## **Chapter Four**

# A 1093 World Map Showing America

In the process of studying ancient maps, I discovered that ancient Chinese cartography had a subtle link with ancient astronomy. This peculiar connection has inspired an intense interest in ancient Chinese astronomical charts, particularly those from ancient graves. They seem to be both unsophisticated and mysterious. Why did ancient people draw an astronomical chart on the ceiling of a tomb? Are these charts merely decorative art, or are they artistic pieces with special theological meaning? Out of curiosity, I made up my mind to explore the possible ramifications of these astronomical charts.

For hundreds, and even thousands of years, people have constructed tombs and furnished them in ways that reflect their beliefs and cultural traditions. In China, ancient astronomical charts depicted in tombs were a special product of the notion of Yin and Yang. This theory holds that all phenomena consist of two opposite aspects: Yin (Positive) and Yang (Negative), which are variously exemplified as up and down, dead and alive, left and right, light and dark, hot and cold, stillness and movement, substance and function, etc. The movements and changes of Yin and Yang give impetus to the development of everything.

It was widely believed by ancient Chinese philosophers that mankind was an entity made up of Yin and Yang. Yang represents the soul, whereas Yin refers to the physical body, which will eventually perish, leaving the soul to live on eternally. Stemming from this philosophy, a unique belief concerning tombs prevailed in ancient China. In the ideal residence, the souls of the deceased would bless their descendants and bring them good luck. In light of this, ancient Chinese people were highly selective about the geographical location and orientation of tombs. In addition, every element of an ancient Chinese tomb – from architecture to murals and from coffins to tomb furnishings – belongs to a purposefully constructed whole. Guo Pu, a philosopher in the fourth century A.D., wrote the classic *Book of Tombs* (Zang Shu), elaborating on the relationship between the physical body and the soul, as well as the tomb and posterity. It also details how to choose the geographical environment for a tomb. On a similar note, ancient Chinese people believed in the ability to communicate with the

souls of the dead.

After the fourth century A.D., this particular tomb culture absorbed the Buddhist theory of reincarnation, which believed that after one dies, the soul separates itself from the body, then wanders in space for a period of time before reincarnating itself by attaching itself to a carrier. In order to call back a soul for reincarnation, they wrote the name of the deceased on a strip of canvass cloth, put it on the face of the corpse, set a map or compass card on its chest, and placed clothes that the deceased used to frequently wear over the corpse. The rising popularity of this belief was one of the chief factors driving the development of mural paintings in ancient Chinese tombs. There were many different types of mural paintings in ancient tombs. Some illustrated passed times or memorable events from the life of the deceased, while others depicted the Taoist Eight Trigrams, or astronomical charts. Regardless of what the depictions were, they invariably served the purpose of calling for the souls to return to human society.

My research into the astronomical charts found in tombs was out of curiosity only. I had never envisaged any concrete results. Yet, I was to make a surprising and amazing discovery - a world map hidden in a nine hundred year old tomb. On this ancient world map, I was able to see the American continent.

More than any other type of historical relic, ancient tombs are now major sources of previously un-transmitted knowledge; their excavations have yielded invaluable evidence for advancing individual branches of historical inquiry, and have contributed vast amounts of information for many other fields of study. The world map preserved in one eleventh century tomb unveils strong tangible evidence that the Chinese mapped America four hundred years before Columbus discovered it.

#### 1. Astrological Charts in Ancient Tombs

Xuanhua city of Hebei province is located 180 kilometers northwest of Beijing. In this city, there is an ancient town built in the ninth century A.D. The town used to be a place passed by northern nomads when they launched invasions southwards. It was also a city centre where, in medieval times, nomads from North China and those who had settled in mid-China mixed. In April 1971, a farmer was irrigating farmland in a village close to the ancient town when he noticed an exceptionally porous bit of land where water rapidly seeped into the earth. After a period of time, a major excavation was launched, uncovering an ancient tomb. Several years late, archaeologists discovered fourteen similar tombs close to it.

From 1974 to 1993, an archaeological team systematically excavated and cleaned up the nine tombs. Their meticulous analyses revealed that the occupants of the tombs were a people of an ancient state known as the Khitan Empire (also known as the Liao Empire), and these nine ancient tombs belonged to a family cemetery built during the eleventh and twelfth centuries.

The Khitan Empire was established in northern China at the turn of the tenth century. In their early days, the Khitan lived in the eastern parts of present-day Inner Mongolia. The area was ideal for raising sheep, cattle, and horses, which were the basic source of wealth for Khitan people. The Khitan declared independence in the second decade of tenth century, and a few years later, conquered another country, known as Bao Hai Guo, in northeastern China, consequently expanding the empire's territory to the Strait of Tartary and Karafuto Island. In the eleventh and twelfth centuries, the Khitan Empire and the Song and Jin Dynasties were the three most powerful states in China. The culture of the Khitan evolved over the course of centuries, influenced by both conflict and cultural interaction with their neighbours, both nomadic and settled.

It was also common for Khitan to intermarry with people from neighbouring steppe tribes, including northern Chinese people. In an effort to recruit talents from the ethnic Han people, the Khitan adopted an administrative system similar to that of the Han Empire. Meanwhile, they channelled huge sums of money to build more towns, thus enticing a large number of ethnic Han Chinese to migrate north to settle down there. One important Khitan town was Jingcheng, which was situated near today's Chi Feng, a city in Inner Mongolia. Han Yanhui, a Chinese Taoist based on Taoist principles, designed this town of mostly Han Chinese. In a policy to encourage people of the Han race to lead contented lives, the monarch of the Khitan Empire adopted the policy of "one country, two systems," i.e. separate government for Khitan and ethnic

Han people. This particular administrative policy meant the Han exerted a profound impact on the culture of the Khitan Empire in terms of its politics, economy, and culture, among other things.

As with the neighbouring Song Dynasty, there were three ideologies that became important in the Khitan Empire – Buddhism, Taoism and Confucianism. Among these three ideologies, Buddhism was the most influential. *History of Liao* recorded that in the year 1078, there were three hundred and sixty thousand Buddhist monks and nuns, representing about ten percent of the total population.<sup>1</sup> This historical record reveals how integral Buddhism was to people's lives in the Khitan Empire.

In 1998, after nineteen years of work in the tombs, the team studying the nine tombs published an extensive academic report of about four hundred thousand words. This report provided a number of descriptions of uncovered cultural relics, illustrations of actual objects, and photographs taken inside the tombs.<sup>2</sup> The research team believed that the most valuable findings in the nine ancient tombs were the mural paintings drawn on the tombs' walls and ceilings, particularly eight colourful astronomical charts drawn on the curved ceilings of eight of the ancient tombs. These experts suggested that the astronomical chart in the tomb of Zhang Shiqing was the most impressive.

It is indicated by the account on the gravestone that Zhang Shiqing was Chinese served as a Khitan government official. He died in early 1116 and was entombed later the same year.

In the middle of the curved ceiling of Zhang's tomb, a colourful astronomical chart is drawn (see fig.4-1).



It is circular in shape, with a diameter of 2.7 meters. The centre of the drawing is in the shape of an overhanging lotus flower comprised of eighteen petals painted in black, red, and white. A circular bronze mirror measuring a diameter of 0.35 meters is embedded at the centre of the lotus flower. The background colour of the surrounding area is pale gray, representing the circular sky. In the inner circle of the astronomical chart, nine large stars surround the lotus, five red and four dark-blue. The red star in the southeast is the largest, with a bird depicted at the centre, representing the sun. The other four red stars are drawn to represent the east, south, west and north. The four dark-blue stars denote the northeast, southeast, northwest, and southwest. The sun, four red stars, and four dark-blue stars collectively represent the "Nine Great Stars" of Tang Dynasty astronomy – the sun, the moon, Venus, Jupiter, Mercury, Mars, Saturn, and two others. The second circle of astronomical charts consists of numerous red dots, each symbolizing a small star. The stars are connected by red lines to form the twenty-eight constellations: the seven on the east known as the "Blue-green Dragon," the seven on

the south known as the "Red Sparrow," the seven on the west known as the "White Tiger," and the seven on the north known as the "Mysterious Turtle" (or "Xuan Wu"). The third circle of astronomical charts is comprised of signs of the Zodiac, originating from ancient Babylon, later incorporating Greek mythologies.

The astronomical chart portrayed on the curved ceiling of Zhang Shiqing's tomb has profound philosophical implications. It reflects the prevailing concept of the universe accepted by ancient Chinese people. *Classic of Mountains and Seas*, the well known classic, holds that "*The earth is formed by six spaces: north, east, south, west, up, and down. The sources of light on earth are the Sun and Moon; and the ethics of mankind come from astronomical phenomena in the sky.*" The outer region of the astronomical chart depicted on the ceiling of the tomb symbolizes the sky and some major celestial bodies. The circular bronze mirror at the centre of the chart represents the earth, embodying the ancient Chinese philosophy documented in the *Classic of Mountains and Sea.* The chart's purpose was to show the tomb's occupant's soul, from another world, where he used to inhabit before he died. Thus, the soul of the deceased could bless its ancestors, and it was hoped, return to the human world one day.

The chart mirrors philosophical ideas generally held by the ancient Chinese and is of inestimable value for historical research. On this astronomical chart, the twenty-eight constellation system of traditional China coexists with the twelve signs of the Zodiac used in the west. This particular combination suggests that in medieval times, Eastern and Western scholars had had some mutual exchange of astronomical ideas. This half-Chinese/half-Western astronomical chart thrilled Chinese archaeologists. They were convinced that the discovery of this ancient astronomical chart was precious and would be deemed incredibly helpful to the study of the history of ancient astronomy and the exchange between Chinese and Western culture. After its release to public, the astronomical chart attracted great attention in the Chinese archaeological world. Many renowned Chinese archaeologists visited the tomb, studying this ancient chart in great detail and writing articles in a series of analyses and verifications. The exceptional importance attached to this chart has made it a part of the compulsory curriculum for students pursuing astronomy as their major in some colleges.

Unfortunately, nobody realized that an astronomical chart depicted on the ceiling

of another tomb was far more important than that of Zhang Shiqing's tomb, so surprising were its implications. The occupant of this tomb was Zhang Kuangzheng.

#### 2. 1093 World Map

The epitaph carved on the gravestone of Zhang Kuangzheng's tomb states that the occupant died in 1058 and was reinterred in the tomb built in 1093. Based on the epitaph, it was unanimously agreed upon by the Chinese academic community that the tomb of Zhang Kuangzheng was built in the year 1093.

The tomb of Zhang Kuangzheng consists of a sloped tomb path, patio, tomb gate, front chamber and coffin chamber. They were laid out along a north-south axis (see fig.4-2).



The gate of the path leading to the two chambers is in the south (slightly tilted to the west). The ground of exit was laid with a layer of paving bricks, which was specifically prepared for the soul of the occupant to return to the human world. The sloped tomb path leads directly to the patio of the tomb, facing the tomb gate. Walking northwards through the tomb gate, one passes through the front chamber and into the coffin chamber is located slightly to the east).

The structural layout of Zhang Kuangzheng's tomb is in accordance with ancient Taoist theory. Taoists believe that the universe is an entity encompassing both space and time, which is divided into the Yin world and the Yang world, with the Yang world located in the south, representing human society, and the Yin world situated in the north, representing the space under the ground. Taoism further holds that after people die, their souls will roam in the Yin world where south is up and north is down, and eventually, these souls will find a carrier to reincarnate themselves. This Taoist belief explains why the tomb gate and main chambers are respectively situated in the south and north, complying with the south is up and north is down rule in the Yin world.

On the curved ceiling of Zhang Kuangzheng's tomb, a circular astronomical chart was drawn (see fig.4-3), measuring about two meters in diameter.



The background color of the chart is pale gray, symbolizing the sky. At the outer circle of astronomical charts, the sun, moon and some other major stars and planets were painted with reddish black. The location of each of the twenty-eight constellations follows the traditional rules of projection. However, the constellation Triones is an exception; it was painted in the south of astronomical charts. Obviously, this arrangement was for a particular purpose.

The inner circle of the chart features a twelve-petal lotus flower, representing the

twelve-direction observation in ancient Chinese astronomy, and its core is a six-petal peony pattern (measuring 0.43 meter in diameter), representing the Taoist concept of "six united spaces" – the unity of space in the north, south, east, west, upwards and downwards.

At the center of this peony pattern, an iron rod is embedded in wall for fixing something to the roof. The peony pattern has a white background, overlapped with grayish paint. The paint at the fringes of the peony pattern and other parts of the circular astronomical chart has remained intact. However, in the center, large chunks of paint and plaster have already become detached and exposed the underlying brickwork. Apparently, this happened when the item fell off the roof (see fig.4-4).<sup>3</sup> The color of the item's remaining outline is brown, suggesting that the item originally fixed to the roof consisted of several wooden pieces.



In summer, it is hot and damp inside the tomb. In this environment, moisture from the wood, over hundreds of years, left brownish marks on the white ceiling. The humidity rotted the wood which fell off the ceiling piece by piece. As a result, the paint and plaster under the wood pieces also peeled off. Despite this, the brownish marks and traces of peeling paint and plaster have made it possible to identify the outline of the wooden pieces, which indicates that they formed a world map (see fig.4-5).



The world map is oriented to the north, and the top of the pattern directly faces the tomb's path in the south and the constellation Triones of astronomical charts. This particular design is in accordance with two traditional Chinese conventions: first, in Chinese cartography, maps are oriented to the north, and second, the Yin world in Taoism is oriented to the south. On the map, Asia, Europe, Africa, North America, South America, Australia and some major seas and oceans can be recognized.

Asia dominates the central part of the map, and China is displayed at the center of the map as the "Middle Kingdom". Indochina appears to the south of China. The outline of India can be recognized to the southwest of China. East and west of the India, the Bay of Bengal and Indian Ocean can be identified.

Europe is drawn on the northwest part of the map. Compared to Asia, the area of Europe is significantly smaller. Scandinavia is depicted in the top left section of Europe and Jutland appears below it. The Mediterranean Sea is mistakenly exhibited as a wide-open gulf. This cartographic error of misrepresenting the Mediterranean Sea as a wide open gulf is shared by some other medieval Chinese world maps, such as the 1402 Kangnido Map. I will touch upon again on this cartographic mistake in subsequent chapters.

Africa is bound by the Indian Ocean in the east, the Atlantic Ocean in the west and the Mediterranean Sea in the north. The shape of Africa is an irregular triangle, wider in the north and narrower in the south. The southern cape of Africa points southeastwards. The western coastline of Africa on the map is largely consistent with modern maps. Thus, it poses no challenge to identify the outline of the Gulf of Guinea.

An isthmus appears to the northeast of Asia, linking it to North America showed as a peninsula. There is another isthmus, i.e. Panama, between North and South America.

This map features almost the entire South American continent bounded by the Atlantic Ocean in the east and the Pacific Ocean in the west. The Cabo Blanco coastal area of Peru in the west, the northeast bulge of Brazil in the east and the Southern Tip of South American can all be recognized on the map.

Australia is mistakenly located in the Indian Ocean. Southwest Australia, the Gulf of Carpentaria and the Great Australian Bight can also be identified.

I was struck by the map. Is it really a map? Could the outline of the map, formed by the traces of peeling paint and plaster, be a coincidence? I kept asking myself.

I redoubled my study on the outline of the map, thinking over various possibilities. Was it possible for the orientation of a naturally formed shape to strictly follow the Taoist philosophy? How could the orientation of the shape be dead against the Triones? Was it a lucky coincidence for Asia to appear in the central part of the shape? Was it another lucky coincidence for the traces of peeling paint and plaster to bear a close analogy to medieval world maps? How could be possible for a naturally occurring map to cover all oceans and seas on the earth? Eventually, the orientation, layout and colour of the outline convinced me that the map was not formed by a strange coincidence. It is the vestige left by a wooden map fallen off from the tomb ceiling.

The visible outline of the wooden map remind me of the historical records of three medieval wooden maps respectively made by the eleventh century scientist Shen Kuo, twelfth century scholars Huang Chang and Zhu Xi. Particularly, Zhu Xi's wooden map was a world map formed by eight wood blocks.

Why was such an incredibly sophisticated world map put on the ceiling? Who was Zhang Kuangzheng anyway? Luckily, Zhang Kuangzheng's epitaph and the colourful murals inside the tomb gave me the answer.

Zhang Kuangzheng was a Han Chinese, and he passed away at the age of 75. He was a man of integrity and inspired the awe and respect of others. He was also a vegetarian and deeply involved in studying Buddhist and Taoist doctrines. He had five sons and three daughters. His eldest and second eldest son died tragically before reaching maturity, but the rest of his offspring were married to either high-profile government officials or wealthy families. Based on this record, we can conclude that Zhang was a scholar in the upper-class society in the Khitan Empire.

The colourful murals inside the tomb reflect the interests and daily life of Zhang Kuangzheng. The tea ceremony mural reveals that Zhang was enthusiastic about the tea ceremony (see fig.4-6).



The painting of him reading suggests he was an avid reader (see fig.4-7).



The astronomical chart charted on the arc-shaped ceiling of the tomb reveals the philosophical beliefs of the occupant, and suggest the reason for a world map on the roof of his tomb. The map was for calling Zhang's soul.<sup>4</sup>

The 1093 Zhang Kuangzheng World Map may shed light on a hitherto unknown episode in New World exploration. By the year 1093, Chinese people may have already completed a survey of the earth's surface, and were entirely aware of the fact that earth was a sphere. The sun, moon and other major fixed stars, including the twenty-eight constellations, surround the world map on an astronomical chart. This drawing reflects the prevailing perspective of universe – the theory of Hun Tian widely accepted by the Chinese academic world in the time of Zhang Kuangzheng, which stated that the sun, moon, and stars all orbited the earth.

Despite their access to records of the terrestrial outline of five continents,

medieval Chinese cartographers were still confronted with an extremely challenging problem in cartographic technique – how to illustrate the outline of five continents on the earth's surface, a three-dimensional space, in a two dimensional representation. This particular cartographic difficulty involves both the cartographic projection and the overall pattern of the map.

In the eleventh century, the bi-hemispherical world map had not been invented yet. In an effort to illustrate these two "New Lands" – the Americas and Australia – on one circular map with Europe, Asia, and Africa, the medieval Chinese cartographers devised a special cartographic technique, which was to employ an entirely different projection technique for the Pacific Ocean and American continents in contrast with the other three continents. This inevitably resulted in the drastic geometrical alteration of the Pacific Ocean and America compared with Europe, Asia and Africa.

On the map, the North Pacific is depicted as an inland sea, and the size of the South Pacific is also significantly diminished, which led to the severe distortion of the shape of North and South America and the shift of the geographical position of Australia. The North American continent, which should have been huge in size, is depicted as a peninsula; the South American continent, which is wide in the north, narrow in the south, is purposely compressed to form an elongated region; Australia, actually located at the boundary separating the Pacific Ocean and the Indian Ocean, is purposely shifted to the Indian Ocean by design.

Based on the inconsistency in projection employed and alteration of the outline of the Americas and Pacific Ocean to that of Europe, Asia, and Africa, I label this particularly special cartographic projection "Unequal Projection." This unique projection also appears on an eighteenth century map based on ancient source.

#### 3. Complete Map of Earth

In 1722, Lv Shian, a Chinese scholar, produced a wood block print map, named the Complete Map of Earth (see fig.4-8).<sup>5</sup> This is a circular world map, depicting Europe, Asia, Africa, the Americas and Australia.



Its overall arrangement of the five continents resembles Zhang Kuangzheng World Map. Particularly, Australia is shifted to the Indian Ocean. This shift is evidently a result of the "Unequal Projection." Lv Shian's map portrays the Mediterranean Sea as a wide open gulf, which is similar to the Zhang Kuangzheng World Map. The Persian Gulf is not shown on the Complete Map of Earth, and this is also a mistake of ancient Chinese cartography. All these provide strong corroboration for the notion that the Complete Map of Earth was derived from ancient Chinese maps.

Although the Complete Map of Earth borrowed several geographic names from the western cartography, most of its information came from ancient Chinese sources. For instance, "Cang Ming Zong" was marked on the Pacific Ocean of the map. This is an ancient Chinese name meaning, "the destination of sea water." In ancient Chinese legends, the Pacific Ocean was where seawater was destined. This legend came into

being because the circulation of ocean currents in the Pacific Ocean misled ancient Chinese navigators to believe that all seawater in the world eventually merged here and disappeared into a whirlpool. This name was seen in lines written by a Chinese poet known as Chen Fuliang in the twelfth century. It was not used again by anyone else, except on a few maps derived from early sources. This ancient name indicates that some of the maps Lv Shian used to draw up his 1722 map originated before the thirteenth century.

Another detail on the Complete Map of Earth suggests even older sources. The map depicts a circumnavigation line, which begins the south Atlantic, passes through the Straits of Magellan, Pacific Ocean, Indian Ocean, Red Sea, and reaches the north Atlantic after going through what appears to be a Suez Canal and Medierranean Sea. Lv Shian could not have acquired his information on this circumnavigation line from contemporary navigators because the modern Suez Canal did not open until 1868, more than one hundred and forty years after he drew the 1722 world map.

How can this be explained? The history of an ancient Suez Canal gives us the answer.

A stele of pink granite was discovered in 1866, by a French scholar, near Kabret, 130 kilometers from Suez in Egypt. It belongs to Darius the Great, a king of ancient Achaemenid Persian Empire, who reigned from 522 to 486 B.C. The inscriptions on the monument refer to the construction of a canal that connected the Nile and the Red Sea: "*King Darius says, I am a Persian; setting out from Persia I conquered Egypt. I ordered to dig this canal from the river that is called Nile and flows in Egypt, to the sea that begins in Persia. Therefore, when this canal had been dug as I had ordered, ships went from Egypt through this canal to Persia, as I had intended." Over the next millennium the ancient Suez Canal was successively modified, destroyed and rebuilt, until finally it was put out of commission by the Abbasid Caliph al-Mansur in about 750 A.D. We are told by historical records, before the eighth century, a navigable canal existed between the Red Sea and the river Nile linking with the Mediterranean Sea, and during the period from the eighth century to 1868, the year the modern Suez Canal was opened, there was no navigable route connecting the Red Sea with the Mediterranean, although parts of the ancient canal were occasionally in operation.* 

The age of the ancient canal suggests that the circumnavigation line shown on the 1722 world map, and tracing the Chinese explorers' route, existed before 750 A.D.

The combination of the ancient names, cartographic mistakes and the circumnavigation line gives a strong suggestion that the prototype of the 1722 world map originated deep in the past, and the Unequal Projection is part of ancient Chinese cartography.

### 4. Unequal Projection and "Discovery" of the Americas by Columbus

The Unequal Projection invented by ancient Chinese cartographers is of unique status in cartographic history, but is also of great importance to the history of the human world. It was this Unequal Projection that misled European geographers and cartographers, culminating in Columbus' voyage across the Atlantic Ocean and his "discovery" of the Americas.

In the fifteenth century, western feudalism was on the verge of collapse. A multitude of new commercial and trading markets were sprouting up. Maritime trade in western European countries along the Atlantic Ocean and at commercial cities along the Mediterranean coast started to boom. As a result, the demand for gold sharply spiked. When European merchants learned that gold was in plentiful supply in the "Indies," or East Asia, many European countries along the coast of the Atlantic Ocean, exemplified by Portugal and Spain, were caught up in a frenzy of exploring sea routes to Asia. It seemed that Asia – so far away from Europe – had such abundant gold that it could never be exhausted. However, the wars waged by the Ottoman Empire disrupted the traditional sea route linking Europe and South Asia. These circumstances compelled the Portuguese to find a new southern sea route around the Cape of Good Hope to Asia. Because this route was such a great source of income, the Portuguese forbade all other countries' ships from travelling by this route. As a consequence, Spain funded the voyages of Columbus.

Pleading with Spanish royalty to finance his voyage to the Indies, Columbus asserted that his proposed route to the Indies, westward, rather than around Africa and the Cape of Good Hope, was the shortest and safest. In support of his theory, Columbus submitted a world map to the royal family. In 1492, with the help of the map, he

successfully sailed across the Atlantic Ocean and arrived at the Bahamas, which he mistook for the East Indies. How did he come to this wildly erroneous conclusion?

Historical materials concerning Columbus are incredibly scarce. Hence, the debate in the historical world has been inconclusive about why Columbus believed he could reach the East Indies by heading west across the Atlantic Ocean. Many historians believe that Paolo del Pozzo Toscanelli, a prominent astronomer and geographer in the fifteenth century, was the inspiration behind Columbus's journey. Henry Harrisse, an eminent lawyer, book-collector and historian at the end of the nineteenth century, discovered a letter that Toscanelli wrote on June 25th, 1474 in an antique file. This letter not only hints at a route to the Indies by means of the Atlantic Ocean, but also alludes to a world map.

Fernando, the son of Columbus compiled a biography of Columbus. Based on this biography, some historians conclude that in 1474, there was a frequent exchange of letters between Toscanelli and Columbus. In a letter written by Toscanelli intended for Columbus, Toscanelli hypothesized the existence of a western sea route linking Europe to the Indies. Some other historians speculate that Toscanelli gave Columbus a world map.

An alternative theory is that Columbus's relatives were of huge assistance in his discovery of America. In 1479, Columbus married the daughter of a navigator, Bartolomeu Perestrello. Subsequently, Columbus inherited some logbooks and maps from his father-in-law. One of Columbus' brothers worked in the Portuguese government as a cartographer, and he clandestinely made a duplicate of a world map preserved by the Portuguese Royal court and provided it to Columbus. As a result, there may have been an abundance of materials from unrelated sources that led Columbus to believe that he could reach the Indies by crossing the Atlantic.

Bartolome de las Casas (1484-1566) was a historian and his father participated in Columbus's second voyage. In his work *Historia de las Indias*, Casas relates: "*Columbus carried a map with him on which this land* [i.e. the shores of the newly discovered land he believed to be India] *and the islands especially Espaniola which was called Zipangu* [Japan] *were depicted*."<sup>6</sup> This contemporary record indicates that prior to launching his first voyage across the Atlantic Ocean, Columbus had indeed

seen a world map that revealed the existence of a piece of land to the west of Europe, which Columbus mistakenly believed to be the Indies. Therefore, when the explorers reached the Bahamas, the misunderstood map may have led Columbus to mistake it for the Indies and refer to people there as "Indians."

What sort of world map did Columbus see? Why did he mistake the Americas for Asia?

No solid evidence has yet been found that could prove what type of world map Columbus referred to. However, historians generally believe that two known world maps charted in the second half of the fifteenth century were closely associated with the map referenced by Columbus. One is the 1457 Genoese Map and the other is the 1489 Martellus Map I mentioned in Chapter Two (see fig.4-9).



In addition, the 1492 Behaim Globe could have been derived from the same source as Columbus' map.

The Genoese Map, Martellus Map and Behaim Globe differ from each other in

many aspects but they share four identical mistakes. The east-west distance across the Atlantic Ocean is dramatically reduced, the east-west dimension of Asia is significantly exaggerated, a huge peninsula with no real world equivalent is drawn in Southeast Asia, and there is a huge gulf to the west of this huge peninsula. This gulf is labelled on the Martellus Map and Behaim Globe as "Sinus Magnus", which means "Great Gulf." Why do similar mistakes appear in Western world maps charted by different cartographers during different eras? What were the causes behind such cartographic mistakes?

In Chapter Two, I mentioned the research and study into the 1489 Martellus Map conducted by Dr. Gallez, who pointed out that "*It has become clear that South America was represented as a huge peninsula of south-eastern Asia on many world maps of the sixteenth century, from the Zorzi sketches of 1560 to the Sanuto map of 1574. Some have called this peninsula the Dragon's Tail, probably in relation to the Chinese Dragon.*"<sup>7</sup> Dr. Gallez also noticed that the Pacific Ocean on both the 1574 Sanuto Map and the Ortelius Map was labelled as "Sinus Magnus." Argentinean anthropologist and historian Dick Edgar Ibarra Grasso also confirmed that on maps charted in medieval times, both the Latin "Sinus Magnus" and Greek "Megas Kolpos" were the names given to the Pacific Ocean, both of which mean "Great Gulf." <sup>8</sup>

Gallez and Grazzo's research inspired me a great deal. Eventually, I found the answer to the problem through a comparison of the 1093 Zhang Kuangzheng World Map with the Genoese Map, the Martellus Map, and the Behaim Globe. The outline of the Pacific Ocean and the fact that it was labelled "Sinus Magnus" on these world maps charted in the second half of the fifteenth century reveal that early European cartographers had seen maps resembling the Zhang Kuangzheng World Map. Apparently, these cartographers misunderstood the unequal projection techniques employed on these world maps. This misunderstanding thus caused early European cartographers to make the abovementioned mistakes.

Before Columbus arrived in the Americas, cartographers in Europe and the Islamic world were ignorant of the existence of the Americas. They believed that the world was comprised of only Europe, Asia and Africa. When they came into possession of maps resembling the 1093 Zhang Kuangzheng World Map, they mistakenly thought of the American continent was an integral part of Asia. Meanwhile,

they considered the North Pacific an inland sea and mistook the south Pacific for a great gulf. Based on the available geographic information provided by Marco Polo and other travellers, they ruled out the possibility of an inland sea in Asia. Thus, these Western cartographers regarded the inland sea projected on maps resembling the 1093 Zhang Kuangzheng World Map as a mistake. On their maps in the second half of the fifteenth century, they corrected this "mistake" with supreme confidence, erasing it from Asia, and effectively unifying North America and the northern part of South America to Asia, dramatically exaggerating the east-to-west expanse of Asia. The South Pacific Ocean was depicted as a great gulf in South Asia and the southern area of South America was featured as a giant fictitious peninsula – the Dragon Tail Peninsula in the southeast of Asia.

It is likely that the name "Dragon Tail" was given to South America by Chinese geographers – no one else considered dragon to be a positive powerful symbol. They often named geographical places for parts of the dragon's body. Western cartographers may have adopted this name from Chinese maps.

The Unequal Projection employed by ancient Chinese cartographers on world maps also triggered the emergence of the second anomalous geographical concept in medieval Western geography, the labelling of Southeast Asia as "Upper India."

Odoric of Pordenone, a famous European traveller in medieval times, began his voyage eastward in 1316, passing through the Persian Gulf, Sri Lanka, and Sumatra, before eventually arriving in China. In the year 1328, Odoric followed the Silk Road, via Tibet, central Asia, and Persia back to Italy. After he returned to his country, Odoric gave an oral account of his journey to writers who produced *The Travels of Friar Odoric of Pordenone*. In this book, Odoric called the eastern area of China "Upper India." Sir John Mandeville, a prominent English writer at the turn of the eighteenth century, continued the use of the term "Upper India" to refer to Southeast Asia in his book *The Travels of Sir John Mandeville*, which was based on early travel logs dictated by Europeans and legends.

In medieval times, some other geographical concepts bearing exceptional resemblance to "Upper India" prevailed in the European geographical world – "India beyond the Ganges," "India Extra Gangem," "India Intra Gangem," "India up to the

Ganges," "India Proper," "India beyond the River Ganges," and "Transgangetic India." These terms referred specifically to the fictitious giant peninsula, i.e. the Dragon Tail Peninsula. In 1492, after the "discovery of new land," Columbus wrote that the place his exploration team had reached was called "India beyond the Ganges," or otherwise known as "Island in the Indian Sea." Bartolomeo Columbus, the brother of Columbus, was personally involved in his brother's fourth voyage. He once showed drafts of three of his brother's maps to Alessandro Zorzi, a Venetian traveller, which were later documented by Zorzi in his geographical journal drafted in 1522. One of the three draft maps evidently illustrated the "fictitious" giant peninsula in the Southeast Asia and labelled it "India Extra Gangem." This particular map proves that Columbus mistook the Americas showed on the map for Asia.

Now that we have sorted out the background behind the emergence of these two anomalous geographical concepts, "Upper India" and "India beyond the Ganges," we are able to understand the reasons why South America's river systems were depicted on the Dragon Tail peninsula on the 1489 Martellus Map, why Columbus mistook the Caribbean islands for East Asia, and why native American are even today referred to as "Indians."

### 5. The Unequal Projection and the "Complete Terrestrial Map"

The 1093 Zhang Kuangzheng World Map is not the only extant map from ancient China employing the Unequal Projection. Feng Yingjing (1555-1606), a scholar of the Ming Dynasty, compiled *General Meaning of the Lunar Ordinances* (Yue Ling Guang Yi) in 1602, documenting a Complete Terrestrial Map (Shan Hai Yu Di Quan Map) that was circular (see fig.4-10).



The names of five continents, which were introduced to China at the end of the sixteenth century by Western Jesuits, appear on the map, but the terrestrial features and other names on the map reveal that the map was based on a map originally charted by Chinese cartographers prior to the fifteenth century.

Compared to the 1093 Zhang Kuangzheng World Map, the Complete Terrestrial Map was dramatically refined in terms of its layout, in that the Americas were depicted as an independent continent. Nevertheless, it shares two major features of the 1093 Zhang Kuangzheng World Map. First, the size of the North American continent is significantly reduced, and second, it once again uses Unequal Projection. In other words, the projection of Europe, Asia, and Africa is drastically disparate from that of the Americas, which suggests that the cartographer of the prototype of the Complete Terrestrial Map was at that time unacquainted with bi-hemispherical world maps or other cartographical layouts that could be employed to display the entire earth in more regular proportions (for instance, the heart-shaped projection world map).

The Complete Terrestrial Map also confuses the Red Sea with the Persian Gulf, a mistake originating with ancient Chinese cartographers long before the fifteenth

century (Chapter Eight will explore this kind of cartographic mistake in detail). In addition, the distance between the two coasts of the Strait of Gibraltar appears to be wider than it actually is, another cartographic mistake commonly found in ancient Chinese cartography.

Several extremely old geographical names can be also identified on the Complete Terrestrial Map. "Cang Ming Zong", i.e. "the destination of sea water" is one of them. Another extremely old geographical name on the Complete Terrestrial Map is "Sanfoqi," which was a name given by ancient Chinese to Srivijaya, an ancient Malay kingdom on the island of Sumatra that influenced much of the Malay Archipelago. This kingdom ceased to exist between 1200 and 1300 due to various factors, including the expansion of Majapahit. Several Chinese classics written during the Song and Yuan dynasties (960-1368) recorded "Sanfoqi" for Srivijaya. For example, *Records of Various Barbarians* (Zhu Fan Zhi), drafted in 1225, and *A Brief Description of Island Foreigners* (Dao Yi Zhi Lue), written in 1349, both contain accounts of "Sanfoqi" for Srivijaya. In the later fourteenth century, this term was replaced by "Jiu Gang," or "Bo Lin Bang." *The Overall Survey of the Ocean's Shores*, a classic written in Zheng He's era, records that "*The country of Jiu Gang used to be an ancient country named Sanfoqi*."

Based on ancient Chinese legend, and the historical period when the two extremely old names were used, it is possible to conclude that the prototype of the Complete Terrestrial Map must have been charted between the twelfth and thirteenth centuries.

#### 6. Unequal Projection and the 1507 Waldseemuller World Map

The use of the name "America" on the 1507 Waldseemuller World Map was eye-catching. Yet, in historical perspective, the significance of the map far outweighs that name. Waldseemuller, a European cartographer at the turn of the sixteenth century, with no access to technical support, managed to accurately ascertain the outline of the Americas based on his vague understanding of the world. This was exceedingly perplexing to cartographic historians.

A few years after Columbus crossed the Atlantic Ocean, many European

geographers and cartographers mistook the place Columbus had visited for Asia. Two private letters belonging to Amerigo Vespucci, the Italian navigator, were published in 1504, in which he claimed that he had crossed the Atlantic Ocean four times and discovered a new land detached from Asia. Vespucci had never travelled to the Pacific Ocean. Therefore, the geographical information regarding the features of "the New World" and the Pacific Ocean must have come from ancient maps. For a long time, historians have been extremely sceptical about the credibility of Vespucci's letter. However, at the beginning of the sixteenth century, many European cartographers were entirely convinced by Vespucci's words. Waldseemuller was no exception. It was he, after all, that proclaimed Vespucci the hero who discovered the New World.

It is highly likely that the documents provided by Vespucci were the reference material upon on which Waldseemuller based his famous map. At that time in Europe, only Vespucci had access to maps showing the outline of these new landmasses and the eastern shores of the Pacific.

After the publication of Waldseemuller's 1507 map, he gradually realized that the new land referred to by Vespucci was merely copied from ancient maps rather than actually explored. In an effort to correct his own mistake, Waldseemuller collected some geographical information with which he drew another version of a world map in 1516 – the Carta Marina. In this version, Waldseemuller re-labelled America as "Terra Incognita" and stipulated that the ancient maps referred to in creating the 1507 Waldseemuller World Map were "obsolete and unreliable sources."

Even though the 1507 world map charted by Waldseemuller appears to be "unreliable," some secrets of history can be revealed in its study.

The 1507 Waldseemuller World Map adopted the Unequal Projection, which, as described above, originated with ancient Chinese cartographers. Waldseemuller was unaware of the real shape of North and South America. When he referred to maps originating from China, he reproduced their version of South America, with an elongated shape and much smaller size than North America.

Two American continents can be identified on the 1507 Waldseemuller World Map: one situated independently on one side while the other was the fictitious giant peninsula in the southeastern part of Asia. Interestingly, a note in Latin, reading "India Superior," or "Upper India," was written on the territory of China.

One Japanese island is illustrated as a large island situated in the middle of the Pacific Ocean on the 1507 Waldseemuller World Map. This mistake appeared to be incomprehensible. No one could figure out why Waldseemuller portrayed such a small Japanese island as almost as big as a third of Europe. Additionally, why was this island was drawn at the centre of the Pacific Ocean, where there is no such island? In fact, the mistake made by Waldseemuller was an inevitable consequence of his mistaking North America to be part of Asia, so naturally, he considered Greenland to be Japan.

Dr. Gunnar Thomson, an expert in ancient cartography, points out in his book, *Secret Voyages to the New World*, that after making a qualitative comparison of the small inset bi-hemispherical map portrayed directly at the top of the 1507 Waldseemuller World Map with the Complete Terrestrial Map, it is possible to recognize the exceptional similarities between the maps in the outline of South America (see fig.4-11). This resemblance suggests that Waldseemuller referenced world maps that used the same sources as the Complete Terrestrial Map.



In 1507, Waldseemuller printed a set of globe gores, comprised of twelve petals with the shape of willow leaves (see fig.4-12).



In medieval times, no standard layout of world maps had yet been formed. Cartographers from different countries preferred to depict their region at the centre of the map. However, this set of globe gores charted by a European cartographer is an exception, for it is centred on China instead of Europe.

On this set of globe gores, every square measures ten longitudinal degrees. In European geography, the circumference of the earth was divided into 360 degrees. Following this line of logic, the map should have been divided into thirty-six small squares horizontally. Surprisingly, in addition to the thirty-six squares, there is an extra portion to the extreme right. As a result, the globe shows the earth with more than 360 longitudinal degrees. Was this a mistake unintentionally made by the cartographer? Obviously, rigorous German cartographers would by no means commit such a careless mistake. Moreover, one must not overlook the fact that Waldseemuller and his assistants, all cartographic experts, charted this set of globe gores. Dividing the earth into more than 360 longitudinal degrees was not a cartographic mistake, but a result of their being loyal to the prototype of the map originally charted by ancient Chinese cartographers who defined the earth into 365.25 longitudinal degrees. This was a prominent feature of an ancient Chinese astronomical system.<sup>9</sup> The number was changed to 360 after the seventeenth century. Undoubtedly, this cartographic "mistake" on the set of globe gores shows its origin – its prototype was from China.

In addition, the set of globe gores contained another mistake originally made by ancient Chinese cartographers – an enlarged Strait of Gibraltar.

The 1516 Carta Marina map also contains mistakes indicative of Chinese origin. It features South America as a continent connected to Asia. This sort of mistake must have originated from world maps with the same source as the 1093 Zhang Kuangzheng World Map.

In addition to the clues left by Waldseemuller on his world maps suggesting the source of his information, his maps also provide some leads concerning exactly when this ancient Chinese cartographic knowledge was transferred to Europe.

In his 1507 map, Waldseemuller labelled South China as "Mangi Provincia." During the Yuan Dynasty, Mongolians referred to the South Song region (Southern China) as "Mangi." Consequently, Marco Polo alluded to South China as "Mangi" in his travel log, and fellow Yuan dynasty explorer Odoric in *The Travels of Friar Odoric of Pordenone Odoric* also described his visit to Mangi. This name suggests that the maps referenced by Waldseemuller originated during the Yuan Dynasty and were transferred to Europe between the thirteenth and fourteenth centuries.

In the sixteenth century, other European cartographic items, besides Waldseemuller's maps, were made, based on maps originating from China. They include the 1502 Cantino World Map, the 1504 Caveri World Map, the 1508 Francesco Rosselli World Map and others.<sup>10</sup>

Before wrapping up this chapter, it would be fitting to revisit a couple of questions left open in Chapter Two regarding Waldseemuller's 1507 map. Why are two different projection techniques employed on this map? Why was South America drawn as an elongated land running north-south? Where did Waldseemuller's information regarding South America originally come from? What was his "obsolete, unreliable source"?

I believe these questions are now answered.

#### **Chapter Four**

<sup>1</sup> See *History of Liao*, vol.23.

<sup>4</sup> The epitaph of Zhang Kuangzheng records that "(this tom) is built for lighting the window for the reincarnation of the soul."

<sup>5</sup> This is a part of San Cai Yi Guan Tu, which also includes a map of China and astronomical map of the polar regions (northern and southern hemispheres).

<sup>6</sup> See Fuat Sezgin, "The Pre-Columbian Discovery of the American Continent by Muslim Seafarers", excerpt from *Geschichte Des Arabischen Schrifttums* vol.XIII. The original source of Casas' record is in *Colleccion de Documentos ineditos para la historia de Espana*, vol.62-66, Madrid 1875-76, esp.vol.2, p.278.

<sup>7</sup> See Paul Gallez, "Walsperger and His Knowledge of the Patagonian Giants, 1448", *Imago Mundi*, Vol.33 (1981), pp.91-93.

<sup>8</sup> See Ibarra Grasso, D.E., *La representaction de American en mapas romanos de tiempos de Cristo, Buenos Aires*, 1970.

<sup>9</sup> In traditional Chinese astronomy, the celestial sphere is divided into 365.25 degrees, a value derived from the understanding of the law governing solar movement. The earliest available record about this ancient Chinese concept can be found in *Mathematical Classic on the Gnomon*, written in the second century B.C.

<sup>10</sup> Such as the 1506 Giovanni Contarini World Map, the 1511 Bernard Sylvanus World Map, the 1526 Franciscus Monachus World Map and the 1528 Paris Gilt Globe.

<sup>&</sup>lt;sup>2</sup> See Excavation Report of The Liao Dynasty Frescoed Tombsat Xuanhua – Report of Archaeological Excavation from 1974~1993, Cultural Relics Publishing House, 2001.

<sup>&</sup>lt;sup>3</sup> At least, three books published the photo of this astronomical chart, including *Excavation Report of The Liao Dynasty Frescoed Tombsat Xuanhua – Report of Archaeological Excavation from 1974~1993*, Cultural Relics Publishing House, 2001; Luo Chunzheng, *The Painting and Mural in Liao Dynasty*, Liaoning Pictorial Publishing House, 2002; Dong Xinlin, *The Colors under the Ground – Ancient Chinese Mural Ppainting in Graves*, Sichuan People's Publishing House, 2004.