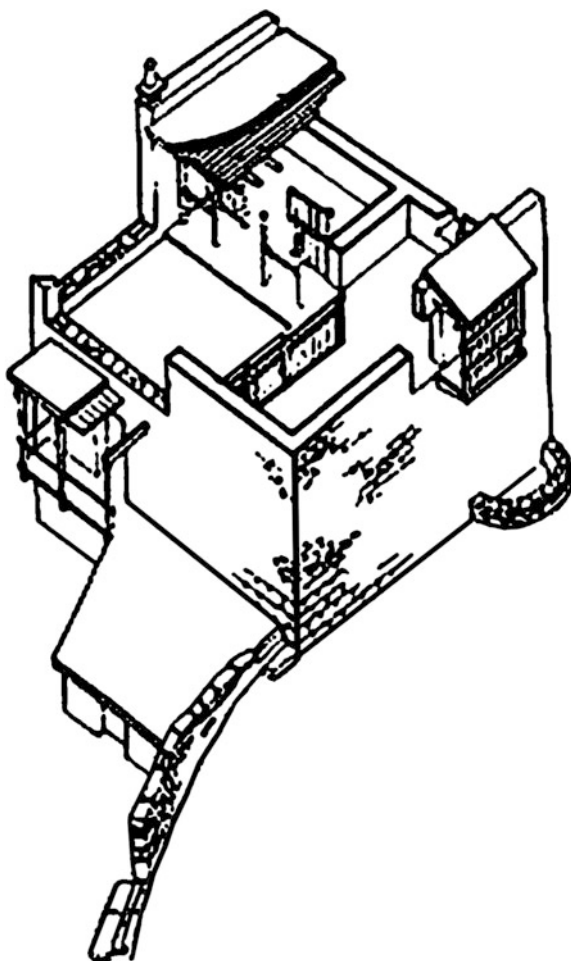


Fig. 2.4 The front elevation of the Zeke House in Longsi Aba Tibetan Village appears to be built in the shape of a trapezoid, which provides a solid building structure. There are windows on the second and third floors but no windows on the ground floor, thus allowing the house to retain heat. *Source* Sichuan Province Construction Commission (1996: 167)



Fig. 2.5 Aba dwellings incorporate stone and wood as building materials. These dwellings have two floors and are decorated with three colors: red, white and yellow. The flat roofs serve as an important ceremonial location for the Jiarong Tibetan people. As a result, in houses with tilted roofs, a gazebo on the second floor will be reserved for worship. One of the corners of the gazebo is a white tower to be used for worshipping the mountain deities. *Source* Photograph by Fan Yin

Vegetation Features

The groundcover of Aba Autonomous Prefecture is alpine meadow, under which lie fertile sub-alpine meadow soils. However, as few tall plants exist in the region due to the generally steep terrain, construction usually requires stone as a basic material (Fig. 2.5).

Cultural Features

The particular Tibetan nationality within Aba Autonomous Prefecture is Jiarong, whose historical legacy may trace back to the Qin Dynasty (221–207 BC). According to the record of the *Book of the Later Han*²: *Treatise on the Western Qiang*,³ the Qin State King Xiangong (reign 384–362 BC) attacked Xiqiang, forcing the people of Xiqiang to flee thousands of miles southwestwards and made a home among the local nationalities there. Thus, part of the Xiqiang were ancestors to today's Jiarong Tibetan (Mao 2005).

As the name of Aba Autonomous Prefecture of Tibetan and Qiang Nationalities suggests, this is a center mainly for Tibetan and Qiang ethnic communities. The Tibetan and Qiang cultures co-exist and intermingle here, and the two cultures' settlement patterns, structures and building materials are very similar. Compared with the other Tibetan villages, the differences between the Aba Tibetan villages

²*Book of the Later Han* (Mandarin: *hou han shu*), an official Chinese historical text from 25 to 220 AD on the period of the Han Dynasty, was mainly compiled by Fan Ye during the Liu Song Dynasty (420–479).

³*Treatise on the Western Qiang* (Mandarin: *xi qiang zhuan*), part of *Book of the Later Han*, was mainly about the history of Western Qiang Ethnic Minority Tribe during the same historical period in the latter part of the Han Dynasty.



Fig. 2.6 In the northwestern mountainous region of Sichuan, public roads are always built along low-lying river valleys. Because the mountains are steep, the Tibetan villages are built straddling the rivers as well. In this image, a string of sutras and images, printed on square and triangular prayer flags, which is called the *fengma* flag, flies in the breeze as unique symbols of the local harmony between the human and natural environment. *Source* Photograph by Fan Yin

and Qiang villages in this region are fewer. Thus, the influence of physical geography surpasses that of religion and nationality on the architecture.

As a result, the Aba Tibetan villages not only have features of traditional Tibetan culture and religion but also remnants of the traditional worship of the Qiang people, such as the worship of mountain deities, water deities, wild raptors and so on (Fig. 2.6). The formation of the Jiarong Tibetan culture has been a process of constant competition for limited living space. To meet the needs of war and unavoidable conflict, regional architecture gained a strong focus on structures of offense and defense (Fig. 2.7).



Fig. 2.7 Because these villages have been situated within the intersection of Han and Tibetan cultures, which have historically jostled each other, every village contains a watchtower tens of meters in height for the purposes of observation and defense. The magnificent watchtower in Zhuokeji Tusi (See: “Extended Reading: The Tusi System” in Sect. 6.5 of *Volume 2 Geo-Architecture Inhabiting the Universe*) Village is suitable as a fortress for defensive function. *Source* Photograph by Fan Yin

Every mountain represents an incarnate deity to every Aba Tibetan inhabitant of the snow-capped mountain. Thus, the basic purpose of the sites and architectural composition of the Tibetan villages is to allow for a rooftop view of a mountain for every household. Individuals standing on their roofs can thus sacrifice to the mountain deities and communicate with the sky and earth. In addition to the worship of the mountain deities, regional ritual tradition is also evident in the village worship of the white stone, which appears on many village building surfaces.

Extended Reading: Tibetan Snow-Capped Mountain Worship

As a tenet of Tibetan nationality, the snow-capped mountain worship is also influenced by the ecological ethics of “Heaven-earth unity” and “animism”, and it is one of the traditional nature worships around the world (Fig. 2.8). The concept of “height worship” is a common psychological strategy for nomadic people, reflecting a need to ascend the heights and enjoy a distant view (Nan 2007). Due to the Qinghai-Tibetan region’s unique geographical conditions, the towering peaks form a stunning and awe-inspiring natural landscape. The geographical conditions here have accustomed many generations living there to a particularly spiritual perception of life. The people in this region see the snow-capped mountain as a route to heaven, the ancestors and the dwellings of the deities and seek the feelings of happiness and peace. Over time, the unique geographic setting of the mountains have allowed their inhabitants to transform feelings of worship and awe into specific ritual patterns, symbols, and graphic formulas, such as the Yamagata pattern, and into using white stone as a construction material. The Aba Tibetan villages located at the foot of the snow-capped mountain also share these characteristics of nature worship (Fig. 2.9).

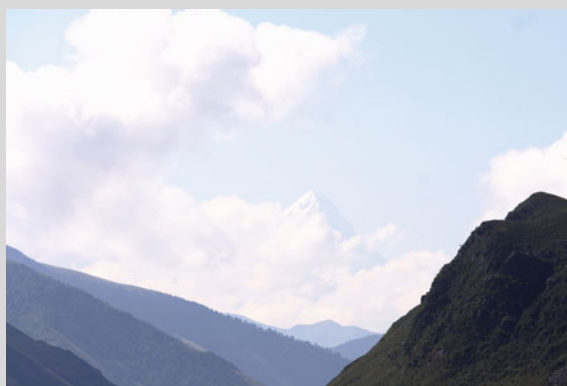


Fig. 2.8 The Tibetans greatly admire the snow-capped mountains: where there is a snowy mountain, there lie the houses of the Tibetan people. Gongga Mountain, located in Ganzi Territory near Aba, raises 7,556 m above sea level and is the tallest mountain in Sichuan Province. *Source* Photograph by Fan Yin



Fig. 2.9 The Aba Tibetan villages have deep religious beliefs in Tibetan Buddhism. Each house's roof is decorated with sutra streamers flying in the wind. Due to the regional reverence for white stone, houses are also usually framed in white. *Source* Photograph by Fan Yin

The buildings in the villages are independent of each other but also linked by passages connecting the roofs for the convenience of military command of reinforcements. The Aba Tibetan villages not only enjoy the advantages of easy to hold but hard to attack but also satisfy the needs of daily life. Due to their high-altitude location, the villages have thick walls and foundations. Architectural styles make use of local materials including resilient yellow mud and locally available wood and stone. Yellow mud and slab stone make up the thick walls, the roof beams are made of wood, and the external surfaces are sealed with clay. The small windows in the walls keep the buildings solid and allow for warm winters and cool summers.

Every inch of flat ground is especially precious in the hilly mountain region. As a result, the Tibetan villages are located at the corners of cultivated land and arranged along the ridgelines of the mountains. The ingenious intertwining arrangement of the buildings both ensures access to sunlight and a mountain view for each house and keeps out the cold winter wind (Fig. 2.10). So far as each single building is concerned, the first floor with insufficient sunlight is used as storage for sundries,



Fig. 2.10 The distance between two residential buildings in Xisuo Village is very small. The intertwining building arrangement makes optimal use of the scarce sunlight, as well as serving a defensive purpose. *Source* Photograph by Fan Yin

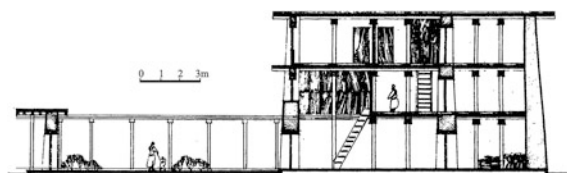


Fig. 2.11 From the cross-section of the Zeke House in the Longsi Aba Tibetan Village, the function of each floor can be observed. *Source* Sichuan Province Construction Commission (1996: 167)

whereas on the second floor are the living room and bedrooms. The third floor, with the most adequate sunlight and the flat roof are used as Buddhist sanctuaries. The whole building thus combines lodging and storage in an incredibly efficient use of space (Fig. 2.11).

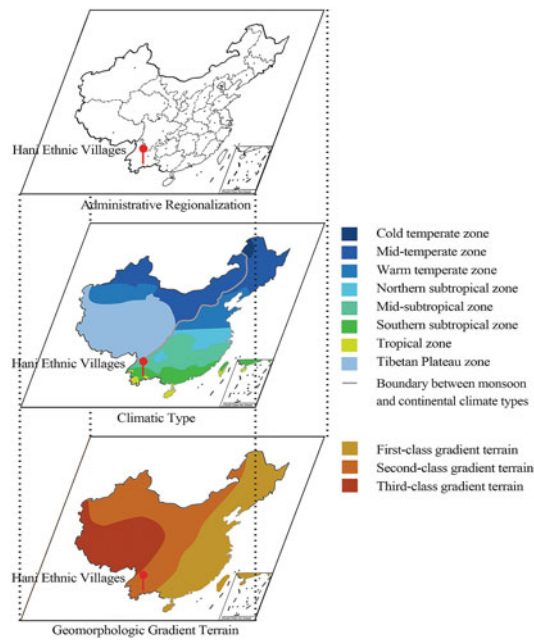
Geographical Interpretation

Standing high on the mountain ridges, the Tibetan villages are easy to hold but difficult to attack. In Aba's rough terrain and variable climates, the villages adapt to local circumstances. Houses are built with thick stone walls and small trapezoidal windows, and keeping the living space above the first floor guarantees warm winters and cool summers. Finally, the traditional ritual practice of nature worships is reflected in the construction of the houses, such as in the use of white stone as a decorative material.

2.2 Hani Ethnic Villages: Home on a Mountainside
Terrace Field ⁴

Location: Yuanyang, Yunnan Province
Key Geographical Concept: Terrace field culture

Terrace fields represent the core of the Hani ethnic villages’ subsistence. Entire villages are dependent on the terrace field ecosystem.



Geomorphologic Features

Yuanyang County lies at the south edge of Ailao Mountain where the valleys cut deeply and flat land is rarely observed. Reclamation of mountains into terrace fields is a useful initiative for the purpose of conducting agricultural activities in hilly terrain. Between the mountains sit layers of spectacular terrace fields (Fig. 2.12). To ensure the maximum utilization of arable land, the Hani villages are located at the tops of terrace field slopes.

⁴The original manuscript for this case was published in *Community Design*, 2009 (2): 92–97, (in Chinese). Now, its content in this book is improved.

Fig. 2.12 Layers of paddy fields below the Hani ethnic villages. Because the mountains are high with steep slopes, the fields themselves are usually narrow. There is a saying that “a frog jumps once across three layers of fields”. The terrace fields can pile up to more than 1,000 layers. *Source* Photograph by Fan Yin



Climatic Features

Yuanyang County is located in a subtropical monsoon climate area, which enjoys warm winters and hot summers. Excessive rain without a clearly delineated dry season means that these climatic conditions are suitable for rice production. Therefore, the Hani terrace fields are devoted to layers of paddy fields (Fig. 2.13).

Fig. 2.13 Observed from on high, one can enjoy the distant mountains shrouded in mist, and the terrace fields are clearly visible. *Source* Photograph by Fan Yin



Fig. 2.14 The Hani ethnic villages are surrounded by green trees and, from below, by layers of terrace fields. The climate here is wet and rainy. A creek flows through the villages from top to bottom, bringing clean spring water for human and livestock to drink, and provides a steady source of irrigation as well. *Source* Photograph by Fan Yin



Vegetation Features

The subtropical monsoon evergreen broad-leaved forest is a typical form of forest vegetation in the humid subtropical region. The Hani people tend to build villages on the hillside, so the dense forests above these villages can help in the conservation of water and soil. Around the villages are usually planted palms, bamboos, pears, peaches, persimmons, etc. Below the villages are layers of paddy fields dedicated to rice cultivation and the breeding of fry. The rivers at the foot of the mountain are used for the drainage of paddy fields (Fig. 2.14). The agricultural ecosystem, including forest-river-village-terrace field, thus ensures a beneficial circle (Qiu and Cao 2002).

Cultural Features

The Hani villages trace back to the Sui (581–618) and Tang (618–907) Dynasties, with more than 1,000 years of history. Many theories exist concerning the origins of the Hani people. Some believe they migrated from the Tibetan Plateau (Jue and Zhang 2000), whereas others say that the Hani ancestors were likely the indigenous dwellers in the Honghe River valley (Wang 1995). Regardless of which view is correct, it is certain that, as opposed to Han, Dai and other ethnic groups that adapt more readily to life on the plains, the Hani people adapt more readily to mountain life. The Hani ancestors chose to settle in mountainous areas. In the course of achieving interdependence with the surrounding natural environment, Hani agriculture gradually grew to incorporate a terrace field ecosystem (Fig. 2.15).

Fig. 2.15 On a winter morning, layers of paddy fields reflect striking clouds. Fog diffuses around the valley. Terrace fields seem to float aloft. *Source* Photograph by Fan Yin



In central Yunnan Province, Ailao Mountain ranges from east to west, originating in southern Dali County and extending into southern Honghe County and stretching nearly 1,000 km. Its average elevation of over 2,000 m renders this area a natural barrier. Because of the significant relative height difference between peak and valley, Ailao Mountain shows clear vertical zoning. The climate in the valleys is hot and dry, whereas it is cold and moist in the peaks. Ailao Mountain is also home to many ethnic minorities. The relatively flat valley regions and arable downstream areas are occupied by the locally influential Dai and Zhuang people, whereas the less powerful peoples, such as the Hani, choose to settle in the mountains.

Extended Reading: Hani Terrace Field Ecosystem

The Hani terrace field ecosystem represents the long-term results of the Hani lifestyle and traditions of production. This ecosystem comprises not only the slope ecosystem, which was created and developed in the process of adaptation to the natural conditions of the Honghe River's south bank, but also the cultural ecosystem centering on the Hani people and their activities (Jue 1999). The Hani people's terrace field agricultural technique represents more than a thousand years' history, and its development not only impacts local natural geography, but also the particular historic legacy of the Hani people. It is said that the Hani people settled in the Dadu River valley early in the third century BC and developed an ancient farming civilization. However, as the population increased, disease spread, and war raged, the Hani people were forced out of their ancient home into a long-term and wide-ranging migration (Wang 1998). At various locations along their route, the Hani people communicated with local populations on the topic of agriculture, enriching and improving their agricultural production skills as a result. The experiences mean that when the Hani people were forced to establish permanent residence



Fig. 2.16 The Hani villages are usually located on a sunny ridge framed above by lush vegetation and below by terrace fields. *Source* Photograph by Fan Yin

in the mountainous region, they were equipped to adapt to a complex geographical environment and were able to develop a terrace field ecosystem in perfect harmony with the surrounding environment (Fig. 2.16). The core structural characteristics of this ecosystem enabled the Hani ethnic villages to form a harmonious cultural landscape with a unique layout and architecture.

To meet their subsistence needs, the Hani people maintain a continuous tradition of plowing and farming in the Ailao Mountain region. From generation to generation, they gradually shape the slope into paddy fields, thereby forming the terrace field layers down to the valley and up to the hillside. Hani ethnic villages are built on slopes above the terrace fields and below the mountain forests, where the inhabitants have easy access to shelter from the mountain breeze, a safe water source, and the terrace fields below. Spring water flows from the mountain top through the villages and is used for both people and livestock (Fig. 2.17). The water then continues through the terrace fields to irrigate the rice before it finally reaches the river valley. When winter arrives, rice in the terrace fields is harvested, leaving



Fig. 2.17 Water is the source of life for the Hani culture. Spring water flows from the top to the bottom of the mountain, thus flowing directly through the villages. Taking advantage of this natural gift, the Hani people incorporate the tilt hammer and water mill in their rice production process. *Source* Photograph by Fan Yin



Fig. 2.18 Mushroom houses are the Hani people's unique architectural style. Built with stone and rammed earth and covered with thick layers of thatch, they resemble mushrooms from afar. At locations close to towns or traffic arteries, thatched mushroom houses are replaced by sturdy brick houses as the product of modern civilization. Therefore, large areas of mushroom houses can only be observed in inaccessible mountain areas. *Source* Photograph by Fan Yin

the ponds clean and clear. The Hani people's mushroom houses and cascading terrace fields form a beautiful scene (Fig. 2.18), creating a paradise that draws photographers from around the world.

Terrace fields represent the core of the entire Hani structural ecosystem, as well as the essence of the Hani subsistence. Within this ecosystem, rice plays an important role in basic-level production. The Hani invented the woodcut watershed to control water allocation, and, in the terrace field structure, the villages have implemented a unique fertilization method. Terrace field-dwelling fish are the ecosystem's important first-level consumer, as they can wipe out the pests in paddy fields while offering a source of protein for the Hani. Therefore, fish are a very important cultural symbol in the Hani legends and myths, literally reflecting the importance of the terrace field to the Hani people. The valuable experiences in terrace field management enable the long-term connection between terrace fields and villages on the hillside.

Extended Reading: Hani Terrace Field Culture

Throughout the long history of Hani habitation in the Ailao Mountain region, the Hani terrace field culture has been not only the central vehicle of the Hani subsistence but also a core aspect of Hani spiritual wealth. Hani spiritual history is rich and unique and derived originally from specific natural geography and historical culture factors. Its characteristics can be summarized as "long in history, rich in content, vast in distribution, spectacular in landscape, harmonious between man and nature, and sustainable in development" (Chen 2007). The Hani people settled in and reclaimed a large area of terrace fields on the south bank of the Honghe River and the Ailao mountain region

during the Tang Dynasty, since which time the terrace field culture has remained the soul of the Hani people. Traditionally, when a Hani baby is born, the family would hold a terrace field labor ceremony. They drew squares in the courtyard to symbolize terrace fields. If the baby were a boy, another seven or eight-year-old boys would perform the action of digging terrace fields with a small hoe. If the baby were a girl, another seven or eight-year-old girl would perform the activities of catching eel and spiral shells in squares symbolizing the terraced field. Only after which ceremony could the new baby be officially named and become a member of the village. The Hani people spend almost all their lives on the terrace field and are buried after death on the adjacent slope to guard the terrace fields from the next world. The Hani people live from generation to generation according to these traditions, reclaiming the towering Ailao Mountain into farmland with uninterrupted perseverance.

As the Hani villages are located on the slopes and confined by the terrain, village architecture is generally linearly arranged and parallel to the contour line. Similarly, due to the limitations of the terrain, Hani residential buildings usually have no courtyard. Winter on the mountain is humid and cold, so the Hani people usually build their villages on the sunny slopes (Fig. 2.19).

The many gullies in the Honghe River valley region serve to separate the Hani communities from each other. Therefore, there can be various forms of architecture within a single ethnic group. The Hani buildings in Xishuangbanna Autonomous Prefecture are mainly constructed with a bamboo framework; and buildings in Yuanyang of Honghe Autonomous Prefecture are “mushroom houses”, named for their mushroom-like appearance (Wang and Shang 2009). The construction materials used in mushroom houses—adobe and thatch—are natural and locally accessible. Their walls can be divided into two sections: above ground and below ground. The first step in construction is to build the foundation of the walls about half a meter

Fig. 2.19 Because Hani villages are built on the hillside, the precious flat grounds become important public spaces for activities. *Source* Photograph by Fan Yin



Fig. 2.20 Part of a Hani mushroom house. These walls are built with rammed earth, and the roof is thatched. Doors, beams and other structural components are made of wood. *Source* Photograph by Fan Yin



under the ground with sand and earth. More sophisticated artisans might use stone or brick instead. The section above ground is also half a meter in height, mostly piled up with splint-rammed earth (Fig. 2.20). The first floor of a mushroom house is used for the storage of farm tools and livestock breeding. The second floor, usually drier and warmer, is used for residence. Finally, the roof is covered by layers of thatches to form four slopes with angles larger than 45°. Observed from afar, houses thus

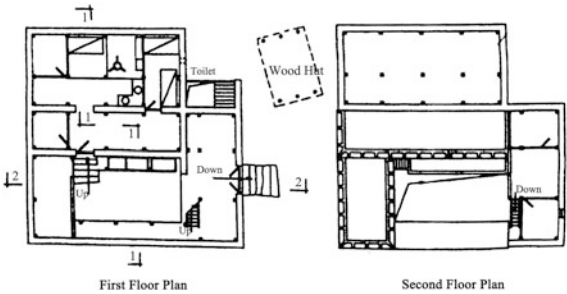


Fig. 2.21 Plan drawings of Chen’s house in Nikubu Village, Yuanyang County. The Hani mushroom houses are usually square in plan. The stove is on the first floor, with a row of small holes on the wall to let out smoke. *Source* Lu (2003a: 1244)

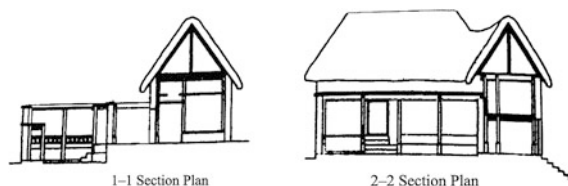
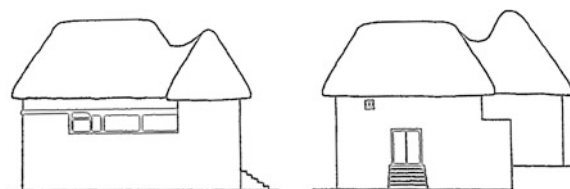


Fig. 2.22 Section drawings of the Chen Family House in Nikubu Village, Yuanyang County. In structure, the Hani mushroom house is made up of a stone foundation, mud walls, wooden pillars, wooden beams and roof, and wooden or bamboo purlins with straw or tiles above. A mushroom houses generally falls into two parts: one-story flat-roof part and two-story sloped-roof part. *Source* Lu (2003a: 1244)

Fig. 2.23 Elevation drawings of the Chen Family House in Nikubu Village, Yuanyang County. The mushroom houses have few or no windows, which enhance their mushroom-like appearance. *Source* Lu (2003a: 1244)



resemble mushrooms, hence the name. The construction materials ensure a warm winter and a cool summer inside the house, while the roof's large slope is an adaptation to the rainy climate (Figs. 2.21, 2.22 and 2.23).

Geographical Interpretation

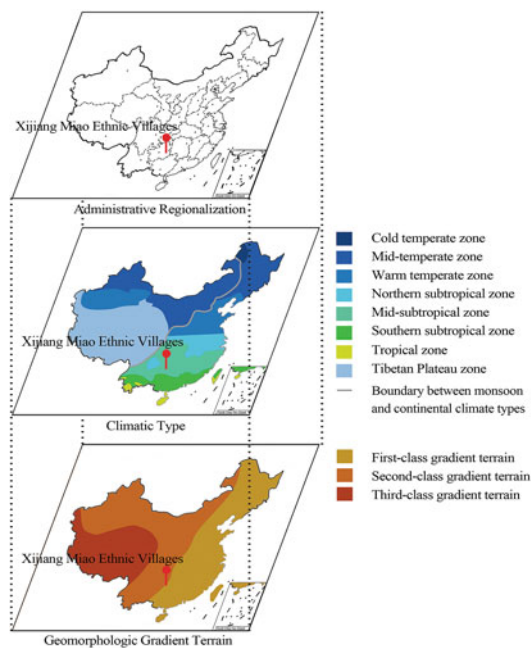
The Hani ethnic villages comprise the ideal adaptive response to the surrounding natural environment, pairing a unique “forest-river-village-terrace field” three-dimensional structure with the indigenous design of the mushroom houses. For thousands of years, villages and terrace fields together have formed a complete ecosystem.

2.3 Xijiang Miao Ethnic Villages: Thousands of *Diaojiaolou* of Column-and-Tie Construction⁵

Location: Leishan, Guizhou Province

Key Geographical Concept: Architectural responses to the sloping terrain

The Xijiang Miao ethnic villages adapt to the local geographic natural conditions, the available building material resources and the varying economic levels through various strategies of construction. Among these, the timber-framed *diaojiaolou* in the southeastern Guizhou Province has the highest adaptability to the rugged terrain.



⁵**Column-and-tie construction** is a typical style of traditional Chinese timber structures in which columns and beams are connected by mortise and tenon joints.

Geomorphologic Features

The Miao ethnic villages in Xijiang are located in Leishan County on the sloping transition zone between Yunnan-Guizhou Plateau and the basin areas in Hunan and Guangxi Provinces, where the terrain is mainly mid-mountain (Editorial Committee on the Leishan County Records 1992: 74–75). Because this region holds more mountainous landforms than plains, the use of terraced fields in agricultural production is common. To fully utilize the farming territory, the villages are mainly built in mountainous areas or near rivers and are usually found on sloped riverbanks (Fig. 2.24). Meanwhile, by means of the *diaojiolou* construction style, these villages avoid the negative impacts of the sloping terrain and floods (Figs. 2.25 and 2.26).

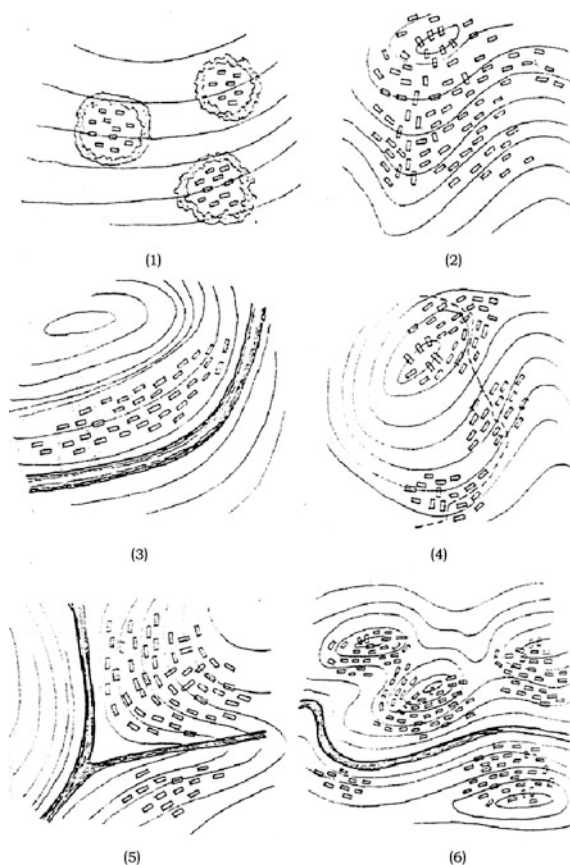
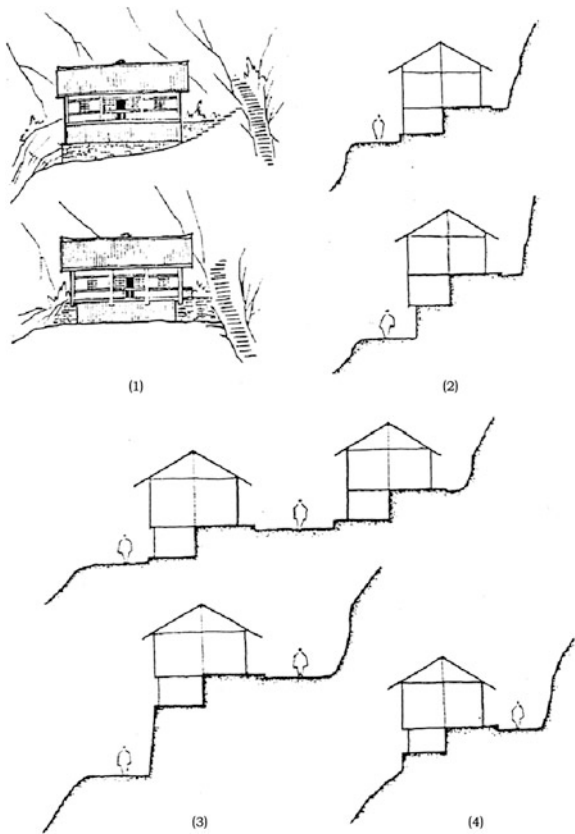


Fig. 2.24 The settlement patterns of Miao ethnic villages. The six main forms are (1) sub-groups, (2) entirety, (3) strips, (4) bunches, (5) attachments, and (6) clusters. Source Wang (2005: 32)



Fig. 2.25 The Xijiang Miao ethnic villages completely conform to the mountain slope to be harmonious with the geography of the site. Visually, the settlement pattern reveals a spectacular pyramid in the residential building group. Both the overall layout and the environment of the villages connote a strong sense of ethnic identity. *Source* Photograph by Ye Wang, provided by Ming Jiang

Fig. 2.26 A diagram of the roads and houses in the Miao ethnic villages. The set of images includes four perspectives: (1) front ridge and rear cliff with roads by the house, (2) front road and rear cliff, (3) both front and rear roads, and (4) front ridge and rear road. *Source* Wang (2005: 35)



Climatic Features

The Xijiang Miao ethnic villages lie in the northern subtropical monsoon humid climate zone. Due to the uneven terrain near Leigong Mountain to the south of the villages, the airflow from the north undergoes a warming process; thus, the climate at the villages is warm, with low humidity and plentiful sunlight (Editorial Committee on the Leishan County Records 1992: 76).

Vegetation Features

The local native vegetation here is a mix of subtropical evergreen broad-leaf forest and subtropical evergreen deciduous forest. The forests are dense and are mainly filled with red *Castanopsis*, large-leaved *Castanopsis*, eyreis, yews and oaks. The climatic conditions in the Xijiang area are suitable for agricultural production. Either one or two crops a year are cultivated in this zone. Residents in this region typically make use of terraced fields for agricultural production.

Cultural Features

Xijiang is a transliteration from the Miao language and originally referred to the location of the Western branch of the Miao people. It is the largest Miao ethnic village cluster in China and the residence of thousands of Miao families. Therefore, it is known as the capital of the Miao people. Xijiang is marked by its villages, which are built on the mountain slopes; its paddy fields, which lie along the dam; and its terraced fields, which are built up in layers along the dam. The tradition of rice cultivation in this region led to the rice culture that has so significantly influenced Miao worship traditions. Traditional Miao myths reveal a harmonious view of the world in which everything is homogeneous and all species coexist without conflict. The Miao people believe that every object has a soul and is immortal. Thus, they believe in primitive religions such as nature worship, totem worship, and ancestor worship. Meanwhile, they advocate harmony between humanity and nature.

The Xijiang Miao ethnic villages consist of five smaller settlements, all located in river valleys surrounded by mountains. To the southwest are steep, high mountains that have acted as a barrier against the cold wind and helped maintain the tranquility and safety of the Miao settlement for thousands of years. To the northeast is a gentle slope, and the villages are built near running water and on low hillsides, slopes or mountaintops. Life on a hillside offers easier access to firewood, the harvest and other natural resources. Keeping a certain distance from the valley below means village inhabitants can avoid the impacts of flash floods, landslides, avalanches and other natural disasters (Zhang 2010). Influenced by an ethnic psychology that combines honesty and pragmatism with the necessity of defending against intruders, the Miao people choose to build their homes beside mountain ranges stretching for thousands of miles (Fig. 2.27).

The Xijiang Miao ethnic villages fully reflect their surrounding geographical features. Due to its local ubiquity, maple wood makes up nearly all construction materials. The *diaojiaolou* are distributed on mountain slopes, making a forest of wooden buildings. All load-bearing and external structures are wood-framed.



Fig. 2.27 The Xijiang Miao ethnic villages compose the largest Miao ethnic village cluster in China. A total of 1,080 Miao families—nearly 6,000 people—make their homes here. It is a unique location where the Miao ethnic ecological culture has been completely preserved and is known as “China’s Miao Culture and Art Museum”. *Source* Photograph by Ye Wang, provided by Ming Jiang

Fig. 2.28 A close-up view of the Miao ethnic villages. The rear facade of a Miao residence is designed in a simple and rugged, but tidy, fashion. The neat carvings of floral patterns and columns make the facade even more beautiful. The design is simple and austere, integrating well with the environment. *Source* Photograph by Ye Wang, provided by Ming Jiang



Outer walls and roofs are covered in gray tile, bark or thatch (Lu 2003a) (Fig. 2.28). The choice of building material not only takes advantage of the rich local wood resources in the Leigong Mountain area but also reflects the residents’ religious devotion to the maple trees.

Local craftsmen, inspired by traditional stilt-style architecture, give full rein to their ingenuity in creating the column-and-tie construction with a gable-and-hip roof,⁶ which incorporates mortise and tenon joints and integrates basic components such as the column, tie beam and purlin. The surrounding natural environment contributed to the development of the column-and-tie construction, which is simple and highly stable. The components of this construction style can compensate for weak timber and create a magnificent landscape of houses in layers and rows.

The Miao ethnic dwellings in southeast Guizhou exist in three categories: one-floor, overhead, and half-suspended. Xijiang Miao architecture has ingeniously adapted to the local terrain: “half-suspended house” is literally translated as “the single-story house that be lifted” in the Miao language (Lu 2003a). Miao architecture takes full advantage of bedrocks with different elevations, leveling house foundations with stone blocks and plinth bases directly above. This style melds the building foundation with the external landscape so smoothly that houses appear to float in the sky (Lu 2003a). From top to bottom, the architecture moves from natural to artificial, the transition of which is comfortable, proper, and delicate, like the works of a deity. The construction technique comprises not only a display of harmony between the architectural grouping and the natural landscape but also a unique and inventive local architectural style.

Extended Reading: Characteristics and Distribution of *Diaojiaolou*

Diaojiaolou is a type of stilt-style architecture. This residential form was invented by mountain dwellers to adapt to the natural conditions of large slope gradation. Its main identifying characteristic is that a component of the house structure is supported by stilts connected to the ground at points while the rest of the house is supported by the slope or cliff (Han 2010). *Diaojiaolou* is mainly distributed in the southwest provinces, including Guizhou, Guangxi, Hunan, and Sichuan, where there exist many ethnic minority settlements such as the Miao, Dong, Zhuang, Buyi, Tujia, etc. (Lu 2008a). The ethnic minority people all make use of this unique type of residential architecture. Because of regional differences in natural conditions and ethnic culture, *diaojiaolou* exists in many different styles. For instance, the “井-shaped Courtyard *diaojiaolou*” of the Tujia people in the Wulin region has the double characteristics of both stilt-style architecture and cave dwelling courtyard. Houses in Fenghuang, west of Hunan, are built on the riverbank and are supported by densely arranged stilts in the water. Like all other distinctive *diaojiaolou*, the various *diaojiaolou*, including one-floor, overhead, and half-suspended, in the Xijiang Miao ethnic villages represent the inventive heritage of the Miao ancestors under a diversity of geographical circumstances.

⁶**Gable-and-hip roof** is a typical roof style in traditional Chinese architecture, usually comprising four sloping roofs with two large roof sections in the front and back, whereas on each of the other two sides is a smaller roof section with a gable.

Diaojiaolou are vertically divided by functions: the bottom floor (the overhanging part in the front) is usually used for feeding livestock, stacking firewood and agricultural instruments, and storing fertilizers. The second floor is for residential use, mainly including bedrooms, a central room (a living room) and a hearth corridor. The top floor is reserved for food storage and drying clothes (Fig. 2.29). Miao ethnic residential buildings usually employ a central room or hearth, whereas the corridor, which is an extension of the central room, is arranged as the main center of family activity. The villages usually also feature public constructions, such as a village gate, a Drum Tower, a pedestrian bridge, memorials, an ethnic music ground and a Miao-style boat shed (Figs. 2.30 and 2.31). In the Langde Upper

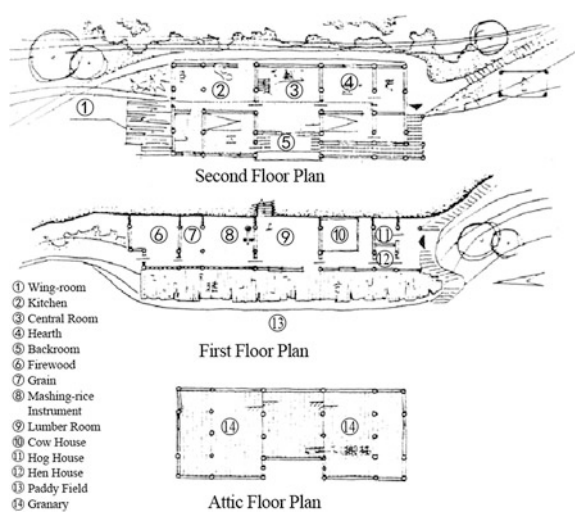


Fig. 2.29 The floor plan drawings of a house in Kaijue Village, Leishan County. This “half-suspended house”—a type of Miao stilt-style housing—is arranged parallel to the contours of the land. One part of the house rests on the cliff while the rest extends over the support of multiple stilts. The bottom floor in the house is used for grain storage and livestock feeding. The compartment is used for storing grain. The second floor, which includes a central room, bedroom, hearth, and kitchen, is mainly residential. *Source* Wang (2005: 40)

Fig. 2.30 The Drum Tower of the villages is a Miao landmark, as well as the main location for multiple public functions. It is often used for worship, meetings, communication, and entertainment. The most typical example is the Tonggu Space in Langde Upper Village, Leishan County. *Source* Photograph by Ye Wang, provided by Ming Jiang



Fig. 2.31 The pedestrian bridges in the Miao ethnic villages are mostly “bench bridges” that can act as spaces for public communication. Its function is similar to that of the Wind and Rain Bridge of the Dong nationality, although this example is simpler in structure. *Source* Photograph by Ye Wang, provided by Ming Jiang



Village in Leishan County, the front, middle and rear village gates act as symbolic boundaries as well as the entrance and exit of the village.

The natural beauty of the Xijiang Miao ethnic villages’ *diaojiaolou* creates an elegant and serene landscape, which serves practically to preserve farmland but also to create a comfortable living environment. For thousands of years, the Miao people have begun and finished their workday with the rising and setting of the sun. The tranquility of this daily routine and the richness of the local ethnic customs are both reflected in the simple but beautiful Miao houses and yards.

Geographical Interpretation

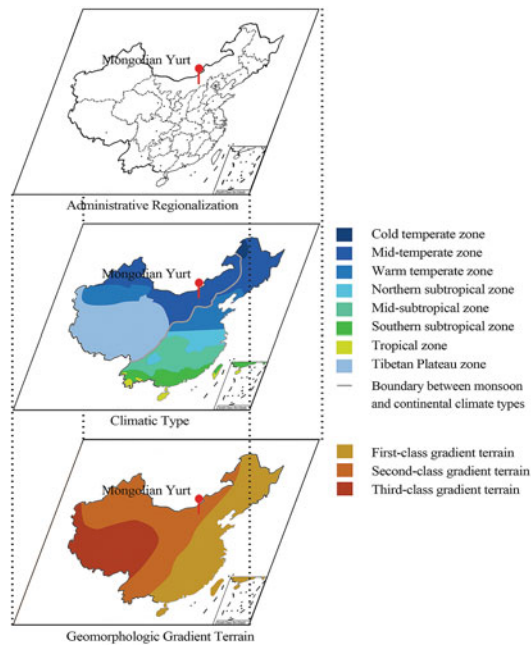
The Xijiang Miao ethnic villages sit in a river valley conforming to the mountain slope to be harmonious with their geographical site. To adapt to the local environment, the Miao people have taken advantage of the mountainous terrain and have adopted a variety of innovative architectural and agricultural techniques. The architectural form of the *diaojiaolou* reflects the Miao necessity of building efficiently against the mountain slope, as well as the skillful incorporation of techniques such as davit, overhanging, and corner cutting. Upon walking out of a house onto the Xijiang alleys, one can see the winding roads leading to the tops of the mountains. The sky seems close at hand from these airy heights.

2.4 Mongolian Yurt: Transition from Nomadic to Settled Life⁷

Location: Inner Mongolia Autonomous Region

Key Geographical Concept: Architectural responses to the changes of productivity and living styles

The Mongolian yurt once served as a residence for Mongolians nomads. However, with changes to the nomadic way of life, the Mongolian yurt is changing as well.

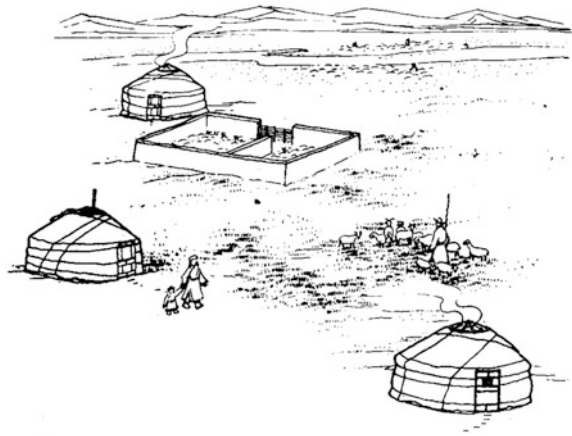


Geomorphologic Features

Inner Mongolian Autonomous Region is extremely vast and consists mainly of a plateau landscape. The eastern plateau is mainly grassland, and a desert lies to the west. The nomadic people live wherever water and grass exist, and the Mongolian yurt has thoroughly adapted to this way of life (Fig. 2.32).

⁷The original manuscript for this case was published in *Community Design*, 2009 (3): 76–82, (in Chinese). Now, its content in this book is improved.

Fig. 2.32 The external form of the Mongolian yurt, including its rounded base and conical roof. The very tip of the cone plays the dual part of skylight and chimney. The yurt walls are windowless. Mongolian yurts as residences for nomads are scattered across the Inner Mongolia Grassland. Source Liu (1984: 340)



Climatic Features

Because the Inner Mongolian Plateau is so far inland, the warm and humid summer monsoon from the southeast loses its moisture before reaching the plateau; during the winter, however, the cold Siberian wind drives straight through to the plateau. Therefore, the Inner Mongolian winter is long and cold, whereas the summer is warm and short with heavy sandstorms, and the annual rainfall is scarce and unpredictable. The Mongolian yurt fits well with this type of climate and plays a part in wind- and cold-proofing while still letting in sufficient sunlight.

Vegetation Features

Mongolian yurts are scattered across China's temperate grassland zone. Over the vast grassland are distributed many varieties of herbaceous plants with unique properties. These plants, in their great variety, adequately serve nomadic subsistence needs in all seasons. For example, the *Stipa-Artemisia* grassland, with its large coverage rate and tall plants, support the grazing in winter, whereas the late-drying and juicy *Allium* plants support the grazing in autumn (Wang 2000b).

Cultural Features

The continual tension between farmers and herdsmen since the Qin (221–207 BC) and Han (202 BC–220 AD) Dynasties and the Qing bureaucracy's different governance policy over the Mongols and the Han have kept the Mongolian Plateau relatively separate from the Han nationality Farming culture, so the inhabitants of the plateau have independently developed their own nomadic grassland culture (Fig. 2.33). A lifestyle with no fixed place of residence has given the sun an important position in the herdsmen's lives. The theme of sun worship frequently appears in the Mongolian shamanistic tradition, which is their primitive religion, and the timing of nomadic daily routine is wholly dependent on the rising and setting of the sun. Another important symbol in Mongolian culture is the character of Genghis Khan (1162–1227), whose tomb took the form of a typical Mongolian yurt (Fig. 2.34).

Fig. 2.33 Above are shown a Mongolian yurt and the traditional heavenly platform, which is used for ancestor worship by Mongolian families. Religious traditions are an important part of the colorful nomadic culture, which appears quite harmonious with the yurts. *Source* Photograph by Yong Yang



Fig. 2.34 Genghis Khan's tomb—"Mausoleum Yurt"—took the form of a typical Mongolian yurt. The Mausoleum Yurt was protected by the Tarhaad, who were the guard of the Genghis Khan's tomb from generation to generation. Now, due to its cultural legacy and significance, it is used for worship. *Source* Photograph by Yong Yang



Over the course of the migratory Mongolian existence, herdsmen were unlikely to maintain a fixed place of residence; thus, the portable Mongolian yurt came into being. The main components of the Mongolian yurt include a skeleton with skylight, an internal mesh wooden structure, a rafter connecting the skylight and the wooden structure, and an external felt and rope belt (Liu 2005). The quick and easy construction of the yurt includes first fixing the internal mesh wooden structure in a round layout, then mounting the skylight skeleton and the rafter above the wooden structure, and finally surrounding the structure with felt and binding it on with rope (Figs. 2.35, 2.36, 2.37 and 2.38). The greatest advantage of the yurt is its easy construction and transportation, as well as the fact that each component is very lightweight and flexible, which is convenient for the rapid and constant movement of the nomadic people (Fig. 2.39).

The nomadic lifestyle is dependent upon the publicly shared grasslands (Junichi 2004). Before the founding of the People's Republic of China in 1949, the grasslands belonged to the aristocracy, and herdsmen migrated within the scope of

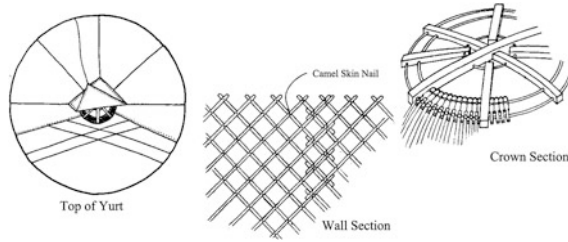


Fig. 2.35 Schematic diagrams of part of the yurt structure. The yurt materials include animal products and timbers. The felt coating over the wooden skeleton is made of sheepskin, and horsehair ropes are used to bind the felt, with camel skin nails to attach the network of battens. The skylight at the top of the yurt is also nailed on with battens. The angle between the battens is always the same. Herdsmen can tell time by interpreting the shadow of sunlight through the yurt skylight. *Source* Liu (1984: 340)



Fig. 2.36 The quick and easy construction of the yurt includes first fixing the internal mesh wooden structure in a round layout, then mounting the skylight skeleton and the rafter above the wooden structure, and finally surrounding the structure with felt and binding it on with rope. The whole process involves only a few individuals. The felt is rolled either up or down to keep the inner room warm in winter and cool in summer. *Source* Photograph by Yong Yang

Fig. 2.37 The Genghis Khan Mausoleum exhibit in the Mongolian History and Culture Museum; this image displays the framework of the Mongolian yurt. The main components of the yurt can be seen: the skylight skeleton and rafter in the upper part and the internal mesh wooden structure in the below section are made of battens, which are conveniently flexible. *Source* Photograph by Fang Wang





Fig. 2.38 A view of the yurt skylight. Because the skylight serves as a ventilated exhaust mouth and the only source of visible sunlight except the entrance, the skylight is used to tell the time of day and is elegantly decorated. *Source* Photograph by Yong Yang



Fig. 2.39 When the Mongolian yurt is transported, it is separated into different sections. Each section can conveniently be carried by a single individual. *Source* Photograph by Yong Yang

aristocratic jurisdiction (Bao 2000). However, since the reform and opening-up in 1978, with the implementation of the contracted management and herd privatization system, the grasslands are permanently owned on an individual basis. Following this policy change, production modes of settlement and grazing in turns with a combination of planting and animal husbandry have gradually replaced the system of nomadic seasonal grazing. With the disappearance of the nomadic lifestyle, the Mongolian yurt has been transforming from a portable to a fixed structure (Fig. 2.40).



Fig. 2.40 Mongolian yurts on the Xilamuren grassland, Inner Mongolia. Within the vast expanse of green and yellow prairie, the white yurts are very eye-catching. They are arranged in the direction of the sun, which rises in the southeast. In a nomadic lifestyle, every family needs a certain section of grassland area for feeding their livestock, so the Mongolians seldom live in close proximity, and yurts are separated by some distance. As the nomadic lifestyle gradually disappears, herdsmen have begun to live closer together. *Source* Photograph by Lianhu Gong

Extended Reading: Nomadic Migration

Nomadic migration refers to a life pattern that is orchestrated around the wise and efficient use of grassland and periodic migration according to environmental and seasonal variation. Throughout history, grasslands nationalities in China have changed from generation to generation, but nomadic people, from the Huns to the Turks to the Mongols, all relied on the prairie, moved with the sun, and lived the traditional nomadic life (Han 2003). Nomadic activity is divided into large-scale nomadism and small-scale nomadism. In winter, the vegetation withers, and only grass that has been sufficiently well-preserved from other seasons can be served as food to the animals. Therefore, the herdsmen separate the pastures into winter and summer camps. Some locations are even divided into four camps: spring, summer, autumn and winter. The type of nomadic migration among different camps within the span of a single year is referred to as large-scale nomadism. Nomadic migration within one camp based on the changing stages of pasture growth is called small-scale nomadism. Due to the wide variety of different pasture, water, and agricultural conditions in different areas, migrations can occur from 5–6 times to 60–70 times within one year (Wang 2000b). It was during the process of frequent migration that Mongolian herdsmen created the yurt. Furthermore, this portable architectural form has formed a unique characteristic of the grassland culture (Fig. 2.41).



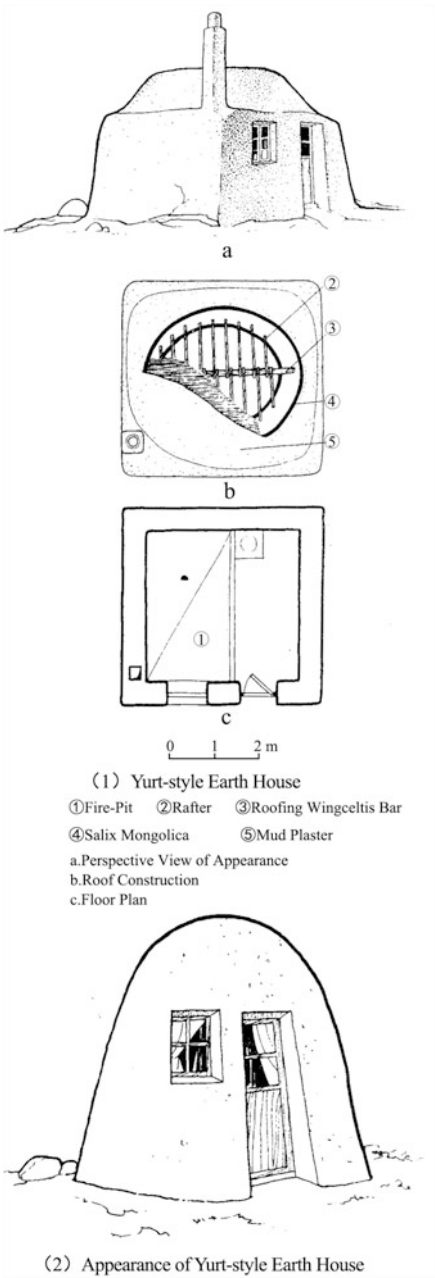
Fig. 2.41 The Mongolian yurt is the home of grassland herdsmen. Where the sheep go, the yurt moves. Enclosing yurt settlements, wooden fences form spaces called the yards. The yurts and yards together provide a home for the herdsmen and their animals. *Source* Photograph by Fan Yin

Due to the influence of the nearby culture of the Han nationality, Mongolian dwellings gradually developed toward the Han pattern and became fixed in place. First, yurt construction traditions began to change. Currently, when the felt covering of a yurt is torn, people no longer use a new cover to replace it but smear the location of the tear with grass and mud (Wang 2000a). The internal wooden framework has been replaced by soil walls. Finally, the interior structure has changed as well, to include a fixed fireplace inside the yurt and a smaller skylight that has lost its original functions. The yurt walls now bear windows, in contrast to true traditional Mongolian yurts. This type of dwelling is now called a yurt-style earth house (Bai 2004) (Fig. 2.42).

Although the form of the Mongolian yurt has changed, the cultural message contained in the architecture has been preserved. The internal spatial organization has changed to include elements such as fixed fireplaces, but the general plan pattern is not dramatically different. The Mongolian people believe in Tibetan Buddhism and set the Buddha statue at true north in their own yurts. The nomadic lifestyle maintains a gendered division of labor, and the earth houses are still divided between the man's side on the east and the woman's side on the west (Fig. 2.43). In the cold winter of the Inner Mongolia Plateau, fire is of unparalleled significance to Mongolian subsistence, so the fireplace located in the middle of the earth house still represents the center of life (Fig. 2.44).

Although the Mongolian yurt has today lost its traditional portability, it still widely exists as a traditional architectural symbol among the modern buildings in the Inner Mongolian Region (Figs. 2.45, 2.46 and 2.47). The nomadic life may be irrevocably disappearing, but the yurt cannot be replaced as an element of the Mongolian culture (Fig. 2.48).

Fig. 2.42 Diagrammatic drawings of the appearance and structure of the yurt-style earth house. These earth houses mostly appear in the Mongolian and Han combined regions, where the nomadic culture has been influenced by a cultivation culture. The insides of these dwellings already include fixed fireplaces and side-windows. Only the general appearance and some structural elements resemble those of the Mongolian yurt. *Source* Institute on the History of Nature Science, Chinese Academy of Sciences (1985: 360)



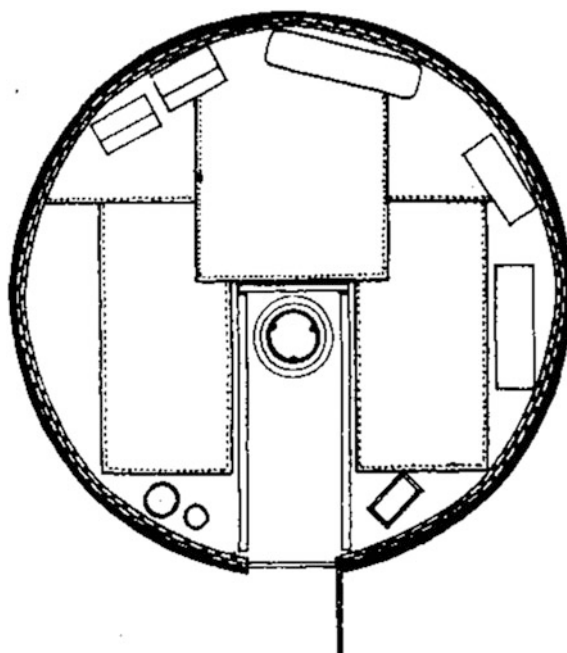


Fig. 2.43 Schematic diagram of the Mongolian yurt. The yurt opens its door to the southeast and holds the fireplace at its center. The northern space of the yurt is considered the home of Buddha. The east is the man's side, where men's work tools are kept. The west is the woman's side, where the objects of women's work, such as water, rice and bowls, are kept. *Source* Liu (1984: 340)



Fig. 2.44 Cross-section perspective of the Mongolian yurt. Its main components are the skeleton with skylight, the internal mesh wooden structure, the rafter connecting the skylight and wooden structure, and the external felt and ropes. The inside fireplace faces the skylight right above, through which the smoke from the fireplace is let out. *Source* Liu (1984: 340)



Fig. 2.45 A Mongolian yurt used for tourists in Siziwang Banner, Inner Mongolia. As a tourist facility, the yurt here is a permanent and immovable structure. *Source* Photograph by Lianhu Gong



Fig. 2.46 More Mongolian yurts as the reception facilities in a scenic area. As an important cultural symbol of the Inner Mongolian Region, the yurts play an irreplaceable role in tourist activities. However, for economic and construction considerations, these yurts no longer use traditional building materials but have replaced these with permanent cement walls, side-wall windows and a largely reduced skylight area. They only preserve the general appearance and decoration of the traditional yurt. *Source* Photograph by Lu Liu

Geographical Interpretation

Within the Mongolian ecosystem, the nomadic people developed a smart lifestyle to adapt to their natural environment, and the Mongolian yurt came into being as a component of the grassland system. Along with the gradual loss of the nomadic lifestyle, the traditional residence—the Mongolian yurt—has also gradually



Fig. 2.47 A tourist reception facility for tourists in Siziwang Banner, Inner Mongolia. As the most distinctive cultural symbol of the Inner Mongolian Region, the yurts' structural components and conformation have been applied to many buildings with other functions, not limited to residential ones. *Source* Photograph by Lianhu Gong



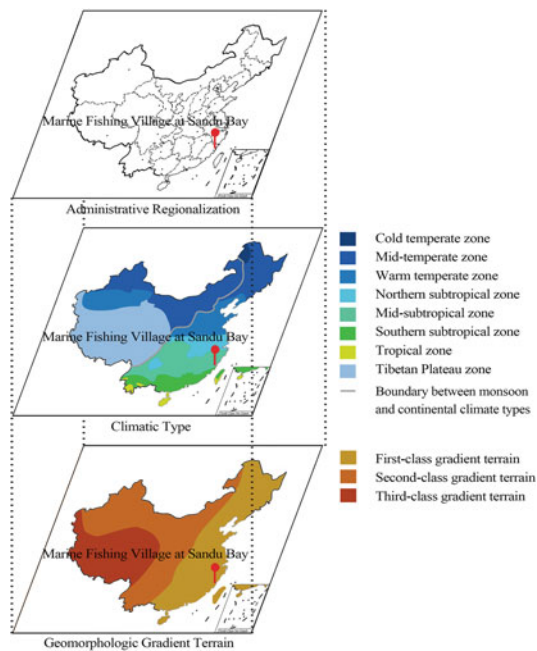
Fig. 2.48 The Inner Mongolian grassland in the morning mist. The grassland has remained unchanged, but the nomadic inhabitants living in the grassland have gradually come to accept more modern ways of life, from fixed settlement patterns and grazing in turns to occasional tourist activities. At the present time, fewer and fewer herdsmen continue with the traditional nomadic way of life, and the future landscape of the grassland is closely bound up with the lifestyle the herdsmen will choose. *Source* Photograph by Fan Yin

transformed from portable to permanent. However, although social and lifestyle adjustments on the plateau have influenced changes in residential structures, the Mongolian yurt as a unique cultural element will maintain its legacy.

2.5 Marine Fishing Village at Sandu Bay: A Village Floating on the Sea⁸

Location: Ningde, Fujian Province
Key Geographical Concept: Architectural responses to the changes of productivity and living styles

Fishermen at Sandu Bay once lived on houseboats, but after their primary occupation changed from farming to breeding, the fishermen began to settle in cottages built above fishing rafts on the bay.



Geomorphologic Features

Sandu Bay is located at the estuary of three rivers in Ningde City, Fujian Province: the Huotong, the Qidu, and the Saijiang Rivers. The estuary outside protects the island by blocking the roughest waves from the outer sea (Fig. 2.49), leaving a

⁸The original manuscript for this case was published in *Community Design*, 2009 (3): 83–85, (in Chinese). Now, its content in this book is improved.

Fig. 2.49 The coast of Sandu Bay is mostly bedrock with steep cliffs. Because these conditions are not suitable for agricultural production, coast-dwellers on Sandu Bay make their living mainly from fishing. *Source* Photograph by Bihu Wu



Fig. 2.50 Sandu Bay is a naturally excellent harbor, with deep, calm water and a narrow entrance. These conditions are optimal for the spawning migration of the large yellow croaker and thus also for the local development of the fishing industry. *Source* Photograph by Zhongwei Chen, provided by Lin Yan



narrow entrance to the wide, deep, and calm water of Sandu Bay—an ideal location for the spawning migration of the large yellow croaker. Guo Moruo (1892–1978), a poet, author and historian, wrote, “Sandu Bay as a good harbour is unique in the world, and its deep water and broad bay are like heavenly lake” (Fig. 2.50). Today, the large yellow croaker is widely popular in Ningde City and is bred in fishing net cages, and marine fishing villages for breeding are built on criss-crossed fishing rafts.

Climatic Features

Sandu Bay has a humid climate with maritime monsoon characteristics. Typhoons and floods pose a constant threat, which contributes to the large quantity of river runoff and the plentiful supply of nutrients that are carried to the estuary, providing adequate resources for the fish in Sandu Bay.

Fig. 2.51 Visible from above Sandu Bay, fishing rafts are connected in a criss-crossed formation, with cottages built directly above the rafts. This scene is reminiscent of a countryside landscape with fields and gardens. *Source* Drawing by Wen Zhang, provided by Yaogen Peng



Cultural Features

The use of coastal fisheries at Ningde can be traced back to the Ming Dynasty (1368–1644), although it was primarily developed during the subsequent Qing Dynasty (1644–1911). However, the fishing ports at Sandu Bay did not exist before 1971, as the fishermen had originally lived on houseboats, drifting in the sea year-round (Editorial Committee on the Ningde Municipal Records 1995: 240–242). The bay is a producing area of the large yellow croaker. Due to the promotion of cage breeding strategies, which began in 1989, fishermen have largely switched from a houseboat lifestyle to a more permanently settled cabin lifestyle (Fig. 2.51).

In areas where the coastline is parallel to natural geological contours, the coast is controlled by the fault and then develops bedrock. In Sandu Bay, the island sea coast is a forbidding shoreline with a steep slope reaching into deep seawater. The bay provides a natural choice for the large yellow croaker’s migration and spawning.

Seen from a distance, the water of Sandu Bay appears boundless. A slice of starlight transforms into flashes of fire on the fishing boats, and the marine fishing village is faintly visible. The boundless sea seems to be a wide land, and the villages above the sea are built on uncluttered fishing rafts (Fig. 2.52). The cabins

Fig. 2.52 When night falls, the setting sun paints the surface of the bay red. The tide rises and floods the fishing rafts. In this image, wooden houses and net cages for breeding the large yellow croaker appear as floating balls on the calm sea. *Source* Photograph by Zhongwei Chen, provided by Lin Yan

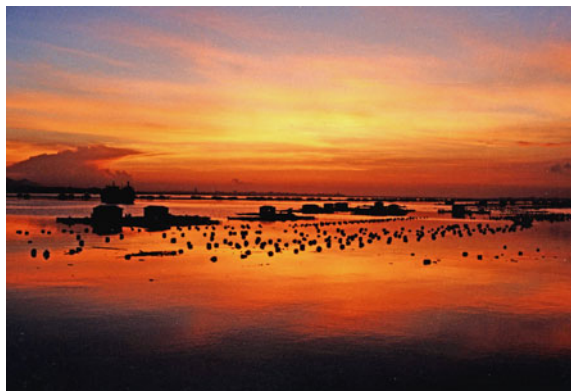


Fig. 2.53 In Sandu Bay marine fishing village, every family's residence is built beside his own net cages.

Source Photograph by Bihu Wu



dotting the surface of the bay are connected with waterways between the criss-crossed rafts. Fishponds and net cages at the front and back of every house are put to use breeding the large yellow croakers (Fig. 2.53).

The unique geographical features of Sandu Bay have turned the surrounding Guanjingyang Sea into a well-known spawning field for the large yellow croaker that is famous throughout the country for the high total outputs of this species. In 1949, the total fishing output for Ningde was 1,214 tons, of which the quantity of large yellow croaker during the flood season reached 788 tons. After this point, the yellow croaker catch has risen year-by-year, and by the 1970s, this number reached more than 3,000 tons (Editorial Committee on the Ningde Municipal Records 1995: 240–242). The large yellow croaker begins to spawn over the month between the beginning of summer and the summer solstice. During this period, all of the fishermen from Fujian to Zhejiang Province come to fish at Sandu Bay, and the number of fishermen can reach as high as 20,000.

Extended Reading: Artificial Breeding of Large Yellow Croaker

The large yellow croaker is classified in Osteichthyes, Perciformes, Sciaenidae, and Pseudosciaena, and it is commonly called the cucumber fish, red melon, yellow croaker, yellow fish, etc. (Miao 2008). It is a local species unique to China and has been called one of the “four marine economic fish” of China. Today, the artificial breeding of deep sea fish, including the large yellow croaker, has become one of the primary industries to the east of Fujian Province. Artificial breeding includes two different methods: pond breeding and seawater breeding in a net cage. Pond breeding involves placing large fish species inside shrimp ponds or old docks with a sufficiently deep water level (more than 2.5 m). Seawater breeding in a net cage, which is more widespread (Fig. 2.54), involves using bamboo, synthetic materials, and



Fig. 2.54 A fisherman feeding the large yellow croaker. Wooden boards placed in a square grid formation make it convenient for fishermen to attend to all of their large yellow croaker cages, whereas the fishing net is used to avert the possibility of the large yellow croaker escaping in the rising tide. *Source* Photograph by Zhongwei Chen, provided by Lin Yan

metal as net materials, assembling a box of a certain shape. When setting into the sea, it can rely on the fluctuations of the tide to facilitate water exchange and keep the fish fed with artificial supplements (Jing 2010). However, due to the difficulties associated with high-density breeding in traditional long-term sea cages in deep water, rough wind and waves often deteriorate cages. Moreover, it may result in a deterioration of water quality after high density, long-term breeding (Xu 2004). Fishermen in recent years have adopted a new mariculture technology known as deep-sea cage breeding. This technology includes the features of enhancing higher capacity breeding and resisting rough wind and waves and can be used for installation in deep seas. China began to implement deep sea cages for the first time in 1998, and their effects have been remarkable. At present, the Sandu Bay area is striving to develop a deep-sea cage culture to improve fish quality.

As the current levels of excessive fishing have brought the large yellow croaker to near extinction, the government has issued a ban to restrict fishing of this species (Editorial Committee on the Ningde City Records 1998: 367). In 1989, the Ningde

Fig. 2.55 A close-up view of Sandu Bay fishing rafts reveals the cages connected in a grid shape, with the fishermen's cabins built directly on the grid foundation and floating on the water. *Source* Photograph by Bihu Wu



City Government first attempted to adopt a deep-sea cage culture, and after the first approximately 10 cages were successfully tested, more than 20 years of development have increased the fish breeding quantity year after year, the vast majority of which contain the large yellow croaker (Liu 2007) (Fig. 2.55).

At present, fishermen at Sandu Bay make a living mainly through breeding the large yellow croaker. Traditionally, they lived on house boats, but the promotion of cage culture in Sandu Bay has transformed the dwelling spaces to facilitate the feeding and care of the farmed fishes. Not only are residential cabins built on the fishing rafts, but supermarkets and restaurants also float on the fishing rafts and cater to approximately 8,000 residents, making the fishing rafts just as complete a village as on land (Fig. 2.56). As the saying goes, “A sparrow is small, but complete”. The boards between the fishing rafts are streets with fishing boats, sampans, and even floating plastic boards as instruments of transportation shuttling residents

Fig. 2.56 The fishing families are all directly interconnected, aptly suiting the nickname “the village on the sea”. The fishing village itself contains streets, doorplates, and even schools, internet bars and karaoke halls. *Source* Photograph by Zhongwei Chen, provided by Lin Yan



Fig. 2.57 The fishing cages are also interconnected. The wooden boards placed on top form the fishing rafts, which then serve as a foundation for the fishermen’s cabins, fresh water tanks, and fishing tools. Every aspect of subsistence for the inhabitants of Sandu Bay is derived from the sea. *Source* Photograph by Bihu Wu



back and forth among the cabins. The whole village relies on the waterway to exchange goods on shore, trading fresh water and daily necessities with fresh-caught fish and shrimp (Fig. 2.57). Light wooden boards are chosen as construction materials because they float well. In an adaptation to the wet and hot climate of Sandu Bay, cabin doors and windows of the barracks are simply constructed and serve as ventilation.

Geographical Interpretation

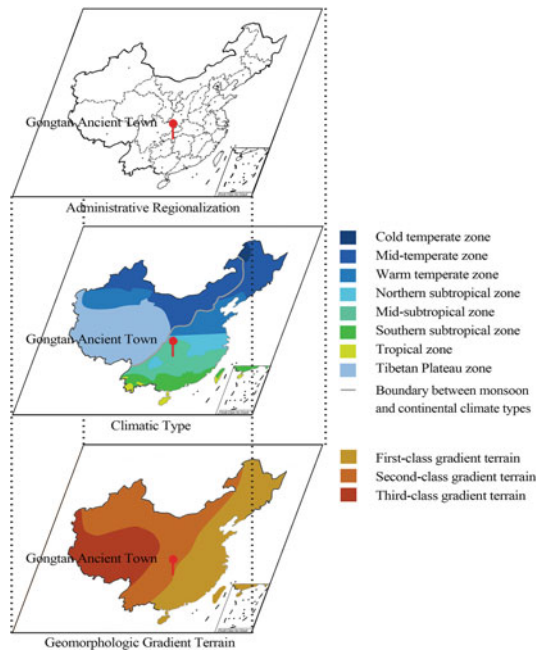
From fishing to breeding and wandering to settling down, changes in production styles lead to changes in residential styles. The people in Sandu Bay survive in their floating lifestyle through hardship and bounty, both of which are affected by the natural environmental features of the bedrock coast. As a village on the bay, it is compatible in every way with the sea that provides its means of survival.

2.6 Gongtan Ancient Town: *Diaojiaolou* on a 40° River Bank

Location: Youyang, Chongqing

Key Geographical Concept: Architectural responses to the sloping terrain

Gongtan Ancient Town has an extremely steep terrain with a slope of more than 40°. *Diaojiaolou* is a unique building form adapted to this precipitous landform.



Geomorphologic Features

Gongtan Ancient Town is located 75 km west of the downtown district of Youyang County at the confluence of the Wujiang and A'peng Rivers and is part of the low hill landform in the southeastern Sichuan Basin (Zhao et al. 2009) (Fig. 2.58). Due to the high mountains, deep valleys, and rapid streams in this area, water transport is preferable to land transport. Gongtan's location at the intersection of these rivers makes it a vital transportation center. To facilitate quay transportation, architectural complexes are mostly arranged along the eastern shore of the Wujiang River. The rugged topography dictates that the local architectural style must comply with the precipitous slopes (Fig. 2.59).

Fig. 2.58 Geographic relationship diagram between Gongtan Town and Youyang County. Gongtan Town is located 75 km west of Youyang County, at the confluence of the A’peng and Wujiang Rivers. *Source* Zhao et al. (2009: 3)

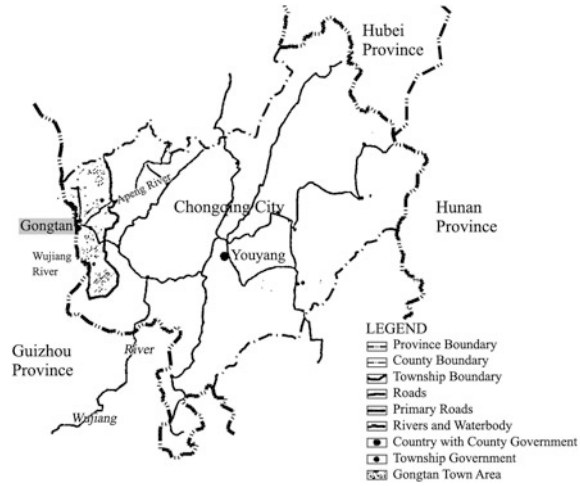


Fig. 2.59 Gongtan is an ancient town with a historical legacy stretching back over 1,700 years. In this distant view of the Wujiang River, the wooden *diaojiaolou* of the Tujia people spreading all over the 40° slope along the riverbank are visible clearly. *Source* Photograph by Bihu Wu



Climatic Features

Gongtan Ancient Town lies in a region of subtropical monsoon climate, featuring hot summers with dense rainfall and warm winters where the temperature is usually above 0 °C (Fig. 2.60). Ditches throughout town serve the purpose of drainage, and *diaojiaolou* style keeps out the humidity.

Fig. 2.60 Gongtan always experiences heavy rains, which is the reason behind the extra extension of the village roofs, leaving only a thin strip of sky between the buildings.
Source Photograph by Bihu Wu



Cultural Features

Gongtan Ancient Town was originally part of Hanfu County in Fuling *Jun*,⁹ which was ruled by the Shu State (221–263) during the Three Kingdoms period and has a history of more than 1,700 years since then. Gongtan is mainly inhabited by the Tujia people, as well as the ethnic groups of the Miao, Gelao, Hui, Dong, Buyi and Han (Fig. 2.61). The name “Gongtan” evolved from the combination of “Gong”, the surname of most settlers here during the Tang Dynasty, and “tuan”, which refers to “turbulence”. The economic development of Gongtan owed its success to its position along the watercourse. In the late 1950s, when the dangerous shoals were exploded flat to unblock the channel, the original function of the ancient town declined. Fortunately, the original shape of the town has been preserved intact because of its inaccessible location.

Backed by Fenghuang Hill and faced with the Wujiang River, the location of Gongtan Ancient Town is in extraordinary accordance with the traditional Chinese town placement concept of “Either under the mountains or above the plains”. In a view from far down the Wujiang River, the wooden *diaojiaolou* of the Tujia people are visible along the 40° slope of the riverbank (Figs. 2.62 and 2.63). These houses

⁹*Jun* (lit. commandery or prefecture), was a traditional administrative division in China from the Warring States period (475–221 BC) until the early Tang Dynasty (618–907). Before the Qing Dynasty (1644–1911), it was smaller than a county, and it was larger than a county afterwards. Since the Tang Dynasty, it has been called “*Fu*”.

Fig. 2.61 Schematic diagram of natural and cultural boundaries of Gongtan Town. Gongtan Ancient Town was initially the residence of the Ba people, and today the Tujia people make up the majority of the local residents. *Source* Ji (2007: 384)

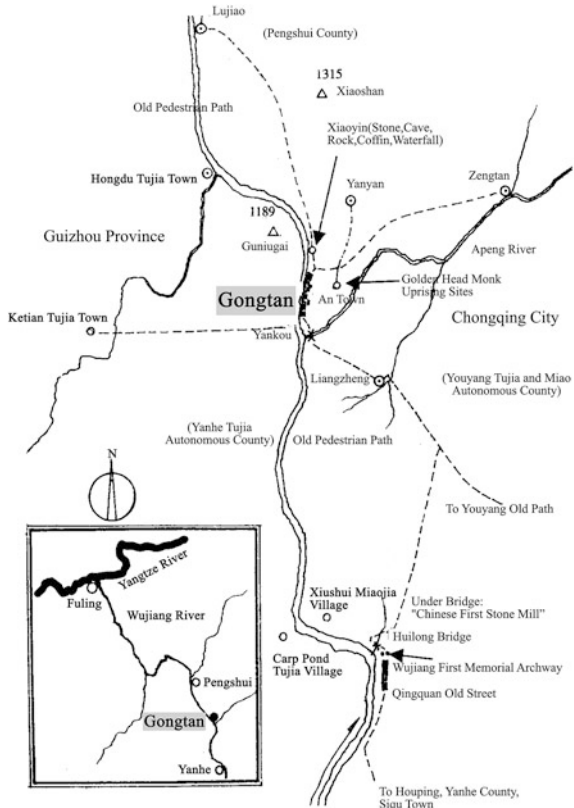


Fig. 2.62 Gongtan Ancient Town is built along the river, and the wooden *diaojiaolou* are located high up on the cliffs by the riverbank. *Source* Photograph by Bihu Wu



Fig. 2.63 Houses in Gongtan Ancient Town are built on stone foundations and fir columns with the column-and-tie construction. Source Photograph by Bihu Wu



are constructed with stone foundation, rock plinths, fir columns, log girders, and mortise and tenon joints, which constitute an endless landscape of *diaojiaolou*. The huge variety of construction techniques in *diaojiaolou* includes such components as platforms, overhanging outriggers, hanging layers, bridging across, and rocks attachments, all resulting in an intriguing web of pillars and roofs conforming to the mountain slope to be harmonious with their site. Concerning the houses themselves, the side facing toward the river is held up by pillars of different lengths.

Extended Reading: Gongtan, A Vital Transportation Center on the Wujiang River

Gongtan was formerly known as Gongtuan, named after the inhabitants gathering there with a Gong surname and the rapidly flowing (Mandarin: *tuan*) Wujiang River. In the first year (1573) of the Ming Dynasty Emperor Wanli's reign, a landslide in Fenghuang Hill on the east coast of the Wujiang River caused a large number of boulders to roll into the middle of the river, blocking the waterway and forming a dangerous shoal, so Gongtuan was renamed Gongtan (tan, lit. shoal) after that point (He and Feng 2004). Given the steep riverbank slope of 40°, this location was not the ideal choice for a town, but it was the one center of the water transportation systems of Guizhou, Hunan and Sichuan Provinces playing a crucial role in external transportation in Youyang County of Chongqing, even as far northeast



Fig. 2.64 The bluestone roads in Gongtan Ancient Town testify to a long history. Concerning the street system in Gongtan Ancient Town, these lanes are perpendicular to the mountain slope, in addition to the main street, which is parallel to the Wujiang River.
Source Photograph by Bihu Wu

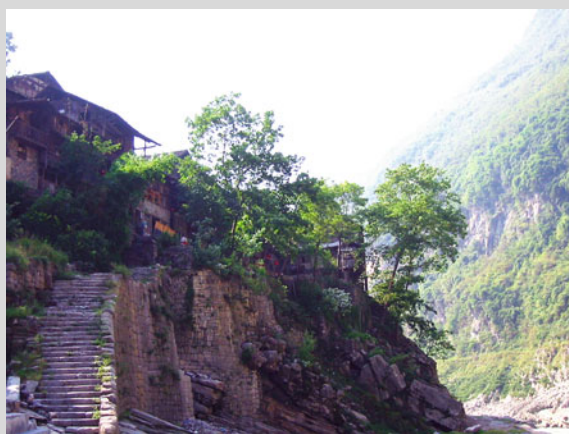


Fig. 2.65 Architectural complexes from the Ming (1368–1644) and Qing (1644–1911) Dynasties have been preserved in Gongtan Ancient Town. *Source* Photograph by Bihu Wu

Guizhou Province. The waterway leading through Gongtan along the Wujiang River north to Fuling was an important connection between Youyang County and Chongqing City. Meanwhile, people from northeastern Guizhou also had to use this waterway to access Chongqing (Zhang 2007). More importantly, the inaccessible beach formed here in Gongtan by the landslide activity gave travelers with cargo sufficient reason not only to pass through but also to stay ashore. To continue their journey, they either must attempt the rapids or remove some stones on the beach. Due to the combination of these geographical conditions, Gongtan became a vital transportation and trade center, preserved as Gongtan Ancient Town with its unique bluestone street (Fig. 2.64) and *diaojiaolou* today (Fig. 2.65).

Because of the north-south mountain valley terrain, a south-north wind is prevailing in the strip-shaped Gongtan Ancient Town throughout the year. Even the layout of the preserved bluestone streets also conforms to the south-north wind direction for as long as 1,500 m at a time, which is to the benefit of the whole town's ventilation system. The narrow streets with widths of 1.5–3 m recall the scarcity of land and help to reduce the burning heat in summer. As for extending far over the side of the buildings themselves, the overhanging eaves offer shade and shelter from the summer sun (Zhao et al. 2001) (Fig. 2.66).

Fig. 2.66 The old streets with bluestone in the ancient town measure from 1.5 to 3 m in width. Due to the overhanging eave of the buildings on each side, the narrow width of the streets provide shade and shelter from sun and rain in summer. Some fist-sized holes still remain in the streets, which were left by workers toting goods who had to rely on a crabstick as support from behind when taking a rest on the long walk up the hill.
Source Photograph by Bihu Wu



Fig. 2.67 Topographic profile diagram of the Xia Family courtyard, trees and Zheng Family House in Gongtan Town; we can easily see the steep 40° slope on which the buildings were constructed. *Source* Ji (2007: 394)

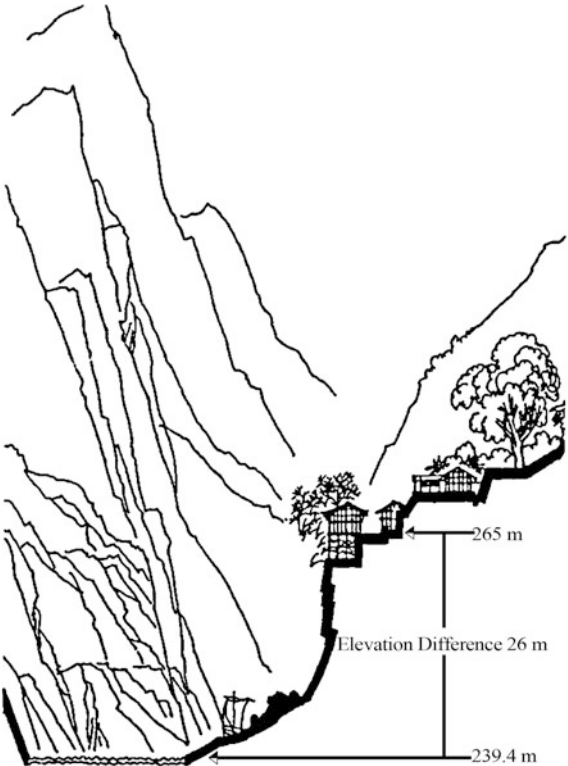
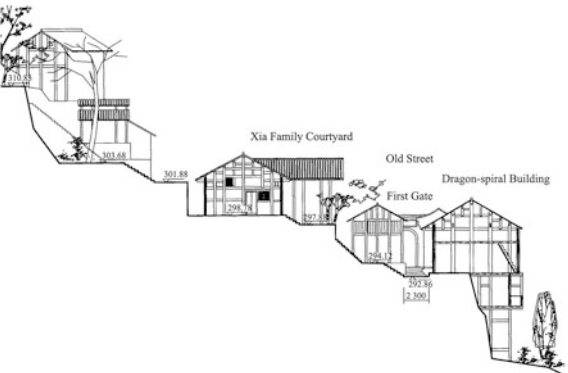


Fig. 2.68 Cross-section of the Xia Family courtyard in Gongtan Ancient Town clearly displays its total integration with the terrain below. *Source* Zhao et al. (2009: 148)



Along the riverbank, the majority of the *diaojiaolou* in Gongtan Ancient Town are built in stacking form (Figs. 2.67 and 2.68). Generally speaking, the lighting that reaches the upper layer of *diaojiaolou* is more plentiful than that on the lower level, so the upper one is reserved for residential purposes. *Diaojiaolou* are

detached from the ground to limit the impacts of abundant rainfall, damp weather, and flooding, as well as to maximize air circulation and provide a cool living space. When suffering floods, the wooden boards on the lower part of the houses can be raised to leave the pillars stable enough to support the houses, thus allowing water to flow down the mountain freely while the houses stand strong. It reflects the strong adaptability of the *diaojiaolou* to the mountain condition.

Unsurprisingly, given the surrounding mountains and water in this region, another main feature of the town is its bridges. Many believe the ditches now used for drainage in the town were originally built for that purpose, but some think these ditches were first naturally formed through rainfall and erosion (Ji 2007: 388–389). The numerous local bridges built across these ditches come in various forms, including arch type, flat slab type, type with roof truss, and so on. The bridges vary in width and have the same elevation as the streets, so passersby are faced with the tough task of distinguishing bridge floor and road surface, sometimes with no other option than to take a wild guess.

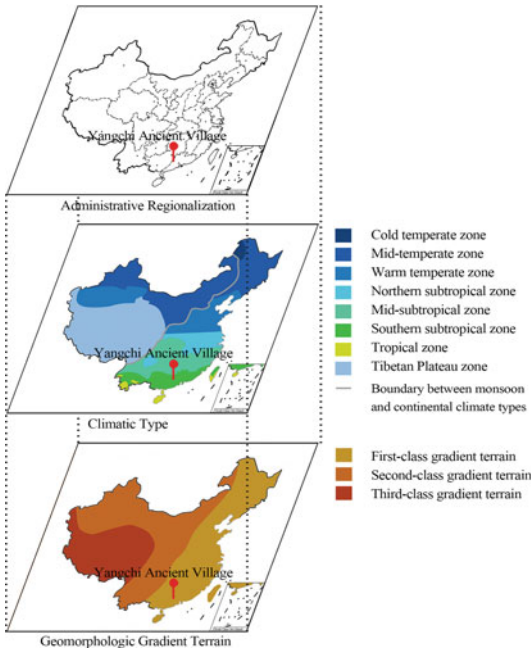
Geographical Interpretation

On the precipitous cliffs along the banks of the Wujiang River, the Tujia people have built *diaojiaolou* houses conforming to the mountain slope, constructed directly on the higher slopes and leaving the lower ground clear. The town is really an excellent example of taking advantage of such a steep-slope geographic environment. In 2007, the entire Gongtan Village suffered through a compulsory evacuation because of the dangerous rock conditions directly overhead, and the initial site was flooded as a result of the construction of the Pengshui Hydropower Station upriver the Wujiang River.

2.7 Yangchi Ancient Village: A Village with a Comb-Shaped Layout

Location: Fengkai, Guangdong Province
Key Geographical Concept: Architectural responses to climate

Yangchi Ancient Village is located in the tropical monsoon zone and is organized in comb-shaped layout, which promotes ventilation in the way of cooling lanes and makes a tropical micro-climate more livable.



Geomorphologic Features

Yangchi Ancient Village is located in Luodong Town, Fengkai County, which belongs to northwestern Guangdong Province. This landscape has characteristics of hill territory, where the northwest and southeast areas of town are comparatively higher. However, the center is relatively flat, including some areas of mesa and plain. A creek meanders through the village, which belongs to an extension of the Xijiang River middle reach, in the Zhujiang River watershed.

Climatic Features

Fengkai County is located 23° north of the equator, with the Tropic of Cancer bisecting it. The county thus belongs to the South Asia monsoon climatic zone,

Fig. 2.69 Spring in the ancient village. From a bird's eye view, the village is clearly patterned in a comb-shaped arrangement. *Source* Photograph by Jingzhong Xie, provided by Qianlong Qing and Wei Liu



which lends it the climatic characteristics of heat and humidity. During summer, the temperatures and solar altitude are high, thus contributing to plentiful sunshine, heavy exposure, long frost-free period, abundant rainfall, and frequent typhoons (Editorial Committee on the Fengkai County Records 1998: 129). Humidity, heat and wind are the main features of the local climate, so damp proofing, heat dissipation and ventilation are the main factors taken into account when local residents try to adapt to the natural environment. The factors above are reflected in the village's layout and its house organization, by allowing for structural openness from inside to outside. The layout of Yangchi Ancient Village is organized in a comb-shaped formation, which has the advantage of ventilating effectively, and draining water under humid circumstances. This comb-shaped layout has been widely adopted in the residential architecture of the *Lingnan* region,¹⁰ which is a worthy consideration as a particularly, climate-adaptive building style (Fig. 2.69).

Cultural Features

Yangchi Ancient Village is made up of typical building groupings, which were derived from the Ming (1368–1644) and Qing (1644–1911) Dynasties and have been preserved in astonishingly complete form since that time. The village is thus worthy of its nickname as “the first village in *Lingnan* region”. All of the villagers share the family name of “Ye” and the same ancestor, Ye Hanbiao, who was an official in the late Ming Dynasty (approximately the 17th century). To avoid the pain of war, he migrated alone from Beijing to this area. Struck by the beautiful natural scenery and pleasant local lifestyle, he decided to live here as a recluse. Over the years, he found a wife and raised children, and from then on, the Ye Family enjoyed its prosperous position. Elders of the family emphasized reading for their children, which resulted in numerous gifted scholars who returned to their home village and went into large-scale construction after achieving scholarly success. After a series of construction projects, Yangchi Village gradually reached the

¹⁰**Lingnan region** originally referred to the region south of the Five Ranges and now generally covers the modern Chinese provinces of Guangdong, Guangxi and Hainan.

Fig. 2.70 At the entrance of the Ye Family’s Ancestral Temple in the village lies a pond of completely clear water. Beside the pond are the poplars and willows. *Source* Photograph by Fang Wang



scale that it now enjoys. In front of the Ye Family’s Ancestral Temple lies a pond of clear water beside which poplars and willows are planted; hence, the name of Yangchi Village includes the meanings of poplars and willows as well as pond in Mandarin (Fig. 2.70).

Fengkai County, where Yangchi Ancient Village is located, is considered the origin of the *Lingnan* culture,¹¹ which has witnessed nearly 400 years of history. Wooded mountains surround the village and all the houses are well arranged on the natural landform. Inside the village, the bluestone paths circled by canals create a scene of idyllic beauty (Figs. 2.71, 2.72 and 2.73). The site selection of this village corresponds to a traditional pattern in Guangdong Province, which emphasizes proximity to water, farmland, mountains and transportation.

Fig. 2.71 Overall perspective of Yangchi Ancient Village. The village is located in Fengkai County, Guangdong, where the warm climate and the fertile soil are particularly suitable for agriculture. *Source* Photograph by Piyan Jiang



¹¹*Lingnan culture* is an important culture in southern China covering what are now the Guangdong, Guangxi and Hainan Provinces.

Fig. 2.72 The internal yard in a household nicknamed “the family of farming and studying”. Even in December, the yard is still green and graceful. *Source* Photograph by Fang Wang



Fig. 2.73 Persimmons drying on the top of a roof, inside the village. In the harvest season, there is comparatively less rainfall, so villagers dry their crops on the roof. *Source* Photograph by Jingzhong Xie, provided by Qianlong Qing and Wei Liu



Yangchi Village has four gate towers in its eastern, western, southern and northern directions, respectively, which serve as entrances into the village. Because the founders of Yangchi originally came here to avoid war, the village also fulfills the requirements of defense. The constant defensive mentality of the villagers can be seen in the well-built high outer walls, which create a protected and private interior space. Furthermore, the living arrangements of people in Fengkai, which allocates a separate three-roomed house to each family, may also originate from this self-protective instinct. The houses are also consecutively connected, which gives expression to the traditional Patriarchal System in the Han nationality.

The scale of the ancient village is not large, and only approximately sixty brick-wood structure houses remain today. The majority of these houses share the same firm-mountain-sloped roof¹² and gable-and-hip roof styles, thick rock foundations with heavy brick walls, and are composed of rooms with two to three consecutive courtyards. The functions of these houses are varied, including

¹²**Firm-mountain-sloped roof** is a typical roof style of the traditional Chinese dwellings, usually comprised of two sloping roofs.



Fig. 2.74 The Chujing Library, an old-style Chinese private library. The residents in the village have always emphasized the significance of education and therefore built a multitude of libraries. Because of their longitudinally connected arrangement, the doors of houses are set facing the alleys, which effectively draws the cooling wind indoors. *Source* Photograph by Jingzhong Xie, provided by Qianlong Qing and Wei Liu

Fig. 2.75 The old-style private bank in the village. The side door of the bank faces the alley. *Source* Photograph by Jingzhong Xie, provided by Qianlong Qing and Wei Liu



residences, temples, old-style Chinese private libraries, banks and schools (Figs. 2.74 and 2.75) (Zhuang and Pan 2008). These houses, built out of bluestone and usually containing three rooms and two corridors, share the typical traits of the *Lingnan* architecture.

Yangchi Ancient Village is distributed in a comb-shaped layout, which is typical of counties in Guangdong Province. Houses are positioned longitudinally, facing the south with a lane at each side. Lanes overlap with houses, giving the entire pattern an impression of a comb. The design of undulating roofs, small courtyards and patios, big lobbies and narrow lanes, help contribute to accelerate the air flow, and adopting dormer windows, high lateral windows, sparse battens and different types of ventilated doors and windows, keeps the houses cool even under the burning summer sun.

Inside the comb-shaped village, the alleys on each side of the buildings are lanes, and the alleys in front and back of the buildings are streets, with lanes and streets lying perpendicular to each other. Lanes are narrower and higher than streets, with higher walls on each side. Additionally, because they receive little sunshine, they are called “cool lanes”¹³ (Fig. 2.76). The dense concentration of the well-organized architectural complexes increases shade and avoids sunshine to reduce heat inside the houses (Xu and Wang 2008). High walls can not only reduce sunlight but also prevent a fire from spreading.

Fig. 2.76 Cool lane in the comb-shaped layout of Yangchi Ancient Village.
Source Photograph by Piyan Jiang



¹³**Cool lane** is a type of narrow alley formed by building clusters which could help to organize the natural ventilation and cool the house. It is commonly found in the traditional *Lingnan* architecture in the south of China.

Fig. 2.77 Views from the side, houses with firm-mountain-sloped roofs and gable-and-hip roofs in the village are well-organized.
Source Photograph by Tianjiao Li



Building groups within the village are interspersed freely. The contrast of large houses and small houses lead to surprising spatial patterns of changing scale between neighborhoods based on the undulations of the landscape (Xu and Wang 2008). Houses positioned directly in front of the street are higher than those further back, so the gridded building distribution when seen from a bird's eye view seems to rise vertically. As a whole entity, the buildings are similar but not tedious, varied but orderly (Fig. 2.77). This pattern of village construction conforms to the mountain slope to be harmonious with its site. It not only presents a rich and overlapping three-dimensional structure but also provides functions of ventilation, lighting and draining; in all, an ideal residential environment for this region.

Extended Reading: Climate-Adapted Comb Distribution System

In many styles of traditional residential architecture, people ingeniously take advantage of wind pressure and heat pressure to solve problems of ventilation (Xiao 2004). The typical comb-shaped village layout, for example, includes a pond or paddy field at the entrance of the village and groves or bamboo as background (Fig. 2.78). Natural breezes bring cool air from the pond to the lanes, alleys and patios inside the village. The spatial change from open land to dense village results in an imbalance of air density, which generates wind pressure and forms an exchange of air between adjacent spaces. Meanwhile, the cool space formed by the pond, trees and field, with the heated space formed by roof and wall can generate an automatic exchange between cool and heated air to enhance the natural ventilation (Xiao 2004).

Inside the village, isolated houses with open-air lanes also make use of the wind pressure for ventilation. Under calm wind conditions, the streets receive more sunlight than lanes because of their larger area in daylight. As a consequence, the street air inflates and generates lower pressure, creating an air flow from lanes to streets. However, at night, when lanes lose less heat and

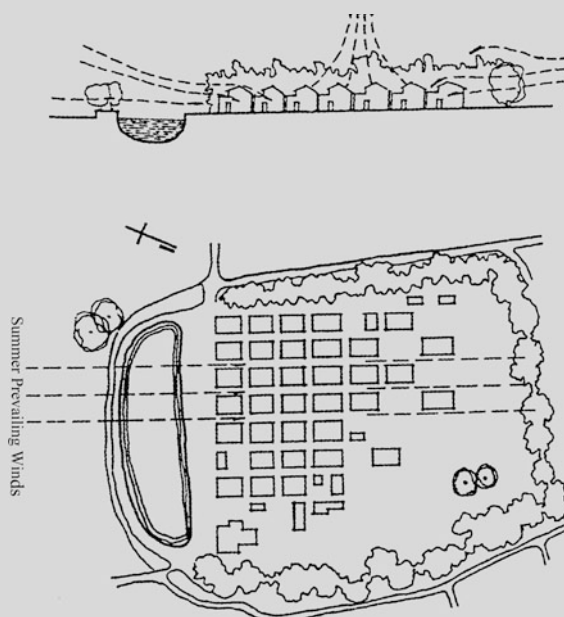


Fig. 2.78 Schematic diagrams of the ventilation mechanism in the comb-shaped village layout. This type of distribution system is popular in the central and western Guangdong area, and a similar distribution pattern can also be observed in Hainan. *Source* Xiao (2004: 4)

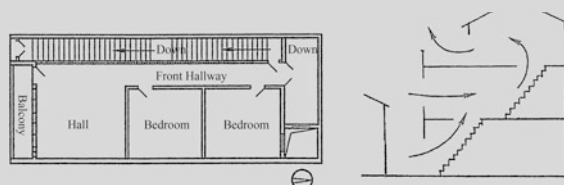


Fig. 2.79 Schematic diagrams of ventilation mechanism in a cool lane. On windy days, the narrow lanes will accelerate wind speed, which helps in lowering the general village temperature, whereas on days with no wind, the dense and cool air in the shade, under the building eaves and high enclosure walls, will form an exchange with the low-density heated air, replacing hot air with cool air in the rooms connected with lanes. *Source* Li and Duan (2011: 26)

retain higher temperatures, the lower pressure in the lanes than in the streets will reverse the air flow from streets to lanes (Tang 2005). Consequently, when the entire village faces a static wind, the comb-shaped distribution generates wind in the lanes and optimizes ventilation, which can improve the interior environment of the buildings in the humid subtropical monsoon climate. Whenever there is a slight wind passing by, the alleys, which like

comb teeth lie parallel to the wind direction prevailing in summer, will accelerate the wind speed and cool the village temperature.

The heat and abundant rainfall in summer around Guangdong district have led most rural villages to adopt the traditional comb-shaped layout, maintaining cool lane space, which accelerates ventilation and allows the entire village to adapt to the regional microclimate (Fig. 2.79).

Aside from the emphasis on ventilation and drainage reflected in the residential building distribution and orientation, people here have adopted a method for raising house basements on a piece of rectangular granite to keep out moisture and moths. This method is very locally adaptive for the hot, rainy, and moist climate. Despite the humidity, the houses in this village contain no hint of moss or mold.

Geographical Interpretation

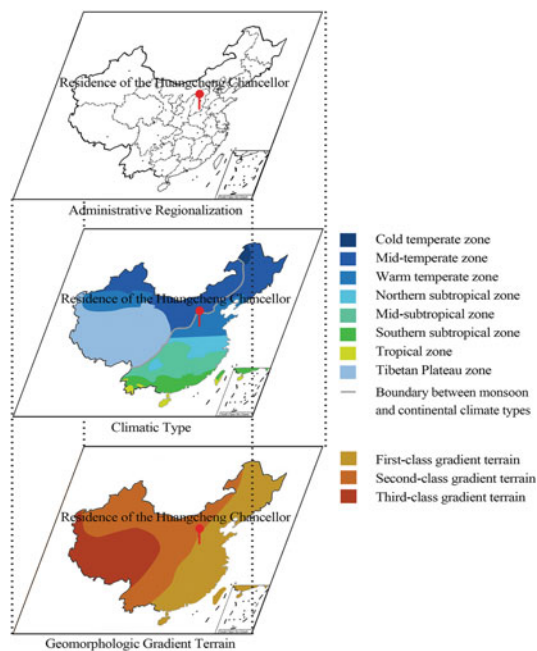
In summer, the climate in the Guangdong district is hot and wet, with heavy rainfall. Many rural areas have adopted the comb-shaped building distribution as a method for optimizing ventilation and cooling in the humid subtropical monsoon climate. The layout of the building group is highly reactive to local climatic characteristics and helps to create a pleasant living environment that is simultaneously fuel-efficient, low-carbon and ecologically friendly.

2.8 Residence of the Huangcheng Chancellor: Defensive Fortifications of an Official Residential Complex

Location: Yangcheng, Shanxi Province

Key Geographical Concept: Architectural harmony between defensive wartime structures and traditions of etiquette

The Residence of the Huangcheng Chancellor has strong local architecture features. Meanwhile, its internal style is unique and magnificent, fully compliant with the requirements of the rites of feudal hierarchy, and naturally imbued with authority.



Geomorphologic Features

Yangcheng County lies near the middle reaches of the Qinhe River in the south of Shanxi Province, at the triple juncture of the Taiyue, the Zhongtiao, and the Taihang Mountains. The Residence of the Huangcheng Chancellor is located in the basin between the southern Taihang Mountains and the eastern Zhongtiao Mountains, an area boasting peaks, ravines, gullies, and a rich layer of coal underground. The Residence of the Huangcheng Chancellor is about 15 km west of the County.

Climatic Features

The area falls within a warm, temperate, continental monsoon region. Compared with other areas in the same latitude around the North China Plain, it has a relatively lower temperature, less rainfall, longer winters, and cooler summers.

Cultural Features

The Residence of the Huangcheng Chancellor has a long history of more than 500 years, and its most famous owner, Chen Tingjing, was the Grand Scholar in Wenyunage, the Royal Library in the Qing Dynasty, and the Minister of Personnel during the Qing Dynasty (1644–1911). Chen was regarded as the tutor and personal assistant of the Qing Emperor Kangxi (reign 1662–1722), and was highly praised for “being as elegant as Fang Xuanling and Yao Chong,¹⁴ and having literary talent equal to that of Li Bai and Du Fu”.¹⁵ From the Chen Family there emerged generations of academicians and poets, who climbed socially to the highest official position in the Ministry of Official Personnel Affairs. The family included generations of scholars who took on the task of compiling the *Kangxi Dictionary*.¹⁶ The emperor wrote a couplet, in praise of the Chen Family, which is still engraved on the

Fig. 2.80 The stone *paifang* in the Residence of the Huangcheng Chancellor uses a technique of stone carving that imitates wood in a simple but elegant style that is free of colored drawing, with tablets demonstrating the good deeds and official achievements of the Chen Family. *Source* Photograph by Fuyu Li



¹⁴Two distinguished chancellors, who served for the Tang Dynasty (618–907) Emperor Taizong, Li Shimin (598–649), and the Wu Zhou Emperor Zetian (624–705), respectively.

¹⁵Two of the most eminent poets during the Tang Dynasty (618–907).

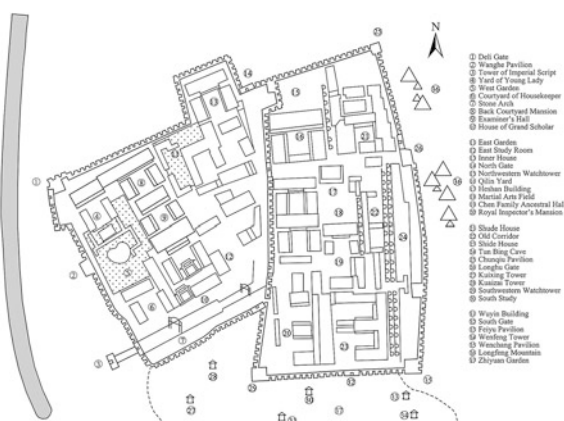
¹⁶*Kangxi Dictionary* (Mandarin: *kang xi zi dian*), a standard Chinese dictionary during the 18th and 19th centuries, was edited by scholars of the Qing Dynasty (1644–1911). It was named after Emperor Kangxi (reign 1662–1722), who initiated compilation of the dictionary in 1710.

stone *paifang*¹⁷ of the wall outside the House. This reads, “Nine winners of the state examination within one family full of virtues and good deeds, and six academicians throughout three generations bearing the favor and trust of the emperor” (Fig. 2.80).

The House is located in Huangcheng Village, which also has a long history and generation after generation of outstanding talent. Situated immediately in front of Fenghuang Hill and facing the Fanxi River, the residence follows the landform and has a variable layout. It is a group of residential buildings of the Ming (1368–1644) and Qing (1644–1911) Dynasties, including temples, watchtowers, and residential houses with unique and complex architectural forms. The site selection of the House makes it an ideal place to live. The inner city is oriented toward the west, while houses on the outer edge face south. The outline of the entire House resembles a turtle, hence the village’s nickname—Turtle City—which also symbolizes eternal stability (Mo 2009) (Fig. 2.81).

Legend has it that Chen Tingjing’s mother hoped to visit Beijing, the capital city; unfortunately, she was unable to take such a long journey due to her advanced age. Thus, Chen Tingjing built an imitation of the Imperial City in his hometown so as to fulfill the wishes of his elderly mother. However, he was worried that this action might be seen as a proof of rebellion by his political opponents, who would report this to the emperor. To avoid arousing suspicion, Chen Tingjing painted both the inside and outside of the city walls yellow, and changed the name from “Imperial City” to “Yellow City”—where both the former and latter are pronounced similarly in Mandarin, as “*huang cheng*”. Thus, the heated debate between “imperial” and “yellow” eventually cooled down and Chen narrowly escaped death. The name of the Residence of the Huangcheng Chancellor spread rapidly

Fig. 2.81 Site plan of the Residence of the Huangcheng Chancellor. *Source* Picture redrawn by Jian Liu, the original one from the master dissertation of Jing Yang (2006: 33)



¹⁷*Paifang* (lit. memorial gate), one type of monument in the form of gates and arches, is used to commemorate the merit or worship the ancestor.

Fig. 2.82 Located to the south of the outer city and to the west of the inner city, the Zhiyuan Garden is the largest garden of the family clan, which comprises pavilions and platforms, fantastic rocks, and tinkling waters. In particular, the Liushangqushui Pavilion is a perfect place for regular meetings of the literati.

Source Photograph by Fuyu Li



throughout the region, and the building cluster became “the imitation capital” in the eyes of the common people (Fig. 2.82).

The Residence of the Huangcheng Chancellor is composed of both an inner and an outer city. The former was constructed by the brothers of Chen Changyan in the sixth year (1633) of the Ming Dynasty Emperor Chongzhen’s reign for defense against the peasant army, while the latter was built by Chen Tingjing in the 42nd year (1703) of the Qing Dynasty Emperor Kangxi’s reign. The total length of the city walls surrounding the two regions is 678 m, and the city itself covers an area of 14,800 m² (Editorial Committee on the Yangcheng County Records 1994: 353). The architecture is configured of 16 large courtyards and 640 houses of various types and styles, all of which are solemn and austere. In the traditional style of aristocratic mansions of the time, the houses are connected to each other. The entire complex occupies a considerable portion of the village area, which is usually considered the center, and has significantly influenced the village’s spatial pattern (Fig. 2.83).



Fig. 2.83 The old watchtower at dawn. The Residence of the Huangcheng Chancellor is one of the most intriguing of the preserved dwelling spaces of Chinese officials. The disciplined spatial layout and the valuable cultural information contained within have given this architectural complex, which occupies most of the village, profound influence over the village’s spatial layout.

Source Photograph by Fuyu Li

Fig. 2.84 The inner city wall is situated in the gully between the west side of Fanshan Mountain and the east side of Xishan Ridge. The magnificent fortification is impregnable against any assault, and is also a prominent symbol of the owner's status in the feudal dynasty. *Source* Photograph by Fuyu Li



As indicated above, the inner city and outer city were built separately in the Ming and Qing Dynasties, leading to different architectural styles, layouts, and spatial combinations. The Douzhuju Residence was the official title of the inner city of the House. The residence has a rectangular layout that conforms to the mountain slope, and is composed of a complex of eight large courtyards, mainly to serve the practical function of defense. The wall in this area reaches 10 m in height and stands two to three meters thick, built out of loess with a base of square stone, coupled with bricks that are 0.5 m thick on both sides (Fig. 2.84). More than 200 forts and 7 battlements lining the city wall play a significant role in military defense (Fig. 2.85). The city has

Fig. 2.85 More than 200 forts and 7 battlements line the inner-city wall in order to guard against the enemy, making it easy to hold but difficult to attack. *Source* Photograph by Fuyu Li



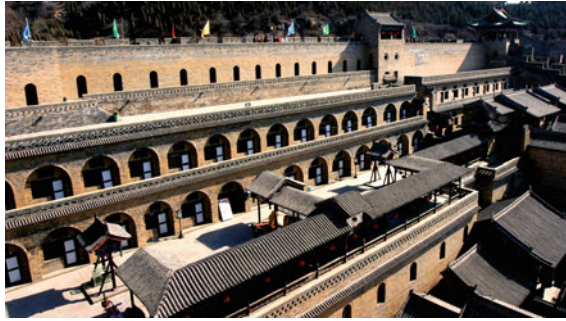


Fig. 2.86 The Fighters' Caves take advantage of the topography, which slopes downward from east to west under the east wall of the inner city. With four levels of cave dwellings and containing hundreds of holes, the caves lead up to the forts. These caves can accommodate hundreds of people so as to serve the purpose of guarding the city against invading bandits. *Source* Photograph by Fuyu Li

five gates, and the courtyards progress along both sides of the central axis in sequence. In addition, giant wooden fences frame the city on all sides, and under the east wall lie four cave dwellings for accommodating troops (Zuo et al. 2005) (Fig. 2.86).

Within the inner city, the Heshan Tower is the most distinctive building in the whole complex. The Chinese word *Heshan* means the territory under control (Yang 2006). As a place of refuge in the case of invading bandits (Fig. 2.87), the building is fortified by an entrance located high on the second floor and only accessible via a suspension bridge. It has windows installed above the third floor, and on its roof residents can gain a view of enemy battlements from the parapet walls and towers. Inside the building, survival during an extended siege is made possible by the existence of multiple hidden escape tunnels, as well as food and water wells and other facilities (Fig. 2.88). After this construction project was completed, the defenses were tested by an attack of roving bandits. The defending villagers in Huangcheng Village were able to stay safe after five days of battle, but the residents in Guoyu Village nearby were plunged into an abyss of misery.

By contrast, the outer city is located on flat ground and arranged, in accordance with the general order of an official residence, in a square to the north of the central axis and three secondary axes. The square layout symbolizes the Chen Family's respect for ritual (Mo 2009), including the House of the Minister of Personnel, the House of the Grand Scholar, the Courtyard of Young Ladies, the Courtyard of the Housekeeper, and many studies and gardens. The large scale of the architectural complex with its central axis represents the honor and dignity of a family of government officials, rather than the luxury and pomp of the wealthiest businessmen.



Fig. 2.87 The Heshan Tower, built during the Ming Dynasty (1368–1644), lies at the center of the inner city. It measures 7 stories of 10 *zhang* in height, with a *kaijian* of 3 *zhang* 4 *chi* and a *jinshen* of 2 *zhang* 4 *chi* in width. The tower’s black brick masonry makes it sturdy and stable. *Source* Photograph by Fuyu Li. *Note* **Zhang**, *chi* and *cun* are traditional Ancient Chinese units of length. 1 meter $\approx$ 3 *chi*, 1 meter $\approx$ 0.3 *zhang*, 3.33 centimeters $\approx$ 1 *cun*. **Kaijian**, also known as *miankuo*, is a unit to measure the width of the building, which refers to the distance between two columns in the frontage of the traditional Chinese wooden architecture. **Chi**, *cun* and *zhang* are traditional Ancient Chinese units of length. 1 meter $\approx$ 3 *chi*, 1 meter $\approx$ 0.3 *zhang*, 3.33 centimeters $\approx$ 1 *cun*. **Jinshen**, a unit to measure the depth of the building, refers to the distance between two columns in the gable of the traditional Chinese wooden architecture

Fig. 2.88 The Heshan Tower enjoys a reputation as one of the most unique fortifications in ancient Chinese history. It took less than seven months to complete the entire mammoth project. *Source* Photograph by Fuyu Li





Fig. 2.89 Bird's eye view of the Residence of the Huangcheng Chancellor. The magnificent architectural complex of the Chen Family covers a total area of 30,000 m². *Source* Photograph by Fuyu Li

Taking a general review of the Residence of the Huangcheng Chancellor, the towers, battlements, and turrets are thoroughly coordinated. At the same time, the forts, iron gates, and external fences form a solid defensive line. A variety of buildings, gates, barriers, and roads comprise a complete and impressive defense system that makes it easy to retain but difficult to attack, including both the inner and outer city (Wang and Jia 2000) (Fig. 2.89).

Extended Reading: Traditional Views on Ritual Discipline Reflected in the Residence of the Huangcheng Chancellor

The castle-like architectural style of the Residence of the Huangcheng Chancellor was utilized for the purpose of confronting the hardship and turmoil of Emperor Chongzhen's reign (1628–1644) during the late Ming Dynasty, and in response to the necessities of wartime defense. Meanwhile, the feudal political system of the dynastic monarchy during the Ming and Qing Dynasties, with its emphasis on disciplined ritual, is clearly reflected in the architectural layout and structure. Nearly all of the buildings are organized as *siheyuan*,¹⁸ appearing structured, orderly, simple and practical. The roofs of the *siheyuan* form a square courtyard, similar to patios in the south of China but quite rare in this locality (Figs. 2.90 and 2.91). Chen's decision to incorporate this structure may be related to his extensive travel over the entire country during his bureaucratic career. In accordance with this mannered architectural form, the decorative techniques follow a rigid hierarchical style.

¹⁸*Siheyuan*, also as Chinese quadrangles, a historical type of residence, is commonly found throughout China, most famously in Beijing. It composes of a courtyard surrounded by buildings on all four sides.



Fig. 2.90 Standing in the southeast corner of the inner city of the House, the Shide Courtyard is notable as the birthplace of Chen Tingjing. *Source* Photograph by Fuyu Li

Fig. 2.91 There are two *siheyuan*, named the Zhongyi and the Yongkun, in the north and south sides of the backyard of the Shide, respectively. They are both composed of a three-story main building on the eastern side and a two-story wing room. *Source* Photograph by Fuyu Li



For example, the roof of the Courtyard of Young Ladies is on the lowest level, while the Courtyard of the Housekeeper is composed of simple, single-story buildings (Mo 2009). In terms of site choice, shape, scale, and dimensions, the buildings embody the feudal concept of social rankings that dictates the superiority of men and upper classes.

Because the inner city and the outer city were built during different dynasties, the decorative techniques of each differ in style. The Ming Dynasty dominates the style of the inner city, which expresses simple, elegant, and understated characteristics, with plinth carvings in stone, brick, and wood, as well as bases in the shape of a drum or square. The outer city took on the more overstated style of the Qing Dynasty, incorporating delicate and colorful decorative elements such as high relief, hollowed carvings, and glaze ornamentation in ornate buildings.

Seen from above, the Residence of the Huangcheng Chancellor is full of scattered castles, pavilions, fortresses, and towers, fully integrating the inner and outer cities (Fig. 2.92). These structures include the ancient city wall, the skyscraping Heshan Tower, the layered Fighters Caves, the simple but elegant stone *paifang*, the structured House of the Minister of Personnel, the peculiar Shide Courtyard, the magnificent Tower of Imperial Script, the majestic Zhongdaozihuang (Villa of the Golden Mean), the delicate Wanghe Pavilion, the splendid Examiner's Hall, the scenic West Garden, and the exquisite south study room. A glance at the nine portals and nine passes demonstrates the complex's impregnability. These impressive buildings were fully functional within the complex, and included the official's residence, religious temples, an academy, defensive fortifications, recreational facilities, and monumental buildings. This was quite rare in China's architecture of the time (Wang and Jia 2000).

As a result of multiple generations of glory, the House of the Chen Family reveals functional transformations from protecting the family's lives and property to the expression of the feudal ritual system. Starting with the inner city, with residences in front of rivers and behind mountains for safety, then transferring to create an effective and noble spatial sequence, the building complex reflects the family's desire to spare no effort in establishing the values of honor and superiority. These results directly relate to the change of social position of the Chen Family during the time of construction (Yang 2006).

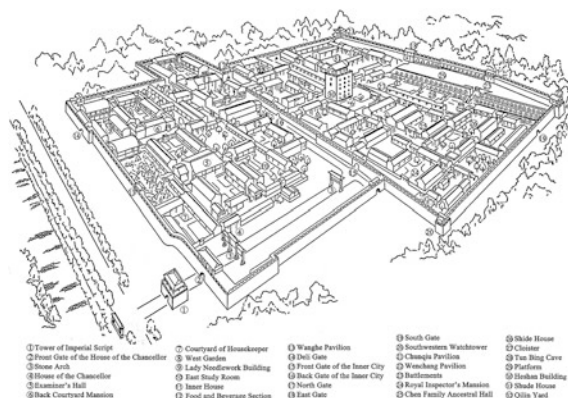


Fig. 2.92 Bird's eye view of the Residence of the Huangcheng Chancellor. *Source* Yang (2006: 35)

Geographical Interpretation

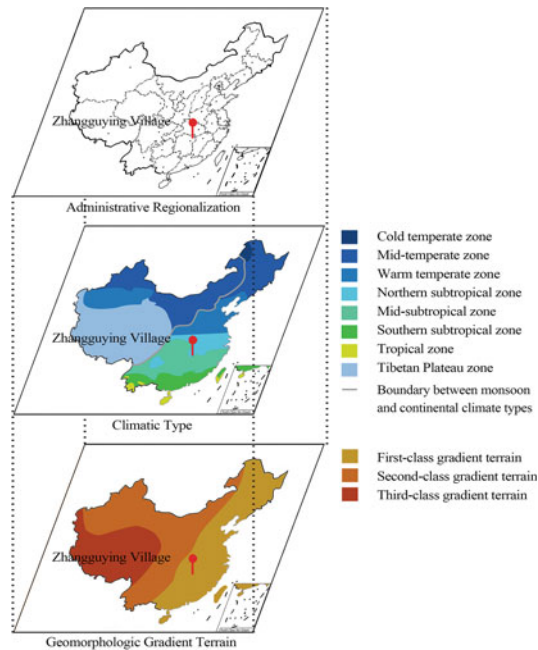
Situated in a visually pleasing environment of hills and rivers, and distinguished by the presence of literati and scholars, the Residence of the Huangcheng Chancellor is endowed with architectural characteristics of both the Ming and Qing Dynasties. The House unites the defensive fortifications of an official residential complex with attention to local traditions and religious beliefs. Moreover, it commemorates the rituals of a culturally sensitive political family in the transition from the Ming Dynasty to Qing Dynasty around the 17th century.

2.9 Zhangguying Village: Charming, Rain or Shine

Location: Yueyang, Hunan Province

Key Geographical Concept: Architectural responses to climate

In the process of acclimatizing to both hot and wet weather, the Zhangguying Village buildings have adopted patios and lanes to keep residents away from sun or rain.



Geomorphologic Features

Zhangguying Village is located beneath Weidong Town to the east of the urban district of Yueyang. Formed by the effects of erosion and deposits, the village sits on a ridged hill with a height of 60–150 m (Editorial Committee on the Yueyang Municipal Records 2002: 251). The Weixi River meanders through the village (Fig. 2.93).

Climatic Features

Zhangguying Village belongs to the northern subtropical monsoon zone. Specifically, this climate is characterized by short freezes and long frost-free period, frequent temperature variation in spring, a distinct monsoon period, an early

Fig. 2.93 This brook is essential to the residents' daily life. This photograph depicts residents acquiring water for daily use. *Source* Photograph by Xiaoping Wu, provided by Xuli Mi and Hui Zhong



Fig. 2.94 Traditional building techniques of Zhangguying Village, still in use today, shelter inhabitants from sunlight and rain. *Source* Photograph by Xiaoping Wu, provided by Xuli Mi and Hui Zhong



decrease in temperature in the fall, droughts in both summer and fall, and a clear distinction among the four different seasons. In accordance to these climatic characteristics, during construction, the people here accommodate a unique system for daylight maximization, aeration, and drainage to effectively manage external conditions in both sunny and rainy seasons (Fig. 2.94).

Cultural Features

Zhangguying Village was named after a Chinese *fengshui* expert who moved from Jiangxi Province to Yueyang City during the Ming Dynasty (1368–1644) (Harunaga 1999). Hence, Zhangguying Village was basically built according to the Chinese philosophy of *fengshui*, which still influences the current residential patterns here. Longtou Mountain surround the village on three sides, and the architectural complexes are facing the Weixi River; thus, the village is placed with the mountain to the rear and the river to the fore (Yang 1993). The central axis of the villages’ houses points directly to Longtou Mountain on the one side, and on the other side points to a distinctive spherical boulder 100 m away; together, the axis, the boulder, the house, and Longtou Mountain symbolize “a dragon playing with a pearl” (Zhang 2006), indicating an excellent dwelling environment according to geomantic principles. All the residents believe that the perfect site choice of the central house ensures the future prosperity of the village and its people (Liu 1999) (Figs. 2.95 and 2.96).

Ever since its founding in the Hongwu period (1368–1398) during the Ming Dynasty, which spanned approximately 600 years, Zhangguying Village has accumulated a number of residential groups, including the Dangdamen, Xitouan, Dongtouan, Shidamen, Wangjiaduan, Shangxinwu, Xiixinwu and Panjiachong, and has developed toward its current scale (Sun 2004). Every village resident has a

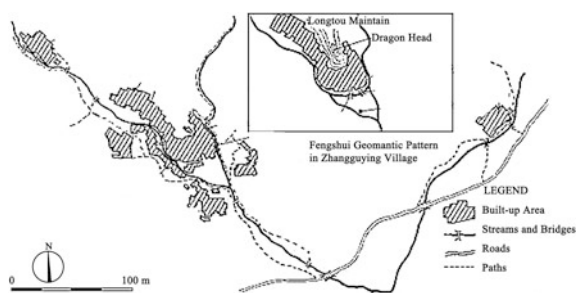


Fig. 2.95 Site plan of Zhangguying Village, including *fengshui* orientation. Zhangguying Village was originally built during the Ming Dynasty—located in front of Longtou Mountain, and framed on one side by the Weixi River. All the elements including Longtou Mountain as the dragon head, the brook and the bridge as the dragon’s beard, and a distinctive spherical boulder in the center of the village symbolizing the *fengshui* pattern of “dragon playing with the pearl”. Source Yang (1993: 270)

Fig. 2.96 A small brook flows between the buildings in Zhangguying Village; the brook and bridges make up the “dragon’s beard”. *Source* Photograph by Feihu Chen



Fig. 2.97 Looking down at Zhangguying Village, one can see groups of patios and connected courtyards. *Source* Photograph by Lei Zhou, provided by Jiansong Lu



reputation of being pure-hearted and industrious that derives from the village itself, which has followed the traditional dictates of “complying with the laws of nature, prioritizing education, and obeying political protocol”. Currently, Zhangguying Village includes a total of 40,000 m² of historic buildings, which were all built during either the Ming (1368–1644) or Qing Dynasties (1644–1911) (Liu 1999) (Fig. 2.97).

Extended Reading: Architecture’s Adaptations to High Temperature and Rainy Weather

The primary issues with buildings in areas of high temperature and frequent rain include the challenge of keeping out rain and excessive sunlight while maintaining good ventilation. Because blocking sunlight is considered a prerequisite for controlling temperature, in tropical areas it is quite common that there are relatively large roofs in traditional residential architecture. An additional obvious approach to keeping out rainwater is the extension of eaves and connecting buildings with enclosed corridors. Deeply sloped roofs can also help to drain rainwater faster and to prevent leakage. Due to the slow



Fig. 2.98 Building groups in Zhangguying Village are linked with lanes similar to the one in this photograph. These laneways not only connect all building groups but also help aeration within the rooms. *Source* Photograph by Feihu Chen

process of natural vaporization in humid areas, another major construction issue has been to apply sufficient aeration to accelerate evaporation and cooling processes. Stilt-style architecture represents the people’s wisdom in both aeration and keeping out the damp, whereas stilted houses keep residents at a well-ventilated height to optimize evaporation (Lin 2007). Meanwhile, building stairwells or a patio to enhance aeration and using bamboo banisters or blinds that do not block air flow are all efficient solutions for enhancing ventilation (Jing and Zhang 2007). Meanwhile, the incorporation of lanes in Zhangguying Village resolves three primary issues—keeping out excessive sunlight, keeping out rain, and maintaining aeration (Fig. 2.98).

Residential houses in Zhangguying Village are connected by patios with a maximum of five successive patios. Each unit consists of a main central room, a patio, and a total of four living rooms on both sides, a series of which shape a pattern similar to the Chinese character “丰”. Axes are used to organize the space, including the central, secondary and tertiary axes. The central axis points directly to

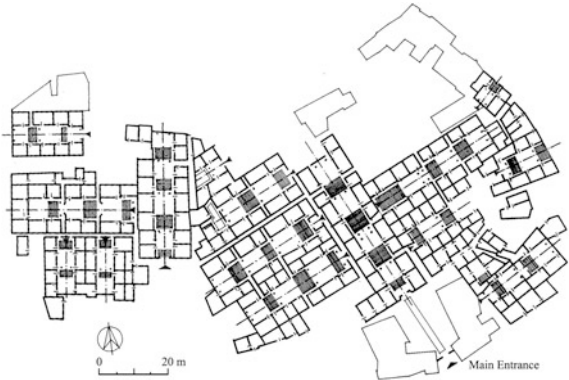


Fig. 2.99 Site plan of Zhangguying Village. There are a total of five successive patios in the central house. The primary axis of the central house sets the axis of the entire village, which is perpendicular to the secondary axis. Every building cluster centers on a patio, and the axes of each group, including several clusters, shape a pattern similar to the Chinese character ‘丰’. *Source* Sun (2004: 478)

Fig. 2.100 Floor plan of Shangxin House in Zhangguying Village. The primary axis in this building group is perpendicular to the auxiliary axes. Each cluster consists of a patio, a central room, and a total of four living rooms on each side. Clusters are connected with lanes. *Source* Yang (1993: 271)



Longtou Mountain and is perpendicular to the secondary, which is also perpendicular to the tertiary axis (Harunaga 1999) (Figs. 2.99 and 2.100).

The patios are in the center of each building cluster (Fig. 2.101), which attracts daylight and allows aeration. In the daytime, sunlight increases the temperature of both the patio and the central room. The heated air rises upward and results in weaker air pressure in the patio compared to the air in the central room. The air flow thus moves from the central room to the patio, while fresh air meanwhile flows in



Fig. 2.101 The patio is the major attribute of Zhangguying Village. The patio in these buildings functions for aeration and drainage, as well as providing an essential space for residents' daily activities. There are two living rooms on each side of the patio. *Source* Photograph by Feihu Chen



Fig. 2.102 The colonnade structure of the buildings in Zhangguying Village effectively protects their residents from sunlight and rain, and the space under the colonnade is an important environment for social activities and communication. *Source* Photograph by Fang Wang

through the roof cornices. Consequently, the whole house participates in a process of convection air transfer (Tang 2005). For drainage purposes, the village roofs all have a steep slope to guide the rainwater into the patio, where a pipe in the corner of the patio can drain the water directly into the Weixi River.

The lanes between every house and central room, which serve to divide the interior space, also work as channels for both traffic and air, thus connecting each house to a group of others. Due to the patios and the lanes that link all the houses in the village, residents can avoid both the rain and the scorching heat (Figs. 2.102 and 2.103).

Fig. 2.103 Various shops along the colonnade in Zhangguying Village. Commercial spaces are also located in the same area.
Source Photograph by Zhijian Tang, provided by Hui Zhong and Zongfu Jiang



Geographical Interpretation

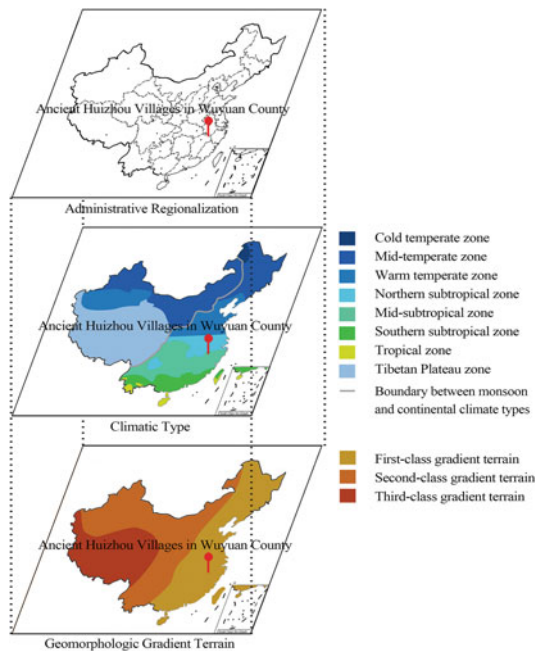
Following the site selection principle, which places the mountain to the rear and the river to the fore in the surrounding environment, Zhangguying Village has also integrated patios and lanes in its internal design for the management of sunlight, drainage and aeration. The village has effectively acclimatized to the subtropical monsoon climate and thus comprises a comfortable dwelling environment away from sun or rain.

2.10 Ancient Huizhou Villages in Wuyuan County: Simple Beauty of High Walls and Narrow Lanes

Location: Wuyuan, Jiangxi Province

Key Geographical Concept: Accumulation and display of farming culture and Huizhou culture

The unique natural environment in Wuyuan County has given birth to the Huizhou culture and has contributed to the development of a unique rural architectural style.



Geomorphologic Features

Wuyuan County lies in a region of low hills, many rivers, and scarce farmland, with mountains covering approximately 83 % of the area. As a local saying goes, “Wuyuan has mountainous area that accounts for 85 % of its total land area, farmlands that accounts for 10 %, and water and estate area that accounts for 5 %”. In a geographical setting such as this, arable land is in short supply. Traditionally, approximately three of every ten Wuyuan families have chosen to enter the field of commerce rather than agriculture (Editorial Committee on the Wuyuan County Records 1993: 308).

Climatic Features

Wuyuan County is situated in a subtropical monsoon climate zone, where the weather is usually warm and humid. Abundant rain forms plentiful rivers and forests throughout the region.

Vegetation Features

With a warm and humid climate, the soil and forests in this area are rich. The main tree species are *Pinus massoniana*, Chinese fir, Moso bamboo and other broad-leaved evergreen trees. In addition, crops are harvested twice a year. In line with local climatic conditions, rice is the major crop, with oilseed rape being an additional winter crop (Figs. 2.104 and 2.105).

Cultural Features

Ancient Huizhou is a land of mystery and magical charms, and people there achieved great standing in all fields in politics, economics, sociology, culture, education, science and technology. Wuyuan County has a long history and is one of the core and origin lands of the Huizhou culture. During the Shang (circa 1600–1046 BC) and Zhou (circa 1046–256 BC) Dynasties, it was attached to Yangzhou City in Jiangsu Province and was divided into two states, Wu and Chu, during the Spring and Autumn periods (770–476 BC). In the 28th Kaiyuan year (740) of the Tang Dynasty, it became a county and, as the source of the Wujiang River, was named Wuyuan (Ouyang 2004). During the Ming (1368–1644) and Qing (1644–

Fig. 2.104 Oilseed rape fields on the Jiangling Ridge, Wuyuan County. *Source* Photograph by Fan Yin





Fig. 2.105 Oilseed rape fields in Qinghua Town, Wuyuan County. Oilseed rape flowers blossom in late March and early April. *Source* Photograph by Fan Yin



Fig. 2.106 Pear flowers beside the horse-head wall. The horse-head wall, also referred to as the sealed firewall, has become a typical symbol of Huizhou-style residential architecture. *Source* Photograph by Fan Yin. *Note* **Horse-head wall** is one of the most important elements with unique characteristics in Huizhou-style architecture of the Han nationality in China. It refers to the top parts of gable walls above the rooftop on both sides and gets this name from its horse-head like shape. During a fire, the horse-head wall built of stone could cut off the spread of flame and prevent neighboring wood-framed buildings from damage

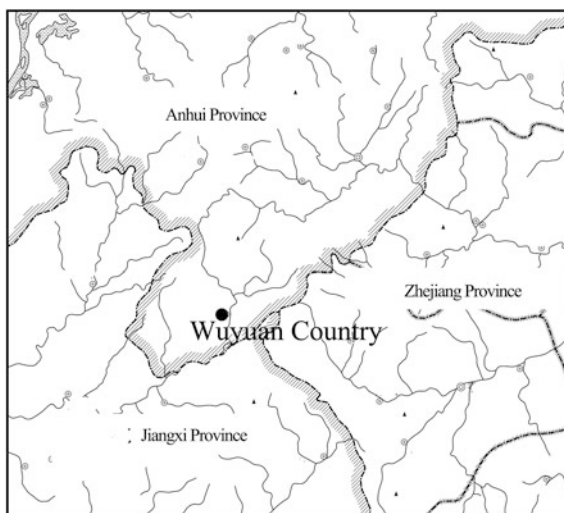
1911) Dynasties, villages in Wuyuan County multiplied and became filled with white houses with black roofs, developing into a unique and established form of Huizhou-style architecture (Figs. 2.106 and 2.107).

Wuyuan County is located in northwest Jiangxi Province, right at the junction of Zhejiang, Jiangxi and Anhui Provinces (Fig. 2.108) and is part of the ancient Huizhou region. Due to the southward migration of the northern aristocracy to

Fig. 2.107 In Qingyuan Village, Wuyuan County, the white walls stand out against the golden oilseed rape fields. *Source* Photograph by Fan Yin



Fig. 2.108 Geographic location map of Wuyuan County, Jiangxi Province. Wuyuan County is located in the northeast of Jiangxi Province, right at the junction of Zhejiang, Jiangxi and Anhui Provinces. *Source* Li (2002: 340)



Wuyuan during the Eastern Jin Dynasty (317–420), culture and education continue to thrive. During the Ming and Qing Dynasties, businessmen in the Huizhou region began to prosper and became the leaders of the country's various merchant groups.



Fig. 2.109 Likeng Village, Wuyuan County, lies right along the river, which not only provides running water but also ensures the buildings’ protection from fire. *Source* Photograph by Fang Wang

A popular saying at that time claimed that “No town is without Huizhou merchants”. After succeeding in business, Huizhou merchants went back to their hometowns to start massive construction projects, including building ancestral temples and reconstructing the entire village. It was at this point that the ancient residential architecture in Wuyuan took on its particular style. Known as “the most beautiful countryside in China” and “the last Shangri-La”, Wuyuan contains a large number of well-preserved residential buildings from the Qing Dynasty. Dynamic



Fig. 2.110 The mountain and river in front of Wangkou Village, Wuyuan County. The water is open and clean, and villagers can wash their clothes here. Sitting on a bamboo raft on the river, one could observe the beautiful scenery. *Source* Photograph by Fang Wang

living landscapes of green mountains and gentle rivers make up the external environment of the villages (Fig. 2.109).

The river mouth is the gateway of all Wuyuan villages and presents the soul of the village culture (Wang 2008) (Figs. 2.110 and 2.111). Residential structures



Fig. 2.111 Shangjiaolong water-powered trip-hammer in Wangkou Village, Wuyuan County. The water-powered trip-hammer is composed of a pestle axle, harrow, bar, column and mortar. This was a traditional tool in use during the Ming and Qing Dynasties, which allowed workers to take advantage of water power to pound rice. At that time, Wuyuan was a shipping terminal and cargo hub. Pounded rice was transported to other cities by boat. *Source* Photograph by Fang Wang



Fig. 2.112 Likeng Village in Wuyuan County. Likeng is an ancient village where most residents share a family name of Li. The village is full of ancient residential structures that have been preserved since the Ming and Qing Dynasties, which line the stream by the mountain. Winding streams wander through the village streets, and the bluestones are laid randomly without a discernable pattern. Dozens of different types of bridges connect the two banks of the river. *Source* Photograph by Fang Wang

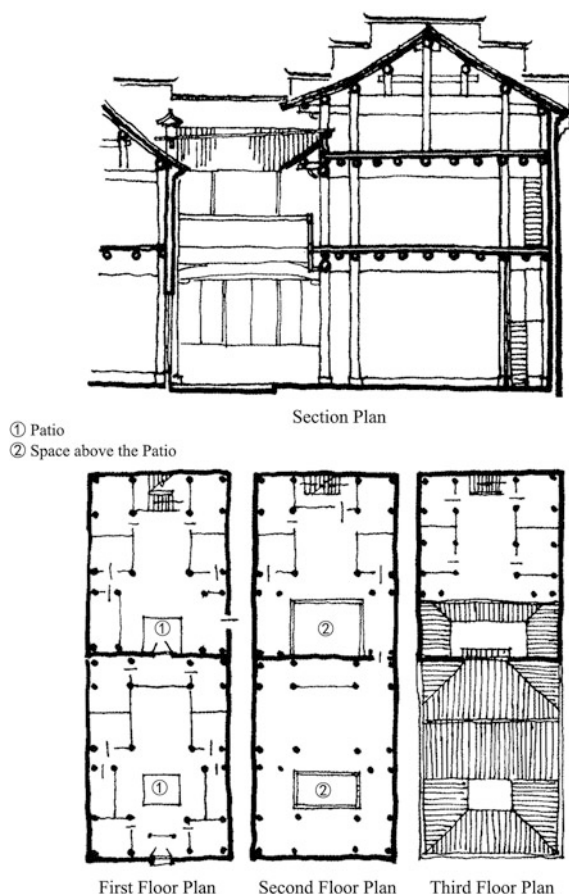


Fig. 2.113 Section and plan drawings of a three-story residential house in Likeng Village, Wuyuan County. This residential house with two patios was built during the Qing Dynasty. However, the third floor only covers the second patio, which connects with the main hall. Between the two patios of the house is a brick partition. There is an extra entrance and exit on the side of the second patio. *Source* Lu (2003b: 440)

themselves are plain in appearance. White horse-head walls and black roofs stand out elegantly against the surrounding natural environment (Fig. 2.112). There are patios in most Huizhou residences (Fig. 2.113) and households connect to each other to form a compact layout (Fig. 2.114). Local support of traditional Confucian values has led to the construction of cultural centers, including an examination room, a Confucian academy, a reading pavilion and a printing court.

Fig. 2.114 The narrow lane space of Wangkou Village, Wuyuan County. Households are tightly connected to each other. *Source* Photograph by Fang Wang



Extended Reading: Huizhou Merchant Architecture

Huizhou Merchant architecture refers to the architectural culture created by homecoming merchants in the ancient Huizhou area. These houses cater to the particular lifestyles and aesthetic preferences of the merchants (Fig. 2.115). The Huizhou merchants were the businessmen whose hometowns belonged in the six counties managed by Huizhou *Fu*.¹⁹ They entered into business during the Southern Song Dynasty (1127–1279), flourished toward the middle of the Ming Dynasty (1368–1622) and reached their peak during the Qing Emperor Qianlong's reign (1736–1795). The rise of merchants greatly enhanced the economic development of the Huizhou region and also contributed to the scale and numbers of Huizhou-style architecture and the advancement of local architectural techniques. At the same time, the lifestyles and aesthetic conventions of the Huizhou merchants both directly and indirectly impacted the artistic features of Huizhou-style architecture (Zang 2005). First of all, the merchants' affluence directed their pursuit of perfection and delicacy. The prevalence of mountains and water in the area, rather than open plains, restricted the merchants' opportunities for the

¹⁹*Fu* (lit. prefecture) was an administrative division during the Tang (618–907), Ming (1368–1644) and Qing (1644–1911) Dynasties of China. It was also called “*Jun*” prior to the Tang Dynasty.

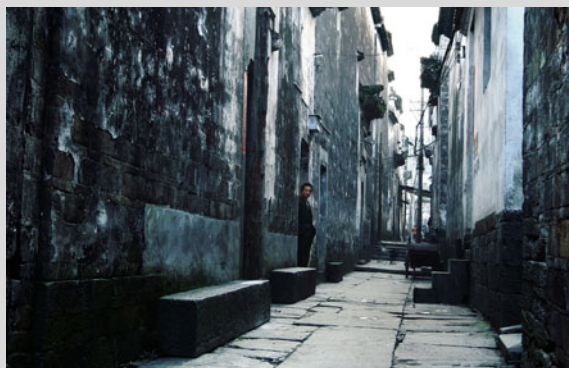


Fig. 2.115 Long and narrow village lane. *Source* Photograph by Fan Yin

luxurious use of space, so they worked on demonstrating wealth in the details of their decoration (Wang 2009). Second, Huizhou merchants showed great respect for Confucian dictates on ancestral worship, leading to the construction of many academies and ritual centers (Zang 2005), adding to the unique architectural flavor of the Ancient Huizhou villages. In addition, the traditional structures of the horse-head wall and the patio called “*Si shui gui tang*”, which collects rain from all directions, to some degree reflect the merchants’ obsession with the accumulation and protection of wealth. In the Huizhou region, the ancient villages that combine political, economic, patriarchal and artistic elements are everywhere, revealing the perfect integration of luxury and austerity that has developed under the influence of the Huizhou Merchant culture.

Wuyuan residential structures are also famous for three types of external carvings—stone, wood and brick. These carvings are sophisticated in the material used and imaginative in design. Glancing at any given rural building, engraved carvings on the beam-column and window hood reveal a wide range of exquisite reliefs (Fig. 2.116). The contents of these carvings are mainly about characters and stories from folk drama. Another theme is plants, such as plums, orchids, bamboo, or chrysanthemums, which symbolize traditional Chinese virtues, such as loyalty, filial piety, honesty, sibling affection, propriety, righteousness, probity, and self-respect.

An old saying goes, “one never wants to visit any other mountains after the trip to Mount Tai; one never wants to visit any other villages after the journey to Wuyuan County”. The essence of the Ancient Huizhou villages of Wuyuan lies in the harmony that combines human wisdom with nature. We could feel the beauty of the ancient and delicate carvings and the preservation of traditional culture handed down from generation to generation (Figs. 2.117 and 2.118).

Fig. 2.116 The Yu Family's Ancestral Temple in Wangkou Village, Wuyuan County. The architecture with an axis features the gable-and-hip roof of the Qing Dynasty. Its *dougong*, ridge, eave-rafters, girders, and plinth are in fine structure and well crafted. *Source* Photograph by Fang Wang. *Note Dougong*, a unique structural element and later an ornamental element in traditional Chinese architecture, is the wooden bracket that joins pillars and columns to the frame of the roof



Fig. 2.117 In the morning, elderly residents relax against the walls of their houses eating breakfast. *Source* Photograph by Fan Yin



Fig. 2.118 Old man doing farm work. *Source* Photograph by Fan Yin



Geographical Interpretation

Wuyuan County has a pleasant climate and beautiful scenery. The people there are friendly, the culture is remarkable. Residential structures are built mainly in the Huizhou style, characterized by white horse-head walls and black roofs. These buildings combine an ingenious construction technique with delicate decoration, harmonizing with nature to reveal the unique local temperament of the Huizhou region.

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