

TABLE OF CONTENTS

Appendix_1 Photography of 75 houses

1.1-1.10 The Underground House

1.11-1.54 The Wooden House

1.55-1.75 The Collective House

Appendix_2 Toolbox: Axonometric Drawings of 15 selected house cases

2.1 Underground House: Back to nature House

2.2 Underground House: Drive-In House

2.3 Underground House: Summer Winter House

2.4 Underground House: Church House

2.5 Underground House: Cut Away House

2.6 Wood House: Highway House

2.7 Wood House: House on House

2.8 Wood House: Pond

2.9 Wood House:Shell House

2.10 Wood House:Wall House

1.11 Collective House:Double House

1.12 Collective House:Outside In House

1.13 Collective House:Plug-In House

1.14 Collective House:Remake House

1.15 Collective House:Slice House

Appendix_3 Program for design: Plan Drawings of 15 selected house cases

3.1 Underground House: Back to nature House

3.2 Underground House: Drive-In House

3.3 Underground House: Summer Winter House

3.4 Underground House: Church House

3.5 Underground House: Cut Away House

3.6 Wood House: Highway House

3.7 Wood House: House on House

3.8 Wood House: Pond

3.9 Wood House:Shell House

3.10 Wood House:Wall House

3.11 Collective House:Double House

3.12 Collective House:Outside In House

3.13 Collective House:Plug-In House

3.14 Collective House:Remake House

3.15 Collective House:Slice House

Appendix_ 4 Photography of 15 selected house cases

- 4.1 Underground House: Back to nature House
- 4.2 Underground House: Drive-In House
- 4.3 Underground House: Summer Winter House
- 4.4 Underground House: Church House
- 4.5 Underground House: Cut Away House

- 4.6 Wood House: Highway House
- 4.7 Wood House: House on House
- 4.8 Wood House: Pond
- 4.9 Wood House:Shell House
- 4.10 Wood House:Wall House

- 4.11 Collective House:Double House
- 4.12 Collective House:Outside In House
- 4.13 Collective House:Plug-In House
- 4.14 Collective House:Remake House
- 4.15 Collective House:Slice House

Appendix_ 5. Axonometric drawings of 3 sites

- 5.1 The Underground House
- 5.2 The Wooden House
- 5.3 The Collective House

Appendix_ 6. Interviews of selected families

- 6.1 The Underground House
- 6.2 The Wooden House
- 6.3 The Collective House

Appendix_1 Photography of 75 houses

The Underground Houses



1.1



1.2



1.3



1.4



1.5



1.6



1.7



1.8



1.9



1.10

The Wooden Houses



1.11



1.12



1.13



1.14



1.15



1.16



1.17



1.18



1.19



1.20



1.21



1.22



1.23



1.24



1.25



1.26



1.27



1.28



1.29



1.30



1.31



1.32



1.33



1.34



1.35



1.36



1.37



1.38



1.39



1.40



1.41



1.42



1.43



1.44



1.45



1.46



1.47



1.48



1.49



1.50



1.51



1.52



1.53



1.54

The Collective Houses



1.55



1.56



1.57



1.58



1.59



1.60



1.61



1.62



1.63



1.64



1.65



1.66



1.67



1.68



1.69



1.70



1.71



1.72



1.73



1.74

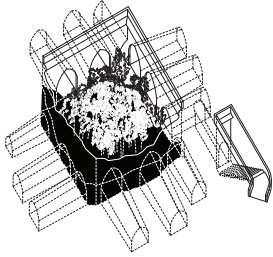


1.75

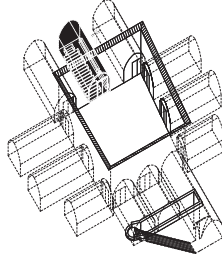
Appendix_2 Toolbox: Axonometric Drawings of 15 selected house cases

The team has visited 75 houses in 18 villages in China and 15 of them were selected as case studies: 5 underground houses in Shaanxi Province, 5 collective houses in Fujian Province and 5 wooden houses in Guizhou Province. The 15 houses are identified as examples of innovative, sustainable and efficient renovations that offered strategies for how to render traditional housing forms viable for modern living. Each house is named after its renovation strategy.

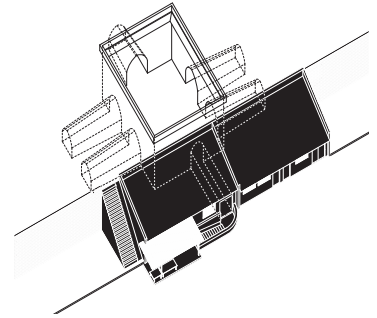
2.1



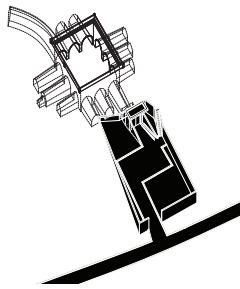
2.2



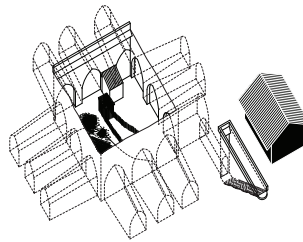
2.3



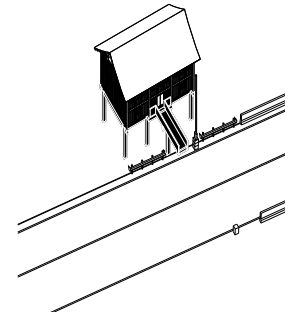
2.4



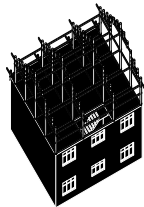
2.5



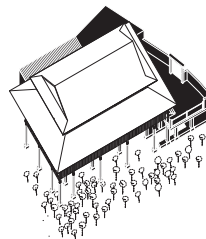
2.6



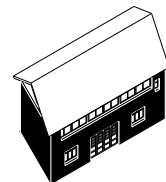
2.7



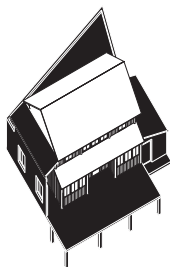
2.8



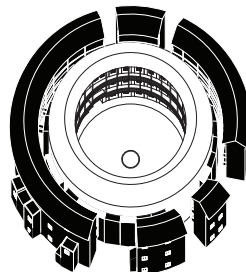
2.9



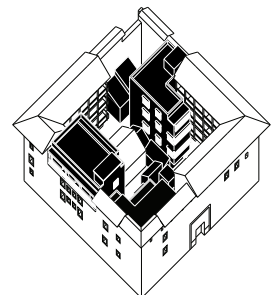
2.10



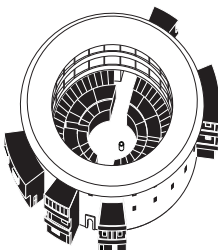
2.11



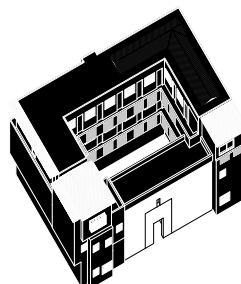
2.12



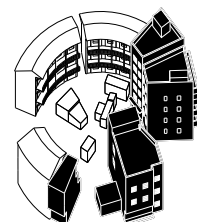
2.13



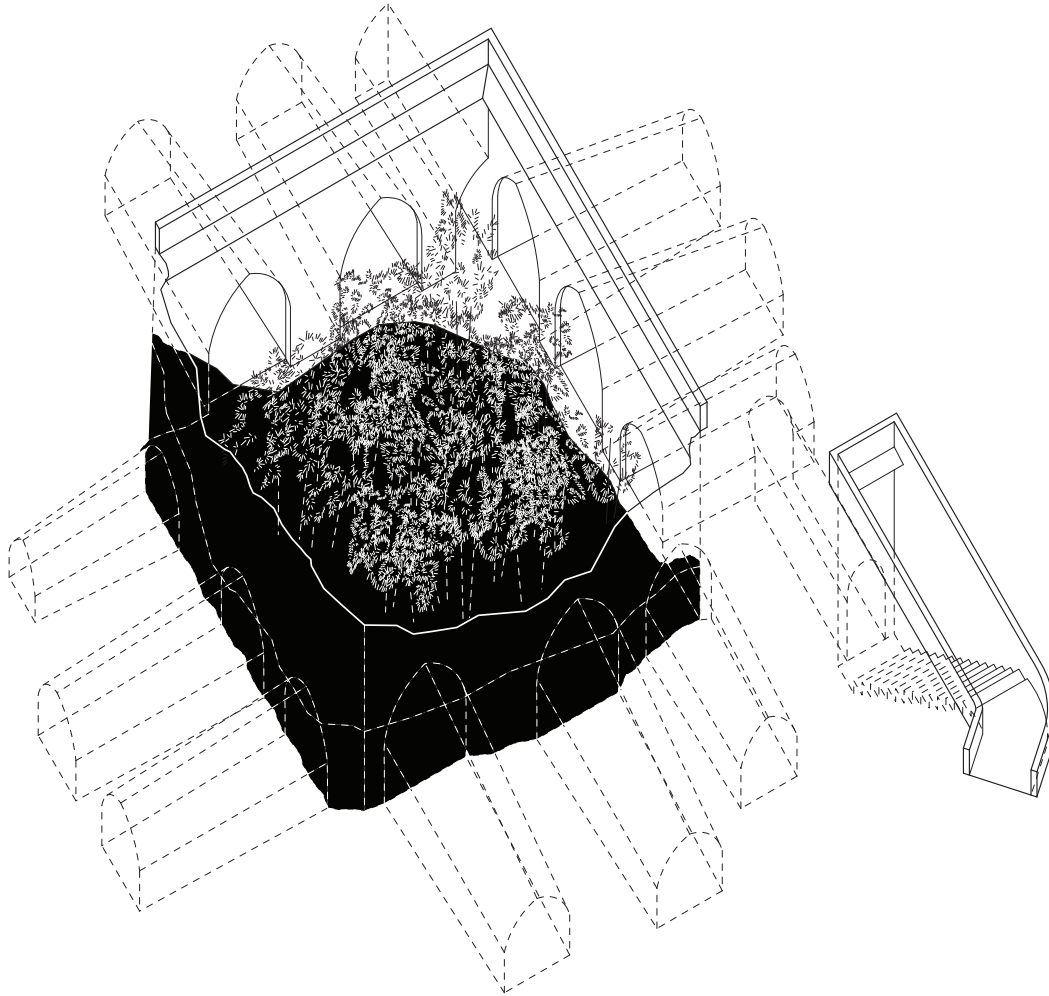
2.14



2.15



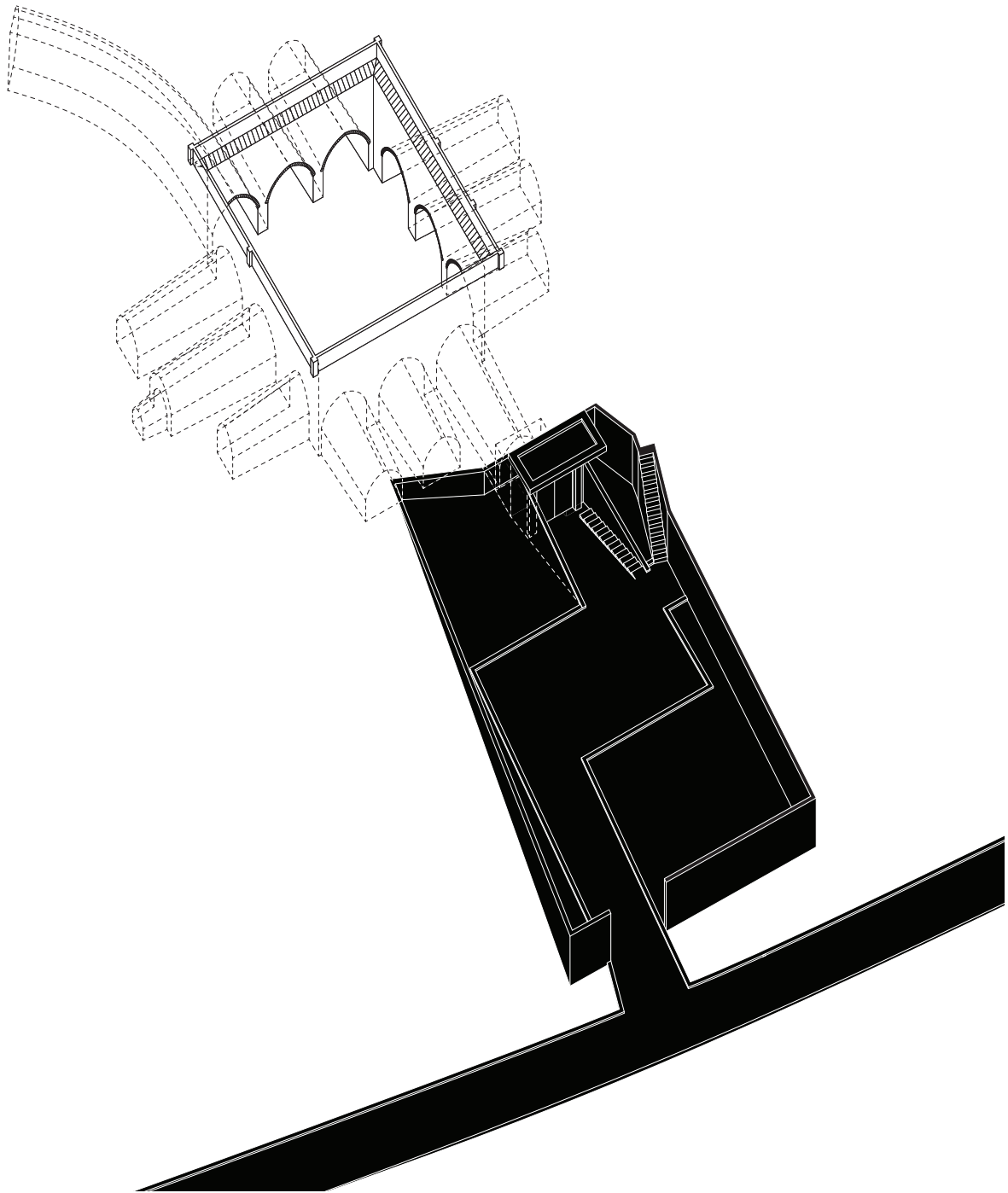
2.1 Underground House : Back to nature House



BACK TO NATURE HOUSE

After some years of neglect, two adjacent sides of the dug-out collapsed inwards creating a ruin. The opposite corner of the courtyard, nevertheless, remained intact, its sharp silhouette defined by a tiled awning. When the family returned to the village to take up the care of their land, they decided to build a new house above ground, using the dug-out courtyard for cooking and its rooms for storage and sleeping when temperatures allowed. To keep the courtyard shaded and cool at midday – even in the summer months – they planted bamboo, vegetables, and a fruit tree on the uneven earth floor. In its half-ruined state, with trees shooting up from the ground, the house seems to have been taken back to nature. Usually, when a dug-out is abandoned the earth falls in on itself. Over time, the pit of the courtyard closes with erosion and sandy soils swept in from the north. For this house, that process was abruptly halted, and the family's daily routine now ensures a renewed productivity. With its earthen ground, garden and bamboo grove, the house inverts the organization of fields above and house below that has characterized life in this region for centuries.

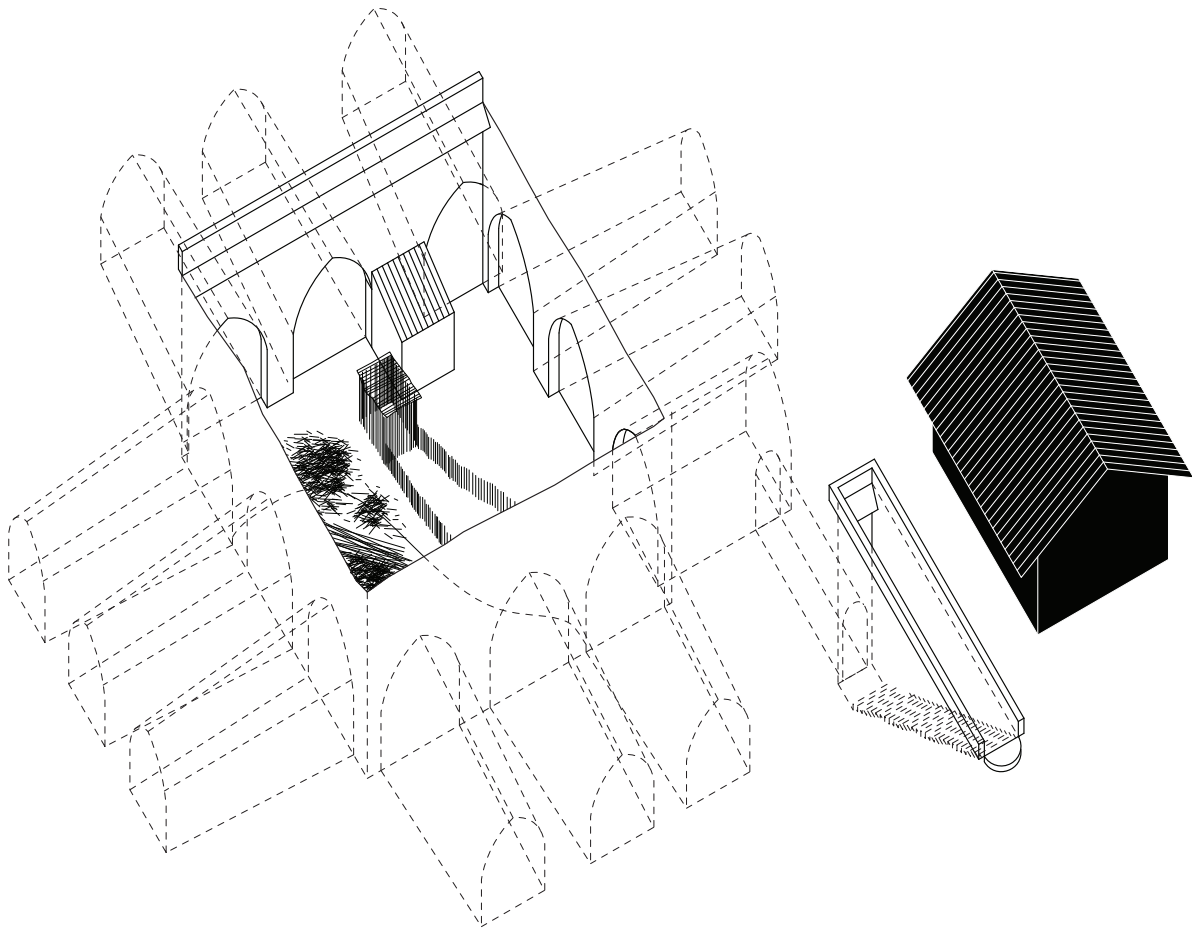
2.2 Underground House : Drive-In House



DRIVE- IN HOUSE

When the eldest son returned from the city to take over the care of his parents' home, he applied for a government subsidy to transform their underground house into a restaurant for tourists. He started by building a new entrance to the sunken courtyard: a ramp large enough for a car to drive straight in. Between the ramp and a newly paved street he built a parking area for visiting guests and a landscaped garden with shaded seating. Red lanterns mark the entrance to the parking and also hang above the sunken courtyard, creating a ceiling of floating lights. In one corner of the courtyard are a pile of logs that fuel the traditional stoves. Small fruit trees have been planted opposite this cooking area. Some of the dug-out rooms serve as private dining areas, another is a kitchen and one more a toilet. In the second phase of renovation, the son installed ventilation. The workers pierced narrow holes into the soft earth for pipes that emerge from the flat ground, extracting moisture, smells, and smoke. New uses, modern conveniences, and the technologies that make them possible have transformed the inherited house.

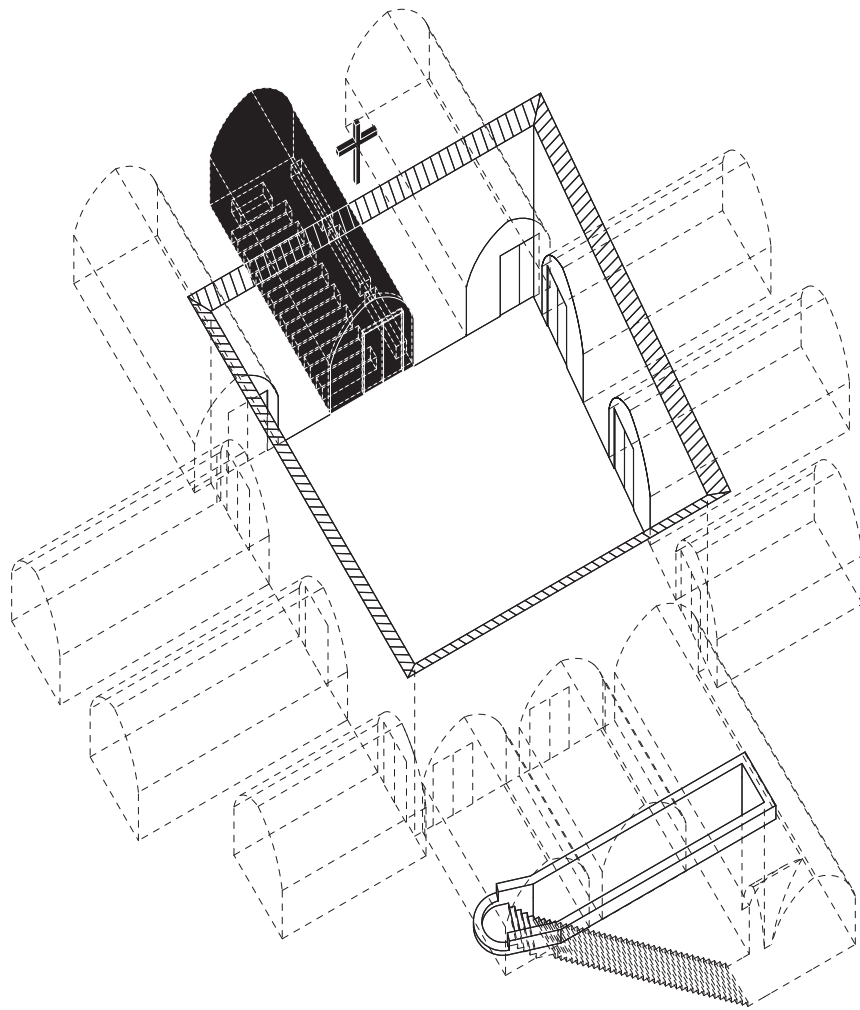
2.3 Underground House : Summer Winter House



SUMMER WINTER HOUSE

The family did not abandon their underground house when they built a new house above. Instead, they continued to live underground in the summer and winter, when the climate is extreme. In the summer, the mass of the ground keeps the rooms at a comfortable temperature; the depth of the sunken courtyard prevents the intense rays of the sun from reaching its floor. In the winter, when temperatures drop below freezing and strong winds scrape the flat, sparse landscape, the earth radiates collected heat and offers protection from the strong gusts. Even in the fall and spring months, when the underground rooms become humid and uncomfortable, not all activities take place in the house above and the family continues to cook in the courtyard. To make this back and forth from above to below ground possible, they positioned the new house next to the ramp that cuts into the earth and leads to the courtyard. From summer to winter, or in the daily cycle, this movement from underground to above becomes a new way of inhabiting the time of dwelling and the depth of the ground.

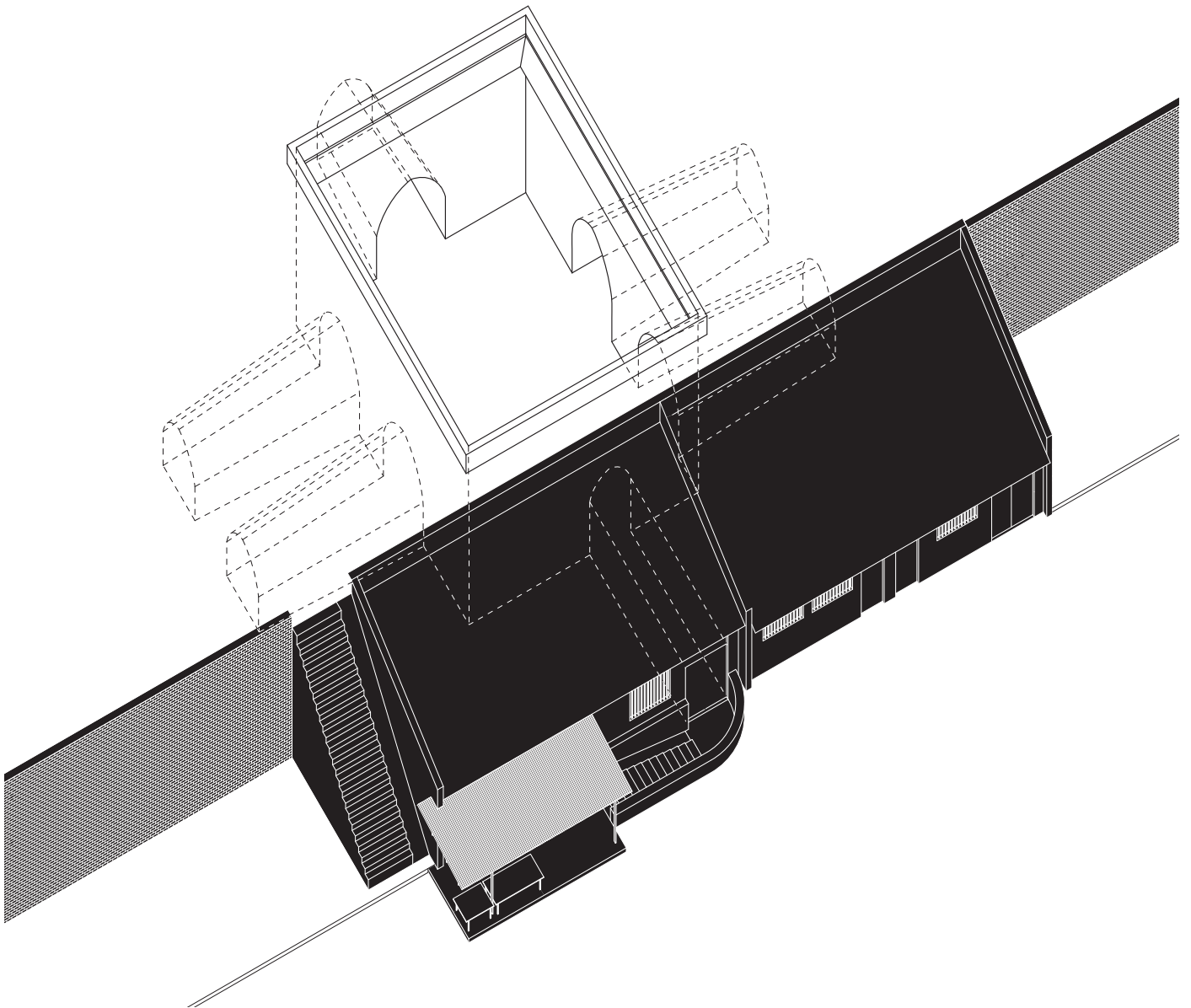
2.4 Underground House : Church House



CHURCH HOUSE

The dug-out stood empty for almost ten years while the older couple who had built it sought one of their children to take over guardianship. The couple's eldest son and his wife accepted the responsibility, deciding to turn the house into a hotel. With a subsidy from the government and loans from the bank, they repaired and reinforced the dug-out's crumbling earthen vaults with brick, and slowly equipped the rooms to respond to the needs of their new guests. Along with traditional heated kang beds that sleep four to five people, they purchased conventional mattresses, tables, and chairs. Recently, they replaced traditional colorful bedding with white linens. They installed toilets in some of the rooms, and drilled holes from the surface for ventilation, eventually adding heating and air-conditioning. One room is arranged with chairs and a central aisle. Until the government asked them to stop and go to the main church in the nearby town, the family conducted Christian services here on Sundays. A cross still hangs above the entrance and is visible from the street. Tourists come from cities and regions all around China as well as other parts of the world, finding the accommodation using reviews on internet sites. When there are no guests, the couple works in their fields – a short walk from the village – where they grow fruit trees and vegetables. The new program for the rooms allows the couple to sustain the dug-out and their own lives

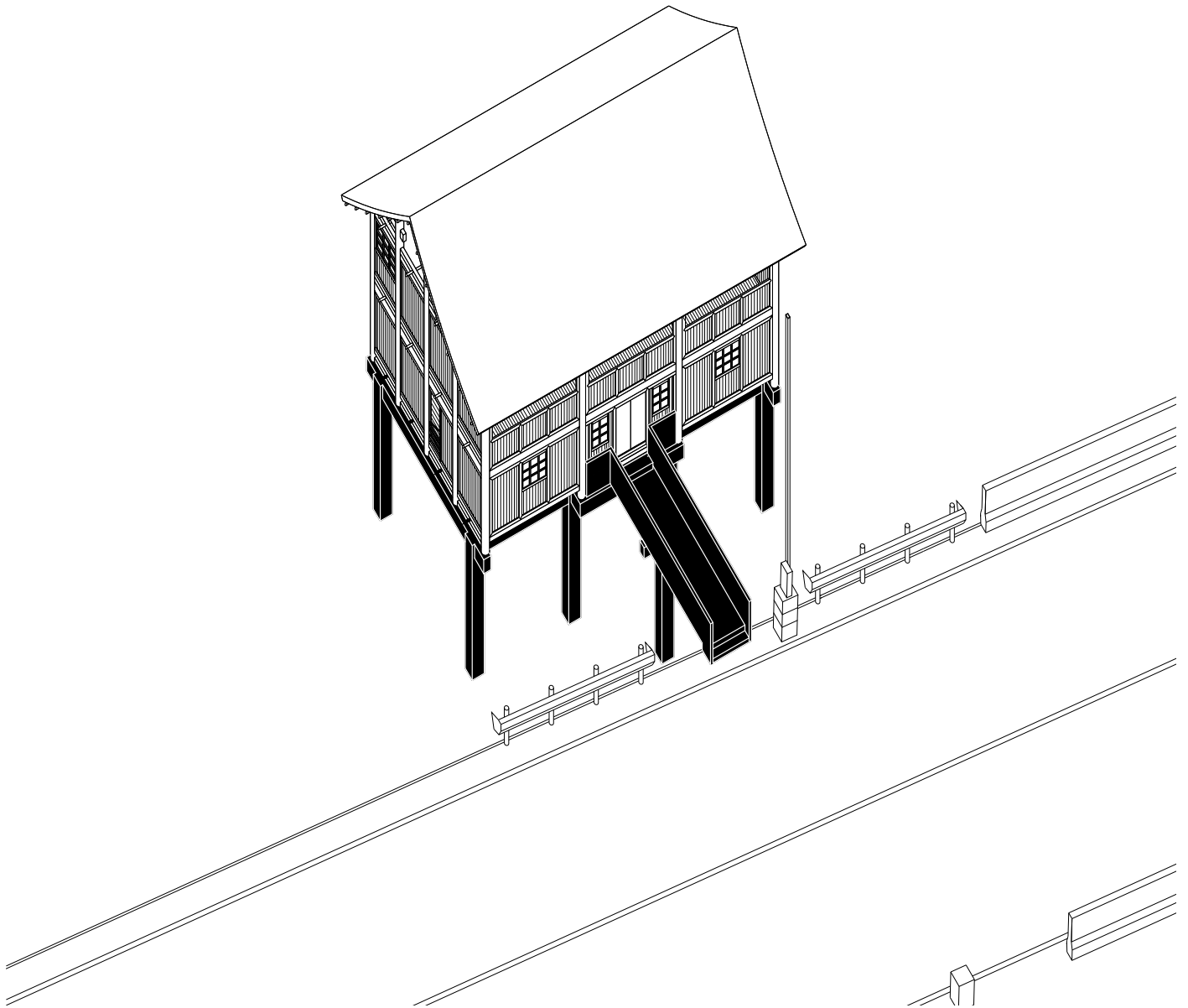
2.5 Underground House : Cut away House



CUT AWAY HOUSE

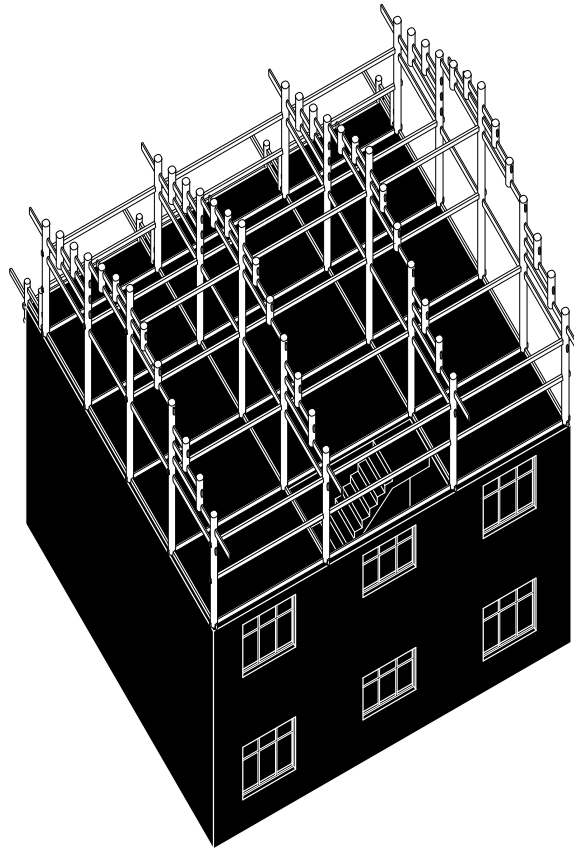
When the district government built a new road, they cut away earth on one side of this family's house, levelling ground that once enclosed underground rooms. Neighbors also affected by the construction flattened their plots and replaced their underground houses with generic multi-story structures. This family responded differently. Taking advantage of the change of grade created by the excavation, they built a direct entrance into the sunken courtyard from the new street. This entrance comprised a linear wooden structure that serves as a buffer from the road and as a retaining wall to the earthen construction behind it. The wooden structure comprises a series of rooms – both private rooms, and new, shop-front spaces open to the street. An entrance stair parallel to the road descends below grade; then a sharp turn leads to a ramp that divides the enclosed rooms and leads to the courtyard. The family increases their income by selling convenience items and fruit from local orchards to tourists passing through the village. Rather than raze their underground house, they found a strategy for negotiating a new, abruptly imposed context.

2.6 Wooden House : Highway House



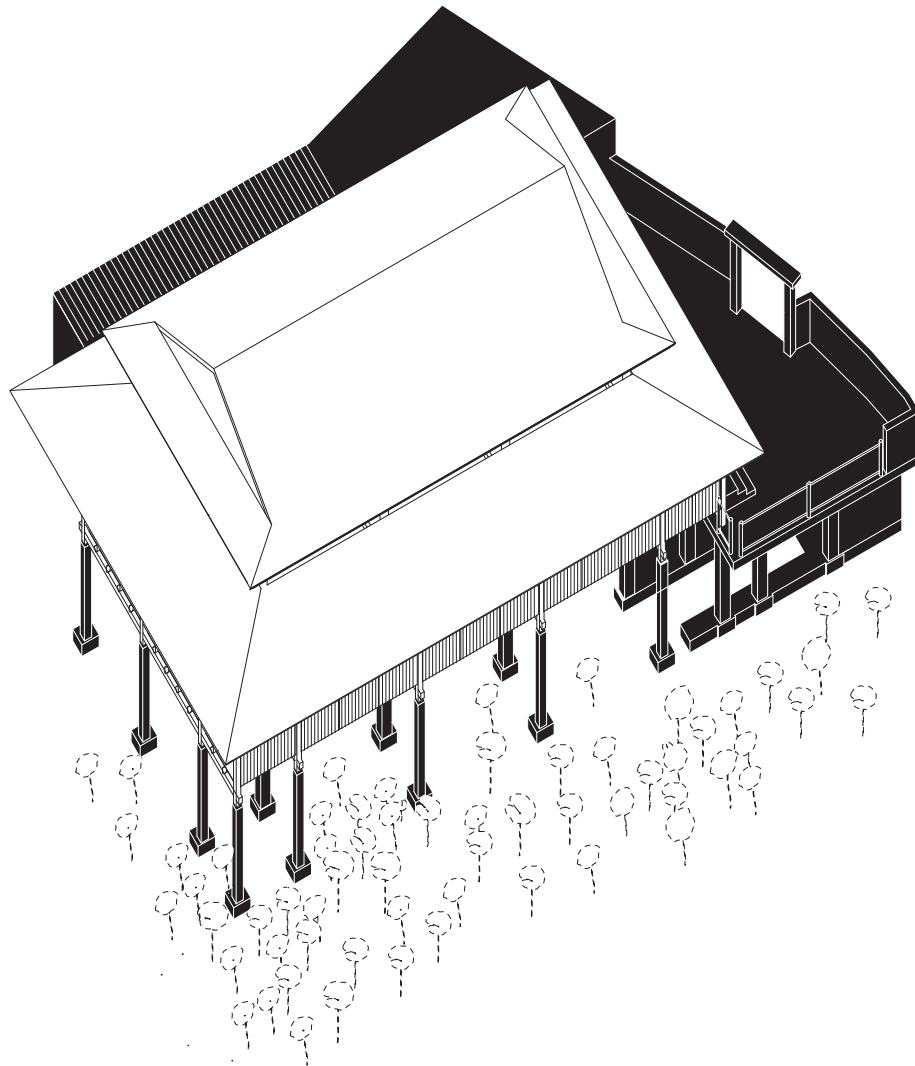
HIGHWAY HOUSE

The original house was dismantled and reassembled next to a new highway that runs along a river that winds through the valley. The house sits on a concrete slab raised by columns from the banks. A footbridge crosses the gap created by the slope to connect the road to the house. The highway house now serves as a government checkpoint for trucks delivering goods to the valley. Before the addition of concrete, wooden piles would have extended from the ground into the house. Because these wooden piles often rested only on stacked stone foundations, houses would sometimes be swept away by frequent floods. Today, the concrete columns and slab are separate from the wooden structure, and the house is protected from the water below. The process of taking apart and reassembling the house in its new site is made visible by the numbered wooden panels that comprise the infill of the elevation. With the concrete adaptation, it was possible to reuse the elements of the house in a new situation.



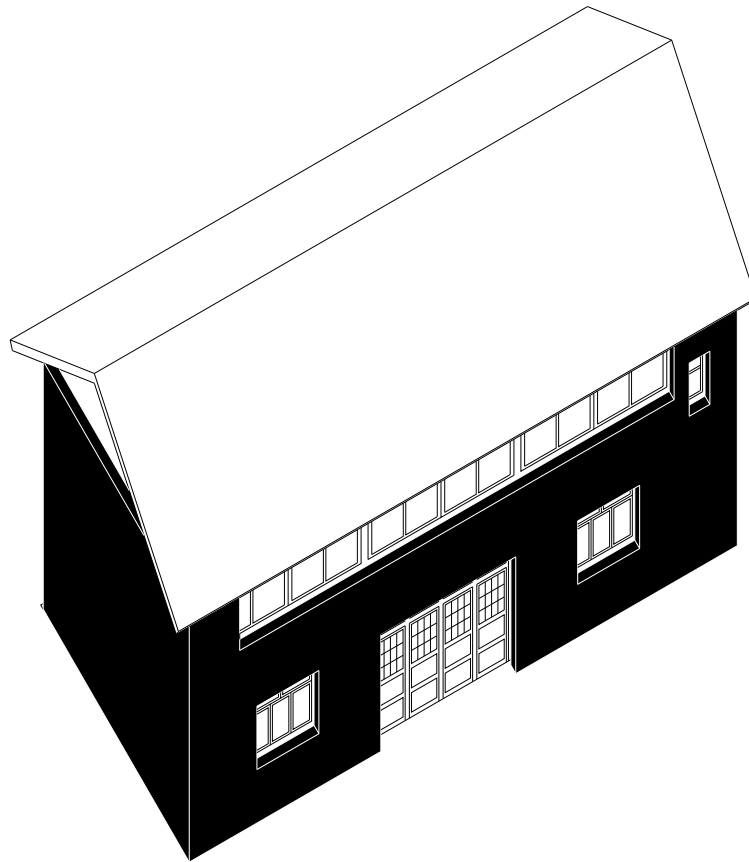
HOUSE ON HOUSE

The family decided to add a wooden frame and pitched roof on top of their concrete house. The dimensions and spatial organization of both houses follow a traditional spatial diagram: three even bays with an open middle area flanked by four equal rooms. In traditional houses this meant that the main space would often be used for a fire; other rooms had no fixed use and could be adapted to a family's needs. Above the main door of the concrete house is a recessed balcony that looks onto the fields. Openings in the facade are filled with aluminum windows. The brick in-fill has mostly been plastered and painted white. A stair at the back leads to a third level, crowned by the traditional frame of a wooden house, that has been left unenclosed. This is often the case in traditional houses; the family smokes meats, dries crops and stores handicrafts in this open space. The void formed by the pitched roof almost doubles the height of the top floor. The everyday activity of the family shifts between the tile-finished generic concrete construction below and the traditional, open structure above. The house stitches together a new combination of old and new, taking what is useful from both.



POND HOUSE

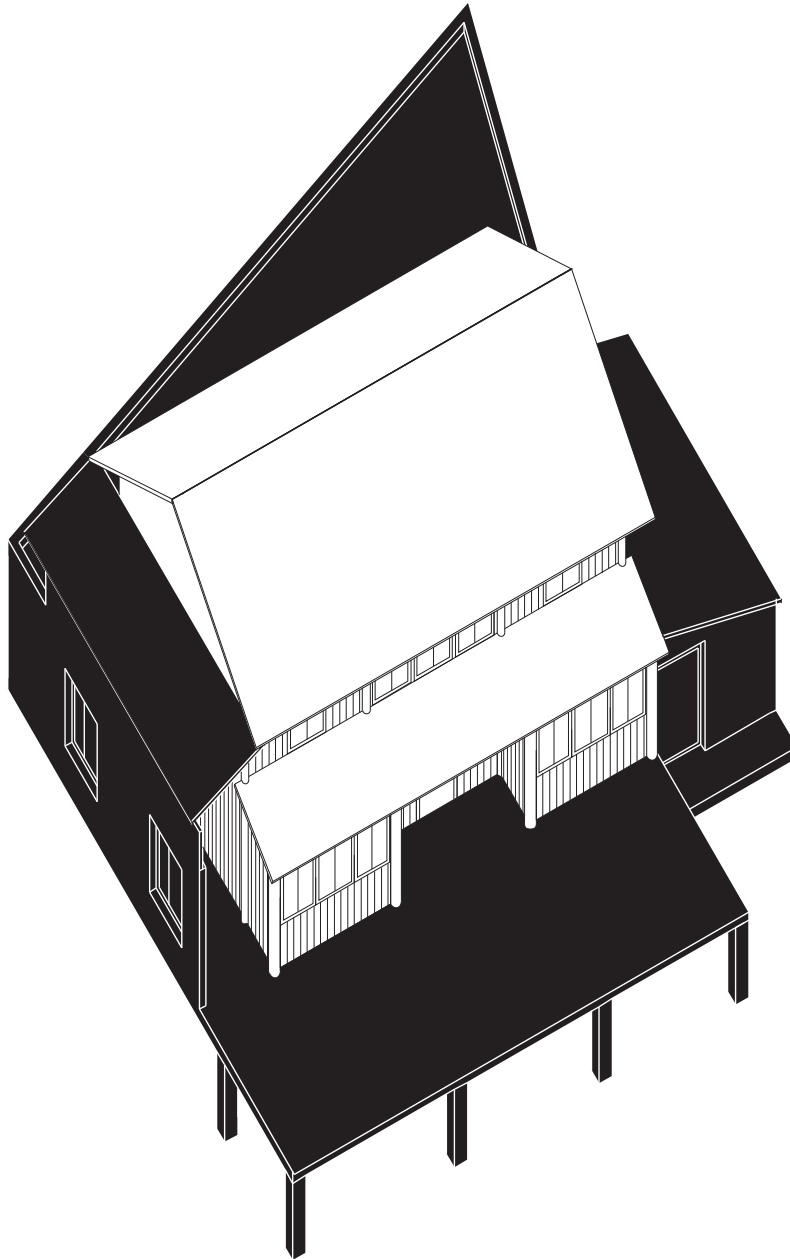
The house once occupied a remote hillside overlooking a village that sloped into a valley. The owners wanted to be closer to a new road that would connect them to nearby towns, so they disassembled the wooden elements of their home and numbered each one, transporting the pieces to a new site once the road was completed. The location for the reassembled house posed new challenges: steps away was a river that flooded during the rainy season, which meant permanent exposure to moisture. The wooden stilts that used to sit on flat stacked stones founded into the earth, were cut down to stumps. The house now rests on tall brick columns, each sitting on a concrete base founded into the ground of a marshy pond. In the gap between the street level and the raised ground floor is a concrete terrace with neat piles of firewood and leftover construction material. After building the terrace, the family added a concrete volume with a kitchen to the rear of the house; underneath, almost surrounded by the water, they completed a small brick volume for a toilet. Noise, dust, and exhaust from the main road soon became difficult to live with, so they added an enclosed wooden porch raised from the pond on thin concrete columns. The family now pass through this intermediate space to enter the original wooden structure. A new terrace on the house's shorter side leads to the street. Gates were added later for safety. The in-between spaces resulting from the challenges of the new site added new and unexpected qualities – mediating between the house, the water and the road.



SHELL HOUSE

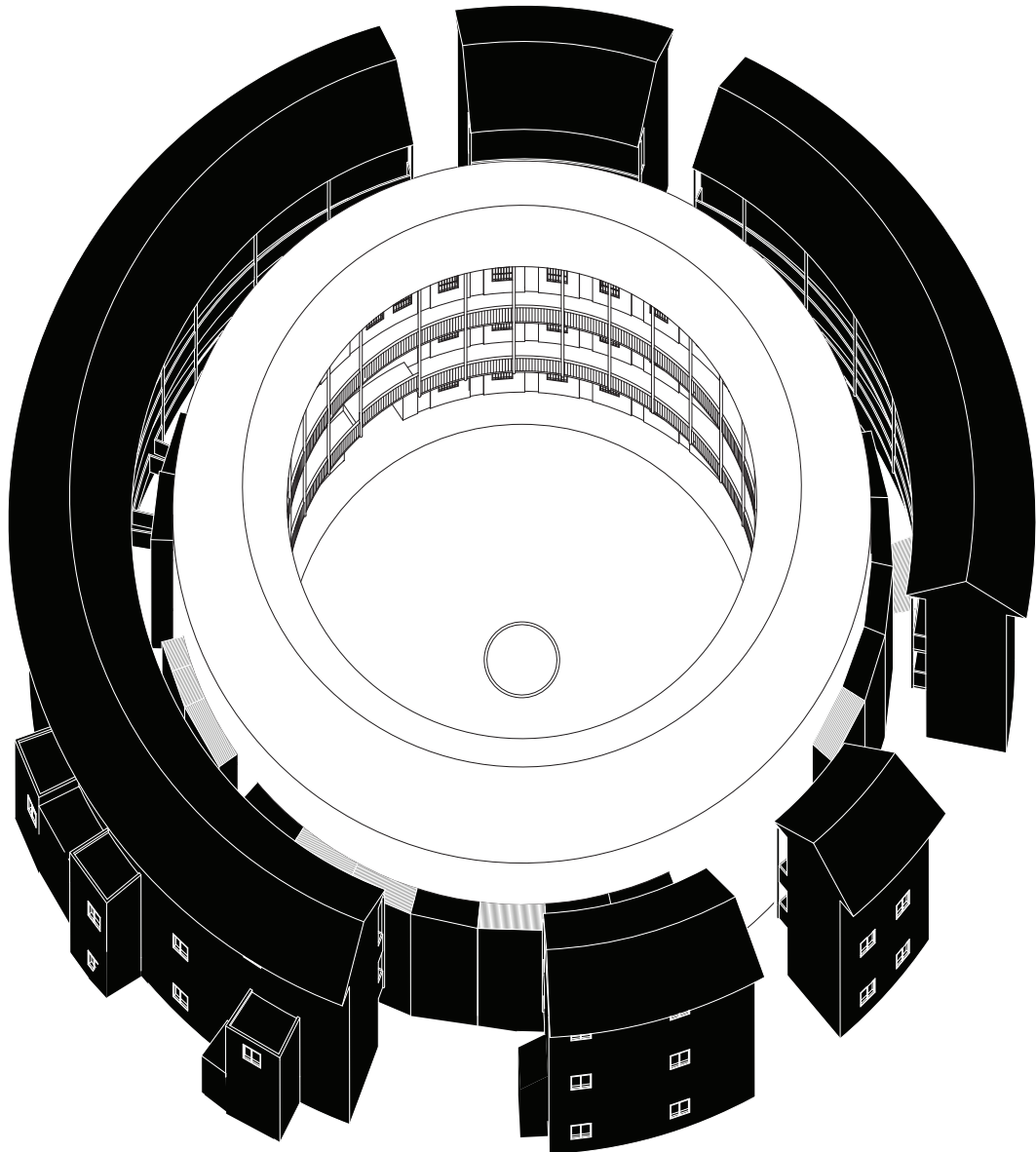
After the residents assembled and raised the houses' wooden frame and completed the roof, they used concrete and brick to build an exterior shell. Brick walls could be completed faster and required less skill than the traditional method of joining wooden elements to create an infill. Where traditionally joined wooden enclosures allow drafts of air and sound from the street, the new shell is nearly impervious to wind and noise. The shell comprises a thin wall that rises two-stories and is set off from the structural wooden grid (in most cases by a few centimeters). Inside the house, wooden partitions that enclose a small area contrast with plastered and white-painted surfaces elsewhere. Pipes for a kitchen and bathroom are fixed to the wall. On the short end of the house, wooden stairs have been slipped in-between the wooden frame and the plastered shell. The plastering stops on the second floor; from there upwards, the outer wall's rough bricks are left unfinished. They climb the entire height of the gable end. In the juncture between the stacked bricks and the roof structure, an inversed 'V' of light illuminates the gap. One manner of living is embedded within another in the meeting of bare plastered walls and wood.

2.10 Wooden House : Wall House



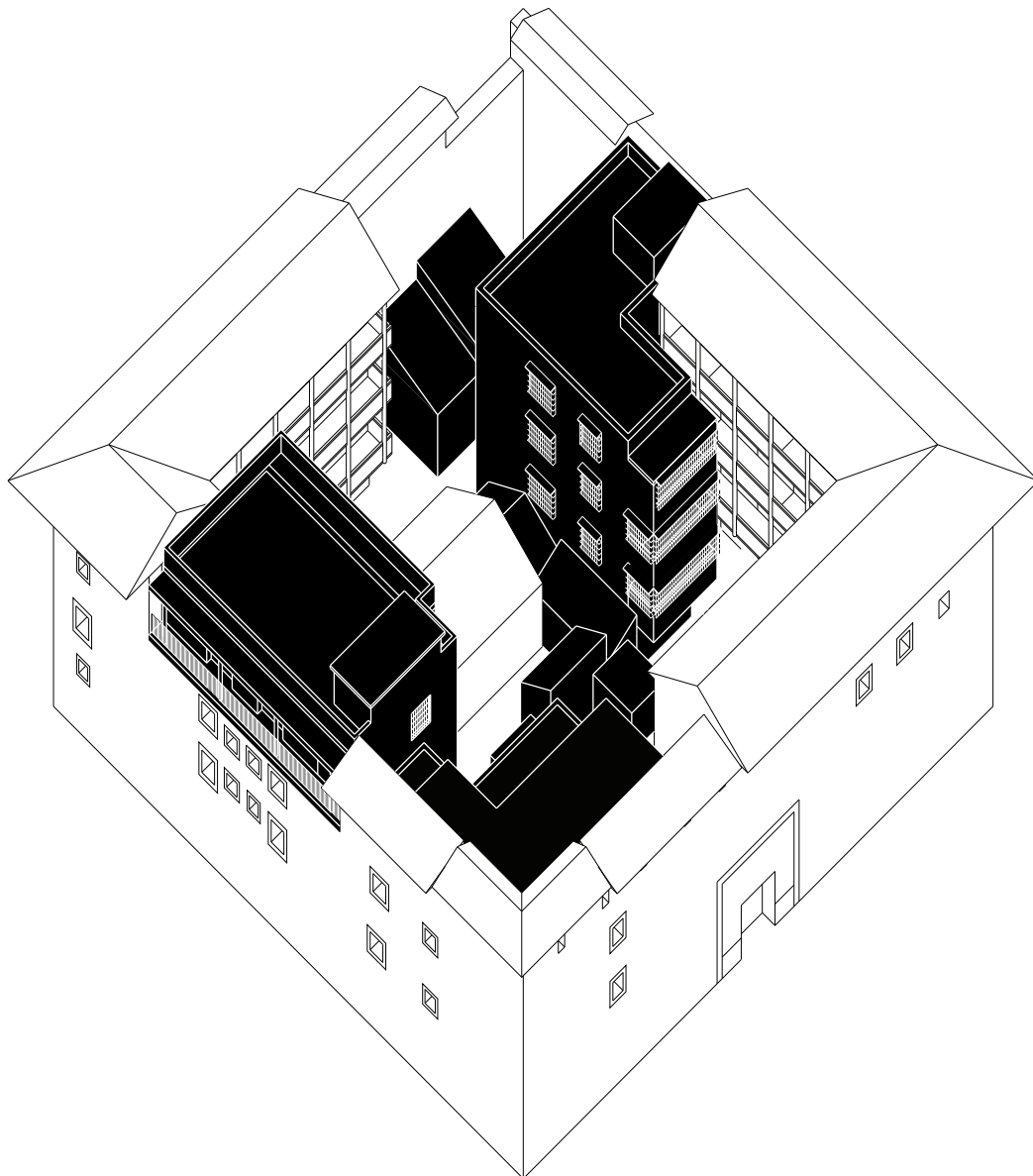
WALL HOUSE

The traditional wooden house fully occupies its irregular site with new concrete frame elements. The main road fronting the house winds through the valley and connects villages to the district town. Between the road and the traditional wooden house, the family built a platform raised from the ground on concrete columns. Underneath, they store building equipment, tools, and a scooter. At the rear of the site is a new addition whose triangular plan extends nearly to the plot line. The bare concrete frame structure, which has mostly been left unfinished, does not impose itself on the wooden house. The development of these additions has been slow and incremental, with the family relying on installments of money sent back by their two sons. Along the back wall of the house, beneath a large triple window, they have installed a countertop with a sink and space for cooking. In the narrowest corner of the triangular room, a tightly compressed space leads to the most recent addition. For many months, there was simply a brick wall parallel to the side of the house. When funds became available, they covered the space with a pitched roof, creating an enclosed passageway from the front platform to the back of the house. On the opposite side of the house, there is a similar sized space that is used as a toilet. In the future, perhaps the front platform will also be enclosed, creating a circuit of spaces with the wooden house at the center.



DOUBLE HOUSE

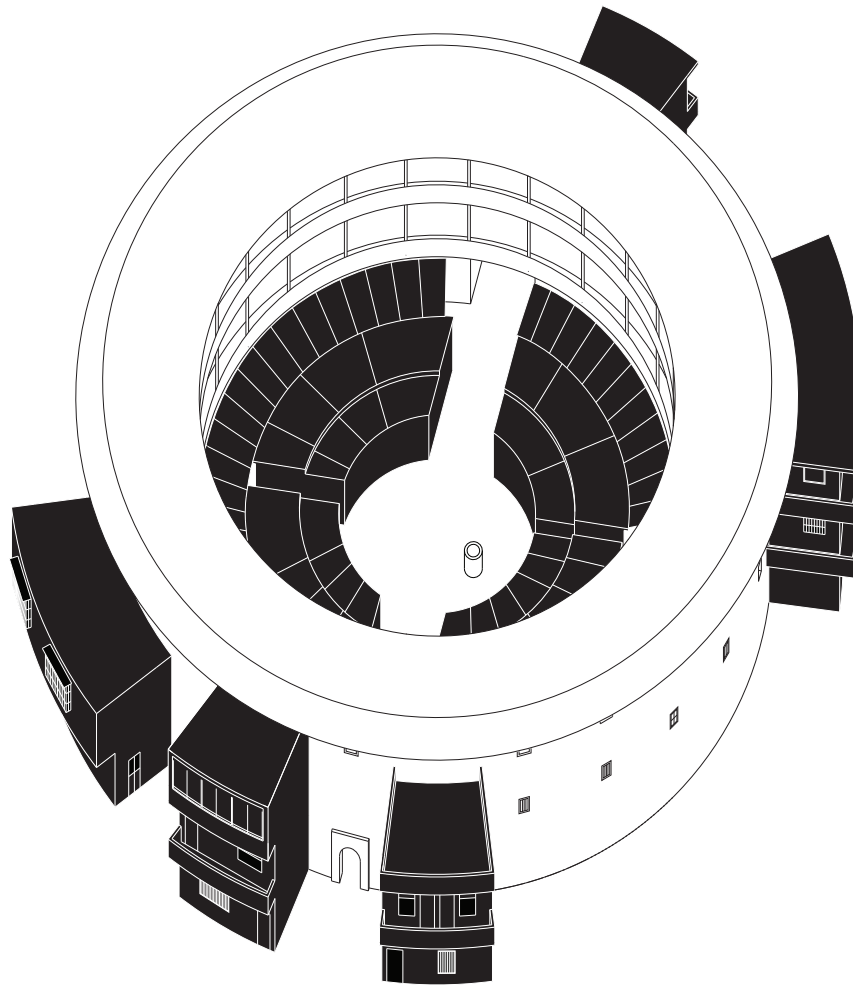
The households of this tulou received compensation from the regional government when a portion of their farmland was cut away by the construction of a highway. With this compensation, they decided to expand their living spaces. Not wanting to build inwards or tear-down the perimeter wall, a second ring of rooms was added around the original tulou, extending each family unit outwards. As with the original tulou, the new ring is made of rammed earth and wood – a nearly perfect twin of the old structure it surrounds. In the space between the old and new tulou is an alley crisscrossed by bridges that connect upper floor units from the inner and outer buildings. Each family's main living space is generally on the ground floor of the old building; a door leading into the alley and through another entrance sometimes connects to a storage area in the new ring where families keep farming equipment or a space for parking. The upper floors of the tulou are typically bedrooms, and the top-most story is used for harvested potatoes, grains and roots. Kitchens and bathrooms have been added directly to the outer wall of the inner ring and are accessible from outside. These additions, projecting into the alley, ensure that this in-between space is always active. While the central courtyard provides a place to work or gather, the curved alley allows for more informal encounters. The double house is a collectively conceived, large-scale strategy for expansion.



OUTSIDE HOUSE

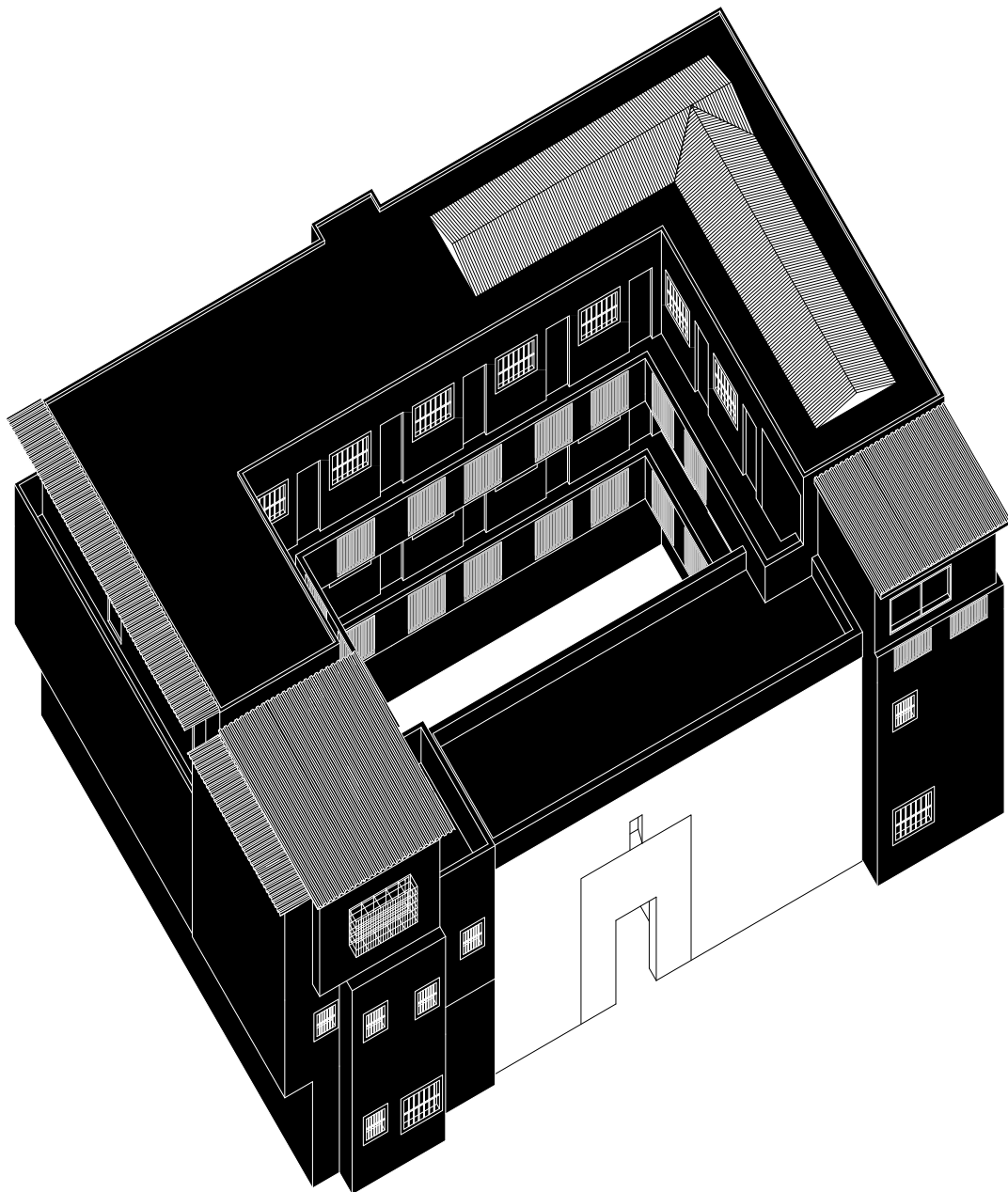
A small village of new constructions was hidden behind the thick earthen walls of this tulou. Three families each built individual houses to replace their original tulou sections. These three to five-story concrete frame buildings replaced walls, walkways, floors, and stairs all made from wood. The additions project into the courtyard up to an agreed-upon line that marks the division between family ownership and the shared communal space. Despite the changes inside, the exterior wall has been almost unaltered. The residents decided collectively to maintain the tulou's traditional external appearance. The more radical changes within have encouraged families to return to the tulou more often, during auspicious festivals, for example. Some older residents chose to live in the new additions, while others preferred to stay in their traditional units. Before the transformation, balconies lined the tulou's inner perimeter, forming a continuous walkway overlooking the regular square courtyard. Residents in any corner could quickly survey nearly every dwelling. With the new, projecting concrete additions, intimate spaces and hidden corners allow for different types of informal encounters and activities.

2.13 Collective House : Plug-in House



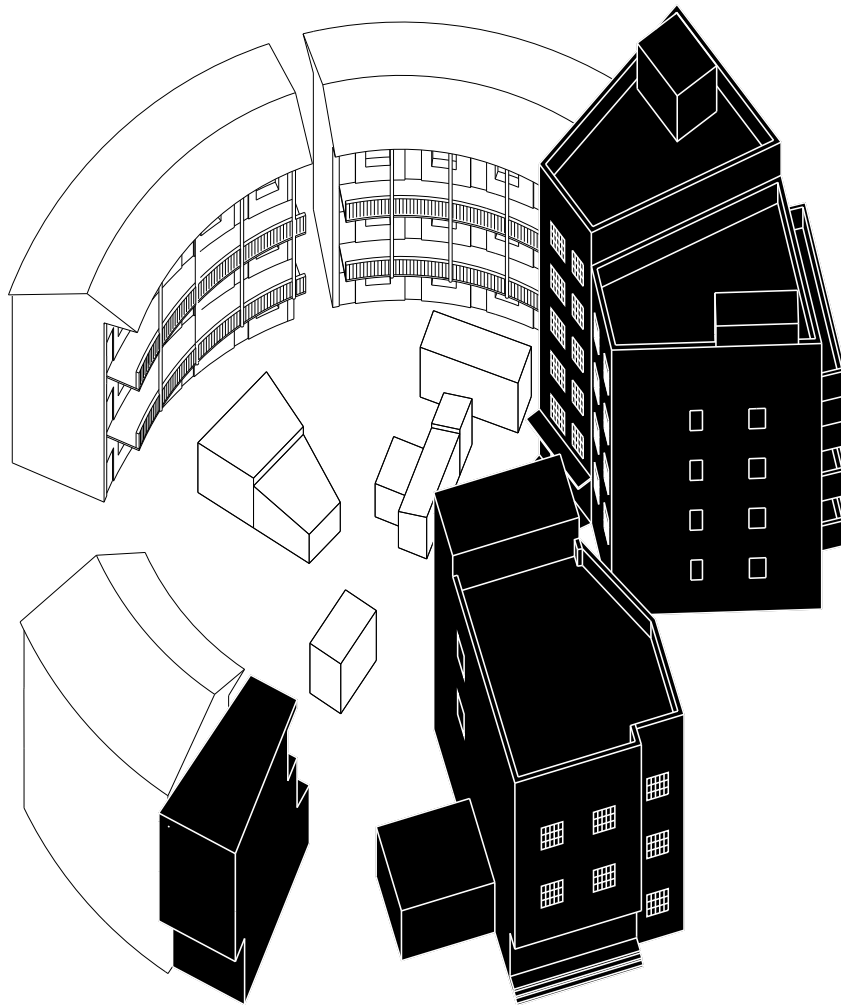
PLUG IN HOUSE

Over the course of several years, this old tulou was redefined by additions both inside and outside its wall. The families here wanted to remain part of the traditional collective living structure, but also to have bigger, updated houses. External volumes plugged in to the tulou from the exterior, orient their once inward-looking units outward. New openings in the earthen wall link the old spaces to those of the plug in extensions. The residents can either access their houses through the collective courtyard or from individual street facing entrances. The plug in volumes do not have interior stairs. When residents want to travel to an upper room, they must pass through the tulou's earthen wall and take a communal staircase, before passing back through the wall to the space above. Each family was also attributed an equal, radially delimited slice within the courtyard in front of their unit. They developed these spaces into individual additions housing bathrooms and kitchens. Some residents covered the gap between the entrance to their house and the new courtyard additions with a polycarbonate awning supported on a steel frame. This translucent covering allows them to use the collective space in front of their ground floor rooms all year. Outdoor stoves, baskets, basins and benches are neatly organized in this space. Despite the courtyard additions, there is still sufficient space for all 30 families to gather there for New Year celebrations.



REMAKE HOUSE

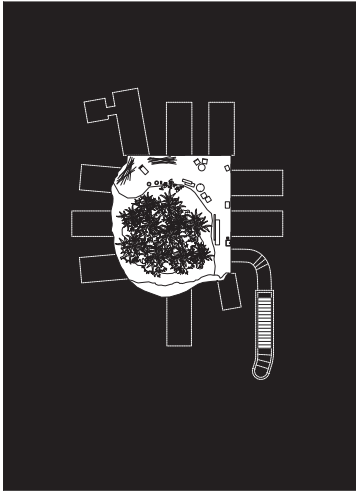
Eight brothers remade their inherited sections one after the other, recreating a collective inhabitation. The tulou is relatively small, with the length of its rectangular courtyard parallel to the entrance. One by one, the brothers replaced their portion of the original tulou with a two-story construction, finished in its own cladding or color. Nevertheless, the remade sections respected the tulou's original circulation and footprint. From the outside, the building is barely recognizable as a tulou. Only the mud entrance wall from the original structure has been maintained. The rooms of this original earthen fragment have been left unenclosed and are used for storage. When the brothers needed more space, they decided to add an additional story to their houses. They flattened the roof of the remaining earthen fragment, so that it could be used as a terrace by the adjacent houses. To unify the front facade, a thick orange band runs continuously along the edge of the slab. The courtyard's proportions are compressed by the additional story. Each corner of the building has its own character, expressed through a particular choice of tiles, decorative features, or paint. The family's different choices within this process of renewal have rendered the tulou's system of vertical ownership legible. Although the building is almost entirely rebuilt, it still carries this central idea of the tulou.



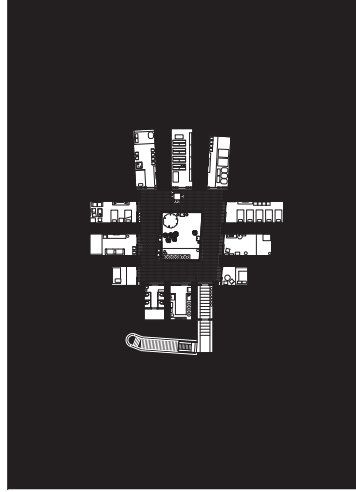
SLICE HOUSE

More than half of this original tulou structure was demolished. In the space of the razed structure, families have built free-standing towers whose footprints are defined by the limits of their original allotted space. The heights of these new constructions vary; some families added extra floors so that their new homes look down onto the roof of the remaining original tulou structure. Other residents abandoned their units and allowed relatives to tear down unused sections to use the land for gardening. Like the new constructions, the gardens also abide by the footprint of the original owner's share of the tulou. These garden plots merge with the patchwork of fields that surround the tulou. While the structural integrity of tulou once depended on the continuity of the perimeter wall, new ways of building make it possible for sections to exist on their own. One of the remaining tulou sections has new concrete columns that extend its entire height. A road from the village and a path from the fields continues directly into what had been the enclosed courtyard. Where the road and path meet, steps lead to an expansive concrete porch and the main door to one of towers that stands in place of a tulou section. Framed views of the surroundings are visible through the new constructions, with the introverted world of the courtyard now open and revealed to the village around it. While retaining the vertical and radial allocation of ownership, this process of patch-work demolition and renewal demonstrates new possibilities for tulou development.

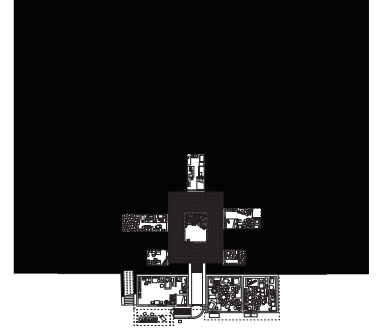
3.1



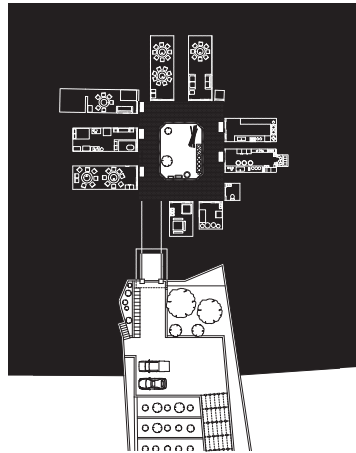
3.2



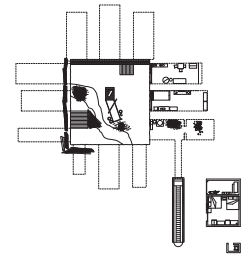
3.3



3.4



3.5



The Underground Houses

The aerial image of underground houses from Bernard Rudofsky's *Architecture without Architects*, comes from collection of aerial images taken by the German aerial photographer Wulf Dieter Graf zu Castell between 1933-1936. The photo is difficult at first to discern with barren trees providing the first orientation and scale for the photo. Looking closer, it is possible to identify people in the photo as well; small figures alone and in groups, their shadows cast long against the flat earth. Scattered between the darkened pits are mounds and faint paths traced into the ground. Rudofsky's text situates these different elements as a village in northern China, outside of Xi'an in Shaanxi province, where life is lived in underground houses.

The assembled figures are undoubtedly looking upwards, perhaps witnessing an aircraft for the first time. In a publication of Graf zu Castell's photos, two other images accompany the photograph selected by Rudofsky. They are of the landscape that surrounds the underground houses: a terrain of porous loess soil comprising sand swept southward from the Gobi Desert. The landscape is flat and marked with precise narrow plots of land. This pattern of agricultural productivity is interrupted by gaping canyons where the edge of the farmland crumbles into a void below, revealing the fragility of the soil and the erosive processes that occur over time. In the center of the photo, a cluster of underground houses and trees are dwarfed by the extension of the flatlands and the scale of the crumbling canyons.

Underground houses are cut into this soil. Some are carved into cliff-sides while others are dug directly into the ground. They begin as uneven pits, but as farmers work to remove the earth they slowly grow, becoming cubic voids twice as wide as they are deep. This void becomes a courtyard for rooms of roughly equal dimensions that are cut, one by one, into its walls, penetrating perpendicularly eight to ten meters into the earth. For centuries, the methods and tools for digging these underground houses were the same—soft earth was scraped and shoveled with rudimentary instruments and carried away in make-shift buckets.

The underground house is accessed by a ramp that begins some distance from the main pit, sloping downwards into the ground and then cutting over to open through a decorated threshold into the courtyard. The houses share the same organizational structure as the Chinese courtyard house, where communal life takes place in an open, introverted space that distributes individual activities into rooms of their own around it.

The landscape of the underground house has historically been one of intense poverty. Centuries-old patterns of deforestation and farming have led to the degradation of an already inhospitable soil. Earthquakes render the loess into a liquid slush during the trembling and have wiped out entire villages. The region was also known for its isolation and banditry, leaving residents with few resources to make lives for themselves—perhaps leading to the radical frugality of the houses. Farmers worked alone or aided by their neighbors to extract the earth and excavate their homes when they finished laboring in the fields. This process could take several years to complete a house. More than most types of architecture, the underground houses need regular care to keep the loess soil from eroding; water and a layer of lime and plaster are applied at regular intervals to keep the structures intact. Without this attention, without inhabitation, the walls of the courtyard eventually crumble into themselves and the cubic void becomes a pit again, in a process that reverses its creation.

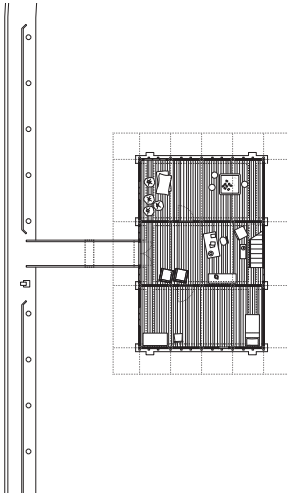
The government's ambitions for the region include the development of a network of paved roads that link the villages to the larger infrastructure networks connecting all of China. To make this possible, the fragile, upper layers are cut away to reach more solid ground below; radical grade changes and new localized topographies now mark the roadside. Courtyard houses that had been below ground sometimes have rooms that open onto newly completed streets. With this development, residents have been able to move away from subsistence farming to grow fruit and other crops that are transported to markets. But this has also meant that children study in nearby towns or attend university in cities, eventually establishing lives outside of the village, as is the case all over rural China.

Older couples remain in villages supported by remittances, taking care of the household as well as young grandchildren. When their grown-up children return home, they are pulled by the obligation to maintain their ancestral homestead. Encouraged by government schemes to engage in heritage activities and tourism, they transform their underground houses into hotels and restaurants for guests. Some villages have reconceived the individual underground dwellings, linking one courtyard to another with new tunnels, and introducing new programs into each space: tourists can shop, eat, and sleep as they make their way from courtyard to courtyard, never breaking the surface of the ground. But these possibilities and the government's promise to support renovations with aid come with long term challenges. Transformations need to be sustained.

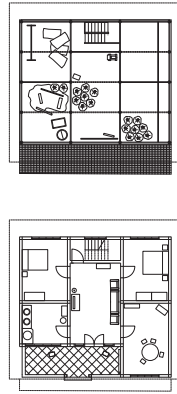
These activities have also introduced changes within underground houses. Toilets and showers are now commonplace and are often ventilated, resolving problems with humidity. Traditional kang beds—wide brick or earthen platforms that are heated from the channeled air exhausted from nearby stoves—have been replaced by mattresses and white sheets. The courtyard offers an isolated space entirely cut-off from even the village around it. For tourists, the underground house offers a simulacra of country life.

Families have also adapted their houses with new additions above ground. These small constructions, sometimes made with the help of local builders, are modest narrow structures a single room deep along their length. They lie within the perimeter of the household's land, sometimes adjacent to the courtyard entrance ramp. Fences are also routine, demarcating the perimeter and securing the households. Families move from above to below ground, depending on the season or the weather. The heat of the summer makes the darkened courtyard rooms more comfortable. In the winter the earth radiates its stored heat, warming the house. Cooking may take place all year in the courtyard. Above ground, the new additions have other conveniences: a constant flow of air, toilets, and heating that is easy to regulate. But the rules are not fixed; the spaces above and below are linked together in one idea of dwelling, the earth's datum a new threshold within that singular realm.

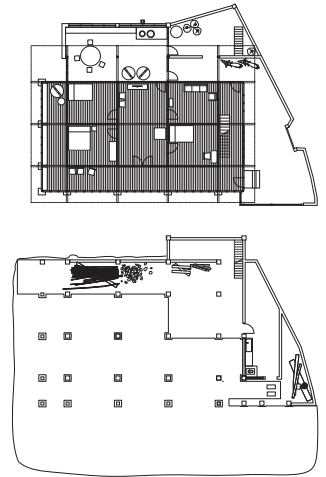
3.6



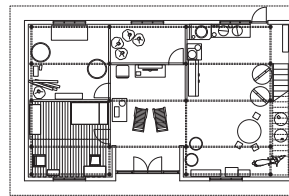
3.7



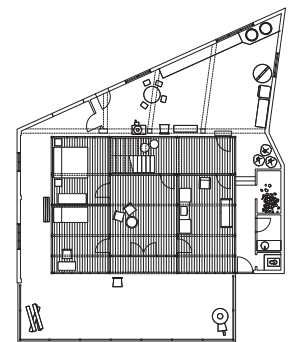
3.8



3.9



3.10



The Wooden Houses

The wooden houses of the Dong people occupy river valleys that thread through three provinces in south-central China. The relationships between place, cultural identity, and craft that defined their traditional wooden architecture have been radically altered by new construction processes that require little skill and make use of inexpensive industrial materials. In other parts of China, these changes have led to the replacement of village fabric comprised of traditional constructions, with generic concrete-frame structures with an infill of mass-produced brick and tile cladding. In Dong villages, these generic constructions are also increasingly prevalent. At the same time, the collision between building methods has led to innovative tectonic solutions and spatial prototypes that afford new ways of living.

As the Dong did not adopt a written script until the 20th century, they relied on oral transmission, material artifacts, and ritual to tell the stories of their history. The houses represent an important part of this identity, comprising an aspect of material culture whose making and character are laden with tradition. This makes any transformation all the more important for how the community identifies itself. The builders within this region aim to maintain the cultural specificity of their community while recognizing the social and economic shifts that have changed people's lives. The act of building becomes a way of negotiating these competing forces.

The traditional relationship between building and Dong identity is crystallized in the wooden frame structure that provides the underlying spatial organization for the home. The houses were traditionally built with China fir wood harvested from the hillsides surrounding Dong villages. Specific rituals accompany the felling of trees, the marking and cutting of logs into sized members and joints, and the day-long assembly of the components into a completed frame. This final act often brings together the entire village and needs to be completed in a single day carefully chosen in advance.

The frame acts as a scaffold for the work that follows. The ink-master, responsible for calculating the lengths of each member and the angles of joints, occupies a respected and often hereditary place within the village. While many men help with carpentry—preparing wood, assembling the prepared pieces—few attain the status of ink-master. This process largely takes place without drawings and almost entirely as a function of the ink-master's accumulated knowledge and intuitive building sense. Know-how is built up, accumulated and shared through the very practice of building itself.

Floors, walls, windows, and furniture were traditionally crafted of the same China fir as the house itself. This wood was also used for boats—once common on the rivers that link valley villages—and for coffins stored in the spaces below elevated houses. While the frame is assembled and raised in one auspicious day, the rest of the house can be completed when time, labor, and money allow. Every village will have one or two completed frames at some point during the year, with the top-most, golden beam often still decorated with a red ribbon. Ceremonies are meant to ensure both the safety of the workers as they climb the heights of the structure and the prosperity of those who will live in the completed house.

The open nature of the frame, defined by several equivalent bays, welcomes improvisation. The spaces on the first floor circle a space for a central fire and are often left undetermined, so that sleeping, resting, and the storage of goods can take place in any of the rooms; the second floor is often left open to the wind. In villages today, the possibility to building to fulfil contingent needs and alter houses over time has opened the way for new ways of building, inscribing new ideas about dwelling into the armature provided by the Dong frame. While villagers are attached to the traditions that their dwellings represent and modestly proud of the more recent attention their wooden homes have received from tourists arriving on new road and high-speed rail connections, they also recognize the fragility of the old way of building.

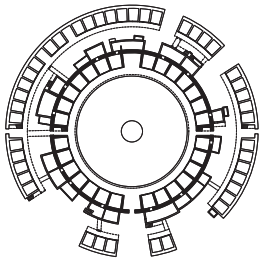
As the piles of traditional houses are not founded into the earth but instead rest on stacked stones, ever more unpredictable floods can sweep away entire structures. Because older dwellings were constructed with mortise and tenon joints that locked into place, these houses would float like rafts along the torrent until they impacted an obstacle and shattered. Other times, the earth of collapsed hillsides would flow into streams of mud, filling the ground floor where household items, tools and appliances are stored. The wooden houses are also difficult to heat, wire, and equip with plumbing.

With villagers returning from the city, or with remittances needing to be invested, money goes to adaptations and adjustments that address these risks. Local regulations allow for certain changes to be made, particularly to ground floors where concrete and brick constructions replace or interlace with the wooden piles. Where before the ground floor was left unenclosed to negotiate the terrain, today it is often leveled and enclosed by plastered brick walls, creating spaces for kitchens and toilets.

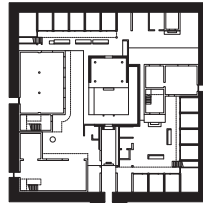
Villages along valley roads have seen the greatest changes. Concrete requires industrial materials to be shipped from nearby towns and calls for a new set of skills. Village carpenters embrace these ways of building, integrating them into knowledge they have carried forward from the past. The sons of carpenters are likely to study in a nearby city and return with a degree in engineering, architecture or forestry management. If they return to the village and take up their father's practice, they work with newly available materials, using CAD drawings or models for reference during building.

While the cost of building a concrete house is more or less equivalent to that of a wood construction, concrete moves along more quickly and requires relatively less skill to accomplish. Unlike a wooden house, the shell of a concrete house provides an enclosed space that can be lived in almost immediately. The spatial finiteness of concrete offers a different kind of affordance than the equal bays of the wooden frame. Some concrete constructions incorporate balconies or entire floors in wood. These hybrid structures are sometimes made from the disassembled frame of an unused house in a neighboring village or valley. Each transported element is numbered in chalk to indicate its place within the renewed structure.

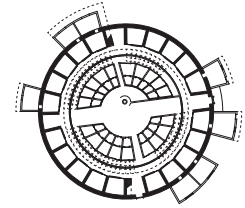
3.11



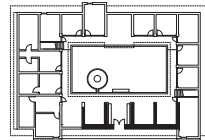
3.12



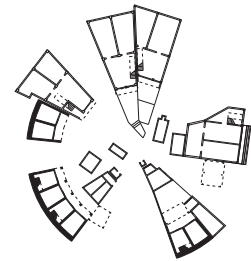
3.13



3.14



3.15



The Collective Houses

Multi-story, earthen wall tulou have been a part of the south western districts of Fujian province for hundreds of years. The continuous construction of these collective dwellings suggests the capacity of the typology to respond to changes in ways of living. The Hakka migrants who originated the tulou settled remote areas of Fujian expecting that this isolation would keep them at a welcome distance from populated Han districts. This isolation also instigated the defensive and collective nature of the typology which secured families from bandits and wild animals. The earliest tulou comprised thick stacked stone walls, attesting to this defensive origin. Later, a method of earthen construction that could be completed with little skill collectively predominated.

Since the most recent period of tulou construction in the 1970s, Fujian has undergone radical transformations. Many tulou are now enveloped by urban sprawl. New infrastructural networks link more remote villages to urban areas and economic opportunity. The 2008 UNESCO World Heritage designation of 46 tulou clusters, catalyzed preservation discourses and a growing tourist economy around these sites. In other villages, many tulou are emptied of residents. Nevertheless, the continued appeal of the tulou's collective way of living has led to cases of remarkable adaptation. These innovations hybridize the tulou's organizational logic with new spatial ideas. The results reveal the flexibility of the diagram at the tulou's core while asserting its capacity to sustain contemporary modes of collective living.

A tulou comprises an exterior wall several stories high and one to two meters thick. This wall was typically made of a mixture of earth, glutinous rice, egg whites and sugar, reinforced with bamboo or fir branches. In the oldest structures, the perimeter was round or oval, but square and rectangular tulou are also prevalent, each form determined in relation to the landscape. Wood from the surrounding forests was used to build-out the remaining structure, with large beams supporting floors, partitions, interior walkways and staircases. Families lived vertically, in stacked rooms looking out onto a central courtyard.

A single entrance secured by thick wooden doors reinforced with an iron plate, connected the courtyard to the exterior. Winds circulated through the entrance door into the courtyard and the walls absorbed heat in the summer. Small windows looking out through the perimeter were reserved for the upper floors.

The collective building of tulou was a slow process, with each layer of earth needing time to dry before another could be added; one story could take up to a year. Upon its completion, families were allotted one of the identical units through lottery, their ownership comprising shares in a cooperative. These families often carried the same last name^{3/4}and could only pass on their shares to other family members. As fortunes changed over time, one single tulou could house people from multiple economic positions. Another governing rule prevented owners from demolishing their section so that the structural integrity of the whole could be ensured. Stairs and interior passageways were maintained in common. While most courtyards was used for cooking and collective activities, some were filled with single-story structures used for collective programs: schools, ancestor halls or stages for festivals or performances. In more recent years, the courtyard in some tulou has been divided in radial sections corresponding with each families' living unit and used to build toilets or kitchens.

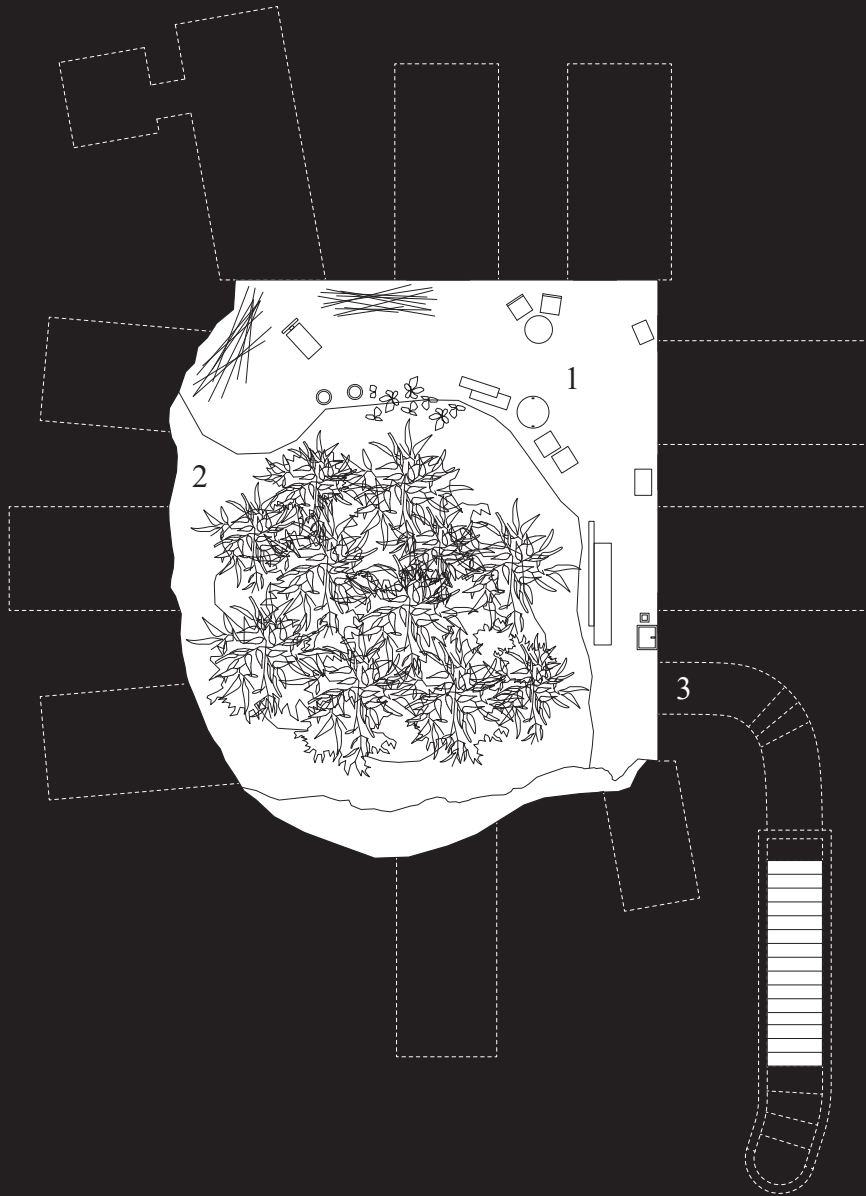
The tulou's spatial diagram is scalable, with the smallest housing ten families and the largest comprising up to several hundred people. This communal mode of living allowed the tulou to endure the tumultuous political events of early 20th century China, when Fujian served as an important terrain for both the Chinese Civil War and the cultural revolution. The mixing of class and status within each tulou meant there was a solidarity between families; as every family was allotted an identical portion, outsiders had difficulty distinguishing rich land-owners from those families with more meager fortunes. The tulou's dense spatial organization also reserved land for agricultural production in a region where the hilly landscape made cultivable terrain rare.

More recent transformations to economies of labor and material have made the tulou less resilient to radical changes to livelihood, family structure and ways of living. Today, the construction of a traditional tulou would cost nearly five times as much as a concrete frame building that housed an equivalent number of families. The wooden beams that connect interior earthen walls need to be sourced and shipped from elsewhere rather than culled in a nearby forest. And the cost of labor, once carried out by residents themselves, quickly makes such a project unviable. Where before family members might be related to everyone within their tulou, these consanguineal bonds have been frayed by economic migration and the loosening of rules governing the buying and selling of shares. As families may not reside in their homes for more than a few weeks of the year, the only permanent residents being older couples and the very young children left under their guard, collective living is constituted in different ways. Individual counters for electricity and water reveal new comforts and a transformed relationship between the collective and the maintenance of everyday life.

The elements of the tulou's diagram^{3/4}the defensive perimeter, the common courtyard, the hierarchy between earthen-walls and wooden elements^{3/4}are today reinterpreted to reflect new priorities. Whole sections of tulou are remade or completely dismantled, new construction methods making it possible to reinforce the structural integrity of the tulou's once inviolate earthen wall. Inhabitants expand their houses outwards, breaking through the perimeter and offering direct access to their units from the street. This allows some families to offer services that respond to the enlarged sphere of economic activity that comprises village life. Other times, construction pushes inward, reinscribing the courtyard with a new character. When space allows, some families choose to build structures outside the tulou itself, with bridges or rooms linking back into the original structure.

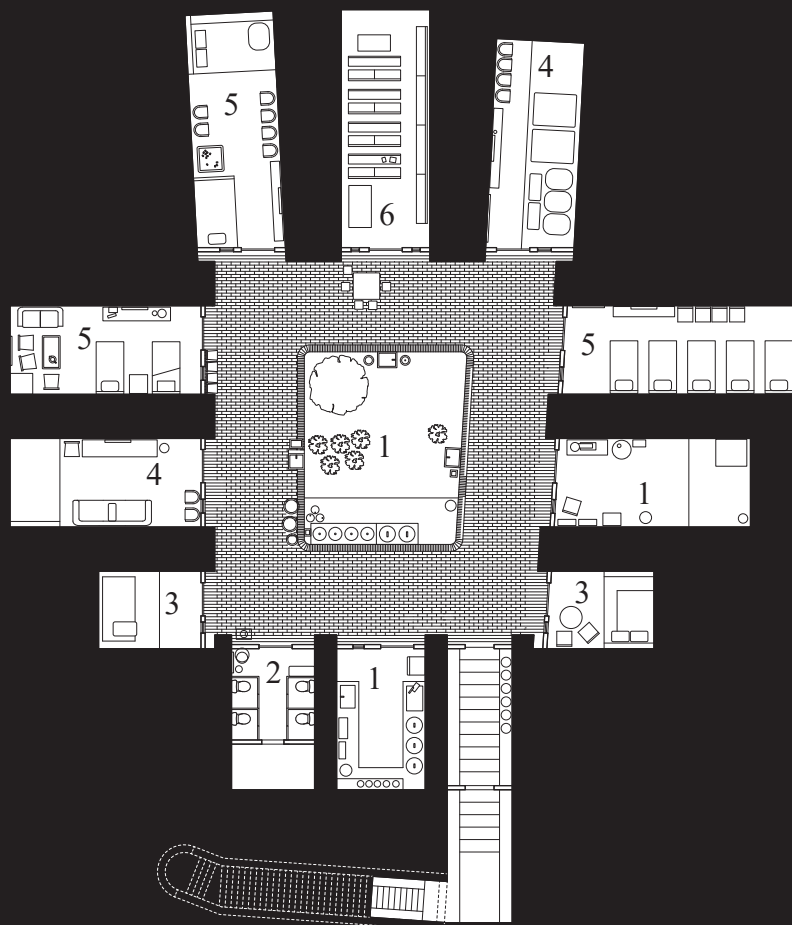
These choices are determined collectively, with each tulou functioning with its own set of decision-making rules. Some are governed by a rotating leader, while in others, residents make decisions by consensus. Small day-to-day issues are discussed on messaging applications. Important choices are made at meetings organized during festivals when family members return to the village. These decisions - whether to build inwards, outwards, breach the perimeter wall, etc. - contribute to the typology's continued capacity to adapt and reflect a desire to maintain the tulou as part of this transformed way of life.

3.1 Underground House : Back to nature House



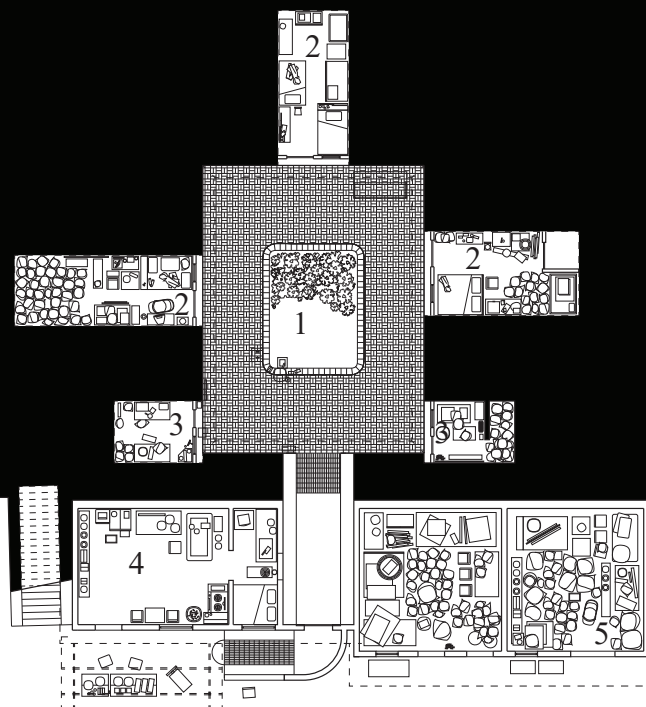
- 1. Kitchen
- 2. Garden
- 3. Entrance

3.2 Underground House : Drive-In House



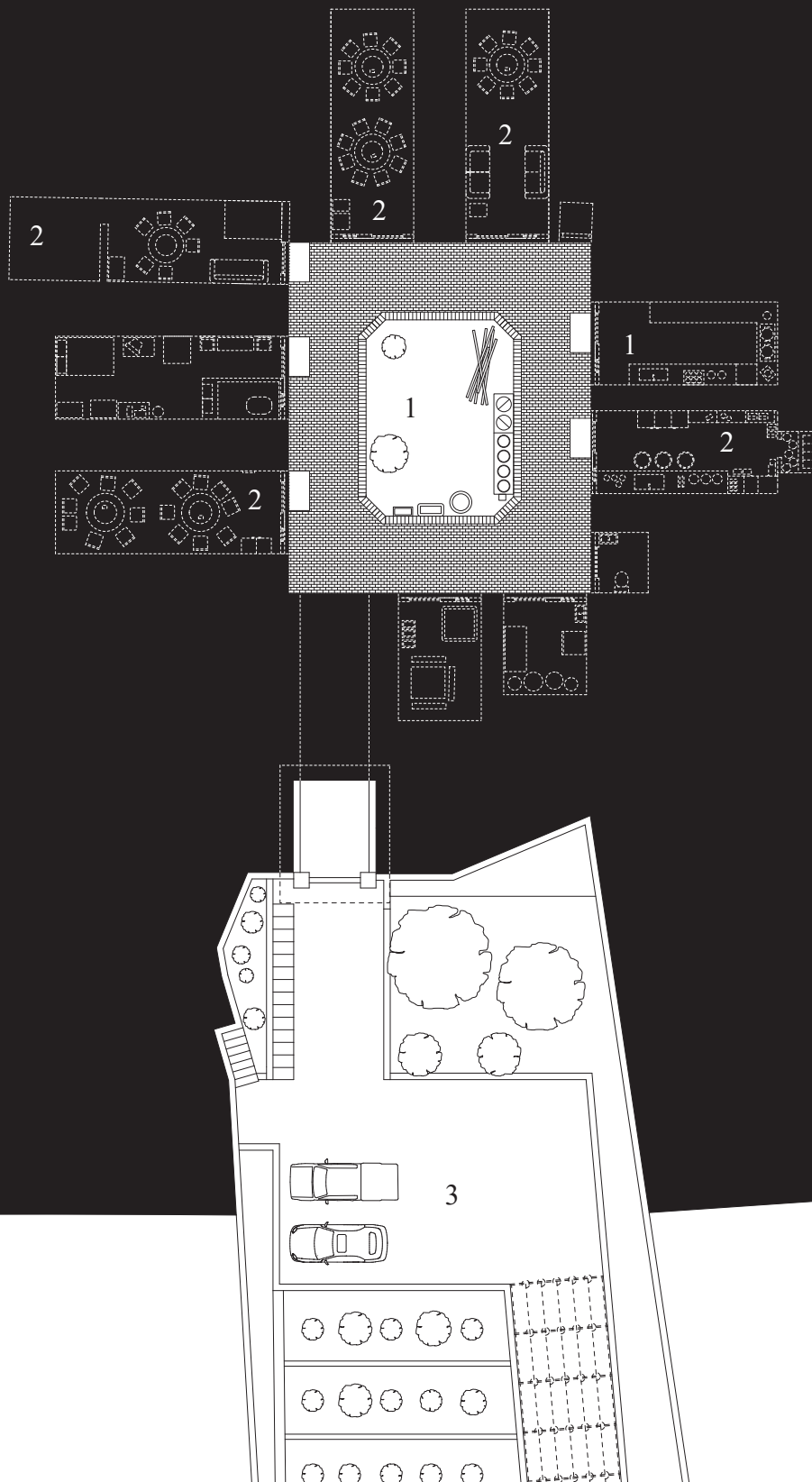
1. Kitchen
2. Toilet
3. Bedroom
4. Livingroom
5. Guest room
6. Meeting room

3.3 Underground House : Summer Winter House



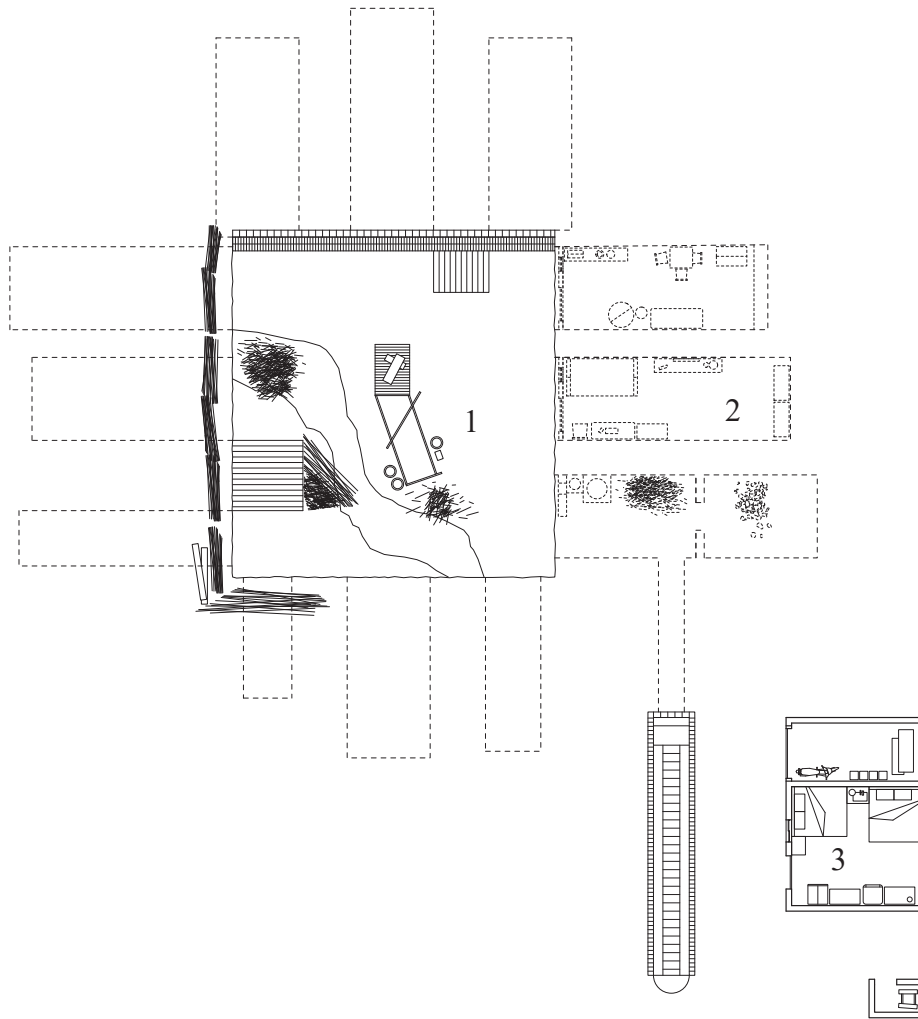
1. Garden
2. Bedroom
3. Livingroom
4. Kitchen
5. Storage

3.4 Underground House : Church House



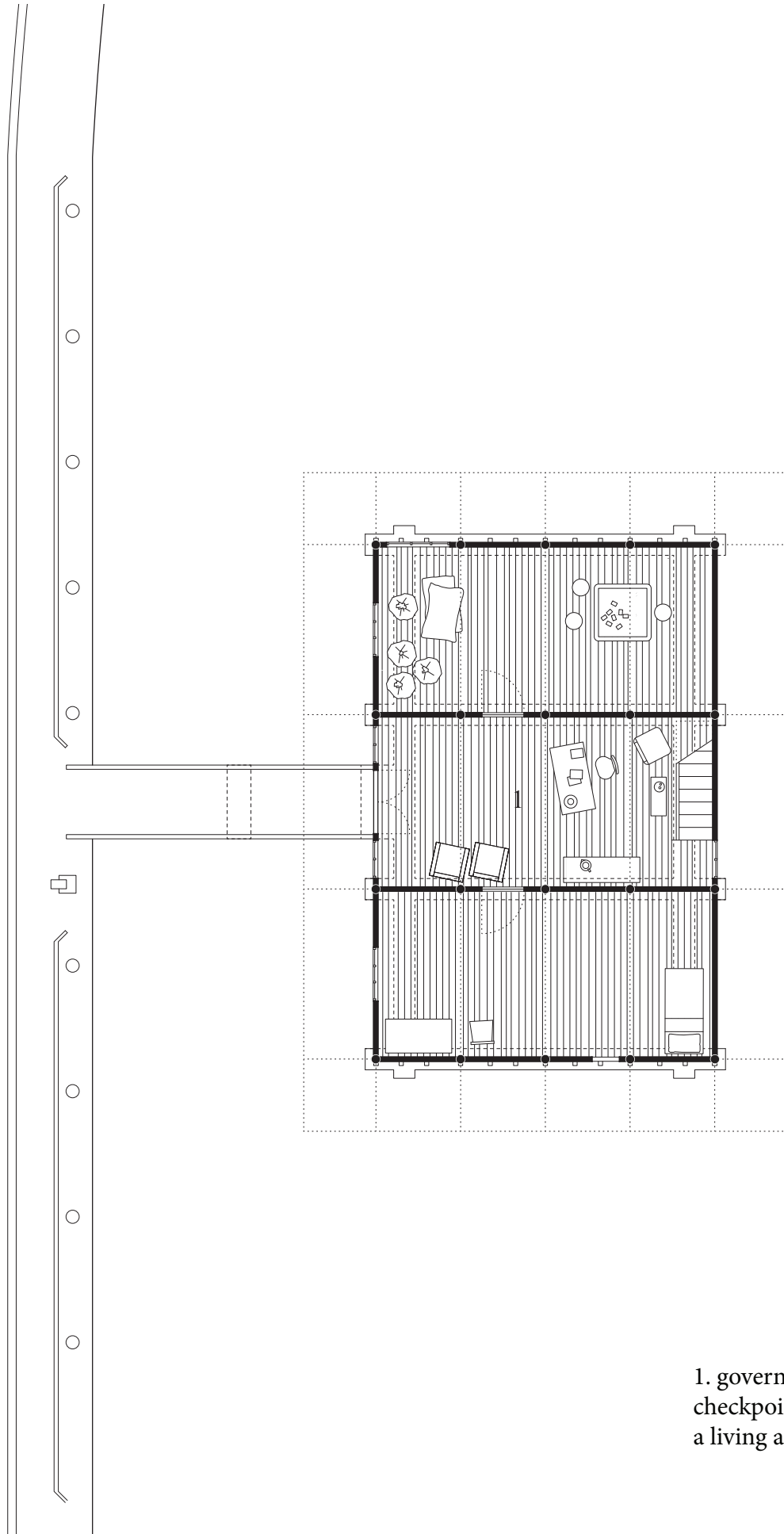
- 1. Kitchen
- 2. Dining room
- 3. Parking

3.5 Underground House : Cut away House



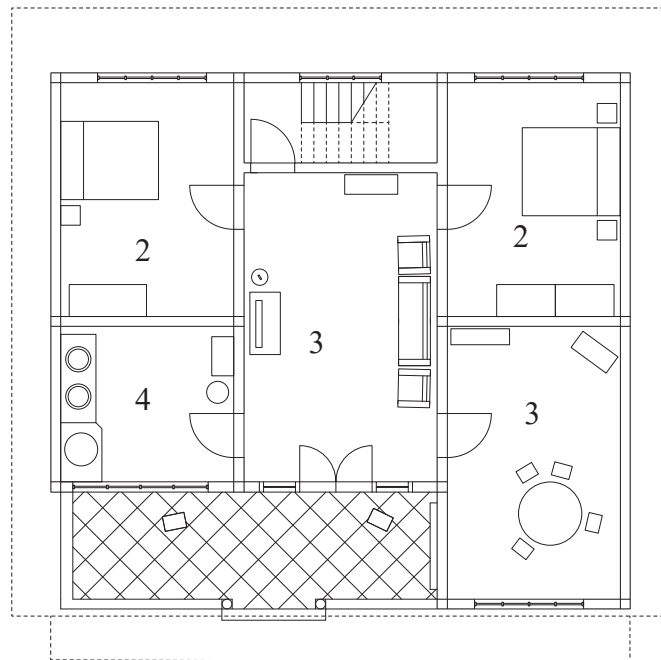
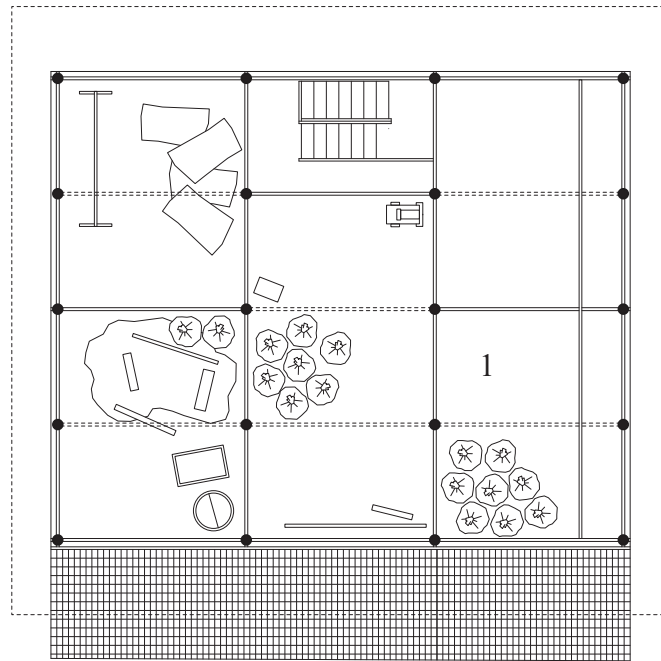
1. Storage
2. Bedroom underground
3. Bedroom above ground

3.6 Wooden House : Highway House



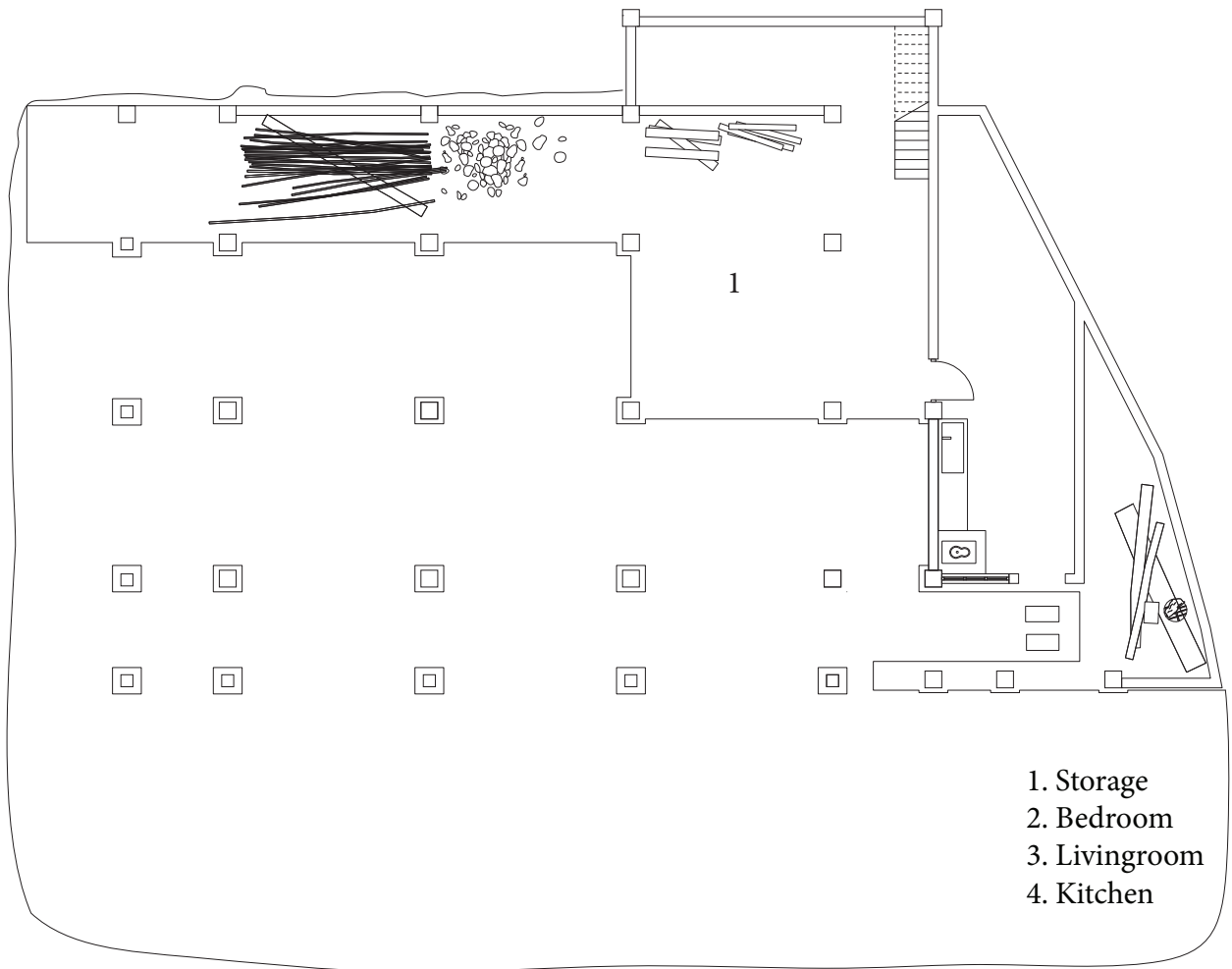
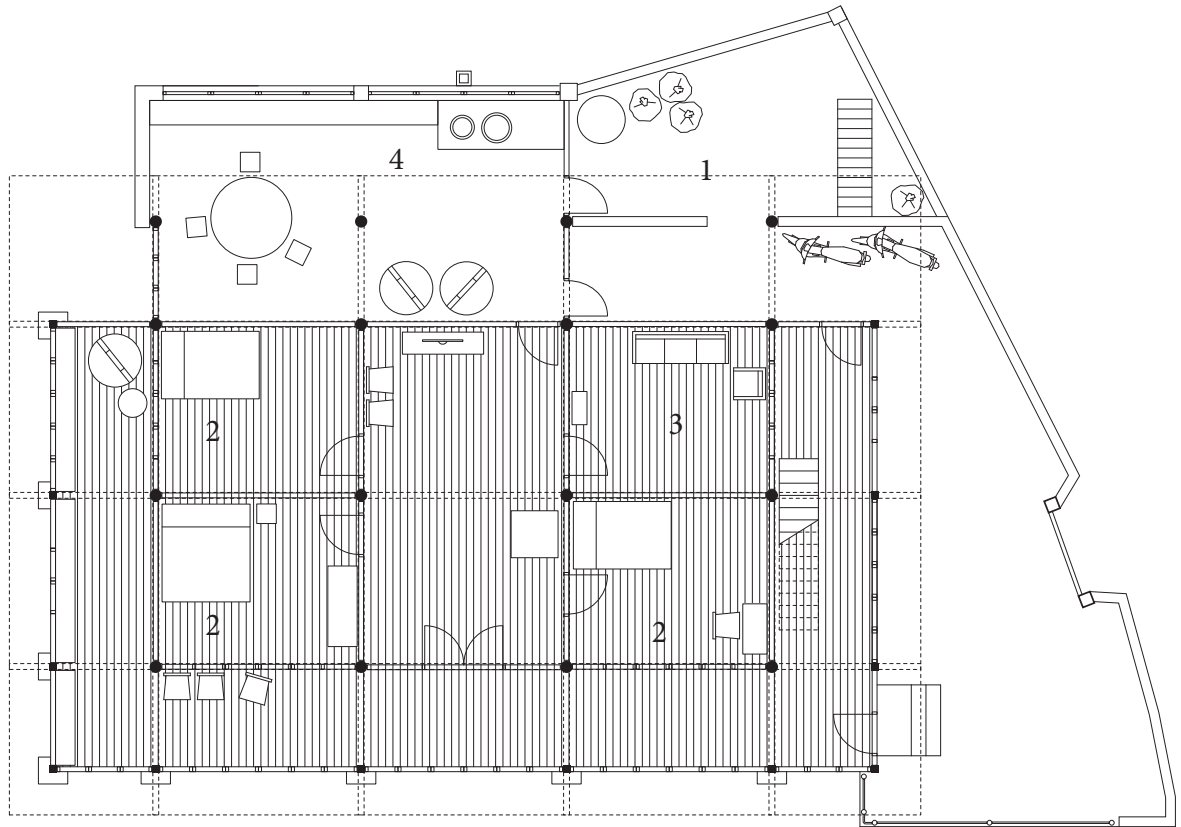
1. government
checkpoint(used as
a living area)

3.7 Wooden House : House on House



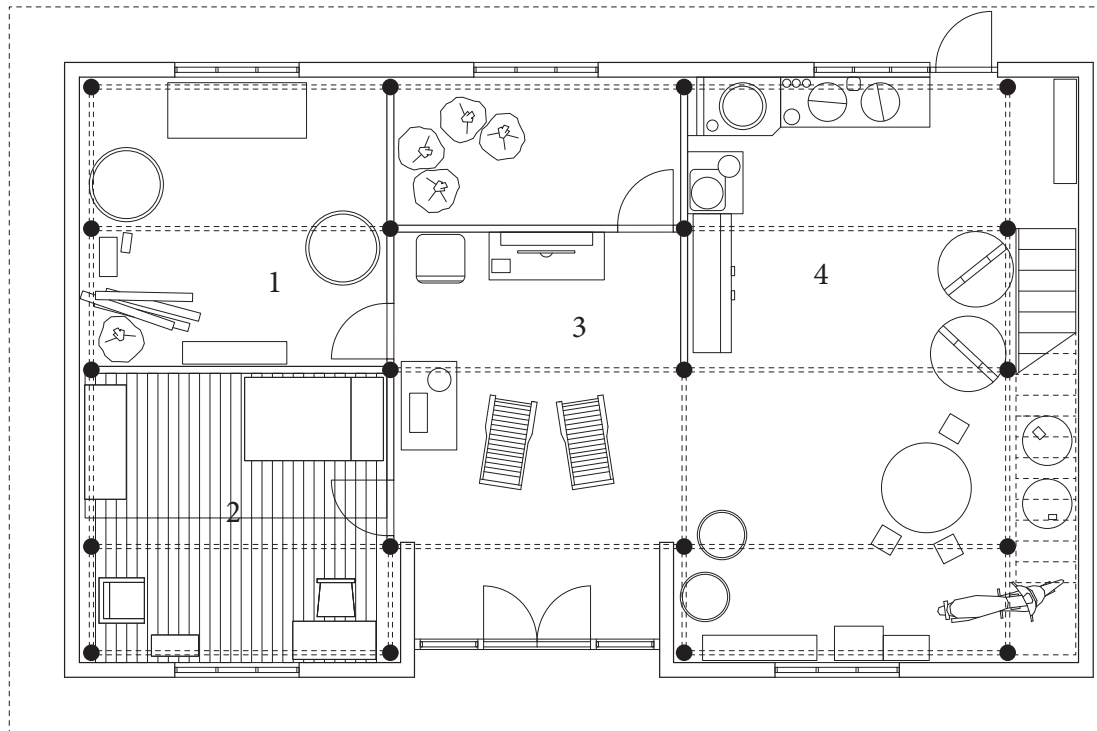
- 1. Storage
- 2. Bedroom
- 3. Livingroom
- 4. Kitchen

3.8 Wooden House : Pond House



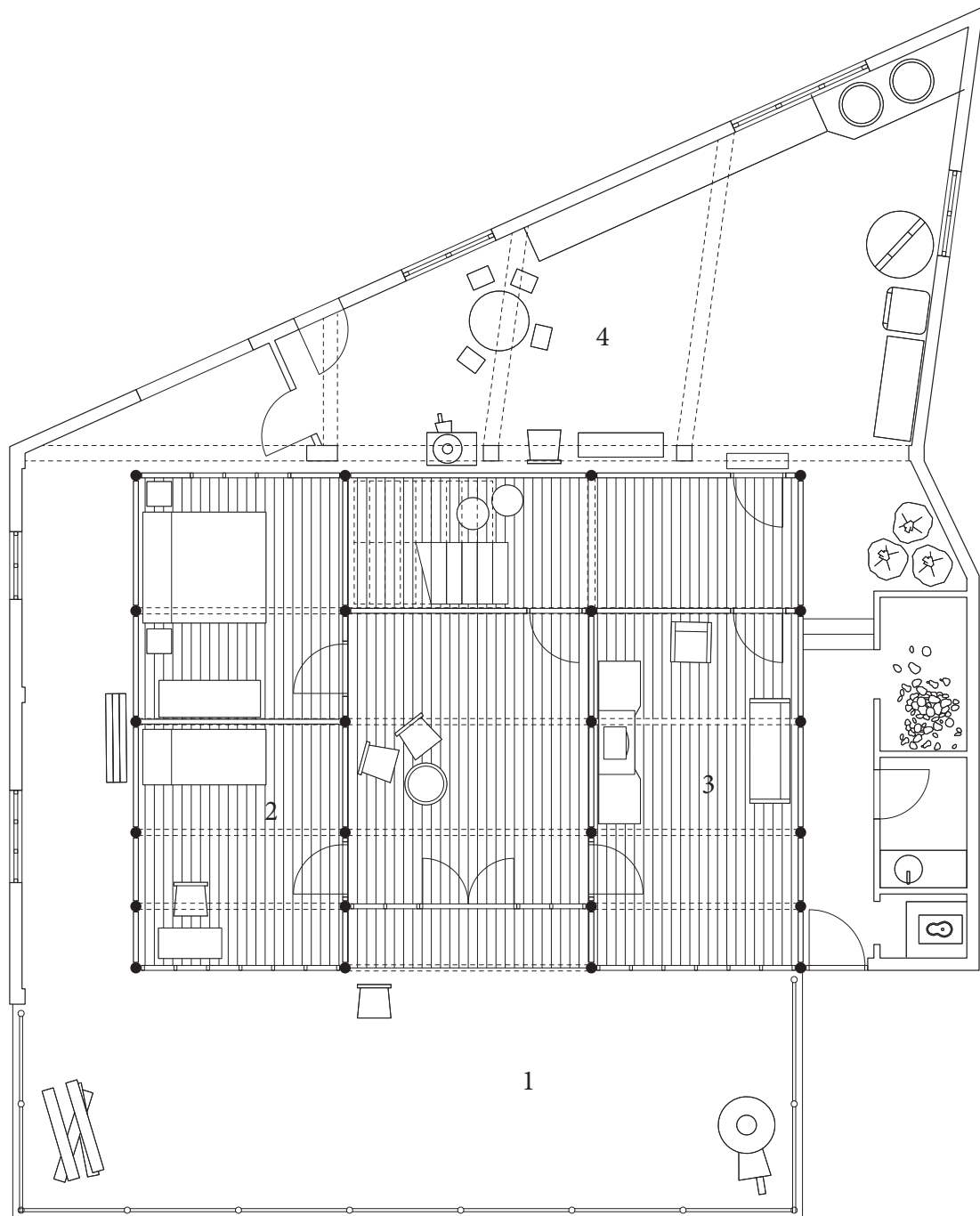
- 1. Storage
- 2. Bedroom
- 3. Livingroom
- 4. Kitchen

3.9 Wooden House : Shell House



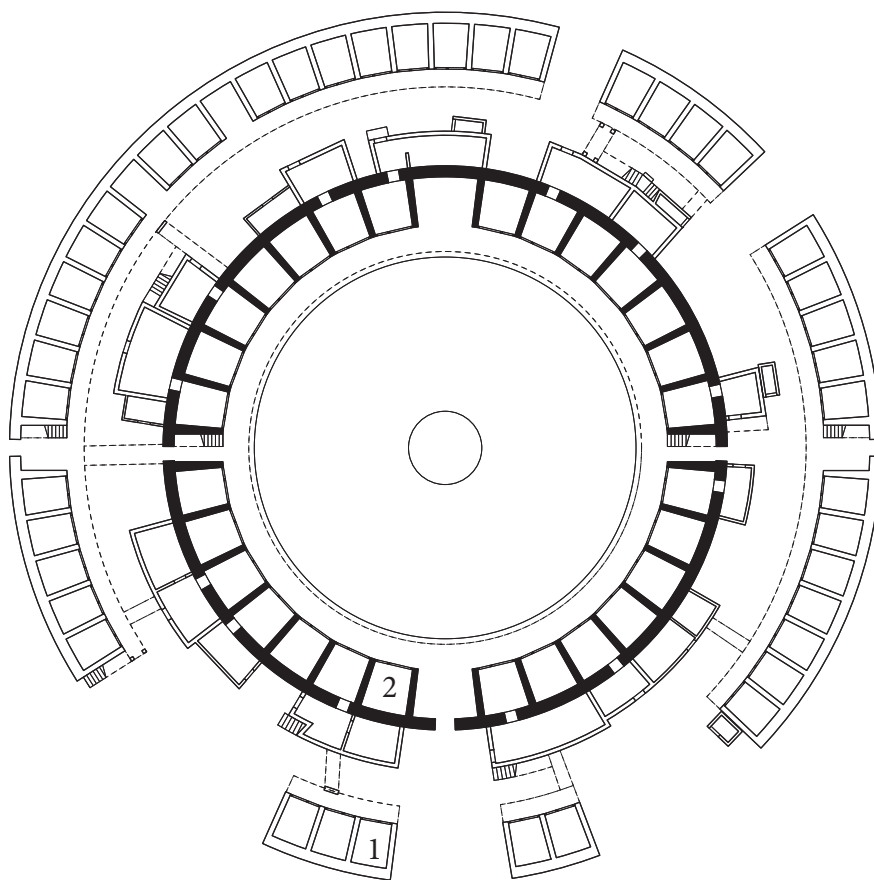
1. Storage
2. Bedroom
3. Livingroom
4. Kitchen

3.10 Wooden House : Wall House



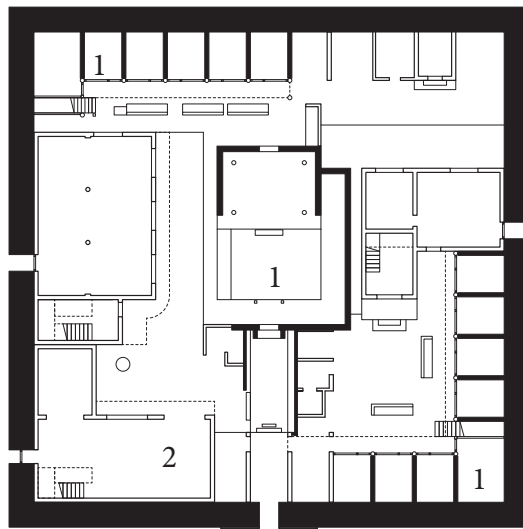
1. Storage
2. Bedroom
3. Livingroom
4. Kitchen

3.11 Collective House : Double House



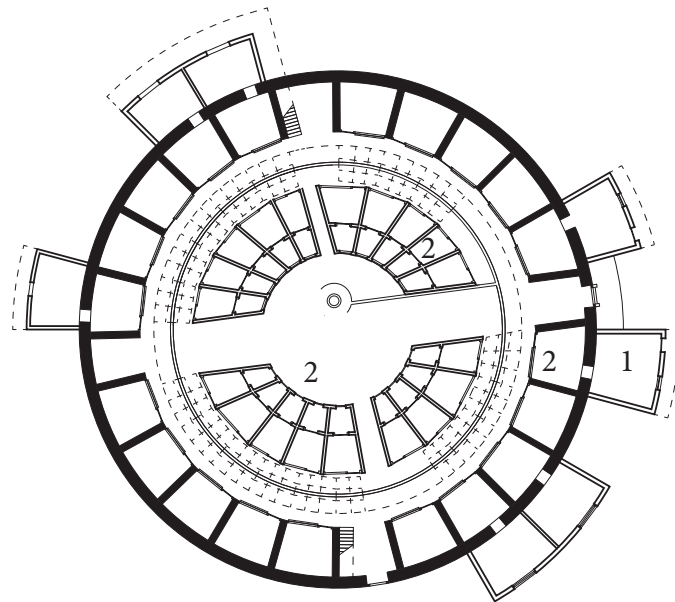
- 1. Bedroom
- 2. Living area

3.12 Collective House : Outside House



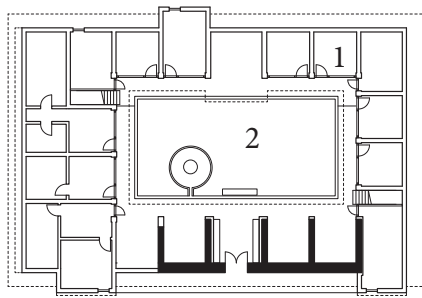
- 1. Bedroom
- 2. Living area

3.13 Collective House : Plug-in House



- 1. Bedroom
- 2. Living area

3.14 Collective House : Remake House



- 1. Bedroom
- 2. Living area

3.15 Collective House : Slice House



- 1. Bedroom
- 2. Living area

Appendix_4 Photography of 15 selected house cases

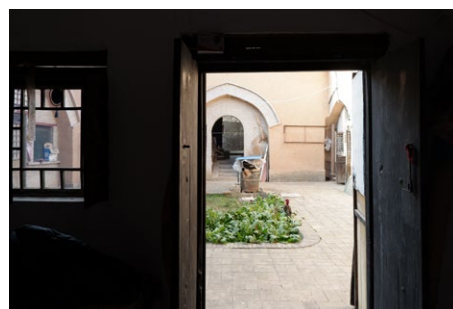
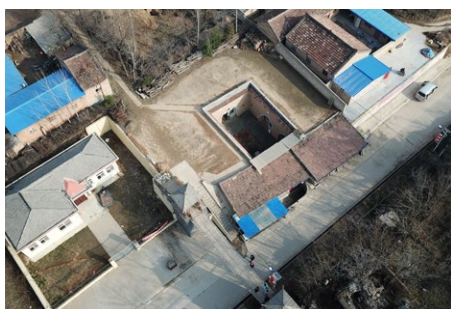
4.1 Underground House : Back to nature House



4.2 Underground House : Church House



4.3 Underground House : Cut away House



4.4 Underground House : Drive-in House



4.5 Underground House : Summer winter House



4.6 Wooden House : Highway House



4.7 Wooden House : House on House



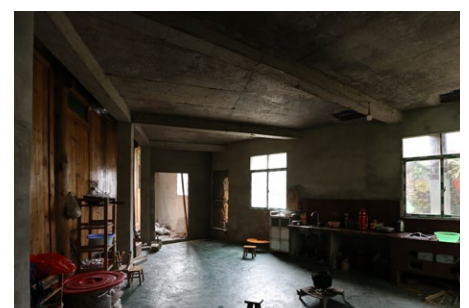
4.8 Wooden House : Pond House



4.9 Wooden House : Shell House



4.10 Wooden House : Wall House



4.11 Collective House : Double House



4.12 Collective House : Outside in House



4.13 Collective House : Plug-in House

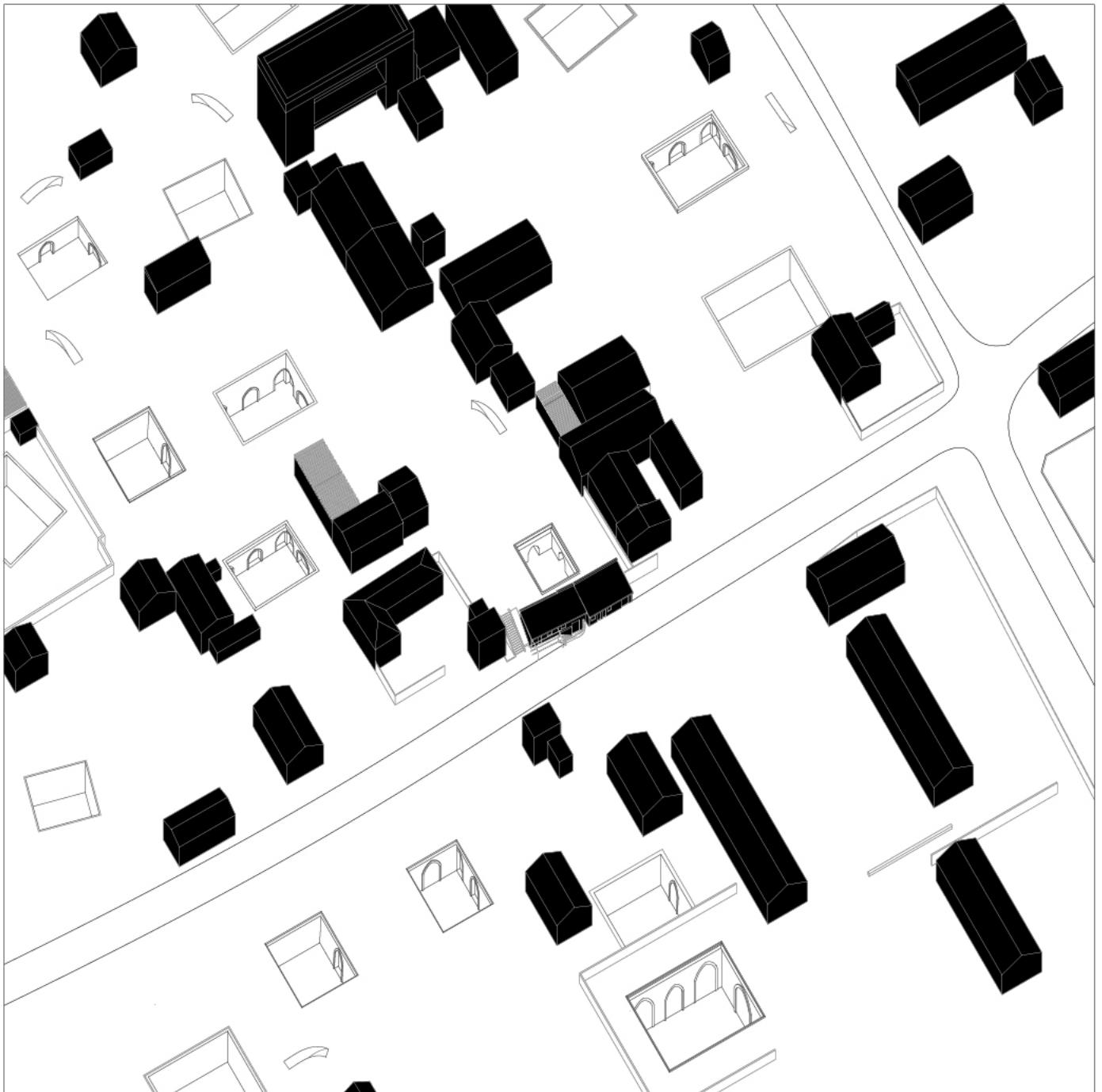


4.14 Collective House : Remake House

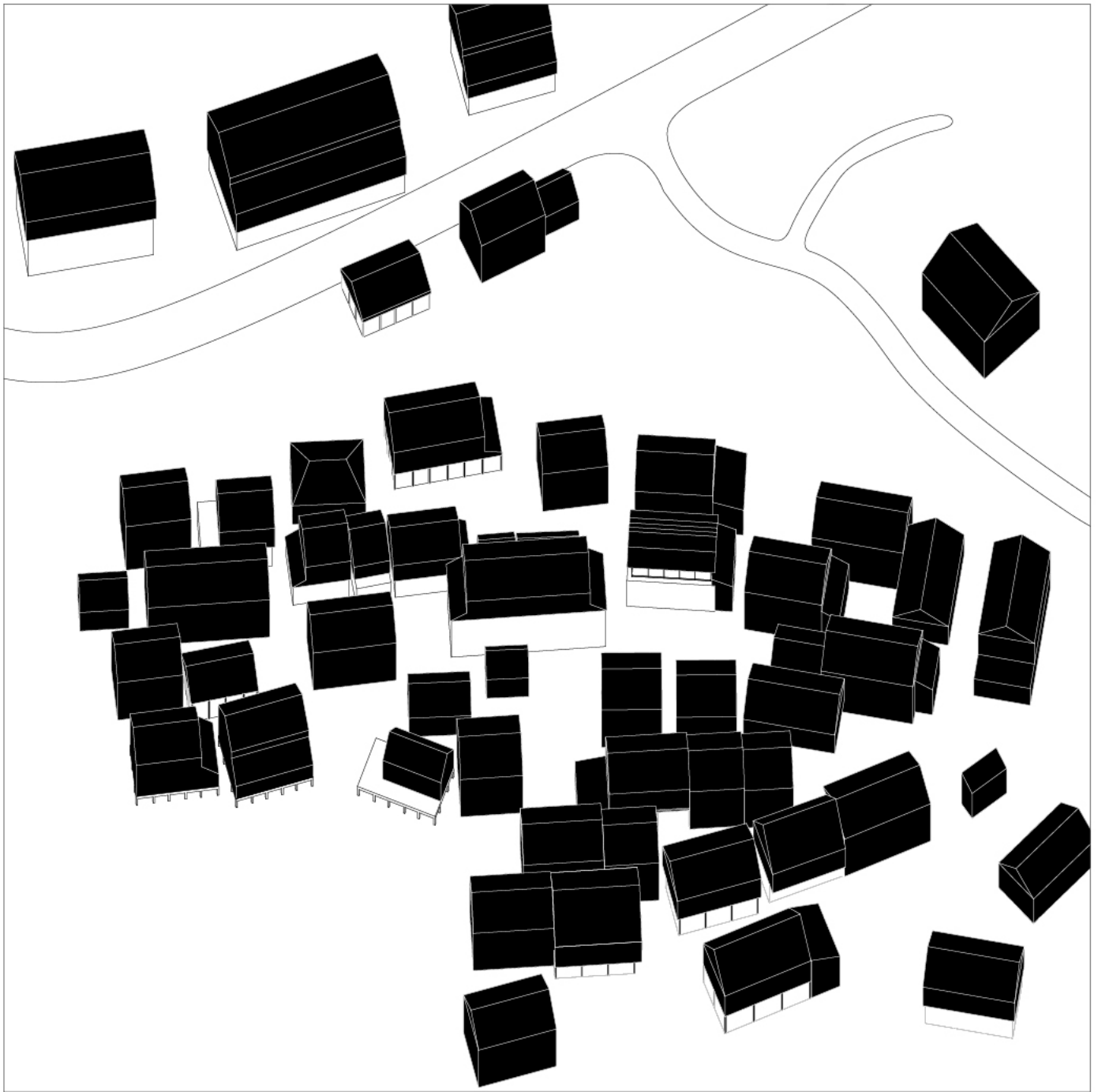


4.15 Collective House : Slice House





5.1 The Underground Houses



5.2 The Wooden Houses



5 .3 The Collective Houses

6.1 The Underground Houses

The interview took place in June of 2018 in a village outside of Xi'an, in Shaanxi province.

We have been living here for two years, since 2016. Before, for more than two decades, we worked in the city. Then we quit to return home – to return here. I run this inn with my husband. The accommodation fee from tourists is our main income. We also sell some farm products. We are farmers also. We produce wheat, corn and fruits on land just nearby.

In our village, 115 courtyards have been renovated. Thirty are unrenovated. And 30-40 have already been filled to build modern houses. That was before the government subsidy policy was out. A long time ago the village consisted of only dug-out courtyards: nearly no houses above ground. In 2014, all the dug-out courtyards were listed as UNESCO World Heritage sites. The government then announced the renovation funding plan for every courtyard: to better protect them.

The dug-outs have gone through many changes. Our ancestors developed this type of housing due to the scarcity of resources. There was no electricity, no roads to the town, etc. The dug-out courtyards solved some basic living problems such as temperature control without electricity. After some years, water wells came to every village with the help of the government. Now some courtyards have running water from the supply above. There are still a few that don't. It depends on the needs that were reported to the government during the 2014 renovations.

Before that, we had to travel to a distant creek to get water. We had a saying that “water is more expensive than oil”. Then electricity came. People now have access to air conditioning and heating systems. The courtyard now is an integration of the old and the new. We find it very pleasant and comfortable to live in.

We opened our dug-out as an inn in June 2016: two full years now. We are trying our best to accommodate the needs and requests of guests from all over the world. Without damaging the architecture, we increased our space from 13 guests to now welcome 40. Another change was adding bathrooms and showers. We didn't have proper toilets before. We just “dug a hole in the ground and put a bucket in it”, as everyone said. The guests couldn't get used to it. So, we began to consider building proper bathrooms.

My husband and I designed the renovations, but we hired people for the construction. We couldn't do it ourselves as it requires professional skills. There is heating in every room. The heaters were added later. We are the only family with heaters for hundreds of miles around. Every room here except for the kitchen has heating now. Also, as part of the renovation, we added ventilation pipes. The traditional courtyard rooms weren't ventilated properly. We used a luoyang chan, a boring tool, to dig a hole from the ground above into the rooms to pass in the pipe. Whenever the door opens, it ventilates. The courtyard rooms aren't like the houses above ground where ventilation is easy. Before the ventilation systems were added, people living in the underground rooms tended to get health problems such as rheumatism. This also affected local eating habits: people here like to eat chili and pepper to get rid of the shi qi: body humidity. We added the ventilation system during the second batch of renovations. It was a result of guest complaints. We locals were used to the humidity, but people from other places couldn't handle it.

My husband and I want to further improve this place. Today, we have 9 rooms – 8 of which are for guests. The bathroom is still shared by everyone. A current plan is to add bathrooms to three or four of the eight rooms, creating a hierarchy for the accommodations: more luxury ones and basic ones. Every room is different. But each has one or two heated beds. The bed is large enough to accommodate three, four, five people depending on the room. For the three rooms where we would like to add bathrooms, the goal is mainly to turn them into more standard suites. The renovation would cost quite a lot of money, which we cannot spare right now.

The guests come from everywhere – both Chinese and foreigners. We had guests from Switzerland, the United States and many other places. We know that they are foreign because they look different from us. And we have had Chinese guests from all the provinces. Some of them knew the place from the internet, some heard from friends, others just somehow found their own way here. On the internet, we have registered our location on Gaode, Baidu, and Sohu. People can search for our inn. We call ourselves “Gao Family Inn”. Of the five inns in the village, we are the only Gao family. So, if you ask, “Where is Gao Family Inn?” people will guide the way for you. Other inns and accommodations have more sophisticated names with deep meanings. We didn’t think much on this matter; the name is easy to remember.

Apart from the guests, now it’s only my husband, my son and me. And my son sometimes stays in our house in the town. It is not far: about 4-5 kilometers from here. But before, there were many people here: my grandparents, my parents-in-law, my uncles-in-law, my aunt, my aunts-in-law, and their spouses and children. It was a large family, consisting of many small sub-families. As the family expanded, we gradually ran out of space in the courtyard. Some family members then applied to the government for new housing. As more and more people moved out, the courtyard was left with only my grandparents. There is one characteristic of a yaodong that you need to be aware of: when the rooms and the courtyard are occupied daily by the residents, it remains in good condition almost effortlessly. When it is not occupied and left empty, it decays very fast. We started the renovation four years ago with one side of the courtyard already decayed.

The layout and usage of the dug-out courtyard remained more or less in its original state. It’s only that the material changed from bare mud and soil to the finish with brick and tile. Some people come and say it’s not authentic enough, but it was the only choice. To renovate and make the place livable for guests from around the world, we had to introduce some contemporary elements to the traditional. Now our courtyard is both old and new. Some guests once wanted to experience the most authentic yaodong, so I took them to the unrenovated rooms. They changed their minds as soon as they walked in. It is too dark inside.

Twenty years ago, my husband and I worked in the town. We weren’t very rich, but we had a stable salary to support ourselves. We worked in a synthetic fiber factory, producing some semi-finished products. My husband quit in 2008 and I quit in 2010. We were both very tired of factory life. He then became a long-distance driver. I stayed at home and tried to look for some part-time jobs. We spent a few years without having a settled job, just wandering around mostly. We finally came back to the village in 2016, mainly because my husband’s parents were getting old and needed some care from us. My husband’s younger brother and his wife moved from the village to town in 2014. It was almost like we switched our lives around. When we first came back, we tried to farm at first. We weren’t very good at it. We needed to learn from the more experienced.

My husband and I had to take over the courtyard, and also, of course, the financial responsibility. Even with the subsidy, it would still cost us over 200,000 Yuan. In the villages, our income mainly depends on the fruit trees. The annual income was around 10000 Yuan, at most. We had to purchase tools, farming supplies, pay for the workers. We knew that taking over the courtyard meant taking over a great debt, but we still had to do it, since we are the eldest of the siblings. We made a written promise to my parents-in-law that we will clear our debts in three years.

When we first started, there was nothing: no wifi, no toilets, no heater. Nothing. We used to have traditional duvet covers with colorful patterns. Then we realized, even though we washed them for every new guest, that they didn’t like them because they couldn’t tell by their eyes if they were clean or not. When we did the renovation later, I changed all of them to white linens. The set up gradually transformed from a more rural style to a more widely acceptable one. The renovation plan is constantly being adapted to customers’ feedback.

We want not only to earn money, but also to live our lives and make friends. We don't like to put excessive effort on advertising. We want everything to be spontaneous. When there are no guests, we do some farming. We want to keep the farmland so that when people step into our courtyard, they know they are in an authentic farmer's family. We also let our guests go pick ingredients from our land and cook themselves. Our only request is not to waste any food.

We have some financial needs, inevitably. We have elderly family members to look after and younger ones to prepare for their wedding. On top of all this, we still have some debts. In the future, if financially possible, we would like to travel around ourselves, to see what other places are like. They must be very different from here.

But I love the village. We have over 400 families. It seems like a large population, but in fact it is not. Most of the residents now are elderly over 50 years old. People younger than 40 mostly left for the town or cities. All the villagers are very friendly to each other. It is quite the opposite from how people get along with each other in the city. We have experienced both. When I lived in the city, my day to day was always the same. From home to factory, from factory to home. Same routine every day. The only place we went outside of work was to the market to get food for cooking. We didn't have the chance to make friends. But it's all different now. In our courtyard, we have control over what we do every day. On summer nights, women my age go down to the central square for some dancing after dinner. Other people just sit on the side and chat with each other. The village doesn't have a lot of cultural facilities like the city does, but that doesn't matter. We feel perfectly content when we simply sit outside and enjoy the breeze. When we were in the town, I got mad at every little thing that goes wrong. Nowadays, I don't get mad at anything.

The interview took place in September of 2018 in a different village also in Shaanxi province.

The courtyard is several decades old – at least 30 years – and the house was built almost 20 years ago. Then people started to not want to go down into the courtyard. That is when we built the house above. We built it for convenience. We hired some workers to help us. It wasn't expensive. The labor was cheap. It was about 10 Yuan per person per day. Now it is at least 100 Yuan. The construction did not take so long: a few days, I think. The bricks too were not so expensive. Around here it used to be all mud houses, but now we are using bricks.

Before it was all flat land and we dug out the courtyard with workers we hired. We used hand-tools. The soils and sand were carried away in a basket. During the 1980's, excavation machinery came in. If our courtyards decay, we can ask workers to come in and fix them. If there is no decay or damage, you just leave them. But nowadays it is impossible to build new ones. The workers who used to make them are all elderly or have passed away. In some of the courtyards, there have been four or five generations.

The entrance before was all flat and the road was a dirt trail before they turned it into pavement. The old trail was inconvenient. When it rained it was hard for the cars to get through. We live up here in the house in colder days and move down when it gets hot. In hotter days, we go down to the courtyard after meals for some rest. But mostly we live in the house up here because it is a lot more convenient. We eat in the house. The kitchen is also here. We don't go to the courtyard for eating. Now we use it to store things. There is another family who built a small shed in their underground courtyard. It is not as good as my shed.

My eldest child is already 36 years old. I am already 55 years old. My husband is 60 years old. We have been living here since her birth: before that was when we dug the courtyard: yes, at least forty years ago. And before this, we lived in another courtyard which is already over 100 years old. We were still at the old courtyard when we got married. There were three of us: me, my husband and his father. But since then he has passed away. The old courtyard has been renovated by the second brother. My husband has two older brothers. And a few sisters. He's the third eldest son in the family. So, it was the second oldest brother who took over the old courtyard. It is a lot better than this courtyard of mine! But it is locked up.

My two daughters got married and went off to live in their husbands' houses. My daughter-in-law and my son moved to SanMenXia together. And a small grandson also lives in the city. Back in the days there was a school near here. Then after some years the students were all gone to the city. The students used to come here after their classes. Now, the nearest school is in Zhangbien: some distance. Even that school does not have many students. Only my husband and I live here now. Last time, I think you saw my younger daughter. She doesn't live here anymore; she lives down the road with her husband. During the festival times, usually the family can't get together. The younger ones can't always get off from work. Or they come back here a little late: usually the second day of the lunar new year.

6.2 The Wooden Houses

The interview took place in July 2018 in a village in Guizhou province.

I started learning carpentry in 2011. My father started in 1982. I started after university where I studied computer science and software engineering. Now, I don't use that so much except that I draw on the computer: mostly with AutoCAD but also now I am learning Sketchup.

Today, there are fewer young people working on carpentry. But I returned because of my family. My father and my father's three older brothers are all carpenters. They learned from their uncle on their mother's side. He was also a carpenter, but he passed away. Most carpenters in this area learned from him. My father has been working as a carpenter for 30 years. He finished junior high school and then he was in the army in Yun-nan for about two years.

When I was really young, I always watched my granduncle teaching my father and his brothers. If they had questions, they would go to him. And then my father became a hand-ink master. I think it took him about five years, although some people work their entire life as carpenters and still are unable to do the work of the hand-ink-master. You have to be able to absorb the details: to pay attention and not forget. Some carpenters, even though they might know the overall scheme of the building, will not understand the details: measurement is important and being able to calculate.

The hand-ink-master will draw the structure and then sometimes make small models. Today some do everything on the computer. But I still make models. The older hand-ink-masters also didn't need to think so much about structure; they already knew, without reflecting on it. I learned fast because I was learning at the same time that I was practicing. Sometimes there are building problems, and I learned quickly how to deal with them. And then I learned how to consider these problems in advance when working on the drawings.

For houses, we still build in wood but also with a mix of concrete and brick. I still haven't made drawings of such a project: only for the wooden houses. For hybrid houses, I usually only draw the wooden part on the top. For the more complex projects, if I don't draw the wooden part first, there will be mistakes. These days we have very few house projects. Houses are too complicated. Of course, the structures themselves are simple. Many people know how to do that, and the cost is low. However, it takes a lot of time to install the wooden panels. We need to wait until the panels are dry. If the panels are not dry enough and we install them, they will crack in the future. That is why it is complicated.

Houses that are more than 100 years old have tenon and mortise joints at the center of the columns. These houses are difficult to dismantle. That is why some of the old houses are leaning over but not falling even if the columns are decaying at their base. When you hit the column, the joint will lock. The carpenters today will not build that way because it is difficult to take apart the house or renovate afterwards. But still without such joints, wooden frames are still a bit complicated.

The frame must go very quick because we need to finish in one day – one auspicious day. You need many people to work. The numbers are also based on how many apprentices the hand-ink master can take. It depends how fast the hand-ink master can mark the trunks for the apprentices to work. If there are too many apprentices, the hand-ink master cannot draw as fast as they cut. If he is fast, perhaps five.

Today, the villagers will not usually take part in the work. In the past, say in the 70s and 80s, people still came together to help. And if the family is in poor economic condition, the relatives and friends will come by for the construction work. A contractor can cost several 1000 Yuan, depending on the amount of work. Even perhaps 10,000. The salary for workers is getting more expensive and also for the timber. That is why many people are now building brick houses. The cost of a brick house is lower. For timber houses, the timber structure is not that expensive, but the panels take time and then it will also take much longer to build.

There are rituals for housebuilding. For example, the raising of the beam. If I build a house for my family, the relatives from the side of the mother in law will go to the mountain at four or five in the morning without being noticed by others to steal a tree from our lands. Actually, now this is told to the owner in advance and the tree is bought and waiting. The relatives carry the tree back to the site and it is used for the uppermost beam; but often this is a symbolic beam and not structural. The reason is that the golden beam should be a bit curved: not too straight. This means that hopefully, the descendants will not be too straightforward when they say or do things. They need to have some consideration: to leave some space. We also give sweets during the ceremony. Even in new houses we will still do this. Any kind of house. If it is a brick house, usually it has a sloped roof. We will put one wooden beam on the top below the ridge of the house.

Nowadays, whether to conduct the rituals or not does not matter that much. We don't believe in those superstitions any more. But we still do that since some people in the countryside haven't changed those old beliefs. When erecting the frames, there is also a ritual for security. Nowadays, we have scaffoldings with steel frames and other equipment, but the rituals provide an assurance. Other times, there will be a celebration and the whole village will gather to have a meal together. Each person will pay some money for the meal. For example, we built a pavilion recently in the countryside. We began the work in the nighttime. First, we erected a column, and when it was upright there were fireworks.

We have all kinds of houses here. We have an entire timber house, a timber house on top of a brick house, or an entire brick house with a timber frame. The last one costs more. The government does not allow us to build an entire brick house. You need to wrap it with wood. This is the government's requirement. A few years ago, even this kind of house was not allowed by the government. When my father started to build a brick house more than ten people came here from the county government. They said: "Are you going to tear this down by yourself, or do you want us to do it?"

They did not allow us to build with bricks. Then he drew a drawing of a house that was brick in the interior but wood on the exterior. People could not realize this was a brick house from the outside. He showed this drawing to the government people, and they didn't say anything. Then a group of people from the higher county government came to look at his house. They said: "We should promote this style!" They did not allow the lower government to tear it down.

The timber house is not resistant for fire and floods. It is also difficult for installing electricity and sound insulation. The brick house can provide better facilities. When you build in this way, it looks like a timber house from the outside and allows us to preserve the ethnic culture and style. The government wants us to preserve these things, but of course they will not give us any support to help. Even though a wood frame house outside of a brick house costs more money, the government does not have the funding. They have many people to support.

The way of building is based on the owner's idea and also the hand-ink-master in the area: whatever his skills and designs are. There can be all kinds of houses. I think that houses in this area are the best cases for architectural design, even if you compare them to those in the city. Every type of house can be found here. Some of them are restored. Some of them are newly-built. When I was studying in the city, I saw the towers and villas: different ways of living. I had the thought that I wanted to earn money so that I could build such a house. Everyone thinks like this when they return from the city. And so, when they get back, they start to build different kinds of houses.

People here are farmers. They can do all kinds of work, including building. In a way, they don't need to spend money to hire designers. They make the designs themselves. Farmers in the city are working in buildings designed by designers. Every step they walk is along a line in the drawing of a designer. When they get back, they make their houses according to what they learned.

The interview took place in November 2017 in Maogong county, Guizhou province.

I farm with my husband. We plant rice, raise pigs, chickens and ducks. Before we had more than a hundred ducks. I have been living in the house for 25 years – since I got married. I was 21. I was born here in the village. My husband is from another clan.

Before my husband's parents had an old house here. But it was taken apart long ago. They had four sons – my husband's parents. They built this house for the eldest son and youngest son, my husband. They built another house for the middle sons. But before the second house, there was a time when all four brothers lived in this house. Two upstairs, two downstairs. It was crowded. But then, the second house was finished, and the middle brothers moved away. The oldest bought their rooms. Later, the oldest also moved out and we bought his rooms. It was then that my husband and I owned the whole house. In the end it was good, because we had three children. We needed all the space.

Before, we were working in Shantou. I was working in a clothing factory and my husband in a bag factory. My husband's parents looked after our three boys. But then my husband returned here to the village when his father, my father in law, was sick and could no longer work the fields. Three years ago, the old man died. I stayed in Shantou working in the factory for two more years while my husband farmed my father-in-law's field. We needed the money to pay for the helpers to build a concrete granary. So, I stayed in Shantou.

The house has changed quite a bit. We made it bigger. We added the three-bay space at the back, the basement and also, as I said, the granary. The kitchen, we built ten years ago. Before, when we shared the house, there were two kitchens. Our kitchen was at the side and my husband's brother's was at the back of the house. But anyway, both kitchens were attached to the house and we closed them with metal sheets. Then, as I said, my husband's brother built a new house and moved. It was then that we took apart the old, attached kitchens. This made it possible to extend the house for a new kitchen and storage.

We built the shower room six or seven years ago. But still there is no water heater. Before, we were washing in that dug-out space in the summer and then, in the winter, in the small yard. The toilet is outside of the house, on the hillside near the road. Before we moved to Shantou, we did not have a gate. I was worried about safety when my husband left the village to work there. I thought it would be safer with a gate.

The basement we made three years ago. It took us a whole year. It was a laborious. We excavated the earth with hoes and moved it out on our shoulders and then piled it here. The ground in front of the backdoor was lower before. Now it has been raised. We built the concrete and brick walls too. Before it was enclosed with iron sheets. But it was not safe and needed to be changed annually. Before there was a fireplace in the ground, but we replaced it with the stove. It was a fireplace of yellow mud enclosed with iron sheets – like the old kitchens.

Now my oldest son and my second son work as house decorators in Guangzhou. The eldest sometimes sends money back. He will send one or two thousand Yuan during the busy times: for example, during the rice harvest. The second one also sends about the same amount. But he is also busy learning. He is learning computer. But the fee of the program is 5,000 Yuan. Since we don't have money to send him, he attends the program with his savings. My third son is working in an electronics factory in Shenzhen. But it has only been several months. He is still asking me for money to pay the train tickets. Sometimes we call on the telephone.

We don't have money to renovate the house anymore. We don't have money to build a new house in the fields near the main road either. I don't think we are capable of it now anyway. Others have built new homes in the fields near the road. They have moved down from the hillside. There are new houses everywhere now. It has grown. Some others bought new houses in the town. But I like living on the hillside. It is close to our fields: to go to do farming or for planting vegetables, it is easy. I cook breakfast after getting up in the morning, and then cook food for pigs and then feed them. After that, I cook lunch. After a break, I go to our fields on the hill to do farming. At around five to six pm, I go back home and cook dinner. I watch television in the evening and go to bed after nine.

6.3 The Collective Houses

The interview took place in June 2018 in a village in Fujian province.

Most of the people here have the surname Jiang. I grew up in Fuzhou and my husband grew up here. His parents moved here when he was young and bought this land. A lot of people used to buy land then. My husband grew up in this tulou. Then, I moved in.

There was a tulou in ruins on this land, which had burned before the Cultural Revolution. Forty years ago, we were able to buy and renovate a small part that was not destroyed in the fire. After we got married and after the birth of my first son, we rebuilt the tulou. Before that, we lived in a place assigned to us during the land reformation, but that place collapsed long ago.

My sons and grandchildren all grew up here. They are teenagers now, my grandchildren. Their parents had to work, so they were unable to take care of them. They stayed here with us so they could go to the elementary and high schools nearby. But in the end, they had rather poor grades. Now, they go to school in the city. Schools are better in the city. The oldest is 19. The younger one is 12, and the youngest is seven. But they do not need me to look after them. They can look after themselves. My granddaughter is in the fifth grade, studying in Xiamen. She called me to tell me that she got a score of 100 for math and a score of 93 for Chinese. I have one daughter and two sons. One son is in Xiamen and another son is in Guangzhou. My daughter is in Shenzhen. I do not know what jobs they do. Even if they told me what they do, I wouldn't understand. I haven't visited them because I prefer not to do long journeys. They rarely come home. Only for Chinese New Year – around four or five days a year.

I like living here. The air quality is great. There are now three families in the tulou. The other families began their renovations a few years after us. We were a few years early. We had to build the roof at the same time as the other parts, or else the structure would have collapsed. It has to be attached together. Each family took on the design and construction of their own parts, but we had to discuss the connection of the roof together. I built first, and their parts were supported on my part of the roof. The tulou has three stories. Each family has its own staircase. Three in total. We do not share the staircases like in the old tulou.

All the rooms are very messy. I put everything in the rooms, including logs and whatnot. It is not as neat and empty as rooms in the city. When we first moved here there was only electricity on the outside of the tulou; now it's inside. The kitchen is now inside too. There are two rooms for the kitchen; it wraps around the staircase at the corner. We added a glass door that was not there before, because of the smell of the wastewater from the septic tank and petrol from cars.

Today there are only a few residents: mostly old women, me, and my husband. My husband and I are both retired. I am 67 years old and my husband is seventy-something. During the day, I cook. Sometimes I farm vegetables on our land and do house chores. We get a pension for our retirement. It is not that much: about 4,000 Yuan per person. My husband is a doctor and still sees patients. Before he retired, he worked at the county hospital. That was more than ten years ago when he was 62. Now, he sees patients here at home. Sometimes, when my husband treats patients I give them medicine.

But I was a farmer. I have always been doing farm work. Today, we do not have much land for farming. This is a very mountainous region, so already there was very little land. The good land we did have was developed for roads. The government paid us, but very little: around 800 Yuan. One square meter of land was only 2 or 3 Yuan back then. We had no say over the development. The government wanted to build highways and a secondary school. They renovate the roads all the time. But the school is not in use today. No one goes to school here anymore. There used to be over 2,000 students, but now there are only around 200. The other children have all been sent to the city.

These days we get very few visitors. There were more last year. I earned thousands of Yuan last year, but none this year. I would sell cigarettes, tea leaves, longan, things like that. I bought them and then resold them; we cannot plant those things here. The tourists come in groups. Sometimes there are up to 20,000 visitors a year. This year – I am not sure why – there aren't any visitors. Maybe they've come and seen it all already. There is nothing much to see here. Nothing special. There are a lot of mosquitoes, flies, and insects, but our place is very clean.

I have two chickens. When my granddaughter comes back, we plan to kill them. My chickens know that I am their owner and they stay in my area. I also have a small vegetable garden. And then by the bridge, there is a small store. It is not quite new, but it sells cigarettes and alcohol; and groceries like salt, sugar, and soy sauce. I can get what I need there. It is near the new village which was built on farmland seven to ten years ago. This area used to be filled with tulou, but no one lives in them anymore. It is a pity how they are all vacant now. In the afternoon, I just lie here. I go to bed at around 10 pm. In the morning, I have to wake up early: around 5 am. If I cannot fall asleep, I wake up.

The interview took place in June 2018 in a village in Fujian province.

When tulou were declared World Heritage sites, an officer from UNESCO came to visit. He told us: "Tulou are 'full stops' that, unearthed, lead to countless 'question-marks' and 'exclamation marks'." He also said that tulou are like an encyclopedia that can never be fully comprehended. They embody vast knowledge ranging from Feng Shui, architecture, aesthetics, environmental science, anthropology, topology, and landscape. According to the masters, the tulou must echo the Feng Shui of its surrounding area. It is not up to us to decide, as the traditional study of Feng Shui is rather profound and cannot be easily understood. There are rectangular tulou and circular ones. The square or rectangular tulou represents flat 'land', while a circular one represents 'sky'. It takes a long time to build a tulou. One with four floors can take 16 years from planning to the completion of building.

In the past, many landlords were extremely wealthy. Some were even governors. They often had officers or visitors of higher social standing come to visit them at the tulou. In the courtyard, there might be an independent building that served as a hostel: for example, with a performance stage and dining area on the ground floor and guest rooms on the second floor.

Some of the most impressive tulou are divided into eight equal parts. This is based on the Eight Trigrams – also from Feng Shui. The very famous Prince of Tulou in Hongkeng village was built this way. Now it is quite popular with tourists. The nation's president also requested to visit in person! It has eight staircases with eight units, each separated with a door. If you want to divide or connect between the units you need only to close the door. Every unit also has brick partitions from the first to the fourth floor that serve as fire-walls. As tulou are mainly built with mud and wood, these can be quite important. You see, the construction of tulou is scientific. In the tulou itself, the first floor served as kitchen space, and the second to the fourth floor consisted of bedrooms. The layout is truly impressive.

The tulou around here are 70 to 80 years old. The oldest one – a rectangular one – is more than 100 years old. No one lives there anymore: only ducks and chickens, fleas and spider webs. It is very dirty. I do not dare go inside. The owners abandoned it. The longer these buildings are vacant, the higher the risk of them collapsing. If people lived in the tulou, they would be repaired regularly. Otherwise, they wear out easily in a few years when problems like a leaking ceiling occur. Villages are like this. We have too much land, but no one wants it. Maybe it is worth a lot of money too, since the government refuses to approve land for building houses now.

My eldest daughter studies IT: information technology. When she was deciding her field of study, I told her that this is a profession for guys. "Why do you want to do this?" She took six mathematics and science classes in high school. And I asked her what specialty she was interested in and she told me that she could not make the decision until year two in college. Everything I say, she tells me "Mom, you do not understand." I really don't! I can only provide them with the financial support they need. I just tell her that she must study hard. My son studies the same field in Xiamen. My daughter's registered residence is with my husband's family, whereas my son is registered here. But it does not worry me. Once my daughter meets someone in college and gets married, her registered residence will change anyways.

We are all descendants of the same family. Everyone who lives in this tulou shares the surname Li. Before, everyone in the village had the same surname. That is how it used to be; today, that is no longer the case. There are too many surnames to keep track of now. Houses are too commercialized, often sold and bought. That is why the residents vary so much: similar to Hong Kong. In some of the new buildings, residents have all types of surnames.

Before, all the rooms of the tulou were crowded, filled with families. Now, all together, there are three families here. Everyone else has moved out even though the houses still belong to them. Most have moved to newer houses. Some bought houses in the city, the others moved to other buildings around this area. The ones who went to the city leave the older ones and the children behind. The younger ones need to go to school, while the older ones take care of them. Then finally, it is only the older ones who are left. This is what happens in the villages.