Reconstruction and Renovation: Changes of Ways of Ethnic Cities in Tibetan Areas in Sichuan in Modern History Coping With Geologic Catastrophes

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Tibetan Areas in Sichuan are inhabited by various ethnic groups, and the development of cities in these areas has always been influenced by geologic catastrophes. The native people have formed their own harness mechanisms for coping with natural disasters. After the central government strengthened its control on these areas since the 18th century, the Tibetan Areas in Sichuan began to cope with the challenges brought by geologic catastrophes in a more active manner. This paper aims to present changes of ways of ethnic cities in coping with geologic catastrophes during modernization by analyzing ways of reconstruction and renovation of Kangting after hit by these catastrophes since 18th century.

Key words: Geologic Catastrophes  Coping Ways  Ethnic Cities  Tibetan Areas in Sichuan  reconstruction

Located in the northwestern Sichuan province, the Sichuan Tibetan Areas include the Ganzi Tibetan Autonomous Prefecture and the Aba Tibetan and Qiang Race Autonomous Prefecture, and cover 51.49% of Sichuan province. These areas are the second largest Tibetan habitats in China and are also important channels for the economic and cultural exchanges between Tibet and the hinterland. People of various ethnic groups migrate, inhabit, communicate or integrate through this “ethnic corridor”, thus forming complex and various races here. After Tubo regime controlled the area since the 7th century, Tibetan culture began to spread and infiltrate here, making this region a part of the Tibetan cultural circle.

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Due to special geographical location at the Hengduanshan Mountainous region where the Qinghai-Tibet Plateau transit to flatlands of hinterland, the movement of India plate and Asia-Europe plate has all been very active. As a result, these areas are frequently stricken by geologic catastrophes like earthquakes, mud-rock flows and landslides. So the development of cities in these areas has always been influenced and constrained by geologic catastrophes.

Kangting, the capital of Ganzi Tibetan Autonomous Prefecture, was also one of them. Due to its special geographical location, Kangting had always been regarded by the central governments of various dynasties as the “base” to govern Tibet and the “lock-key” to control Tibet.

Different from cities built in plains, Kangting had been constrained from developing “freely” by three mountains around the city. With Zheduo River running through the city from south to north, for the past hundreds of years, Kangting has developed along the banks of Zheduo River from small settlements into a city whose construction land appears like a branch growing along the valley.

Geologically, Kangting is located at the most active seismic belt, the Xianshui River Seismic Belt. According to the records, Kangting had been hit by four earthquakes above the magnitude of 7.0 since 1725, which brought severe devastation to the city (Table 1). Influenced by the complex and diverse terrain in mountainous region of high altitudes, Kangting’s climate was also complex and volatile, and secondary disasters caused by earthquake like fire and mud-rock flow brought more damages to the city. We could get a clue in the following analysis that Tibetan cities like Kangting had always had to face the grave challenges brought by geologic catastrophes and continuously adjust the ways to cope with them in the process of modernization.

<table>
<thead>
<tr>
<th>Time</th>
<th>Disasters’ Types</th>
<th>Impact on Cities</th>
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<tbody>
<tr>
<td>August, 1725, M7.0 earthquake</td>
<td>Local government offices, residents’ houses and blockhouses were all collapsed.</td>
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<tr>
<td>June, 1776, Mud-rock flow caused by flood</td>
<td>The city was buried by the mud-rock flow, and only few buildings survived.</td>
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<tr>
<td>May, 1786, M7.5 earthquake</td>
<td>All buildings were collapsed. The number of collapsed government offices, warehouses and military houses are 169, the shops are 722, earth house 54 and blockhouses 177.</td>
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<tr>
<td>Nov. 7th 1792, Earthquake</td>
<td>The city walls and hundreds of blockhouses were all collapsed.</td>
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<tr>
<td>June, 1822, Mud-rock flow caused by flood</td>
<td>The wall of Nanjiaochang and Jingangsi temple were flooded badly.</td>
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<tr>
<td>June, 1830 Mud-rock flow</td>
<td>Nanjiaochang and Jingangsi temple were damaged.</td>
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<tr>
<td>1923 M7.0 earthquake</td>
<td>About 1300 people were killed, the city walls were collapsed.</td>
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</tr>
<tr>
<td>April, 1955 M7.5 earthquake</td>
<td>Over 600 houses were collapsed and 500 broken.</td>
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</tbody>
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Note: the table is from Kangting County Annals.
1. Traditional measures of Kangting to cope with geologic catastrophes

The early city formation and developing process of Kangting were same as those in early Tibetan settlements. It was a summer pasture with few people settling there at the very beginning. Since the Tang dynasty, the tea-horse trade was prevailing here and the city was becoming more and more prosperous

The special geographical conditions of Tibetan areas in Sichuan made it particularly important to select the appropriate sites for settlements. The settlements were usually developed around temples, and the early sites of temples should also be selected strictly and carefully, namely selecting places of good geomantic omens and landscape. The sites of later chieftains of local governments and houses of residents should all follow the guidance of Lama(Tibetan monk). Like many other Tibetan cities and towns, Kangting was originally built towards south to ensure sufficient sunshine. In addition, the site of Kangting had these characteristics: against mountains and facing the river, shunning winds, and near the waters and forests.

At the very beginning, only dozens of citizens’ houses were built around the government offices and Lama temple. The traditional Tibetan buildings were all made of earth, stones and woods. The main structures were decided upon the conditions of building materials and local geology. The major structures were Bengkong structure (Picture1.), Beam-column-frame structure (Picture2.)and inner-frame structure (Picture3.)with wall and column both bearing the loads.

“Bengkong” was a kind of wooden structure stubbed with logs or half round logs. The box structure loaded by such walls had a good quality of integrity, but its scale was restrained by the sizes of logs. Such box structure was generally used as independent rooms for storage, bedroom and Jingtang (a part of a house for religious activities). Usually people set “Bengkong” on the 2nd floor or on the top floor of the house. (Picture1.)

Beam-column-frame structure was consisted of vertical columns and beams loaded by Timus which set on the head of the columns, were a kind of mortise and tenon joints used to connect columns and beams. The purlins were paved tightly on beams, and then the branches and sticks were paved on the purlins, finally earth were covered and tamped to form the roof of the house. The protecting walls made of earth or stones without bearing load were built outside the columns. (Picture2.)

Inner-frame structure with wall and column both bearing the loads, was made through laying stone walls with holes on the wall for doors and windows at first, and then the beams and rafters were set on the wall, finally tiles and slab stones were paved as roof; or a simple wood Chuan-dou type structure (the traditional Chinese timber frame in which columns support purlins beam directly) was made first, and then stone walls were lay around the Chuan-dou structure to bear the load. (Picture3.)
According to the local annals, the early urban buildings were one or two-story houses with flat roofs. After many earthquakes, people also explored practices on strengthening the rigidity. The practices to make walls with woods inside the house or on the 2nd floor came into being, which had reduced the weight of the house and strengthened mutual support. (Picture 1) Some buildings began to adopt the mixed blockhouses where the Bengkong was built in the corner or separation space of the 2nd floor while walls made of logs and columns form a frame-structure of mortise and tenon connection, an Earthquake resistant frame.

The structures of buildings here have to meet local geologic conditions. Additionally, influenced by the predominant Tibetan Buddhism, people in the Tibetan areas in Sichuan have their unique understanding about geologic catastrophes. Tibetan people have all believed that the death of a person is a very common thing just like his/her birth\(^5\). So they think that to acknowledge and accept disasters, diseases and uncertainties in life is part of their destiny. The human-caring Tibetan Buddhism has also comforted Tibetan people who are under the risks of possible natural disasters, so they can always accept all that nature has done on them\(^4\). In 1870, a M-7.5 earthquake hit Batang, a populous city in the Tibetan areas, killing more than 2,000 people including local officials and 400 Lamas. The Shanghai-based English journal North China Herald reported this disaster, describing that it’s their indomitable religious beliefs that gave Tibetan people great courage and ability to make a new city after the disasters\(^6\).

We have observed that native Tibetans had fostered their own experience in coping with geologic environment, which mostly emphasized finding ways to survive in nature in a negative yet flexible manner.
2. The changes of ways for restructuring Kangting city in the process of modernization

Since the Qing Dynasty, the border areas were covered by the united administration of central government. Through establishing an integrated political system, the central government strengthened its control on these areas. During the hinterlandization, Kangting, as the center city of Tibetan areas in Sichuan, had undergone great changes, especially its ways to cope with natural disasters.

(1) The city was built in another site

In 1666, the 5th year of Qing emperor Kangxi, the Qing government began to rectify its rule in the Tibetan areas in Sichuan through re-acknowledging the local government organs. In 1696, the 35th year of Qing emperor Kangxi, the Qing government reestablished the Mingzhengtusi, a government organ to rule the areas after they won the war in which a rebellion group was defeated, and it had also established checkpoints and sent officials to levy taxes and supervise the trades. In 1729, the 7th year of Qing emperor Yongzheng, the Qing government established Dajianlu Hall in Kangting as the center of their ruling here and sent military forces in the next year. As a result, Dajianlu quickly became a place of importance in trades which was often described as the following: it’s a cohabitation of both Han and Tibetan people; a route must been taken toward Tibet and a prosperous trade place with wide ranges of goods.

In 1745, Mingzhengtusi was also moved to Kangting from Muya and some houses were built as the local government offices and rooms for their families and important subordinate officials. At the same time, 7 Lama temples were respectively built both in and out of the city.

After nearly 40 years of rapid development, the city was seriously damaged by natural disaster in 1776. After the heavy rain for several days, the lake at the top of Paomashan Mountain was overflowed and the whole city was crushed by the mud-rock flow. The losses were so huge that only several shops were survived. Wen Shou, governor-general of Sichuan at that time, went to Kangting himself to inspect the disasters. Because the city has special significance to the Qing government, it was reconstructed quickly under the special order from central government, and moved to a safer place ——the foot of Paomashan Mountain.

The newly-built city were developed along the banks of Zhedu River enjoying more convenient transport. Built against the mountain and along the river, the city appeared uneven and irregular, where the streets were bend enough to slow down the wind from valley. To facilitate the transports and exchanges of people living by the river side, 4 porch-bridges were built. Except that the east and west streets and 4 bridges were paved with slabstones, the rest of the streets and roads were paved with cobblestones (Picture4.).
### (2) Changes of buildings

The early buildings in Kangting were mainly Lama temples, blockhouses and chieftains which were made of slabstones, woods and earth. The heights of buildings ranged from several meters to 10 meters with obvious edges and corners and clear and regular lines, showing the excellent skills of Tibetan artisans. As the Qing government strengthened the control on these areas, Han culture was brought here. Deeply influenced by the geologic disasters, the architectural styles and selecting of materials were gradually infiltrated with Han styles.

According to the journey records in the 59th year of Qing emperor Kangxi, although there were lots of Han immigrants and officials, Kangting was still like a village\(^7\). The majority of houses in the city were blockhouses and tents, which was very similar to the other places of Tibet. But by the early 20th century, Kangting had become a city with many wooden houses. Several earthquakes had challenged the traditional constructing techniques of blockhouses. The severe damages to the blockhouses in earthquakes recorded in the history are still clear to see.\(^\text{(Table 1)}\) The earthquake on August 1st, 1725, destroyed all Lama temples, government offices, houses of officials and civilians. None was ever survived. Eighty percent of businessmen and residents were buried by the collapsed houses, including Sang Jie, head of the officials here, Yu Dianxuan, an official responsible for posting and Xu Zhongxiao, an official managing the revenues and grains. Over 169 government offices, warehouses and military houses and 722 shops, 54 earth houses and 177 blockhouses were collapsed.

After several earthquakes in the ruling period of Qing emperor Qianlong, government offices, shops, civilians’ houses, temples and halls were mostly reconstructed in wooden structures with better earthquake resistance. Up till the Republic of China, the majority of buildings in Kangting were made in wooden structure instead of stone blockhouses,

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[Picture4: The changes of buildings and lakes in Kangting (made by Zhang Sijia)]

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which were usually short and small houses with roofs made of gray tiles. What differed from those in hinterland was that part of these houses had stone walls in two sides or in the back of it in case of fire, which was called fire-proof walls. The houses in the streets all had a 0.8-meter high Diaojiaolou, a kind of the houses whose rear part was supported by wooden stakes under the ground. While these buildings began to show Han style, they had still kept the local characteristics of Tibetan areas. Many families would have a smaller room at the back of central room, which was called earth warehouse with stone walls 60cm higher than the house and wooden doors whose panel was covered by iron. These earth warehouses were used to store the valuable belongings of the family, which were not only fire-and-stealing-proof but also prevented the robbery caused by mutiny.

The constructing artisans were consisted of technicians from Aba County and DaBa County, so they were called the Bang of West Road. They were very good bricks-layers and were good at laying bricks with slab stone. They can made very good walls without using threads and rulers. Following the mid of the Qing Dynasty, artisans from inner Sichuan formed the main labor forces in the market. They did better in wooden or wooden-brick structures, so the changes of architectural style in Kangting could be seen from this point. The artisans from the hinterland could rebuild the Chuan-dou structures with stronger earthquake-resistance, short and small story houses and earth houses with fire-proof walls and flat roofs by taking into account the realities of Kangting—— narrow spaces, strong winds, frequent fires and earthquakes.

(3) The changes of public spaces in cities

In the early times, there were only limited public spaces like temples, city gates and Tibetan fork dances for people to communicate and do business. Since modern times, the squares came into being in Kangting. The early city square was located at the front of auditorium. The square now were redesigned and reconstructed into the ascending square enclosed in three sides, which has not only provided Kangting people with a comfortable public space for leisure, entertainment and communication, but also a shelter for emergency when geologic catastrophes occurred.

In the early stages, without careful planning and designing, businessmen and residents built houses in the streets,
which made the streets of Kangting very narrow and winding and the layout was very irregular and unreasonable. With the development of the city, the early freely developed streets were unable to meet the needs of people. In 1933, a plan was made to widen roads to another 4 meters and at least 3.3 meters in extremely narrow areas. Besides, a campaign to widen streets was launched, which made it clear that the sidewalks should be 0.6-1 meter wide.

In 1943, the five main routes were widened to 6 meters. The improvements of streets also helped to avoid disasters and reduce losses caused by earthquakes. The government was also trying to reduce the damages of earthquakes by controlling the density of buildings and increasing the public green area. As a result, Kangting city enlarged its expansion toward the two sides. After 1949, the Kangting began to construct the city in accordance with its geologic conditions under the guideline of ‘control, renovation, evacuation, and development’ 10).

3. Conclusion

The development of cities in Kangting has always been influenced by the frequent geologic catastrophes. The reconstructions after disasters provide us a good angle to observe the choices of cities after the city development had been interrupted and the material orders and normal functions of cities had been destroyed. These choices represented the value system of cities at that time and also had an impact on the construction of cities in the future. We have found that, compared with other Tibetan cities, Kangting, on which the hinterland mostly influenced, was more active in coping with challenges brought about by the geologic disasters, and its spaces of cities got renovated from every reconstructions. Besides inheriting the original life experience of natives, Kangting has also integrated many foreign thinking patterns, which had enriched the harness mechanisms responding to the natural disasters.

References