


Liangzhu Civilization

Xiang Ji
Shu Song
Xin Wu

The Paleoenvironment, Plants and Animals of Liangzhu

Essence and Treasures

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Liangzhu Civilization

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The Liangzhu Civilization series consists of 11 volumes, namely: Realm of King and God: Liangzhu City; Fanshan Royal Cemetery: Pyramid of the East; Liangzhu Jade Artifacts: Legal Instrument and Royalty; Liangzhu Pottery: Introversion and Resplendence; Engineering and Tools: The Stone Story of Liangzhu; Painting and Symbol: Primitive Characters of Liangzhu; The Paleoenvironment, Plants and Animals of Liangzhu; ; China and the World in the Liangzhu Era; Eighty Years of Archaeology at Liangzhu; What Liangzhu Was Like; and One Dig for Five Millennia: Liangzhu in the Eyes of an Archaeological Journalist. Representing the combined efforts of archaeologists from the Institute of Cultural Relics and Archaeology of Zhejiang Province who have been exploring Liangzhu for over 30 years, the series boasts a wealth of significant findings made at Liangzhu, shares the archaeologists' valuable experience, and includes abundant pictures of the excavation site. Accordingly, it will help readers develop a deeper understanding of Liangzhu Civilization and reveal the evolutionary course of Chinese civilization, characterized by 'unity in diversity.' Both the publication of the Liangzhu Civilization Series and the 'Liangzhu Civilization Towards the World' exhibition are expected to serve as a bridge to the public, thereby further disseminating Liangzhu Civilization and promoting an interest in traditional Chinese culture.

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Foreword: Liangzhu and Five Thousand Years of Chinese Civilization

The combination of time and space is marvelous. When we look up at the starry sky and see the immense universe, the twinkling stars seem to be permanently embedded in the canopy of the heavens. However, we know from modern science that the light-year is a unit of distance, and the light of stars from the depths of the universe was emitted in the distant past—the travel across time and space happens in the mere blink of an eye.

Archaeology is also a discipline about the travel across time and space. Through the door of time opened by our own hands, we can go back to different moments in human history, and 5000 years ago was a special one.

Globally speaking, the period 5000 years ago was a great era in which civilization was born. Coincidentally, early civilizations all grew up in the world's major river basins, such as the ancient Egyptian civilization in the Nile River Basin, the Sumerian civilization in the Tigris–Euphrates River Basin, and the Harappan civilization in the Indus River Basin. How about the Chinese civilization 5000 years ago? This issue has baffled scholars for quite a long time. They have examined ancient China's cities, characters, bronzeware, etc., according to the international standards of civilization and found that the ancient Chinese civilization could date back to no earlier than the Shang dynasty when oracle bone script appeared.

The history before the emergence of characters was called “prehistory” in archaeology. During China's prehistoric times, different geographical units in the vast territory have given birth to cultural sequences with various characteristics since 10,000 years ago, which is figuratively called “the sky dotted with stars” in archaeology. China's prehistory, however, has long been underestimated. We always take the Xia and Shang dynasties as the origin of the Chinese civilization and take the Yellow River civilization as its core, which unconsciously downplays the historic significance of high-level ruins and high-grade relics in surrounding areas, such as those from the Hongshan culture in western Liaoning, the Shijiahe culture around the Yangtze River and the Han River, the Liangzhu culture in the Taihu Basin, the Taosi culture in southern Shanxi and the Shimao site in northern Shaanxi. As we explore the origin of the Chinese culture, we come to realize that some cultures like “stars dotting the sky” sparkled the first sign of civilization, and the Liangzhu culture is a particular one among them.

The Liangzhu culture, an archaeological culture of jade worship, suddenly came into existence in the lower reaches of the Yangtze River approximately 5300 years ago. Despite the fact that jade had already been widely admired, it was not until that period that jade worship reached an unprecedented climax. Different from ornamental jade ware many people love, Liangzhu people's jade ware was made not only for aesthetic purposes. Represented by *cong*¹, which belonged to the ritual jade ware system besides *yue*,² *huang*,³ *bi*,⁴ crown-shaped ornaments, three-pronged jade artefacts, awl-shaped jade artifacts, tablets and tubes, Liangzhu people's jade ware symbolized their status, power, or wealth. Various jade ware buried in earth mounds alongside the people with supreme power showed the dignity of the deceased, and the divine emblem often engraved on the jade ware demonstrated Liangzhu people's unified belief. The owners of the jade ware were Liangzhu's ruling class who believed they could exercise the god's will as the embodiment of the god. The types and quantities of the jade ware buried with them imply their social status and responsibility. It seems that the Liangzhu culture was once divided into multiple centers and covered a great number of small states, because extremely high-level tomb groups were found at the sites of Fanshan and Yaoshan in Yuhang District, Hangzhou, the site of Sidun in Wujin District, Changzhou, the site of Gaochengdun in Jianguyin, and the site of Fuquanshan in Shanghai. Fortunately, history gave Yuhang an opportunity: more and more sites of the Liangzhu culture were found around the site of Fanshan, and the good protection of these centrally distributed sites allowed archaeological work to be carried out smoothly in the area. In retrospect, it provided a foundation for the rediscovery of the Liangzhu culture. Otherwise, no one would have realized that the scattered sites are different parts of the ancient capital city Liangzhu.

We now can see that the Liangzhu City, composed of the imperial city, the inner city, and the outer city, covers 6.3 square kilometers, around eight times the size of the Forbidden City. It boasts palaces, royal tombs, city walls, moats, a water transportation system inside the city, and a water conservancy system outside the city. It was a proper capital city in terms of its scale and layout, and the Liangzhu culture could reach the standards of civilization except for characters and bronzeware. Nevertheless, with our minds open, we may find that the general standards of civilization should not be applied rigidly when determining whether a culture has entered a civilized society or not. The significance of etiquette manifested by bronzeware in other civilized societies is reflected in jade ware in the Liangzhu culture. Despite the lack of the character system through which languages can be recorded and thoughts and cultures can be passed down, the symbols incised on ritual jade ware could unify people's thoughts to a great extent, and the impressive organizational and managerial capabilities of Liangzhu society reflected in large construction projects also suggest that there must have been a certain method for information transmission similar to the

¹ *Cong* (琮): a straight tube with a circular bore and square outer section with convex sides.

² *Yue* (钺): axe.

³ *Huang* (璜): semi-circular jade artifact.

⁴ *Bi* (璧): flat jade disc with a circular hole in the centre.

character system. For these reasons, the discovery of the Liangzhu City established the existence of the Liangzhu civilization.

The archaeological studies of Liangzhu have lasted for more than eight decades. In 1936, Shi Xingeng first discovered black-surfaced pottery and stone tools, and today we have defined the Liangzhu culture as the first regional culture in ancient China that formed an early kingdom; in 1959, Xia Nai put forward the designation of “the Liangzhu culture” and scholars came to know the characteristics of this culture, and today we carry out multi-field and all-dimensional archaeological research on the Liangzhu civilization and the state form of Liangzhu becomes clearer and clearer to us. This book series, written by young and middle-aged scholars who are devoted to the archaeological work of Liangzhu, focuses on recent archaeological findings and studies of the ruins of the Liangzhu City in Pingyao Town, Yuhang District, Hangzhou, and contains a huge amount of information, including different aspects of the site that people hope to know, the history of the archaeological studies of Liangzhu, the palaeoenvironment, plants and animals of Liangzhu, Fanshan royal cemetery which is the highest level of cemetery in the Liangzhu culture, high-grade jade ware of Liangzhu often discussed by people, and a wide range of pottery used in Liangzhu people’s daily life. On top of that, Liangzhu is also compared with other ancient civilizations in the world, and an intriguing series of news reports on Liangzhu is commented on by media professionals. We hope this book series can arouse readers’ interest in the Liangzhu civilization, so more people can be inspired to explore our history.

Perhaps many people would ask about the relationship between the Liangzhu civilization and the Chinese civilization because Chinese people are called the descendants of Huaxia⁵ in modern history but few people have heard of Liangzhu. This is understandable: we believe the Chinese civilization is a unified civilization of a state with its political power in the Yellow River Basin; it has survived from the Xia, Shang, Zhou, Qin, Han, and Tang dynasties and is still thriving today. However, the archaeologists have launched the “In Search of the Origins of Chinese Civilization” project to gain some insights into the earliest cultural form of Chinese civilization, so we should not have too many presuppositions for the earliest civilized society. Since we have found a 5000-year-old regional civilization, the Liangzhu civilization, we may also find the Hongshan civilization in northern Liaoning and the Shijiahe civilization in the middle reaches of the Yangtze River, though we are not able to confirm the existence of these civilizations at this stage due to limited archaeological findings. While the Liangzhu civilization started declining gradually 4300 years ago, the elements of the civilization have been well inherited because of Liangzhu’s jade, and its influence has spread all over the country—regional civilizations actually have a nationwide and even universal influence.

Human migration and communication have never ceased since the Palaeolithic era. Population movement of different scales, degrees, and forms have facilitated collisions, exchanges, and integration between cultures, and the development of

⁵ Huaxia refers to a confederation of tribes—living along the Yellow River—who were the ancestors of what later became the Han ethnic group in China (source: <https://en.wikipedia.org/wiki/Huaxia>).

regional civilization is also a dynamic process. The one thousand years following the Liangzhu civilization—the earliest Chinese civilization we can confirm as of today—witnessed the successive prosperity of Taosi, Shimao, and Erlitou, and the center of regional civilization changed from time to time. In this process, the elements of civilization, such as etiquette, hierarchical society, and city structures, were inherited and integrated till the beginning of the Xia and Shang dynasties. In fact, the Xia and Shang cultures evolved in their respective regions, and the change of the dynasties reflects the dominance of Xia which was replaced by the dominance of the other regional civilization—the regions were much larger this time and the civilizations fought against each other during that period for the control over the territory. It was not until the Qin dynasty that a state unified by centralized political power appeared in China. In this regard, the period from Liangzhu to the Shang and Zhou dynasties saw the Chinese civilization's continued evolution from a regional civilization to a unified one, so this period can by no means be separated apart.

Liangzhu, China
May 2019

Bin Liu

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Chapter 1

Climate and Environment of the Liangzhu Site



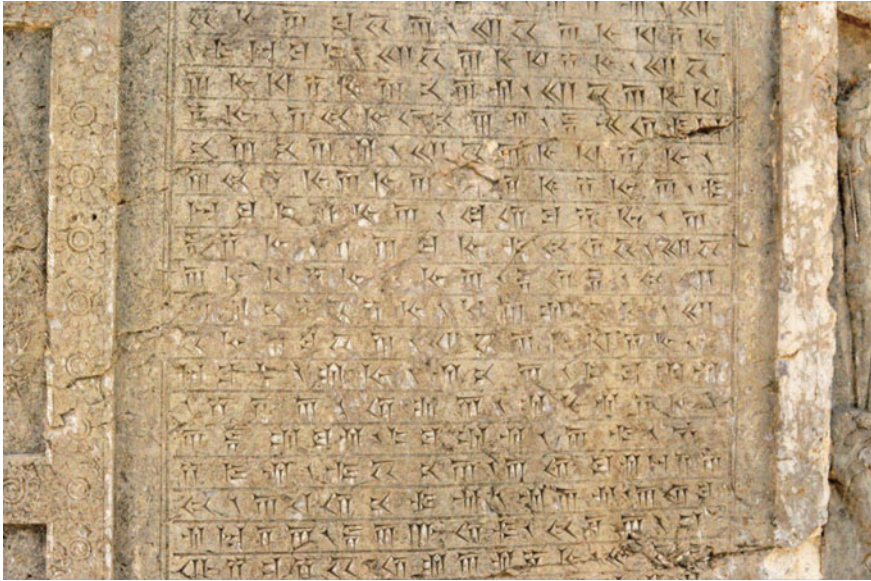
1.1 Human and Nature

1.1.1 *Climate and History*

The earth, who has celebrated her about 4.6 billionth birthday, witnesses countless stories.

Human now is generally believed to have finished evolution from Australopithecus millions of years ago, while Homo sapiens made its debut on the earth hundreds of thousands of years ago. Counted from the emergence of written characters till now, human civilization only existed for around 5000 or 6000 years, which cannot at all hold a candle to the history of the earth. Even so, the progress of human civilization has been a bumpy ride.

Around 5000 years ago, Sumerian civilization known for cuneiform tablets was created by Sumerians residing in Mesopotamia (the land between the Tigris and Euphrates; the two rivers flows through what are now known as Turkey, Syria, Iran, Iraq, and some other countries, with the main parts sited inside Iraq). At the same time, ancient Egyptian civilization was brought to birth in East Africa and North of Nile. Then the first dynasty of Egypt was established. Shortly after ancient Egypt, nourished by Indus River, Harappan civilization flourished inside what is now known as Pakistan. No doubt, China, one of the Four Great Ancient Civilizations, joined the history on time. Around Taihu lake appeared Liangzhu culture known for its mastery of jade production. It has risen to one of the significant sources of Chinese civilization in people's mind thanks to the ongoing archaeological discovery of the Liangzhu Ancient City and its outer water conservancy system for over ten years.



Cuneiform tablets

5000 years ago, how did earth look like?

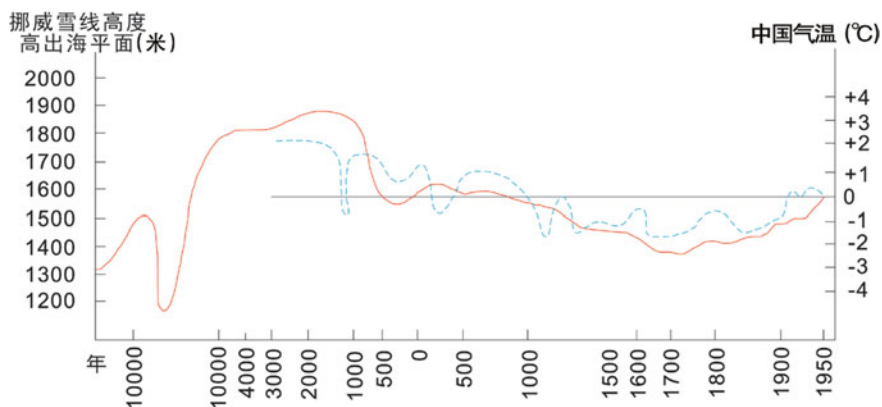
As a matter of fact, 5000 years is too short a period to make the earth change drastically in terms of geological scale which can easily take millions of years. Travelling back to 5000 years ago, we would find mountains and seas basically identical as what they are today. Yet, there are indeed nuances such as sea-level height, location of coastline, temperature, rainfall, and so on. Geologically speaking, the era that accommodates all of us belongs to the Holocene epoch in Quaternary Period. Dating back to 2 million years ago, Quaternary Period was divided into Pleistocene (2,000,000 years ago ~ 10,000 years ago) and Holocene (10,000 years ago to the present). During the Pleistocene, epoch emerged giant mammals like mammoth, and Homo sapiens at the last phase, and when Holocene came, the Homo sapiens took over the stage. Quaternary Period is an Ice Age, characterized by extremely freezing climate, and great width and coverage of ice sheet of the north and south poles. The famous scientific film *The Day After Tomorrow* is set in the arrival of Ice Age. But for sure, Ice Age won't come so rapidly as depicted in the movie.

Perhaps you may have the question: We have a warm climate now. How could it be an Ice Age?

That's because even Ice Age is not equivalent to absolute ultimate glacial period. There exist alternate variations of interglacial period that is secondary to glacial period. Ice Age2 the Meltdown, the second movie in Ice Age animated series tells the story when glaciers begin to melt, which is a sign of interglacial stage. After the late Quaternary glacial period (the latest glacial period to the present, 110,000-10,000 years ago), temperature warmed up rapidly, followed by Holocene interglacial stage. It was in these 10,000 years that mankind accomplished burgeoning

development. However, as told before, Ice Age contains cycling between glacial and interglacial periods, and climate change exists regardless of different time scales. Four seasons in a year; morning, noon, and evening in a day. Since Holocene, there have been several different phases of climate change. From 10,000 to 8000 years ago, temperature rose quickly to the point approximating modern level with slight fluctuation. At this time appeared some early Neolithic cultures, such as Shangshan culture (earliest at about 10,000 years ago) in Zhejiang Province, China. While the Middle Holocene, 8000–4000 years ago, is warmer compared with modern period. Inside Zhejiang Province emerged cultures like Kuahu Bridge culture (8000 years ago), and Hemudu culture (7000 years ago). The climate was the warmest around 6000 years ago, when the average temperature on the land in the middle and high latitudes was 2–3 °C higher than it is now. It's the very period that witnessed the gradual growth of the Four Ancient Civilizations. Afterwards (around 5300 years ago), Liangzhu, one of the brightest stars of China that time, rose slowly in Hangjiahu Plain.

In the last 4000 years, the Holocene climate showed a trend of cooling down to modern level. It was around this time (4300 years ago) that Liangzhu culture perished. (Possibly there's deviation of about 10% due to failure to implement tree ring calibration for early dating data.) In addition, Medieval Warm Period that is warmer than contemporary age (from the tenth to the thirteenth century, when the temperature was about 1°C higher than it is now, from Northern Song Dynasty to Yuan Dynasty), and Little Ice Age that is colder than now (from the early sixteenth century to the middle and late nineteenth century, from the end of Ming Dynasty to the end of Qing Dynasty) also appeared in the last 1000 years. For the last hundred years, huge volumes of systematic records on temperature observations have been taken worldwide. In accordance of what have been recorded, the overall trend is that from the late 1800s to the 1940s, there was a noticeable spiral-up in global temperature; From the 1940s to the 1960s, the world underwent a slight cooling down; as of the 1970s, the world's temperature has been bouncing back, and most intensely since the 1980s. Climate change has been increasingly disturbed by human since the last hundred years, marked by the well-known greenhouse effect. It's also the first time that human posed an impact to global climate in millions of years since earth is born. Before that, the development of human society and the course of civilization were restricted by the climate in a certain way.



Norway Snow-line altitude in the past 10000 years (solid) and Chinese temperature (dotted)

(Zhu Kezhen)

高出海平面 (米) : Height above sea level (meter)

中国气温 (°C) : Chinese temperature (°C)

挪威雪线高度 : Norway Snow-line altitude

About 4000 years ago, the global climate plunged into frigid periods lasting for successive centuries. It was also the first Little Ice Age in nearly 5000 years. Also dubbed as “the 4000-year-ago-event”, this climate shift cast a profound impact around the globe. People of Mesopotamia forsook their farming land and residence base in the south, residents of the Indus valley moved from east to areas with more abundant monsoon and rainfall, and for the nomadic peoples of the Sahara, some migrated from south to grassland, while some from east to the Nile valley. That time in China, Liangzhu was declining. Shun abdicated and handed over the crown to Yu for his merits of flood control. Accepting Shun’s will, Yu eventually established Xia Dynasty. From 3800 to 3200 years ago, with the climate of China turning warm and humid, Xia Dynasty collapsed, and Shang Dynasty took over its place. From 3200 to 2600 years ago, the earth entered the second Little Ice Age, and it became cold and dry. People in the north began to migrate to the south. During this period, they overthrew Shang Dynasty, established Zhou Dynasty, and continued to fight against foreign aggression and domestic rebellion. Over 2700 years ago, once again the climate turned warm and humid. The monarch of the Western Zhou Dynasty took the price of losing his country to put a smile on his consort, Baosi’s face. Consequently, the Western Zhou Dynasty burned down into flames. With the capital of Zhou Dynasty moved to Luoyang, curtains of the Spring and Autumn Period and the Warring States Period were raised, ushering in a gradually split era. About 2200 years ago, Qin Dynasty died young, overthrown by Liu Bang and Xiang Yu,

replaced by Han Dynasty after Liu bang defeated his old-time ally. 2000–1400 years ago, the earth entered the third cold and dry Little Ice Age in nearly 5000 years. Taking advantage of the cold current, Wang Mang managed to usurp the throne and established Xin Dynasty that lasted for 15 years before the Eastern Han Dynasty built by Liu Xiu, a descendant of Han Dynasty, took over its place. Ruled by the Eastern Han Dynasty for 200 years, China then stepped into Wei-Jin and Southern–Northern Dynasties. During Wei-Jin Dynasty, ancient celebrities were keen “Wushi powder” takers. Made of five minerals, the powder can warm up users’ body. It’s assumed that the popularity of “Wushi powder” is in connection with the freezing weather. Roughly 1400 years to 700 years ago, the mild and wet climate reigned again, contributing to Sui and Tang dynasties unifying the Chinese territory around 600 A.D. Thriving on agreeable climate, agriculture and animal husbandry gained rapid development. So did Tang Dynasty. This warm and humid climate lasted for almost 700 years. By the middle and late period, the forces of all the ethnic groups in China had gradually fledged, bring an end to Tang Dynasty. It’s common knowledge for readers of Semi-Gods and Semi-Devils and The Legend of the Condor Heroes that during the northern and southern Song dynasties, the states of Dali, Liao, Xia and Jin ran neck and neck. At last, Kublai Khan put an end to the division of states, reunified China, and opened Yuan Dynasty. 700 years ago, the fourth Little Ice Age arrived. It lasted less than 100 years before Yuan Dynasty was torn down by cold and starved peasants. The Mongol nobles ended up banished back to the northern steppes. In 1860, it became warm again. With the beginning of climate change, this time mankind paid a miserable price—two rounds of world wars.

Looking back into the past, we can find that chaos of human society came hand in hand with climate change. Cold weather results in northern nomadic peoples migrating to the south in lack of water and pasture. And in ancient times when agriculture is the pillar of society development, inevitable are riots and civil commotions against oppressing feudal ruling classes. While people (mainly the ruling class) tend to indulge in material desires, neglecting duty to govern the country, or wantonly engaging in military aggression when blessed with durably pleasant climate that keeps them warm and fed.

According to the current archaeological findings, Liangzhu dated back to 5300 years ago and ended 4300 years ago. Due to the failure to find its writing system and related records, it would remain an eternal mystery whether any uprising or revolution ever took place during that time. Nevertheless, the ancient city and water conservancy system dated to roughly 5000–4900 years ago made it safe to call the Liangzhu back then as the Liangzhu Kingdom. The pleasant climate, well-developed productivity and pursuit beyond basic accommodation within the ruling class or even part of the civilians, such as for engineering construction and religious belief, were all evidence. Personally, the author believes that religious belief is rooted in speculation and interpretation of the world in which mankind live, as well as the craving for the better unknown world.

Climate may not be the history maker, but it indeed affects the progression of early human civilization in an actual way.

1.1.2 The Mysterious 30 Degrees North Latitude

Longitude and latitude are created to facilitate geographic location labelling. Latitude line can be understood as the trajectory recording the movement of a certain point on the earth following the earth's rotation.

Checking the geographical location of the Four Ancient Civilizations, we can find almost all of them located at 30 degrees north latitude. The Euphrates and Tigris of the Mesopotamia join the Persian Gulf at about 29.5 degrees north latitude, flowing through what now is renowned as "Fertile Crescent", with the downstream later becoming the birthplace of Sumerian civilization. The Nile, cradle of ancient Egyptian culture, flows into the Mediterranean Sea from south to north at around 31.4 degrees north latitude, with its lower reaches scattered with about 80 pyramids. The entrance of the Indus into the Indian Ocean is slightly deviated at roughly 25 degrees north latitude. At approximately 30.5 degrees north latitude, city of Harappa that led to the unearthing of Harappa civilization was discovered. Let's go back to Liangzhu, and we will find that its city location also at about 30.4 degrees north latitude.

The reason why the widely known Four Ancient Civilizations sprang up one after another around 30 degrees north latitude remains unclear till today. 30 degrees north latitude is located less than 7 degrees to the north of Tropic of Cancer (about 23.5 degrees north latitude), denied direct sunlight. The sun can beat down on places between Tropics of Cancer and Capricorn, resulting in overall hot climate there. While geographically 30 degrees north latitude belongs to the subtropical zone, enjoying the climate that is cooler but warm enough for human to live comfortably. Despite the less abundant distribution of animals and plants than that of rainforest, people can do well with their initiative. I guess, in some way, such environmental conditions also promote the progress and development of human beings.



Liangzhu Emblem in mixed patterns of man, gods, and celestial beasts

That the Four Ancient Civilizations flourished hand in hand at the same 30 degrees north latitude alone is insufficient to address the mystery of that location. There are many more stories that occurred here.

Let's travel across the time and space of 30 degrees north latitude. You can see Nebuchadnezzar II of the ancient Babylonian kingdom building a garden in the air for his queen Amyitis who suffered from disease and homesickness; people in the nineteenth century constructing the Suez Canal bridging the Mediterranean and the Red Sea, spanning across the latitude line; over 6000-km-long Mississippi River carrying nearly half a billion tons of sand each year into Gulf of Mexico, converging sand into huge deltas at the outlet; the famous Gulf War breaking out at the Persian Gulf, the world's largest oil region, whose proven oil reserves took up two-thirds of the global total by the end of twentieth century; many disappearances of ship happening in the "Bermuda Triangle" between the straits of Florida and Puerto Rico at the eastern tip of Greater Antilles due to the complex environments, and even inspiring some novelists; the Himalayas, the world's highest mountain range, rise at 30 degrees north latitude, and the Brahmaputra valley turn into "the keyhole that opens the door to earth's history."; Nu, Lancang, and Jinsha rivers presenting the spectacle of "Three Parallel Rivers" that stretches for over 170 km, with the