

## Review to Chinese Old Maps and Recent Study Progress<sup>\*</sup>

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**Abstract:** Ancient Map is a significant constitution of historical culture treasure, which symbolizes the sovereignty, the national territory and the accumulation of geographical knowledge. The remarkable achievement of Chinese ancient cartography, which aggregated much knowledge and mapping techniques, has been recognized internationally. This paper draws an outline of the history of Chinese cartography, with several sample illustrations, and presents a brief review to the study achievements in this filed, from the approaches of project, scholar, publication, paper and digitalization work recently.

**Key words:** history of cartography, academic review

The History of cartography is inter-discipline among the geography, cartography and history of natural science. With reference to other civilizations in the world, the history of Chinese culture and science is long and continent, kept down much for investigating. In several periods, Chinese civilization, including cartography and geography, stood in the front at the ancient time. At the meantime of accumulate of materials and ideology, much maps or plots were produced, recorded, conserve and survive to present, which records the massage of technology of Chinese past surveying and mapping. These past map, are worthwhile for research with the view of history of cartography, and draw the world attention.

According to the mapping methods and way of conservation, the catalogues of past maps are formal or official map, commercial published map and draft map in achieves. For the reason for the official map, which was believed to represent the status of past surveying and mapping, secretly conserved in the palace, or lost in war. So, the academic activity was impossible to carry on. From 1920's, the Department of Achieves, Library of Forbidden City Museum undertook the collection to the huge achieves of Ming and Qing Dynasty, including the thousands of old maps storage in the House of Geographic Map. Meanwhile, the Department of Map, National Library of Peiping initiated the collection and the study to the old maps under the guidance of Librarian Wang Yong. The institute of collection and research to the history of cartography were found since then. Wang Yong's books of the *History of Chinese Geography*, the *Study to Chinese Books and Maps of Geography* and the *Outline of Chinese Cartography*, are treated as the authorized academic works. From 1950's, the Chinese Academy of Sciences raise the idea of introduce the modern scientific methodology towards the history of Chinese natural sciences, including the cartography. Along with the study to history of geography, the field of history of cartography was shaped, and drawn dozens of scholar to participate in.

In 1970's, 2 treasure maps were found in the tomb of West Han Dynasty in Chang Sha city, capital of Hunan Province, and several papers published to lead the international attention to Chinese past achievements on surveying and mapping. Since then, the research receives more support from academy, library and museum. 1980's, several projects carry out and leading achievements were reach in 1990's, which were acknowledged by international scholars such as J. Harley, D. Woodward, T. Campbell and Mei-Ling Hsu. In the recent decade, more progress has been achieved in the study on the history of Chinese cartography and worthwhile introduced.

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According to personal knowledge, this paper gives a brief review to these achievements from approaches of institutions, projects, publications, paper and other; raise the analysis for present and prospect future works.

## 1. Outline of Achievements of Chinese Ancient Maps

Ancient Maps are treasure of the Chinese Culture and the world civilization. The original map initiated with characteristic, draw, and icon in the primeval stage of thousand years ago, recording the brief visual perception to geography, especially the river, hill and road, which is nearly relevant to resident subsistence. In the early legend before the War State Period (475B.C.- 221B.C.), there are several records about using map for residence, farming, military and building graveyard. For example, the Book of Guanzi(管子), is the earliest written for the usage of map. The preserved earliest (300B.C.) map, named Zhao Yu Tu (兆域图), is a copperplate map of cemetery plan, which excavated in Hebei Province in 1977.

In the early feudal stage of the War State Period, the Qin Dynasty (221B.C.-206B.C.), and Han Dynasty(206B.C.-220A.D.), the growth of geographical knowledge promoted the development of surveying and mapping. In addition to the story of Map of Yan, and the Han Troop taking over the conquered Qin's Maps, the preserved maps of Qin and the West Han, unearthed separately in Fang Ma Tan(放马滩) of Gansu Province in 1986 and in Ma Wang Dui (马王堆)of Hunan Province in 1973. The former is on the bronze plate, and the later drawn on silk, include a topographic map, an urban map and a military one. Both indicate the first glory achievement of Chinese ancient maps

In the West Jin Dynasty (265-316), There was a outstanding cartographer named Pei Xiu (裴秀, 224-271), who raise the idea of "six principles in mapmaking (制图六法)", which including scale, orientation, distance, elevation, slope, etc. It is reasonable to compare Pei Xiu to Greece Cartographer Ptolemy (托勒密, 99-168). Although his map was not reserved, the theory with six principles remarked the beginning of the second stage and did the long effect for thousand years until modern period.

In the Tang Dynasty (618-907), the application of paper and print, and the effect map administration, both push the mapmaking prosperity, although no actual maps remain to present, except a revised map of Hua Yi Tu(华夷图) originally compiled by cartographer Jia Dan (贾耽, 730-805), who shaped the tradition of measuring the distance with grid (Ji Li Hua Fang, 计里画方). In the Song Dynasties (960-1279), the traditions pass down with the famous scientist Shen Kuo (沈括, 1031-1095), . More than dozens of engraved maps, preserved to present, such as the Yu Ji Tu (禹迹图) with li (里) grid on stone tablet in Xi'an of Shaan'xi Province, and the Ping Jiang Tu (平江图) in Su Zhou of Jiangsu Province. For the reason of widespread of woodcut print, lots of maps on paper were recorded or copied for present view.

Yuan Dynasty (1271-1368) took vast territory under control, so the geography knowledge accumulation and mapmaking practice should be more than ever, as historical achieve recorded but few map entity present. Cartographer Zhu Si Ben (朱思本) compiled the large Yu Di Tu (輿地图), past to Qing Dynasty but lost regretfully. In the Ming Dynasty (1368-1644), navigator Zheng He(郑和) sail seven time with useful nautical charts. Cartographer Luo Hong Xian (罗洪先, 1504-1564) and his Guang Yu Tu (广輿图) with seven editions, Chen Zu Shou (陈祖绶) and his Huang Ming Zhi Fang Di Tu (皇明职方地图), Yang Zi Qi (杨子器) and the Yu Di Tu (輿地图) with his notes, could be taken for the representation of that time. For the date is coming near, hundreds of original draw map preserved in libraries and museums. In the 17<sup>th</sup> century, Italian Mapton Martini(卫匡国) visited China, copied the Guang Yu Tu to bring back to

the Europe, transferring the Chinese map international. Meanwhile, Italian Matteo Ricci (利玛窦) delivered the world and the globe idea to China and made the color world map.

In the Qing Dynasty (1664-1912), with the introduction of graticule of latitude and longitude surveying, territory mapping was carry out for twice in the Kang Xi period (康熙, 1662-1722) and the Qian Long period (乾隆, 1736-1795), reached the famous work of Huang Yu Quan Lan Tu ( Map of the Emperor's Territory, 皇輿全览图), which was the first map from actual field survey with the trapezoidal projection and the scale about 1:1,400,000. That was authority national atlas at that time.

In the early 1900's, modern surveying, mapping and print techniques were imported and widespread. Both military and civil mapping institution were found and produce large number of modern map, such topographic map, traffic plan map, educational geographic atlas, etc. the magnum opus was the *New Atlas of the Republic of China*, compiled by Prof. Weng Wen Hao(翁文灏), Prof. Zeng Shi Ying (曾世英) and Prof. Ding Wen Jiang (丁文江), published by the Commercial Press in Shanghai in 1933.

Despite of carefulness for the ancient maps, much of them vanished and only about 7000 copies remain in Chinese libraries. These treasure deserve the academic attention and the physical preservation. For this, the study to the Chinese ancient maps developed in recent dozen of years.

## 2. Recent Academic Progress

Taking a kind of activity as science or academy, that's mean a group of scholar devote their attention to the subject, such as the history of cartography, and concentrate scattered idea to system solution, nevertheless correct or not. From this point of view, the Chinese scholars make comprehensive progress, main of which noted below.

### 2.1. Institution and Programs

Institution and personality are must for academic development. In the author's point, the institution related with the history of cartography could be cataloged to academic and archive preservation one. The former are several authority institutions engaging in study, such as Institute of History of Natural Sciences, Institute of Geography, Chinese Academy of Sciences (CAS), Institute of Cartography, Chinese Academy of Surveying and Mapping (CASM), Department of Geography, Department of History, Peking University (PKU), etc, with supports from the National Sciences Foundation (NSFC) or State Bureau of Surveying and Mapping (SBSM). The latter are Department of Map, National Library of China, National Foundation Geographic Information Center, Chinese the First History Achieves, etc., preserve the olds maps and provide reading service.

Since the academic facilities reform in 1980's, the front progress is mainly reflected from the ongoing programs. As far as the author knows, there are several promoting programs which worth to rise as follows to draw broad interests. The results of large project are atlas with photocopies of old map and academic paper.

The first is the compilation of *Atlas of Ancient Maps in China*, beginning from 1983 with support from the NSFC, and published separately 3 huge volumes, the first one recording the history from the War State to the Yuan Dynasty, published by the Culture Relics Press in 1990, the second of the Ming Dynasty in 1994, and the third of the Qing Dynasty in 1997, mainly text in bilingual of Sino-English. Taking the third for example, this volume records 84 maps with 212 sheets of the Qing Dynasty, with 16 authority papers and chirography to the cartographical history. The leading personalities of the group are Prof. Cao Wan Ru, Prof. Zheng Xi Huang, Prof. Niu Zhong Xun and Prof. Huang Sheng Zhang, Dr. Wang Qian Jing, etc. This group was

formed from the early 1980's when writing the book of *Ancient Geography of China*, also the leading group in History of geography and received the honor from the CAS.

Second is the compilation of *China: in Ancient and Modern Maps*, lasting from 1986 to 1989, with Support by the SBSM. The authors are Prof. Yan Ping, Jin Ying Chun, Zhou Rong of Institute of Cartography, CASM, and Library of Sun Guo Qing of National Library, etc. This Group visited Chinese main libraries, museums, collected hundreds of copy of early maps, and reached the compilation and research success. *China: in Ancient and Modern Maps*, composed of 166 sheets with impressive print, published separately in Chinese by Harbin Cartographic Press and in English by Philip Wilson Publishers of Sotheby's Publications in 1998.

With the bound academic content and the refined bookbinding, both atlases above are recognized as the landmark of history of Chinese cartography and conservation of Chinese cultural relics. In addition, with the support from National Library, the Hong Kong Museum compiled a large publication of *China on Old Map* for the Old Map Exhibition to celebrate the return of Hong Kong in 1997, with limit spread. In 1979, Hong Kong Chinese University Press issued the *Chinese Walled Cities: A Collection of Maps from Shina Jokaku no Gaiyo*, recording lots of modern Chinese urban maps.

At present, there are three programs is undergoing. The first is the compilation of *Atlas of Ancient Urban Maps in China*, leading by Prof. Zheng Xi Huang of CAS. The second is the research to the modern mapping, leading by Prof. Liao Ke of CAS. Third is the study and digitalization process to the modern topographic maps, leading by the author, Doctor Wang Jun of CASM.

There are also large programs about history of geography, or comprehensive history of Chinese natural sciences, which including the content of history of cartography, mainly presided by the Institute of History of Natural Sciences, CAS.

## 2.2 Reference Books

About the reference book, the department of map of National Library compiled the *Directory to 6827 domestic and abroad past maps* in this Library, published in 1997 with clear and useful index. With his hard efforts in Europe, Prof. Li Xiao Cong of Peking University compiled a *Descriptive Catalogue of Pre-1900 Chinese Maps Seen in Europe*, with preface of Prof. Hou Ren Zhi and Chairman of Imago Mundi Ltd. Librarian Tony Campbell. With these two valuable guidance books, the interested scholars may trace most of old Chinese map preserved.

## 2.3 Academic Writing and Magazine

Including in above two Atlas, there are academic writings from both historical achieve and cartographic approaches. In 1995, *Treasure of Sino Old Maps* published in Xi'an Cartographic Press, compiled by Prof. Yan Ping, etc., with concise materials from *China: in Ancient and Modern Maps*. This book outlines the history of Chinese ancient map. Volume two of *History of Chinese Surveying and Mapping*, from Ming dynasty to the Public of China, edited by SBSM, published in 1995, which including the content of cartography.

For the nature of historical geography, the scholar pays equally attention to historical document and ancient map, which records the information of past environment. Along with his efforts on history of geography, Professor Niu Zhong Xun of Institute of Geography, CAS, published the academic collection of *Concise History of Chinese Geography* in 1996, including the seven papers on history of cartography.

*The Studies in the History of Natural Sciences* is the authority journal of this field for twenty years. The recent papers of history of cartography are follows: Ms. Cao Wan Ru's *Review to the study of the History of Chinese Cartography in recent forty years* (1990), her *Investigation to the cartography interchange between China and Foreign Countries* (1993), Ms

Zhang Ping's *Zou Dai Jun and the Germination of Chinese Modern Geography* (1991), Dr. Que Wei Min's *On Cartographical Rule of the Gazette-map in Ancient Chinese Local Records* (1996), Mr. Jiang Dao Zhang's *Distinctive Features of Traditional Chinese Cartography* (1998), and Dr. Tang Xiao Feng's paper on geographical idea and map in the Song Dynasty (1998), etc.

The magazine of *China Historical Materials of Science and Technology* introduces the paper on the historical literature and personality. The recent example of paper on the history of cartography is Dr. Wang Qian Jing's *The Distribution of Maps in Books and Their Social Function in Ancient China* (1998), which point out that maps not only served as tools for illustrating geographical knowledge, but also played a vital role in many aspects of the ancient Chinese society. There are academic writings by Doctor Wang Jun on the research to some old maps of Beijing in the Modern Periods, with emphasis on topographic one, in the *Science of Surveying and Mapping* (2000, Vol. 25), the *Progress of Geographical Sciences* (2000, Vol. 19). There are also papers in the magazine of *Cartography* in city of Wuhan, as well.

### 3. Reason behind the map history

According to the research results above and the author's view, the reasons and characteristics behind the achievements of Chinese ancient cartography may include those as follows:

- (1) As early as 3000 years ago, the governor made use of map as tool of military and dominion, to illustrate the environment in the territory. So it's reasonable that the original surveying and mapping sprout much early with the evidence of maps in Fang Ma Tan, and in Ma Wang Dui.
- (2) There were senior cartographers such as Pei Xiu (223-271), Jia Dan (729-805), Shen Kuo (1031-1095) who constantly noted down the theory and methods of traditional Chinese cartography in literatures for the posterity to follow, although the actual map lost or confined in the feudal official.
- (3) Integrated with the historical documents such as local records, lots of paper maps preserved to present, and most of them appear like landscape painting, even in the late of Qing Dynasty, on which, hills, rivers and residence were portrayed with handwriting text rather than symbolized.
- (4) Unified domination such as the Qing Dynasty may carry out territory surveying and mapping, to achieve the distinguished atlas. However, the map was strictly conserved in the box room, so the geographical knowledge was not well know to be social property.
- (5) Only in the modern stage after 1900, the import of the occident modern mapping methods was put to the popular application, with the standing authority body found both in military and civil organizations.

### 4. Prospect

With the several published atlas of ancient maps, the achievement of Chinese cartography in the historical period gradually receive the international acknowledge. For the new progress and topics in front of the academy, the author think, would be thematic study and popularization to the society. The historical urban map, topographical map, is under research. Further, the landscape map, the boundary map maybe included into the academic attentions. On the other side, with the aid of digital technique and web infrastructure, the academic progress would spread and become social knowledge more effectively. Keeping this in mind, the author construct the website of *Sino-past-map* (<http://www.casm.ac.cn/~wangjun/>) to promote the academic communication, and web-publish some new results.

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For this, the study to the Chinese ancient maps developed in recent dozen of years. 2. Recent Academic Progress Taking a kind of activity as science or academy, thatâ€™s mean a group of scholar devote their attention to the subject, such as the history of cartography, and concentrate scattered idea to system solution, nevertheless correct or not. From this point of view, the Chinese scholars make comprehensive progress, main of which noted below. 2.1. Institution and Programs Institution and personality are must for academic development. In the authorâ€™s point, the institution related with the hi-çœltâ€™s an old tradition,â€ he said. â€œThe engineer should stand under the bridge when the first heavy load goes over.â€ Dr. Konstantin Chumakov is an associate director of the U.S. Food and Drug Administrationâ€™s Office of Vaccine Research and Review, which would be involved in approving any coronavirus vaccines for use in Americans. He is also a co-author, with Dr. Gallo and others, of a recent article in the journal Science that promotes research into repurposing existing vaccines. In an interview, Dr. Konstantin Chumakov said he cannot remember eating the sugar cube back in 1959 â€” he was 5 years