Title: *The Han Mawangdui Maps*

Date: pre-168 B.C.

Author: unknown

Description: From ancient times maps have served a variety of purposes in China. Many were designed as practical educational tools for scholar-officials, to guide, instruct and edify in times of both peace and war. They were also employed as a concrete means of asserting the emperor's territorial claims, whether local, empire-wide, or world-wide. Maps became symbolic tokens of exchange in China's domestic and foreign relations, and were even used to depict a perceived link between the realms of heaven and earth. Significantly, they also provided a means by which viewers could take "spiritual" journeys to distant lands - the cartographic equivalent of "travelling [through a landscape painting] while remaining at rest [*woyou*]".

Traditional Chinese maps tend not to be drawn to scale, include a great deal of text and are sometimes pictorial. This generalization is accurate in so far as one acknowledges that a number of kinds of mapping practices, reflecting various epistemologies, did coexist. Distinct technologies and map styles were suited to different audiences and purposes.

The excavation of three Han Dynasty tombs in 1973 at Ma-wang-tui (Mawangdui) in Ch'ang-sha, capital of Hunan Province, is truly one of the most significant archaeological discoveries in modern China. On the one hand, the sophisticated tomb design and method of preserving the dead represented a level of technology unsurpassed by and eventually lost to posterity. On the other, the wealth of well-preserved artifacts, paintings and decorative designs, food, clothing, utensils, weapons, and ancient texts on philosophy, astronomy and medicine, provides living testimony to the life of Han China for both laymen and specialists in a variety of disciplines. To the geographer, however, there is nothing more spectacular and exciting than the three maps found in Tomb No. 3.

After more than two thousand years, the silk fabric upon which the maps were drawn was inevitably badly decomposed. Thanks to the painstaking effort and skilled work of a few specialists in the art of repairing old paintings, two maps have been successfully restored. To facilitate a better understanding of the restored maps, experts have reconstructed each in black and white on exactly the same scale. Facsimiles as well as interpretive studies have appeared in Chinese journals since 1975. At the time of its discovery, they were the oldest maps yet discovered in China, until 1986 when *Qin [Ch'in] State* maps dating to the fourth century B.C. were found.

Preliminary studies thus far have established several significant historical facts. These maps were of early Han vintage and compiled before 168 B.C. when they were entombed with the deceased young nobleman. As such, they can justly claim to be some of the oldest maps extant in the world. Moreover, they were in the custody of one of the most powerful families in the State of Ch'ang-sha; and, placed in the same grave with a variety of weapons, they constituted a set of important references vital to the military command. One is a map of towns and villages, another a Garrison map, and the third a Relief map. Theses restored maps merit serious investigation on the information they yield on China's cartographic skills and geographical concepts at such an early date, as well as on the strategic position of the State of Ch'ang-sha, the last surviving princely state in early Han China.

Ch'ang-sha, as a political region, dates back to the Qin dynasty which established the Ch'ang-sha Chiin or Prefecture. It became the Ch'ang-sha Kuo or State under the Han. The eastern and western limits of Ch'angsha essentially correspond to the same barriers that separate the present Hunan Province from Chiang-hsi and Kuei-chou. In the north, however, the territory actually extended beyond the Tung-t'ing Lake basin to include the southern bank of the lower Han River.

In view of Ch'ang-sha's special relationship with the House of Han, the strategic significance of the border region between Ch'ang-sha and Nan Yueh becomes self-evident. During the years when Dowager Lu controlled the throne (187-180 B.C.), Chao T'o's forces actually launched a large-scale invasion on the southern border of Ch'ang-sha but was repelled. The relief map covers precisely an area where the rugged terrain and narrow passages were of vital importance both to the security of the state and to the staging of any southward offensive. The defense posture, including troop deployment and military installations, is elaborately portrayed in the Garrison map which focuses on the most sensitive area approximately one-half of the territory covered by the slightly larger Relief map.

The Relief map measures 96 x 96 cm and the mapped area stretches from approximately 111° to 112.5°E longitude and from 23° to 26°N latitude, encompassing the present southern Hunan, northeastern Kuang-hsi and much of northern and central Kuang-tung. The main focus of the map, however, appears to be the Hsiao River basin in southern Hunan which contains the most rugged terrain in early Han China. As the map was designed to show the landforms, relief features, roads and passages, the concepts of contours, shading, major lineaments and variance in elevation are clearly and unmistakably presented upon close scrutiny. The portion relating to the Chiu-yi Shan [the Nine Beguiling Mountains] in southern Hunan represents the most ingenious portrayal of a region, the very name of which bespeaks its physiographic complexity and excessively cloudy weather. While the nine bars evidently indicate the relative heights of the nine peaks, the three different shades in each bar are undoubtedly intended to convey other basic geographic information, possibly rainfall, temperature and/or cloudiness. The parallel horizontal lines with rounded tips in the lower left sector must have had a special significance for the military of that time. In view of the fact that the foothills overlook the Ch'ien Tao passage way, these lines may well be indicators of the varied widths of the southern massif of the Chiu-yi Shan or simply relative distances in terms of travel time from one side of the mountain to various commanding points in the foothills.

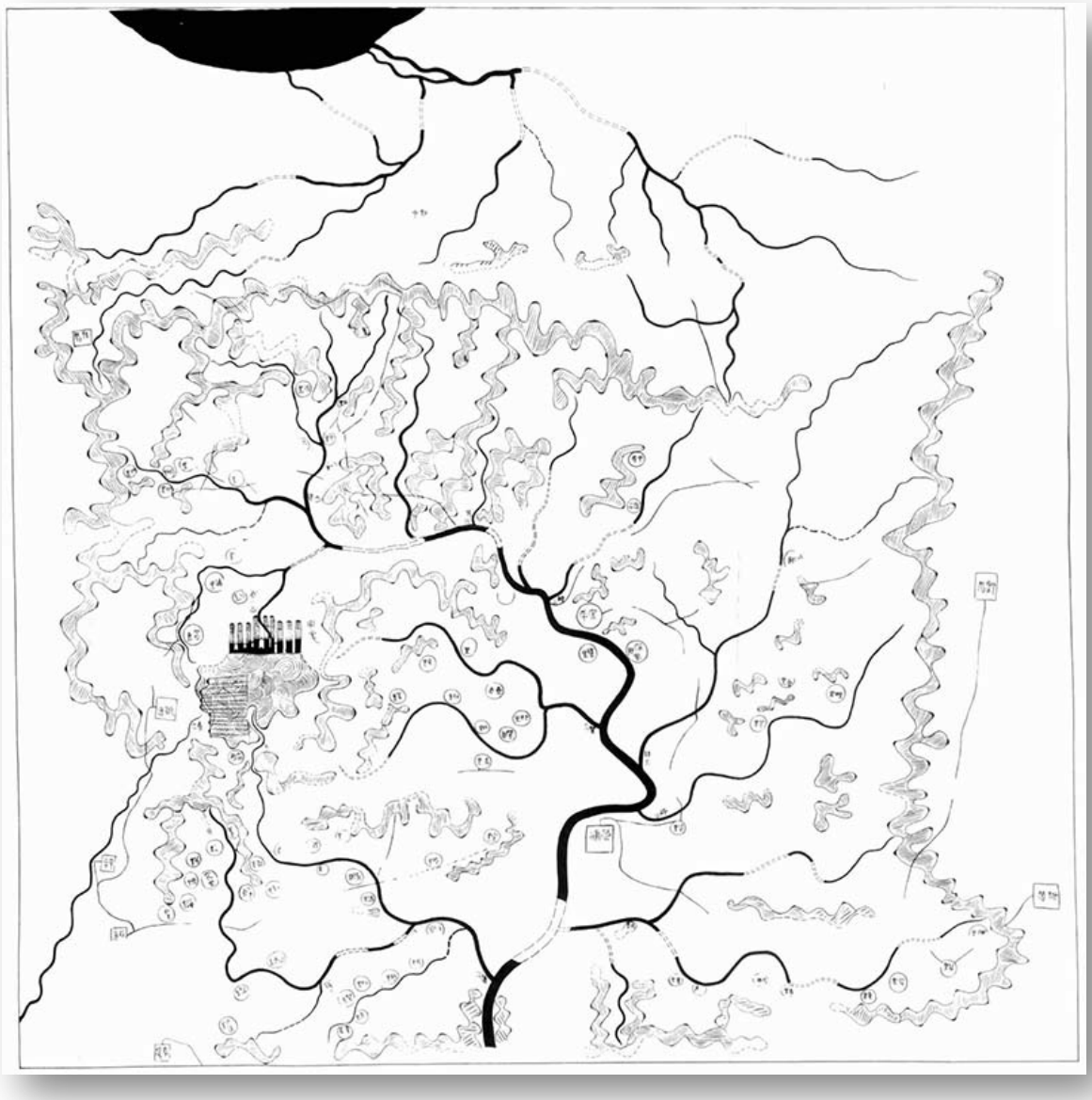
Another approach to the delineation of the difficult terrain was through an accurate cartographic portrayal of the drainage pattern in terms of tributary relationships and differentiation in the volume of flow by the varying degrees of thickness in the lines.

Before attempting to identify other details of the Relief map, it should be pointed out that, for all practical purposes, it is oriented in a southerly direction. At the top, the solid blue in the original colored version, or the solid black in the black and white reproduction of the map, corresponds to the broad Hsi Chiang estuary, or simply a part of the South China Sea. Below (or north of) the drainage divide (no doubt the Nan Ling range) is the drainage area of the Hsiao River, the leading tributary of the Hsiang Chiang. The prominence given to the Chiu-yi Shan, marked with the name of the ancient emperor Shun, who was believed to have been buried here and the skilful drawings of the various tributaries of the Hsiao River, further facilitate identification of

other features and places.

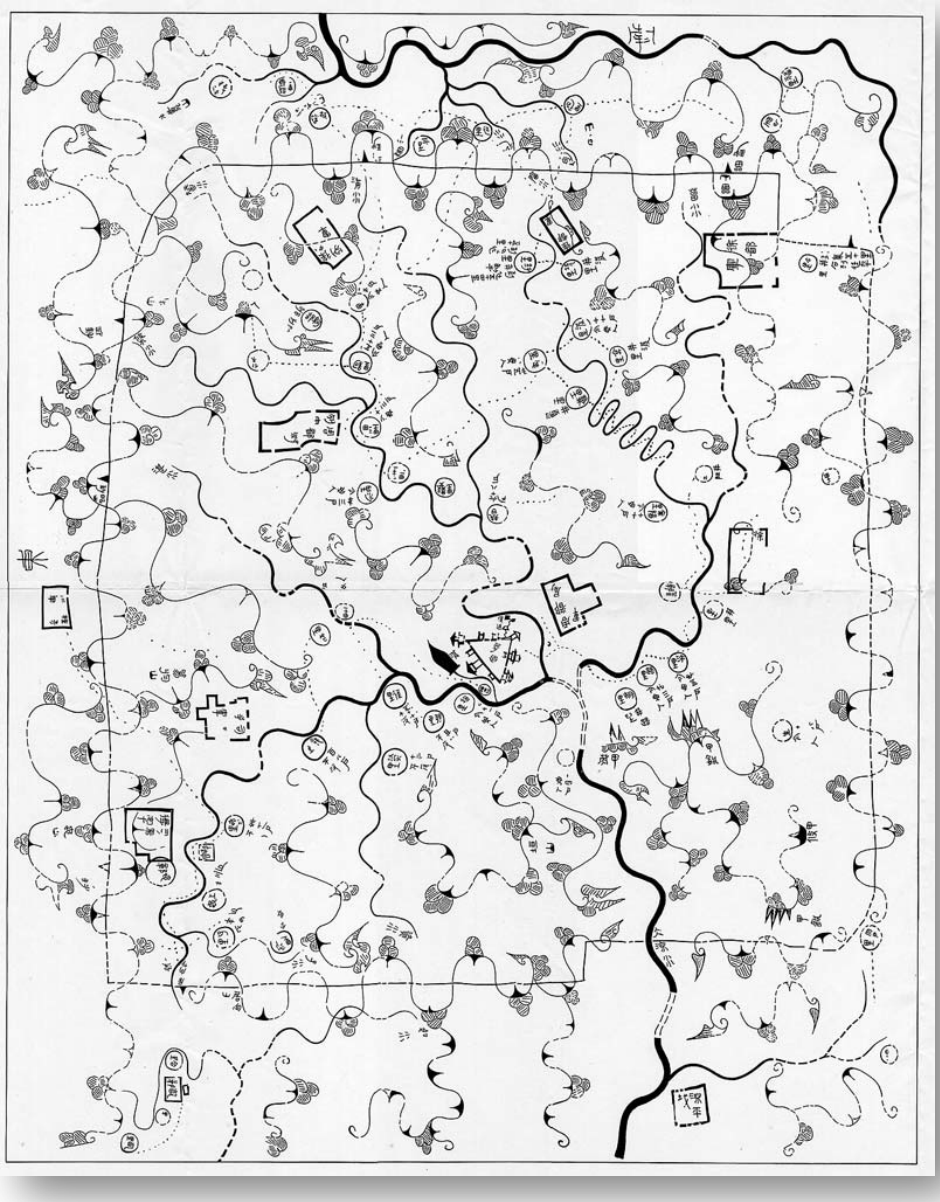
There are altogether ninety-three names of rivers, cities, towns and villages. Among the nine rivers, three actually carried the same names as they do today. Among the eight hsien capitals, all except one, Ch'ien Tao, which was abolished several decades later, have been well documented in official annals and frequently noted by geographers in succeeding dynasties. Out of fifty-seven villages bearing the term *li* [village], only a dozen cannot be deciphered. A more detailed analysis of all the villages on the map will undoubtedly yield valuable insight into the settlement pattern and processes in South China during this period.

The Relief Map of Southern Ch'ang-sha from Tomb #3 of the Han Map collection, 96 x 96 cm



A reconstruction of the Relief map of Southern Ch'ang-sha from the Han collection published in Wen-wu*, No. 2, 1975. The map is thought to represent an area mainly lying between 110° and 112°30'E and between 23° and 26°N.*

Of special interest is the design of the Relief map. For obvious military reasons, the map is centered around Shen-p'ing which was the commanding headquarters of the southern Ch'angsha defense area and the leading garrison station of the Hsiao River basin. The roads and small rivers are easily distinguishable. Cities, towns and villages are marked by symbols of varying shapes and sizes. These symbols, though simple and limited in variety, are of better design than those produced in the Sung and Yuan periods in terms of visibility and size in proportion to the mapped area. In delineating the drainage basins, encircling mountains are drawn near the edges of the map, a method still in use at the turn of the 20th century.



The reconstructed Garrison Map from Tomb #3 of the Han Maps collection, 98 x 78 cm, oriented with South at the top

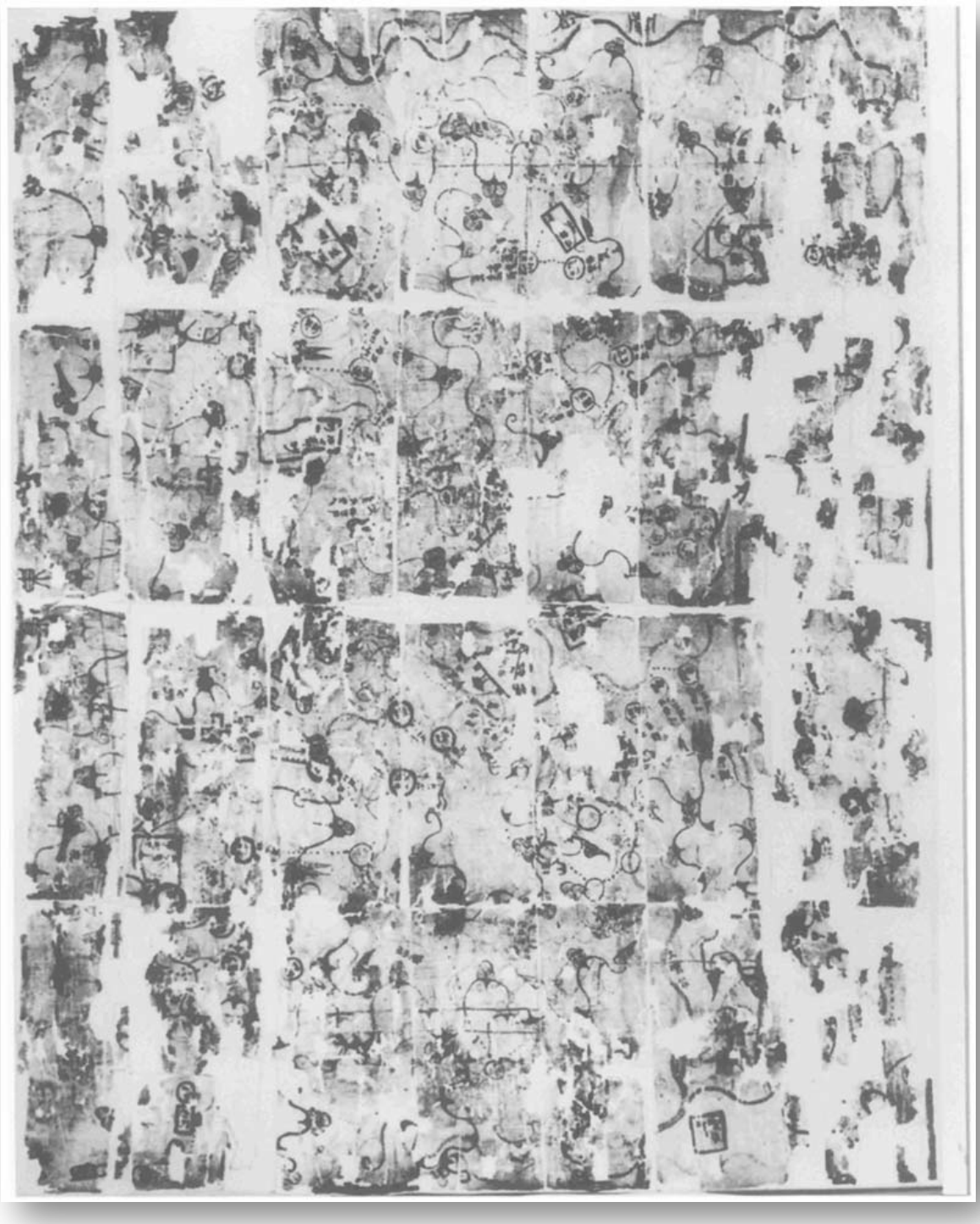
On the matter of accuracy, this Relief map is undoubtedly based on information gathered through actual survey, and is indisputably superior to those surviving from the Sung, Yuan and even the early Ming periods, in so far as the subject area is concerned. Except for the Hsi Chiang basin (under the name of *Feng Chung*) which was outside the defense area and therefore probably not carefully surveyed, as evidenced by

the highly simplified sketch, the portion north of the Nan Ling divide which accounts for nearly three-fourths of the map is distinguished by a high degree of accuracy. Although no scale is specifically provided, actual distances between river confluences, cities and other identifiable places reveal a fairly consistent scale of about 1:180,000. The same can be said with respect to the Garrison map which is about one-half of the ratio in scale and covers about one-half of the territory as covered in the Relief map.

The Garrison map measures 98 x 78 cm and is a tri-colored piece of drawing, covering the border area between Ch'ang-sha and Nan Yueh. Like the Relief map and for possibly similar reasons, the lower (and therefore the northern) three-fourths of the mapped area is more uniform in scale (about 1:90,000) and remarkably elaborate in detail. There are nearly as many place names and markings as shown in the larger relief map, including twenty-five on military posts, nine on mountains, fourteen on rivers and forty-nine on settlements. Since each settlement and its size were of obvious military significance, population is marked by the number of households in each village, and even the loyalty of the villages near the commanding headquarters is indicated by the label "non-hostile" or "now uninhabited", the latter suggesting that the inhabitants may have been relocated or had migrated elsewhere.

Besides possible identification of most of the settlements and stations on these maps, there are other symbols and technical terms of interest and significance. For instance, the section for Ch'ien Chang in the Garrison map reveals an enclosed area settled by non-Chinese groups and over half a dozen settlements in the relief map are clearly tribal in nature denoted by the term *pu* [tribe] or *chiin* [chieftain].

The special technique employed in the Garrison map may be appreciated from the point of view of military strategy as well as cartography. From the standpoint of the latter, one cannot but be impressed by the skill in using light brown color for the rivers, shading for mountains, sharp markings for high peaks, and heavy black and red colors for settlements and military installations. The symbols for smoke beacons and signal towers, fortifications, village roads, an underground tunnel (or camouflaged passage way), and a dammed reservoir, should be of special interest to cartographers even in modern times. Furthermore, the map provides a vivid picture of the positioning of the major military units, the areal extent of each base, as well as its relationship to the commanding headquarters. Most striking is the triangular fortification of the latter with guard towers on three walls. This heavily defended installation with a nearby man-made reservoir was not only well planned and constructed, its location in the middle of a sharp loop was also carefully chosen. From the distribution of the major army units, the strategy may be discerned as one based on three lines of defense. The front line was held by three units of General Hsu's army which guarded the valley leading to the Nan Yueh border. The second line was defended by one unit from Hsu's and two from General Chou's army, deployed in the three valleys behind the mountains. Situated to the left of the headquarters were two units of General Ssu-rna's army which constituted the main reserve and thus forming the third line. There are altogether eight signal towers on the front line. Such a strategy clearly illustrates a concentrated surveillance against any possible hostile incursion through the natural passage ways from the south.



Black and white photograph of the Garrison Map, 98 x 78 cm, oriented with South at the top

The revelations in these two maps inevitably lead to the question concerning the position of P'ei Hsiu (224-271), commonly acknowledged since the fourth century as the founder of the principles of Chinese cartography (see also *Book II, #218)*. The fame of P'ei Hsiu, it should be noted, has been based on his own words in the preface of his

compilation of eighteen large maps of China, none of which has survived in its original form; his preface has been quoted by later scholars as having dealt with six rules essential to obtaining the most accurate representation, based on scale, orientation, distance, relief, curvature and rectilinear position. These rules and their application were closely followed by cartographers of subsequent centuries, as evidenced by two Southern Sung maps dating back to 1137 *(Book II, #218* and *#218.1)* and Chu Ssu-pen's *Kuang Yü T'u* of about 1320 *(Book II, #227).* The two Sung maps survived in the form of engravings on stone tablets preserved in Hsi-an, one with square grids entitled *Yu Chi T'u*, *(#218.1)* and the other without grids entitled *Hua Yi T'u (#218)*. Some authorities have even suggested that the *Yu Chi T'u* may be a copied version of P'ei Hsiu's original map by the same title. When placed side by side with the Han maps, this 12th century work fails to show any significantly superior visual quality in terms of topography, road pattern, symbol design and the presentation of passage ways and tributary relations of drainage systems. In fact, the skilful use of contours, shading, and the maintaining of a uniform scale in the Han maps are features that are unmatched by any extant large-scale map of later centuries before the works of the Jesuits in the late Ming and the early Ch'ing.

From a historical point of view, the two restored Han maps provide strong evidence for the conclusion that, with its elaborate road system in conjunction with the network of waterways, the State of Ch'ang-sha was able to maintain a strong defensive posture vis-a-vis the hostile kingdom of Nan Yueh to the south. With the smooth and gradual integration of Ch'ang-sha into the Han Empire, it became eventually possible for Han Wu Ti to unify the entire deep south without too much effort.

As one marvels at the sophisticated techniques of surveying and mapping involved in the production of the Han maps, one cannot help but be-perplexed by the lack of significant progress in cartographic techniques during subsequent centuries. For a few tentative clues to this phenomenon, one may begin with a brief glance at the important function of maps in China since classical times, and the vulnerability of official map collections during recurring political upheavals throughout the course of Chinese history.

In times of war, as the annals of early history reveal on numerous occasions, maps often decided victory or defeat for contending states. Maps of military value were therefore passionately sought after by rulers of various states large and small. In times of peace, order and unity, special offices existed for the collecting of maps, and for mapping the domains of the empire for a variety of purposes. The Chou regularly maintained two offices, one named *Ta Ssu-t'u* or *Ti-kaun ssu-t'u* in charge of all land maps, and the other *Ssu-hsien*, in all likelihood a center for the strategic map collection. The latter had the function of interpreting, on the basis of all the available regional maps of the Nine Provinces, all the mountain ranges, forests, the hindrance of rivers and swamps and the roads and passages across them. There is little doubt that topographic maps were widely in use in Han times, not only in the southern region but elsewhere. According to the *Han Shu*, when General Li Ling was campaigning against the Hsiung-nu, his army units not only used prepared maps to ascertain the mountains, streams and strategic fortifications, but also carried out the task of mapping the terrain features in areas newly traversed.

There are also examples of the crucial role played by maps during classical times. Su Ch'in, one of the most celebrated geo-strategists of the Warring States period, is said to have used maps in promoting his "Vertical Alliance" among the various rulers hostile

to the Ch'in. On one occasion, he tried to persuade the King of Chao by showing him that, on the basis of the maps in his possession, the area of the proposed alliance was five times the size of Ch'in. The story of Ching K'o's unsuccessful attempt on the life of the King of Ch'in (afterwards the Emperor Ch'in Shih Huang Ti) is well known to students of early Chinese history. Carefully guarded, highly suspicious and extremely alert, the King was usually beyond the reach of any ordinary stranger. It was only Ching K'o's ostensible offer of a strategic map of a certain part of the Yen State that enabled him to get close enough to strike the blow with a dagger wrapped in the map. In the struggle between the Han and Ch'u, following the collapse of the Qin dynasty, it was the extensive collection of maps by Liu Pang's adviser, Hsiao Ho, that made it possible for the founder of the Han dynasty to know all the strategic gateways and existing fortifications, and helped him win the final victory.

While the existence of large map collections during many periods is beyond doubt, their destruction and disappearance are much less well documented in the surviving historical annals. However, there seems to be a pattern in China's political history that the fall of the capital of a dynasty or state was usually followed by large scale destruction of one kind or another. A brief capture of Hsien-yang, the Ch'in capital, in 207 B.C. was accompanied by a raging conflagration. The destruction must have been nearly total and Hsien-yang was permanently replaced by Ch'ang-an and Lo-yang in the following dynasties. The rape of Ch'ang-an by An Lu-shan's rebel forces in 755 A.D. included deliberately setting the T'ang capital and surrounding towns on fire after three days of pillaging. As late as the Ming dynasty when Chu Ti, the usurper of the throne, captured Nanking, the palace was engulfed by fire so devastating that in the confusion, the whereabouts of the dethroned emperor, Chu Yunwen, has never been known. The periodic loss of the imperial collections of art treasures, books and archives must have been incalculable. It is no coincidence that among the Ming maps that have come down to us, not one, except that of Ch'ing Chun to be mentioned later, dates back before the Ching Nan Incident (1399-1402) through which Chu Ti rose to power. Chu Ssu-peri's *Yü T'u* of about 1320 (commonly known in the West as *The Mongol Atlas*) actually survived until the time of Lo Hung-hsien (1504-1564), a Ming scholar who, about 1555, some two centuries later, published a revised and enlarged version, entitled *Kuang Yü T'u*, of Chu's map. A map of China and the world of the early Ming period, composed by a Buddhist monk named Ch'ing Chun, survived until 1402, when it formed one basis of the world map entitled *Hun-yi-chiang-li li-tai kuo-tu chih-t'u* [Map of Historical Emperors and Kings and of Integrated Borders and Terrain, a.k.a. the *Kangnido*] composed by Yi Hui (Li Hui) and Kwon Kun (Ch'üan Chin), see *Book III*, *#236*. The two Sung maps, the oldest for China as a whole, owe their survival to their skilful engraving on the stone tablets in Hsi-an.

All three Han maps have been valued for their "modern" appearance: they use a planimetric projection, with the depiction tending towards conventionalization (of settlements, mountains and trees), and shows an early use of scale mapping. The scale varies between 1:150,000 and 1:200,000 in the central portion of the topographic map and between 1:80,00 and 1:100,000 in the central portion of the military map, a remarkably small scale error.

The Prefecture map was in tatters when it was found and because of its conditions, its interpretation is difficult. Despite gaps, in the lower part it is still possible to recognize a city with an outer and inner wall.

It was indeed through a combination of unique factors that the three Han maps of Ch'angsha have been preserved and discovered. They were, to begin with, prepared by the local defense authorities of a semi-autonomous state in an outlying region, free from incessant and large military campaigns. The city of Ch'ang-sha, called *Lin-hsiang* in Han times, unlike the northern capitals, was not at the crossroads of major military conflicts or alien invasions, besides being immune to such natural disasters as the periodic flooding of the Huang Ho river. Other circumstances which contributed to their survival include the fact that these maps were drawn on silk before the invention of paper, placed in a lacquer box, sealed in a many-layered coffin, and buried in a tomb carefully designed to minimize destruction by natural and human forces.

Having attained a high level of sophistication during the Han dynasty, Chinese cartography must have suffered irreparably during the ensuing era of incessant warfare among the Three Kingdoms. When P'ei Hsiu embarked on his cartographic career and the collecting of maps in the third century, the difficulties he encountered can well be imagined. While he accomplished a great deal in gathering and organizing a variety of local maps of uneven quality under a uniform system, his commentaries inadvertently understated the skills and capabilities of ancient cartographers before him. There is the likelihood that he was not even aware of some of the techniques already developed in earlier times, such as those shown in the Han maps of southern Ch'ang-sha.

From the foregoing, it may be further surmised that some of the famous maps in classical China long since lost to posterity could have been qualitatively comparable to the maps from Ma-wang-tui. These lost maps include those in the collection of the Chou Map Offices, the large map used by Han Wu Ti in his discussion with Chang Ch'ien on the location and extent of the Kun-lun Mountains, General Li Ling's terrain maps prepared during his campaigns against the *Hsiung-nu*, the strategic map mentioned in the biography of Yen Chu, the battle map brought back by Generals Ch'en T'ang and Kan Yen-shou from their campaigns in Turkestan against the Hsiung-nu and their employed Roman legionnaires, and the terrain maps of China's eastern coastal hills cited in the biography of Li Hsun. In the final analysis, the prolonged stagnation in the later centuries, characterized by the paucity in innovative advances and the failure to perpetuate some of the skills already well developed by the early Han, can only be explained by the truism that history does not always march in an upward curve in any part of the world.

Prior to the discovery of the Han Maps, the oldest printed map in the world was known to be a Chinese map of Northwestern China (*Book II, #220*), assumed to have been made around 1155 A.D. and predating the first printed European map by over three centuries.

A Comparison of the Qin and Han Maps

The *Qin (#111.1)* and *Han* maps differ in orientation: south rather than north is at the top on the *Han* maps. The *Han* maps clearly are superior: They cover a much larger area, contain much more information, and employ a large number of well-designed map symbols.

Despite these differences, there are significant similarities between the *Qin* and *Han* maps. First, both the *Qin* and *Han* maps are local or regional rather than national or global maps. They present similar information: mountains, rivers, roads, settlements, and the like, and some maps also contain economic, population, and/or military information. Both sets of maps were invaluable to administrative work and military activities in historic times.

Second, geographic features are located fairly accurately on these maps. Intricate river systems are shown; this practice was preserved in most pre-modern Chinese maps because rivers are important for transportation and as sources of water supply. Although no map scale is given on any map, the fair presentations in the maps suggest that some surveying and/or field checking must have been done prior to mapping. This was definitely the case for the *Han* maps.

Third, we already know that the *Han* maps are rich in symbol use; the *Qin* maps, which were made much earlier, also used several types of symbols. It is interesting to note that in the incomplete *Qin* Map 5, the few symbols (or drawings) are similar to those used to show mountains in the *Han* military map.

Fourth, a fair amount of letters and notes are used to describe and/or identify various geographical features, as well as to note economic and political activities. Some maps also include notes indicating the mileage between places. These textual notations enhance the value of the maps for economic, military and political affairs.

The field of cartography comprises two basic elements: (a) mapping and measurement techniques and (b) cartographic conception and philosophy. Techniques are required for surveying and for map making. The conception and philosophy, which have developed closely in relation to the field of geography, define the direction and scope of cartographic inquiries.

Based on the graphic evidence provided by the *Qin* and *Han* maps as well as the literary records of Chinese developments in mathematics, surveying equipment and techniques, it is clear that in terms of technique the Chinese cartographic science had been well equipped since the early times. These cartographic techniques continued to advance far more extensively than in Western Europe until the Renaissance when the West, whose objectives were totally different than China's cartographically, developed projections and scientific applications of longitude, latitude and scales. Mei-ling Hsu's article hypothesizes about the reasons that truncated Chinese cartography's continual advancement.

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NOTE: "Han" is a term with a long history. In the 18th century the term *banren* [Han people] referred to those people who considered themselves descendants of the Han Dynasty (202 B.C.-

220 A.D.). The term *banren* was also used to distinguish culturally Chinese peoples from their non-Han neighbors (i.e., Miao, Zhuang, etc.). Since the late 19th or early 20th century the term *han* has come to refer to anyone who is, appears, claims, or is assumed to be, ethnically Chinese. Sun Yat-sen and other republican revolutionaries found it a useful construct for unifying the population (north and south) against the Manchus. For an in-depth study of the modern term *han* as a construct, see Leo J. Moser, *The Chinese Mosaic: The Peoples and Provinces of China* (Boulder and London: Westview Press, 1985). At a broad level of generalization *han* is a bit like the term *white*. It brings together a diverse grouping of people under one common rubric, thus creating a shared condition that can exist only by virtue of its contrast to apparently greater difference - black, Hispanic, Manchu, Miao, etc.