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The Cheonggyecheon River Restoration of Seoul

-Challenge to the history and environment-

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Korea is a large peninsula where 70 percent of the land is mountainous. Traditionally, cities were built on the rivers and coastline. These harbor and river valley cities that still stand today have transformed themselves over the generations. The river city of Seoul is one such city, with over 600 years of history it has seen some sudden change in recent times. The Cheonggyecheon project attracted public support for several reasons. There was hope that Seoul would see environmental improvement and local disparities would be addressed along with concern about the safety of dismantling the aging concrete cover road. 5.84km of the total 8km length of the river and work on all 9 blocks progressed at high speed. In October 2005, in just the second year after the work started, the Cheonggyecheon was restored to its former glory. The historical city of Seoul was planned according to feng shui principles. It also introduces how the Cheonggyecheon has adapted to enormous changes in modern times as rapid growth and a wave of urbanization led to its concreting over and the building of an elevated highway. It includes a profile of the Cheonggyecheon's design and discusses water security, flood prevention, maintenance, bridge design and more. Post-restoration issues are also explained through analysis from a variety of points of view. The 6km stretch has 9 blocks which can be roughly divided into three broad areas.

Key Words : Cheonggyecheon, history, environment, restoration, elevated highway, clear stream

1. Introduction

There was a time when grass grew thick in the river, insects flew about and fish lived in the clear stream. All too soon the rocks were covered with concrete and the clear stream was polluted and gradually became a drain, before being turned into a culvert. It was all in the name of the economy and ever increasing convenience and efficiency. This is how we lost the small amount of nature left to us in the city.

In recent years the concrete coverings and culverts have been removed from waterways all over the country, restoring the original river currents and pools in attempts to return waterways to their original state. Waterside rejuvenation has become a subject of much interest in terms of environmental recovery, water accessibility and landscaping. Among the many case studies the most dramatic restoration of all is credited with raising the value

of the city itself. The city is Seoul, the capital of Korea. The waterway in question is the Cheonggyecheon.

The Cheonggyecheon flowed from East to West through the old center of Seoul and played an important part in urban development during the Joseon dynasty. However, since the start of the 1970s that history has been interrupted. The stream was covered in concrete and an elevated highway built on top of that to meet the increasing demands of economic growth and the transport infrastructure.

The Cheonggyecheon's elevated highway was based on Tokyo's Metropolitan Highway and was a symbol of Korea's rapid growth; Seoul's growth was following Tokyo's lead. Meanwhile, the result of the new concrete cover road becoming Seoul's main road was that the river underneath became a drain.

2. Cheonggyecheon restoration

There's no doubt that the project's completion in just two years and three months was surprisingly quick, but two big issues still had to be resolved. Firstly, how to manage the 170,000 vehicles that passed through every day. The surrounding roads inevitably have to carry most of the traffic and even today the problem of congestion remains an important issue. Secondly, the large number of roadside stalls. While 80 percent of the public agreed with the restoration of the Cheonggyecheon, the majority of stall keepers were strongly opposed to moving. The solution was to provide financial support for those subject to a move and to move most of the stalls to the former soccer ground at the



Fig.1 Location of Cheonggyecheon River

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Dongdaemun stadium nearby. The result was the creation of one enormous street stall shopping area where around 500 stalls jostled for space.

An even bigger problem was the water itself. The issue of the polluted water that had been flowing through the culvert was solved by improving the water treatment plant. However, the fact remained that there was hardly any water to flow in the restored stream. The steady increase in concreting over and filling in the surrounding tributaries since the 1970s had left only a tiny flow of water into the Cheonggyecheon. Groundwater and water from downstream of the Hangan River was purified and pumped in order to maintain a level of around 40cm. This is how fish and waterfowl came to return once again to a clear and plentiful stream.

There are many among the stall keepers who value the restoration work done, but it's true to say that there are some who wanted it to remain how it was. With the removal of the highway, views have improved, the air is cleaner and the temperature has dropped as the flow of wind has increased. Even the noise level has noticeably dropped between 5-10 decibels. Along the river banks more people than ever gather to relax or visit as tourists and stores and the like are starting to appear.

The Cheonggyecheon restoration has been hugely successful in improving the environment and revitalizing the city, but that's not all it's done for Seoul. From 1394, when it was designated as the capital of the Joseon Dynasty, until the 1970s when the covering took place, the stream was one of the essential elements of this feng shui city. The ideal geography for feng shui is a basin surrounded by mountains and with waterways flowing in and out of the city. Seoul does indeed have these features, with the Cheonggyecheon carrying water in and the Hangan River carry-

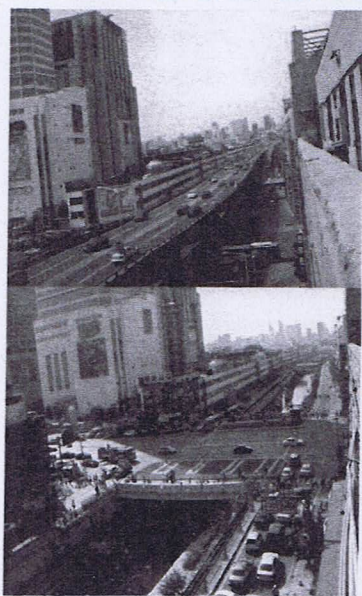


Fig.2 Elevated highway and a cover lid road were removed, and a blue sky appeared.



Fig.3 Building street of sky rate

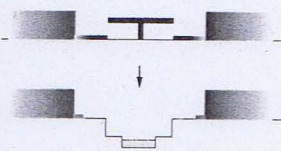


Fig.4 Before and after of Cheonggyecheon

ing it out. The Cheonggyecheon restoration has seen the reclamation of this history and blown a breath of fresh air back in to the city.

A belief in feng shui is still deeply rooted in Korea and as such the restoration of the Cheonggyecheon has had a big influence on the mentality of the people of Seoul.

3.Environmental regeneration of the Cheonggyecheon

After the restoration of the Cheonggyecheon, each urban block area has been given a theme which is enhanced to give each area a distinctive characteristic. The former bridge and palace gardens with their reproduced historical molding has made blocks 1~4 a popular tourist spot. Blocks 4~7 are spaces for play and education where commercial facilities and high rise apartments and the like are being constructed. A biotope was created when the stream was regenerated, providing a space for nature and the ecological system from block 7 and downstream. Culture, history, people. It's easy to forget the most important aspect of all. With the restoration of the stream itself the culture, history and people are all revived. The Cheonggyecheon restoration enterprise certainly won greater-than-expected success. Although the theme of the project was the regeneration of water, it has to be said that it has also become the regeneration of the sky. It's inevitable that various issues will continue to emerge, and it will be important to keep preserving the Cheonggyecheon with every new solution found. This restoration project was not only to improve the urban environment, in restoring Seoul's 600 year history it's given a certain meaningful connection to the future. Meanwhile, is it possible for Japan to learn from Seoul? Tokyo's highway that Seoul once learnt from is still there, covering a river. Let's hope that the Cheonggyecheon's successful regeneration will spur on the revival of Tokyo's Nihonbashi river.

4.The history and culture of the Cheonggyecheon

A city based on feng shui principles It is only in recent times that the Korean capital has become known as Seoul, literally meaning capital city in Korean. It used to be called Hanseong, but the name Hanyang is older and more familiar among Korean people. It's a little like the way the Japanese use the word Edo

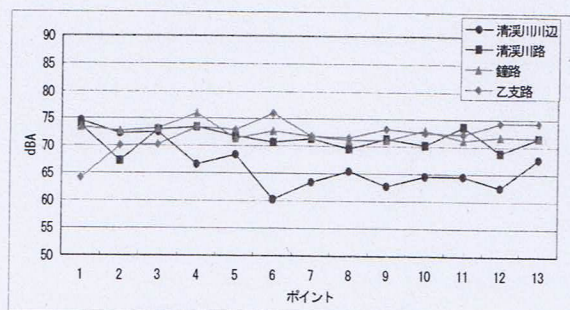


Fig.5 The noise measurement of Cheonggyecheon and outskirts

for Tokyo.

The old Seoul was a city planned according to feng shui principles. At the time, feng shui regarded mountains and rivers as essential elements in the construction of cities and towns. With the Cheonggyecheon in the centre of Seoul as an important feng shui feature, first the palace and then many more historically important buildings were built. However, as modernization advanced, the city economy grew rapidly. The river became polluted and the Cheonggyecheon disappeared from view. Now, with the restoration of the Cheonggyecheon, the feng shui city has seen a revival.

Even today, there are many archeological remains in Seoul that were built according to feng shui principles. If one looks at an ancient map of Seoul it looks just like a map of the basic principles of feng shui. It is thought that there are very few cities that are as completely in keeping with the ideal feng shui city model.

It's now known that in Hanyang (modern day Seoul) the castle walls were built along the mountainside and that a number of narrow tributaries flowed into the Cheonggyecheon. Although we can no longer see these tributaries within the palace walls we can imagine what the Cheonggyecheon would have looked like. The Cheonggyecheon is surrounded by Mt. Bukak, Mt. Inwang and Mt. Nam. It was a city waterway formed by the many tributaries flowing from these mountains. Although some bridges are still in place now it is hard to imagine just how many rivers and bridges were scattered around the ancient city of Hanyang.

There are 3 streams that join with the Cheonggyecheon and it's 25 tributaries to flow into the Hangang river. With the Cheonggyecheon in the centre, the castle town was divided into north and south. Each half was divided again into several natural areas as defined by the water flowing from the valley. Palaces, such as the Koengbokgung and the Chandukgung, were built in each area. In addition, the royal ancestral shrine and altar to worship the state deities were constructed along with the Sungkyunkwan national education institute and villages of various sizes. Also, a large road was constructed alongside the Cheonggyecheon connecting the east and west of the city, and along the tributaries running north and south various roads were

built connecting all parts of the city. Wherever water and roads crossed, bridges were built to connect the villages.

And so the old castle town of Seoul, built by linking together the neighboring mountains, became the city, and roads developed alongside the rivers that flowed down valleys and villages were formed. To put it simply, the making of the city of Seoul in the Middle Ages was in line with the natural topography. On the one hand, it's clearly the case that the roads were influenced by the Cheonggyecheon and its tributaries.

The most important buildings in Seoul are on land surrounded by the flow of the Cheonggyecheon, just using the topography of its flow. Although the main road is straight, there are plenty of meandering and dead-end roads. These roads were constructed following the watercourse of the Cheonggyecheon.

5. The history of dredging

In the Joseon dynasty the Cheonggyecheon was called the Gaecheon. The word Gaecheon was the common noun for a man-made river. Therefore, it was not only the main Cheonggyecheon but also all the other local man-made watercourses that were called Gaecheon. For the most part, these man-made rivers acted as flood prevention facilities and sewers. In order to maintain these man-made rivers, they had to be continually dredged. The main purpose of dredging was to prevent overflowing and damage to local buildings in times of heavy rainfall. The main task was the removal of sediment from the bottom in order to increase the depth and width of the channel.

At the same time, the banks on both sides were repaired and a water gate installed to allow proper drainage. In short, maintenance and dredging were essential for the disposal of city sewerage. As there were no real drainage facilities in the castle town at the time, the Cheonggyecheon functioned as the main drain for all types of waste. As the population of Seoul increased from year to year, so did the waste flowing down the Cheonggyecheon. As a result, regular dredging of the river bed became an essential maintenance strategy.

The construction of the Gaecheon At the end of 1411 (Taejong, year 11) the government set up a special department and estab-



Fig.6 A figure of original form of the feng shui.

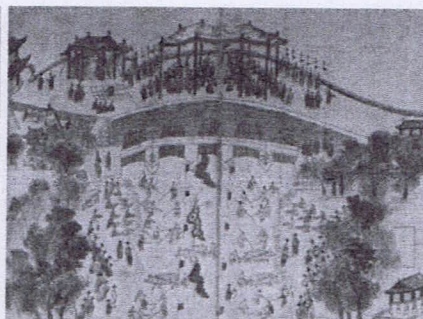


Fig.7 The king who inspects dredging of Cheonggyecheon on Ogansugyo bridge



Fig.8 Cheonggyecheon of about 1900, Women wash it, and children play with water.

lished the Gaecheon construction project. Work began in January the following year. 50,000 soldiers were selected from three regions (Jeonrado, Keongsangdo and Chungsheongdo) and completed the first stage of construction after one month of forced labor. The riverbed was dug up, the river was widened and the upper stream banks were stacked with stones. Also, the banks along the area now known as Cheonggye 3rd and 4th street up to the Ogansumun gates was lined with trees.

Two of the main wooden bridges (Gwangtonggyo and Hejeonggyo) were rebuilt from stone. In spite of extensive prior planning and safety measures being implemented, the construction work proved to be very dangerous and saw the deaths of 64 people. Although this large scale construction was completed, once the rainy season started both the tributaries and the main waterway overflowed. The water mouth beneath the castle town proved to be too narrow, resulting in massive water damage. Because of all this, even more basic repair work was necessary. This time, seasonally unemployed farm laborers made up the bulk of the workforce who started in 1422 (Sejong, year 4), and spent the next 13 years or so repeatedly carrying out repair work that brought the waterway up to more modern standards.

This is how the Cheonggyecheon coped with the flow of nature and with the help of all those called upon over many years, the stream was transformed into the man-made waterway of the Gaecheon.

6. Pollution and dredging of the river

Over the 500 year history of the dynasty, the Gaecheon was by no means a place of great beauty, it was primarily a man-made drain. A large number of those who congregated around the Gaecheon were the poverty stricken. They not only made their homes by digging holes in the ground but also contaminated the water with their waste.

The level of filth was, quite simply, unbelievable. According to a topographical feng shui report, Lee Hyonjik appealed to the high court in 1434 (Sejong, year 6) that there was clearly a problem with the maintenance of this Myongdangsu as the Gaecheon water was dirty, all kinds of waste were piled up and it gave off a

stench.⁷ Although proposals for improvements were repeatedly made, no action was taken due to various political and economic problems. It took 300 years before the Gaecheon construction actually began. The Gaecheon dredging started earnestly in 1760 (Yongjo, year 36). 150,000 laborers were hired a year, with 50,000 extras. It was at enormous cost that, finally, 57 days of work took place from February 18 to April 15. When people from outside the castle town were asked, it was readily agreed by residents and priests alike that this, the largest construction project in history, was the greatest achievement since the founding of the nation.

7. Urbanization and the growth of Seoul

Another underlying factor that contributed to the choking of the Cheonggyecheon was the ever expanding population. From the second half of the 17th century the population was increasingly concentrated in the centre of the city. As urbanization progressed, some of these people cultivated the land in the restricted mountain areas surrounding the city. The result of which was the ruin of the mountains around the Cheonggyecheon and both flash floods and gravel pouring into the river.

Furthermore, the surrounding mountains were increasingly plundered as trees were felled to provide material for housing construction and fuel for heating. It was because of this increase in reckless deforestation for farm land, building and fuel that the flow of gravel into the Cheonggyecheon increased and the riverbed deposits continued to get worse. It got to the stage that when even a drop of rain fell in the city, the Cheonggyecheon was inundated and river dredging became essential. The dredging work carried out by Kongjo guaranteed the security of those living in the area around the Cheonggyecheon.

At the time, those living near the Cheonggyecheon were those most involved in the population increase. Along the 8 roads on the riverbanks of the river there were around 500 illegally built dwellings in those days. This just goes to show how insufficient the space was in the city for building houses. Suffice to say that those new to Seoul had no choice but to build in the area around the Cheonggyecheon. The dredging became a necessity in order



Fig.9 A village of the barracks



Fig.10 The supporting beams of the elevated highway



Fig.11 The river was covered, Traffic jam of the car

to insure the safety and security of increasing numbers of inhabitants in this area. As the Cheonggyecheon was restored, the previously buried Kwangtonggyo bridge was brought to life again and records of dredging were identified. Four Chinese characters were written on a supporting beam. The first of these means Yongjo year 36 in the zodiac calendar (1760).

It gives the average of the dredged river bed for that year. After Yongjo had finished the large-scale work a dredging work agency and officer were put in place and an association made to divide up the dredging areas. It was recorded in the Joseon dynasty records that after this regular dredging took place. However, the Cheonggyecheon during the Joseon period was by no means all about negatives like pollution, flooding, dredging and such river management issues. For the people who lived there it was of course their water supply but it was also an essential space to do things like kite-flying and the traditional custom of bridge-walking called Dapgyo.

8. Modernization and beginnings of the culvert Colonization and the Cheonggyecheon

In 1910, Japan annexed Korea and a General Government was established in Seoul. Over 700,000 Japanese nationals immigrated to the new colony on the Korean peninsula. Seoul's official name was changed from Hansung to Gyungseong and an ever increasing number of Japanese settled in the country. By 1942 there were over 170,000 Japanese citizens. The Japanese in Gyungseong lived in a new town, called Namchon, to the south of the Cheonggyecheon.

When the Japanese government started dredging the Gyecheon, they decided to officially name the waterway the Cheonggyecheon. This was the first time it was given the name that we still use today. The Chinese characters mean "fresh breeze river valley". As a child I remember calling it the Gyecheon, even after it has been officially named the Cheonggyecheon. As far as I can remember it was only after it was covered and the elevated road built, that I started to call it the Cheonggyecheon.

Dredging work was begun on the Cheonggyecheon and its tributaries in 1918 and was carried out regularly in order to prevent

epidemics. In spite of this, the heavy floods of 1925 brought enormous damage. It was from this time, that the dredging became deeper and clean water started to flow into the Cheonggyecheon. There's no doubt that the water became more a part of people's lives as women washed and children played in it. The area surrounding the Cheonggyecheon bustled with the activity of the ordinary people who lived there.

Due to the rapid progress of urbanization in Seoul around this time, the tributaries from north and south of the Cheonggyecheon gradually decreased. One of the reasons for this was the development of the new train service from around the year 1900. Because the train line ran from east to west, some tributaries flowing from north to south had to be partially covered. In addition, with the construction of many foreign buildings, including the Japanese and 11 overseas consulates, the neighboring tributaries were turned into culverts.

It was around this time that Seoul's population suddenly increased with the inflow of rural farmers who came to settle in shacks around the Cheonggyecheon and the pollution of the waterway once again became a serious problem. This was how the process of urbanization turned the Cheonggyecheon from being an enjoyable and useful place into somewhere that could only be used as a drain. Before long, it was all turned into a culvert for flood control. Consequently, the culvert was then turned into a road and the street no longer had any connection to the waterway or its tributaries.

The start of the Sino-Japanese war in 1937 and the Pacific war in 1941 meant that the national treasury and Seoul's finances took a turn for the worse. This combined with the absolute lack of labor, among other things, meant that dredging the Cheonggyecheon became more unlikely. The result of all this was the drastic increase in pollution of the Cheonggyecheon. In Seoul at the time, it was important that roads were available to quickly transport war supplies and so a plan was made to cover the Cheonggyecheon and build a road on the top. This work was started in 1937, in front of the Kwanghwamun post office and completed up to the Kwangtonggyo bridge by 1942. There was also a plan to cover the remaining section, but this was sus-



Fig.12 Lump of concrete running over a river



Fig.13 Construction for reproduction



Fig.14 Elevated highway and a cover lid road were removed, and a blue sky appeared.

ended at the end of the war.

9. Rapid economic growth and the elevated road Revival from the ruins

The Korean war went on, while the Japanese military liberated the Korean peninsula and the new government was established. In the 10 years or so since the Pacific war broke out in 1941, the Cheonggyecheon had been left to its own devices.

It was so full of gravel and waste that it was impossible to dredge. At the same time, an even more serious problem was the large number of shacks that had sprung up around the Cheonggyecheon. To begin with the illegal shacks were just built around the east gate of Dongdaemun.

They then spread to Cheonggye streets 5 and 6 and were packed in with almost no gaps between them up to streets 3 and 4. As this was in the age before septic water tanks, the flow of excrement and waste water from the shacks was left to pass untreated into the Cheonggyecheon, spreading its foul smell as it went. By the time the Korean war ended in 1953 there were even more illegal shacks built in Seoul's central district around the Cheonggyecheon.

After the destruction of war, the biggest issues were the removal of the shacks and constructing the Cheonggyecheon's culvert. Progress of covering work The Korean government and the 8th mayor of Seoul, Heo Jung, established a 4 year plan to tackle the Cheonggyecheon's issues and cover the waterway.

The covering work began on September 10, 1958 with the 450m stretch from Kwangtonggyo to Janggyo. An additional 30 meters was covered up to the Bansan market but the work was not progressing quickly. This construction work to cover over the waterway in the centre of Seoul did not make much headway. However, this all changed after the military coup d'état lead by Pak Junghee in may 1961.

The military regime took over the project and quickly got the work done. This proved to the Korean people that the new military government was worth trusting. The 4 year construction work to cover the inner city Cheonggyecheon right at the beginning of the Korean governments rule really was an amazing achievement. At the time it was felt that this concrete covering

offered the best solution to the cities problems with regards its pollution, landscape, hygiene and transportation. The state of the Cheonggyecheon prior to covering work was a huge problem for the city.

Every few years a large scale dredging was essential to deal with the gravel piled up to the height of the banks and the smell that was more than local residents could put up with. It seemed at the time that the covering work was the perfect solution that would solve all the Cheonggyecheon's problems. As a result, the government decided to cover the nations waterways as they had done in Seoul.

To begin with the Cheonggyecheon was covered up to the Dongdaemun gate and then further east to Majangdong and construction was completed by the early 1970s. The improvement in the area surrounding the Cheonggyecheon following this construction was really surprising. The shacks along the banks had all disappeared and at that time most of the tributaries had also been covered. The remaining rivers were covered up until the end of 1995. In all, a huge number of waterways in Seoul were covered, with the large majority of that construction taking place in the 1960s.

10. The exhibition

A book of "Seoul Cheonggyecheon reproduction" was published at the same time in Japan and Korea. The exhibition of a photograph and the drawing was held as the memory in Tokyo in July, 2012. In addition, it was performed in Osaka in March, 2013.

This book won prize of The Japan Society For Folk Architecture. A panel photograph is approximately 150 pieces for this exhibition. The contents are scenes around the Cheonggyecheon after the reconstruction, before the history and the culture.

The drawing is an original elevation of the south and north side Cheonggyecheon of 12km in total length. This exhibition is planned in Hosei University Ichigaya campus at autumn of 2013. I am going to display it in future in United States and Korea. I hope that introducing it into the global society by this event widely.

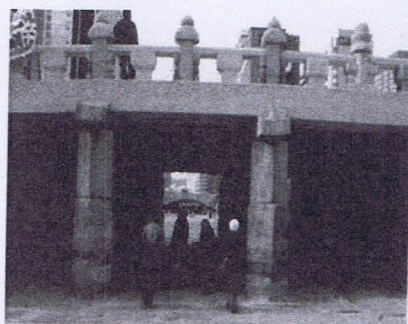


Fig.15 History revived



Fig.16 Natural environments improved



Fig.17 State of the exhibition in Tokyo