

A GENERAL SURVEY OF CULTURAL TRADITION OF THE CHINESE CARTOGRAPHY

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Abstract: Based on a review of the development history of thousand-years ancient Chinese cartography, this article discusses and summarizes the connotation and characteristics of the culture of Chinese traditional cartography.

Key words: cartography culture; connotation of cartography culture; ancient Chinese cartography

Maps are a kind of language expressing mankind's thinking on the knowledge of geographical environment. Its development and evolution reflect changes to the range and degree of knowledge possessed by their makers regarding geographical environment, reflecting mankind's ideas, mode of thinking, ideas of judgement of beauty, spirit of creation, measure of value, etc. Hence, it is an important cultural product and tool. The culture of cartography includes cartography thinking, cartographic language, map technology, mapping products, map specification and so on. With thousand-years history, ancient Chinese cartography has abundant cultural connotation. Chinese cartography grew up in the soil of Chinese traditional culture, its development is closely related with the culture.^[1] Not only it is a product brought up in Chinese traditional culture, but also its direction and mode of development, are also affected and restrained by the culture.

Chinese traditional culture, developed in its own geographical environment for a long time in ancient China, has its own unique character. With growing up from this kind of cultural background, ancient Chinese cartography formed a special cultural tradition. Its characteristic is demonstrated in the aspects of expressing mankind's geography thinking, world view, its theory development, technology advancement, application and management of maps, and so on.

I. Geographical view of Tian Yuan Di Fang (heaven is round and land is square)

Tian Yuan Di Fang is an ancient philosophical thinking in China. Its concept can be traced to the ancient China long time ago. During Zhou dynasty, there was a thinking saying that "heaven is as round as a piece of lid and the land is like a chessboard". During the reign of Spring-Autumn period, the concept was gradually developed. It reflected the knowledge that the ancient Chinese possess on the peripheral environment. In ancient China, there were two main school of cosmology thinking. One is Gai Tian's theory believing that "the heaven is round, the land is square and the sky is like the inverted bowl covering the land" as recorded in *Zhou Bi Suan Jing* (Book of Maths) written in Western Han period. The other is Hun Tian's theory as recorded in the *Hun Tian Yi Tu Zhu* written by Zhang Heng. Both theories assert Tian Yuan Di Fang or Tian Yuan Di Ping (Heaven Is Round and Land Is Flat).

Maps are means and tools reflecting the knowledge that mankind had on geographical environment. Undoubtedly, they should be affected and restrained by the geography thinking. With thousand-years development history of Chinese traditional cartography, its knowing and

expression upon outside environment, theory formation and development, production and application are all dominated and affected by Tian Yuan Di Fang, which can be testified by the development history of Chinese cartography.

Chinese traditional cartography has a very long history and had reached a high level of development long time ago. According to the records of *Zhou Li* (Ritual of Zhou Dynasty), as early as Western Zhou dynasty, maps were already widely applied. In early Han dynasty, Chinese cartography had reached a relatively high technology level. This can be seen from the ancient maps coming out of the Han tomb in Mawangdui, Changsha. In particular, Pei Xiu concluded the technology and implementation of cartography and instituted the six principles of map-making (Zhi Tu Liu Ti) in Western Jin dynasty. The principles were laid down in the early days and its system is complete. It holds an important position in the history of Chinese cartography dominating in the Chinese traditional cartography for more than one thousand and seven hundred years. Zhi Tu Liu Ti lies on the geography view of Tian Yuan Di Fang. Its applicable scope is subject to limitations. Besides, the theory does not have an essential change for more than a thousand years and can hardly jump up to a new level.

In the Tang Dynasty, China undertook the world's earliest measurement of meridian, and in early Yuan dynasty the concept of longitude appeared. The possibility existed of using the method of longitude and latitude survey to replace the method of Ji Li Hua Fang in map-making. As recorded in the *Tian Wen Zhi* (Book of Astronomy) of *Yuan Shi* (History of Yuan Dynasty), Jamal al-Din, an astronomer from the western regions, introduced the sphere and Di Yuan Shuo (Theory of Earth Being Round) was introduced into China in early Yuan dynasty. However, all these did not have very much impact on Chinese traditional cartography.

In late Ming dynasty, Matteo Ricci and other western missionaries introduced the Di Yuan Shuo to China on many occasions. The theory began to have an influence on Chinese to a certain extent, but is restricted to the minority scholar-bureaucrat. With the orders of the leader of emperor Kangxi in early Qing dynasty, a large-scale surveying and mapping with the method of longitude and latitude survey was spread throughout the entire China with the output of *Huang Yu Quan Lan Tu* (Map of Complete View of Imperial Territory). The surveying and mapping activity reached the highest advanced level in the world at that time. However, Chinese cartography did not continue to develop from that on and entered into the phase of recent cartography. At that time, the Di Yuan Shuo and the method of longitude and latitude survey introduced by western missionaries had a limited impact. The Chinese society generally believed Tian Yuan Di Fang, and around 90% of the Chinese did not believe that the shape of the earth is round.^[2] In late Qianlong period, a policy of closed country to international intercourse was administered. After this, Chinese cartography still moved along its traditional path. During the reign of Guangxu period of late Qing dynasty, the compilation of the atlas of the all provinces in China began. After encountering this transition, Chinese traditional cartography truly began to leap and entered into the phase of recent cartography and Di Yuan Shuo was gradually accepted by the majority Chinese. Maps were drawn with the method of longitude and latitude survey and map projections.

II. Sino-centric world view

With the passing of time, the knowledge of the ancient Chinese regarding the wider world gradually expanded outwards, centered on China herself. Ancient Chinese maps record this gradual evolution in understanding. This world view in turn affected the development of ancient Chinese cartography.

During the Western Zhou dynasty, when the *Tian Xia Zhi Tu* (World Map) was produced, the limits of “the world” were confined to an area covering Northern China and the middle and lower reaches of the Yangtze River. With the opening of the Silk Road, in Han times, the Chinese world view took a large step forward. Following the long distance expeditions of Zhang Jian to Central Asia, people’s geographical awareness stretched as far as Central Asia, Southern Asia and even to the eastern border of the Roman Empire. Meanwhile, at sea, new routes were opened up across the Pacific Ocean. However, over the next thousand odd years, this range of knowledge was not further expanded. This point can be confirmed by looking at maps from this period such as the *Hai Nei Hua Yi Tu* (Covering Territory under and beyond the Jurisdiction of Central Government) by the Tang cartographer Jia Dan, and the Yuan dynasty *Yu Di Tu* (Map of China) by Zhu Sibei. When Zhu Sibei drew the *Map of China*, the geography of the South China Sea region, the deserts of the North West, and foreign countries, was not understood, and thus these parts are left blank.

The seven voyages of the Ming envoy Zheng He, who navigated as far as the East coast of Africa, brought new understanding of the geography of overseas parts, and the *Zheng He Hang Hai Tu* (Zheng He’s Nautical Charts) were compiled. However, the foreign parts shown in these charts are not drawn to scale and are depicted very cursorily.

In the late Ming period, when the Italian missionary Matteo Ricci brought world maps and geographical knowledge to China, Chinese people were still rejecting the idea of continents, and exaggerating their own country so that it took up the whole world, which was referred to as “All under Heaven”^[3]. Against the background of a unique geographical environment, social and economic conditions, and culture, in understanding the outside world, the Chinese developed a profoundly sino-centric world view. The Song dynasty thinker Shi Jie is highly representative in stating in *Zhongguo Lun* (Discussion of China), “The area of the sky we call ‘above’, the area of the earth we call ‘below’. The area occupying the center between earth and sky we call China (lit. the central land). The area at the edges between earth and sky we call the (land of the) border tribes. The border tribes are at the outside. China is the inside”.

This kind of world view demonstrates that Chinese people at that time had an unreal conception of their own civilization as the highest in the world, while adopting a disdainful, superior approach to foreign cultures. When Matteo Ricci unveiled his world maps to the Chinese, some people, finding that China formed only a small part of the globe and was not the center of the world, fiercely opposed the materials he had brought. They viewed Matteo Ricci as a heretic and a charlatan who was unable to prove his claims^[4]. Thus we may say that the maps and geographical knowledge of the world which Matteo Ricci brought with him, did not have much influence on the majority of contemporary Chinese. For a long period after this, the territorial range of Chinese maps did not show any obvious signs of enlargement.

However, in the 19th century, Chinese geography experienced an unprecedentedly large amount of geographical discovery. Wei Yuan compiled *Hai Guo Tu Zhi* (Records and Maps of the World), which is the first atlas in China to cover the whole world. Xu Jishe wrote a work, *Ying Huan Zhi Lue* (Short Records of the World) describing the geography of the world with 38 attached maps. These opened up the geographical horizons of the Chinese people, and gradually brought to the Chinese a new world consciousness.

III. An intimate connection with politics

Since ancient times China has used Ban Tu to define the national territory. This word is

make up of two Chinese characters, Ban which means the population census, and Tu, which means maps. The great Qing Emperor, Kangxi, once said, “The territory under our control we refer to as Ban Tu. By Ban we mean the country’s population, by Tu we mean its land.”^[5]

This compound, Ban Tu, occurs as early as the Warring States period, in the *Zhou Li, Tian Guan* chapter. At that time, maps were widely used to delineate territory, mark field boundaries, and to clarify land holdings. The *Zhi Fang* chapter of the *Zhou Li* states, “Master maps of the world, in order to possess the land of the world”. Maps could be used as evidence to settle disputes over land rights. When one state was defeated and conquered by another, in addition to handing over its territory, the defeated state also had to hand over its maps. Thus Han Fei said, “To submit maps is to concede territory, to concede territory is to diminish the state.”^[6] In the process of their development, maps came to symbolize the nation’s sovereign territory, its population and political authority. When the Tang dynasty Taizong Emperor campaigned against Tujue (a nationality in ancient China) and Korean, these two states handed over the *Xi Yu Tu Ji* (Maps and Records of Western Territories) and the *Liaodong Shan Chuan Di Shi Tu* (East Liao Mountains and Rivers Maps), indicating that they had conceded. If one country conquered another, they always took steps to obtain their maps. After the Qin swallowed up the other six states of China they also appropriated their maps and census records. When the founder of the Han dynasty, Liu Bang, led his rebel forces in sacking Xianyang, each general could take a share of the loot. Significantly, it was the most far-sighted general Xiao He who chose to gain possession of the Qin states maps.^[7]

As maps had a political function, the maps which were drawn up at the behest of China’s rulers had a highly political flavour. For instance the Tang dynasty *Shi Dao Tu* (Ten Circuits Map) included mountains, rivers, populations, taxation, political boundaries and even the political strategy regarding China’s borders. Such maps acted as a direct tool of government.

The link between maps and politics is also evidenced in the relationship between their development of maps and the use they were put to by rulers, and the direct influence of rulers on map-making.

During the late Ming period, when Matteo Ricci and other Western missionaries came to China to spread Protestantism, they brought to China advanced Western map-making techniques and maps of the world. Despite fierce opposition, as they had the approval of the Wanli Emperor, they were able to continue their activities. This marked the first contact between Chinese and Western cartography.

In the early Qing period, China initiated a large scale mapping of the entire country, producing the *Huang Yu Quan Lan Tu* which reached advanced world standards. This map-making activity moved China to the front ranks of world cartography. The leader and overseer of this work was none other than the Kangxi Emperor himself.

The political function of maps meant that they received serious attention from successive governments. This was beneficial in developing and improving the science. On the other hand, as maps were kept in strict secrecy, this mitigated against their widespread use and popularization. They were also extremely easily destroyed during war time. Once it was completed, the early Qing *Huang Yu Quan Lan Tu* was shut away deep inside the imperial palace. Thus, although it was the most advanced actually surveyed map in the world at that time, for a very long time it was not actually put to any practical use.

IV. The use of pictorial methods

Looking at representative historic Chinese maps, it is clear that Chinese maps reached a high degree of technique and precision, at a very early date. However, the number of ancient Chinese maps which use Zhi Tu Liu Ti and Ji Li Hua Fang (Drawing Square Grid With Chinese Unit Li) method is not very high. Many more maps use a pictorial method to convey information. Although these latter maps are not the mainstream of ancient Chinese cartography, they were produced in large numbers, and were widely used.

Pictorial maps use the technique of three dimensional landscape painting, or pictorial symbols or a combination of plane layout and pictorial representations, to indicate mountains, rivers, cities, scenery, ancient relics and other natural and man-made features. They do not emphasize the map's mathematical precision. The location of features and the distances between them is not marked accurately. Features are also not drawn to scale. The development of such maps has a long history. By the Qing dynasty, they had reached a very high artistic quality, and used many colors and the detailed Gong Bi (fine brush) style of painting. They possess a strong impression of three dimensionality, fresh colors, and a high degree of artistry.

The development of pictorial maps is determined by a great many factors. Initially, during their infancy maps are a map-like sketch made by people of their surrounding physical features. As map-making becomes more developed, the craft cannot throw off the influence of drawing, and thus the techniques and rules of drawing are used in making maps. During the Northern and Southern dynasties period, Xie He summarized the "Six Laws of Painting".^[8] These included rules for arranging the layout and using different colors to depict different objects, which were used in map-making.

The traditional Chinese concept of a "Union of Man and Heaven"(Tian Ren He Yi) is also a background factor in the development of Chinese pictorial maps. This concept emphasizes the harmony of Man and Nature—that people can find emotional sustenance in contemplating nature. When depicting mountains and rivers in maps, these features became the subject for creative drawing, and a vehicle for the painters emotions. The ancient Chinese had a form of landscape maps which is very similar to a landscape painting. Where the subject is the same it is often difficult to tell a map from a painting. Both use painterly techniques to draw the target features in life like style. The Tang poet, Wang Wei, drew the *Wang Chuan Zhen Ji Tu* (True Depiction of Wang River), which shows the scenery along the Wangyu River valley. It incorporates a combination of painterly aesthetics and authentic scenic representation. Near objects are painted larger than distant objects, there is use of light and shade, and a direct sense of three dimensionality.^[9]

V. Emphasis on prose description

There is an important Chinese term Tu Shuo which is also sometimes referred to as Tu Jing, Tu Ji or Tu Zhi. The Tu here stems from the Chinese word for map, and Shuo, Jing, Ji and Zhi are all words meaning roughly records, annotations, description. Thus the term Tu Shuo refers to the prose description accompanying a map. Chinese Tu Shuo has a long history.

The famous early Imperial period works, *Shan Hai Jing* (Records of Mountains and Rivers), is in fact the annotations and description which originally accompanied the *Shan Hai Tu* (Map of Mountains and Rivers). At that time, techniques did not exist for indicating the location and distances between physical objects on maps. This information was supplied as prose description. After the Song and Qi times of Northern and Southern dynasties, Tu Shuo writers became increasingly numerous, and by the Sui-Tang period there was a large number of such writers.

Sui dynasty maps such as *Qu Yu Tu Zhi* (Territorial Maps and Records) by Yu Mao and *Zhu Zhou Tu jing ji* (Anthology of Maps and Descriptions of Various Places) by Lang Weizhi both use a “one map, one prose description” format. “To describe mountains and rivers, the first volume has landscape maps. To describe prefectures and counties, the first volume has city maps.”^[10]

The Tang dynasty also used a one map - one description formula. The *Yuanhe Jun Xian Tu Zhi* (Yuanhe Maps and Records of Prefectures and Counties) by Li Jifu gives an introduction to each county. It explains, “The maps are in the first chapter, in front of the prose description”^[11]. From Sui-Tang times onwards, Tu Shuo developed along two paths. One route was to continue to use prose in parallel with the maps. For instance, when the Tang cartographer Jia Dan produced his *Hai Nei Hua Yi Tu*, he also wrote a work *Gu Jin Jun Guo Xian Dao Si Yi Shu* (Account of Commanderies, States, Counties, Circuits and Border Tribes in Ancient and Modern Times) which gave added commentary on the maps. The other development route was for the prose description to predominate over the maps, the number of which slowly dwindled. By Northern Song times, the maps were already being relegated to an appendix. Tu Shuo thus slowly evolved into *Di Fang Zhi* (local chronicles). Local chronicles describe the geographical features, historical events, and so on of the area within each administrative region. Local chronicles generally all have map appendixes. The extant number of local chronicles dating from Ming-Qing times is extremely large, and they retain a great many maps.

There is a strong connection between the long running historical growth of Tu Shuo and the special features of geographical research in China. The *Di Li Zhi* (Book of Geography) of *Han Shu* (Han History) is an extremely successful geographic text, and gave birth to a new system of geographical research. It mainly relates administrative boundaries, and the history of their evolution. Mountains and rivers, as such, are given lesser importance. After this, geographical research did not emphasize the shape and appearance of the geographic terrain itself, nor did it emphasize the study of the rules behind geographic changes. Instead, comparatively more importance was given to tracing the evolution of political boundaries and to recording local history. This kind of information is not easily expressed in pictorial form, and thus the amount of prose words had to increase.

The development of Tu Shuo enhanced the functions of maps, and ensured a large amount of valuable ancient geographical and historical material was preserved. However, it had less impact on study into the natural environment itself. It also served to attenuate the advantages of the map format in presenting geographical information.

VI. Military maps more sophisticated

After human came into class society, wars always happen. Maps are a tool of the wars. Each of dynasties especially knew of the importance of maps.

Maps in China were used in wars so early. It is said that both Huang Di and Chi You, first head of the earliest tribal in ancient China, ever utilized maps. During Warring States period, slavery collapsed, wars often occurred among each of kingdoms upon the use of maps. At such time, military maps were used owing to enough realization on the importance of maps. *Di Tu Pian* of *Guan Zi*, written by Guanzi living in Spring and Autumn period, is the earliest article to keep record of relation between maps and wars, this article explains the role of maps for wars as following: each person who lead soldiers must know of maps to collect intelligence such as land, roads, vegetation, strategical positions, and so on.

In Qin and Han dynasties, the military maps were developed a lot by the popular use

during unification of ancient China. In 1973 ,three ancient maps drawn on silk fabrics were found in the relic of Mawangdui in Changsha city , one of three directly reflects the militance, and designates name of army, place of military camp, defense border, water pool against fire, and so on. Through which we can understand the concept of war in ancient China.

Following war range, development of pattern of war and military concept, military maps were improved, the technology to produce military maps was getting more perfect with widespread use on. Li Jifu living in Tang dynasty paid much attention to mark the elements of war on maps, he ever drew a map for wars which was put on for reading every day by Tang Xianzong, one of emperors of Tang dynasty.^[12]

Most of military maps were managed in ancient China by Bing Bu Zhi Fang, a bureau under defense department , which stimulated the development of military maps.

VII. Stress on on-the-spot investigation and data checking

The precision and reality of maps reflect level of cartography development. As early as 2000 or more years ago Chinese cartography reached the sophisticated level of technology and theory depend on development of maths and measurement tools, practical investigation ,and inheritance of maps.

The ancient maps of Han dynasty tomb in Mawangdui hold higher precision with settlements, mountains, rivers, roads, etc. marked. The author must work on careful practice, and then be able to finish it.^[13]

Jia Dan, a specialist for cartography living in Tang dynasty, drew many maps, such as *Hai Nei Hua Yi Tu*, through practical investigation of years and reading of a lot of maps.^[14]

Zhu Siben, a cartographer in Yuan dynasty, who made much contribution to traditional cartography of China, paid much attention to practical investigation for map-making, he drew the famous *Yu Di Tu* with higher precision and reality. He was a taoist, often ordered by emperor to fete mountains. Through wide trip and inheritance of previous maps, he ascertained incorrectness of and revised previous maps, if the precision and reality of data could not be proved , he would rather discard them.

VIII. Stress on map-management

China has a long history in depicting maps with utility of maps occurred very early. *Zhou Li* recorded that, at the time of Western Zhou dynasty, many kinds of maps were used to many fields , allocating land, managing border, to name a few. For maps kept, Western Zhou dynasty established special department responsible of management of maps with formal officers , of whom positions were Si Tu , Tu Xun , Mu Da Fu , Zong Zhai, and so on . Si Tu had two kinds of Da Si Tu and Xiao Si Tu, Da Si Tu were charge of maps of whole state , Xiao Si Tu were responsible of district maps , Tu Xun of land and products maps , Mu Da Fu And Zong Zhai of Zhao Yu maps.

Maps of Qin dynasty were held by Yu Shi Da Fu(Imperial Councillor), a name of official position , who were charge of laws as such a law officer , and maps .

During Han dynasty maps were increased a lot . At the beginning of Western Han dynasty , Shiqu Ge, which was the earliest storage of China to keep maps, was built to collect both maps and books of Qin dynasty . At the time of Eastern Han dynasty , rules were constituted for periodically drawing maps . Guangwu Di, in year of 39, stipulated for that each of administrative districts must yearly dedicate district maps. These rules were useful for the empire to handle land and population, and continually improve management and renewing of the district maps year by

year .

From the time of Eastern Han dynasty on, maps were kept by full-time officers, and periodically renewed. At the beginning of Qing dynasty , maps were compiled at large-scale range , Yu Tu Fang, a storage for maps, was constructed because of severe increase of maps^[16]. At Guangxu time of Qing dynasty, maps were managed by special bureau with positive responsibility, keeping maps, drawing maps, printing maps, and so on. Furthermore, officers of maps were also existed in other bureaus.

Ancient China took several materials to make maps, some of materials, such as stone, played certain role in keeping maps. Stone-carved maps appeared at Liang time of Northern and Southern dynasties, and of Song dynasty were popularly used, because they were able to be copied by offspring, and were easily protected.

Since ancient China paid attention to management of maps, maps were continually improved time by time through dynasties, Chinese cartography were objectively promoted .

Culture of Chinese cartography has millenniums of history. One of important feature of this culture reflects from inheritance, main reason that cartography was existing through millenniums is that the culture can inherit advantages over discarding disadvantages during the course of its developing, simultaneously acquire innovations over inheritance. Nowaday cartography is being developed upon traditional one. The purpose of researching the cultural tradition of Chinese cartography is to absorb the quintessence and bring about a great advance in modern cartography.

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