

THE RELATIONSHIP BETWEEN THE ENVIRONMENTAL CHANGE OF THE ZHUJIANG RIVER DELTA IN HOLOCENE AND ITS CULTURAL ORIGINS AND PROPAGATION

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ABSTRACT: The cultural process of the Zhujiang River Delta began 6,000 a B.P.. The origins and propagation of different kinds of cultures have close relations to its climatic change, especially to its sea-land change in Holocene. These relations are showed in three respects. (1) The environmental change in Holocene results in the cultural evolution of the Zhujiang River Delta; and different kinds of cultures show the environmental characteristics at that time. (2) The horticultural culture and the rice-growing culture are all developed in the Zhujiang River Delta, but they have different cultural ecological factors and are not a successive developing process. (3) The environmental change promotes the propagation of the late primitive culture and the rice-growing culture and the formation of the late primitive culture district and the rice-growing cultural district of the Zhujiang River Delta.

KEY WORDS: Zhujiang River Delta, environmental change, cultural origin, cultural ecology, cultural propagation

I. THE ENVIRONMENTAL CHANGE IN HOLOCENE AND THE CULTURAL ORIGINS

Different with geographers, most of the scholars in archaeology, agriculture and agricultural history often explain the cultural history and agricultural origins of the Zhujiang River Delta as a unitary economic-cultural type and in a rectilinearly-developing pattern, so it is difficult to get satisfactory results. There are two shortcomings. One is they lack a profound geographical knowledge about the Zhujiang River Delta; the other is they use static method of causal relationship rather than a developing viewpoint. From the

viewpoint of cultural geography, the rise and development of culture of the Zhujiang River Delta are suited to the environmental evolution. In other words, geographic phenomena are not only spatial forms, but also cultural forms.

As early as 100,000 years ago, the most early man of the Southern China—Maba man had existed in the mountain area of the north of Guangdong Province^[1]. They always lived in a cave with a river and a wide valley in front of it. A cave could hold about 10–100 persons. Their major economic activities were gathering and hunting. But this way of life ended with the end of Quaternary Ice Age and the rise of the global temperature and sea-level. Because increased temperature caused forest area to enlarge and the density of forest animals to decrease, hunting became more and more difficult. As a result, the ancient people emigrated to south. About 6,000 a B.P. they arrived in the Zhujiang River Delta. At that time, the Zhujiang River Delta was full of water, so ancient people had to live in aqueous environments, such as delta plain, river bank and sea bay. From the characteristics of shell mound deposited in Middle Neolithic Age (6,500–5,200 a B.P.), we find that although animal remains include many kinds, such as shellfishes, fishes, amphibians, terrestrial animals and birds, most of them are shellfishes and fishes. This shows that people lived mainly by fishing-gathering. Of course, there were also a few part of people lived by hunting and gathering fruits in terraces and hills.

In the early stage of Late Neolithic Age (5,200–4,200 a B.P.), the culture of the Zhujiang River Delta changed into another kind because the sea level settled wavily. Hydrographic economy was destroyed by the decrease of water-body area. So, some people emigrated to river outlet, estuary and islands (these places are near today's Zhongshan City, Zhuhai City, Shenzhen City, and so on), continuing to hunt and gather; others moved to terraces and hills, hunting, fruit-gathering and planting. This is why sandy land ruins abruptly and largely increased in this period. From the implements of production at that time, most of them were adzes and spears, and the implements for levelling were few. This fact indicates that the planting is not rice-growing agriculture but horticulture.

In the end of Late Neolithic Age (4,200–3,500 a B.P.), the climate became hotter and moister and the sea-level had a slight rise. Accommodating themselves to environmental change, people started hydrographic economy again in aqueous environments. This economy-culture lasted about 700 years. From the fact that there were few terrace and hill ruins, horticulture was very possible to be discontinued.

In the Borne Age (3,500–2,500 a B.P.), the climate fluctuation was from slight hot and slight moist at Q_4^{2-2c} (3,500–2,900 a B.P.) to hot and wet at Q_4^{2-2c} (2,900–2,500 a B.P.), and the sea-level fluctuation was raised first, and then settled, i.e., during 3,500–2,800 a

B.P., the sea-level was from -1.0m to $+1.5\text{m}$ down to about $-2.0^{[2]}$. People emigrated to terraces and hills from the delta plain again, so land economic-cultural activities restarted too. Archaeological discovery shows that the production implements for levelling increase largely at this period, which means the origin of rice-growing agriculture. But as a whole, the Zhujiang River Delta was still such a delta that rivers, sea-bays and lakes were found almost everywhere at that time, and the forests of the tropics and the tropicals covered all over the terraces and hills. Therefore, its agriculture, I believe, was in a very primary and simple stage.

II. THE CULTURAL ECOLOGY OF AGRICULTURAL ORIGINS

C.O.Sauer and D.E.Yen all suggested that it was a successive process from horticulture to cereal agriculture when they studied the origins of Southeast Asia^[3-4], but C.Gorman suggested that they started simultaneously^[5]. Through analysing the climatic change, sea-land change, sea-level change and archaeological findings of the Zhujiang River Delta in Holocene, and comparing with other agricultural origin places in the world, I find that the horticulture and cereal agriculture of the Zhujiang River Delta didn't originate at the same time, and they were not a successive process.

As has been pointed out above, the horticulture of the Zhujiang River Delta originated in the early stage of Late Neolithic Age. The process is probably in this way: People noticed that some root-tubers, stem-tubers, stems and branches were able to grow up to ripe plants when they gathered fruits. So they intentionally chose some of these "seeds" to plant near their houses or retained some of these "seeds" to regenerate. These activities helped people to understand the growing rules and their ecological needs about some plants, while gathering their fruits to replenish foods as well. Gradually, plant domestication became a main economic activity, and it opened the first chapter of agricultural history of the Zhujiang River Delta. From the viewpoint of plant ecology and ancient documents, I deduce that the people at that time largely planted bananas, cane, Chinese yams, taros, gingers, and so on.

The cereal agriculture, mainly rice-growing agriculture of the Zhujiang River Delta rose during the Bronze Age. But I believe the Zhujiang River Delta is not an origin place of rice-growing agriculture. There are four reasons why I hold this opinion. First, although there were a lot of *O.sativa* *L.F.sponanea*, *O.sativa* *L.subsp.hsien Ting* of China is generally regarded to be evolved from it in the Zhujiang River Delta^[6], there were not any remains of rice-growing found in all archaeological sites of the Zhujiang River Delta before the Bronze Age. Contrary to this fact, in the Late Neolithic Age (4,500 a B.P.), *O.sativa* *L.*, mainly *O.S.L.subsp. Hsien Ting*, had become an important crop in the North of

Guangdong Province. Second, deducing from the excitation mechanism of rice-growing, the aim of rice-growing was to maintain surplus food for non-harvest seasons^[7]. In the Zhujiang River Delta, people were easy to get enough food throughout the year because it had rich aquatic products, terrestrial animals and birds. However, in the North of Guangdong Province, there was a cold season in which it was difficult to find food. Once people there found the edibility and store-enduring characteristic of *O.sativa L.F.spontanea* which could be found everywhere near their houses, they were bound to domesticate it. Third, people in the Zhujiang River Delta had less planting experience than those in the North of Guangdong Province. The people here were used to fishing, gathering and hunting and spent most of time in the Neolithic Age to do these economic activities except for a short time's horticulture. Obviously, the North of Guangdong Province was more possible to be a place of agricultural origin. As a matter of fact, many scholars, such as Ding Ying^[8], Tong Enzheng^[9] and Li Runquan^[10], all believed rice-growing agriculture originated in the Southern China, including the North of Guangdong Province. I basically agree to this hypothesis. Finally, the legend of Ram City (Guangzhou's alias) shows that Guangzhou's rice-growing agriculture was from "Nan Hai celestial being" whose totem was rams. I believe that "Nan Hai celestial being" are ancient people of the North of Guangdong Province, not people from Southern China Sea. The rice-growing agriculture of the Zhujiang River Delta was propagated from the North of Guangdong Province via the tributaries of the Zhujiang River step by step.

Primitive agriculture has two characteristics promoting cultural propagation. In one hand, at primitive agricultural period, planting was intermittent and had to change places frequently. A plot of land had to be abundant when it had brought under cultivation after some years, and let it be natural state for 8–10 years or longer in order to recover its fertility of soil. In other hand, the development of rice-growing agriculture guaranteed people enough food all year around and required people to settle down in one place, which made population increased rapidly. When increase of population went beyond its limit that agricultural productivity could support, a general solution was emigrating to other places. Just in this way, the people in the North of Guangdong Province, with rice-growing agriculture, gradually moved to southern fluvial plains and eventually arrived in the Zhujiang River Delta. This process of propagation lasted about 2,000 years.

III. THE CULTURAL PROPAGATION AND FORMATION OF THE CULTURAL DISTRICTS

There are two forms of cultural propagation. One is cultural spread – culture propagates horizontally i.e. spatial developing process of culture. The other is social heredity – culture propagates vertically i.e. chronological change of culture. When I study the propaga-

tion problems of the Late Primitive Culture (Neolithic Age) and the early agricultural culture (mainly rice-growing culture) of the Zhujiang River Delta, I find that two forms are coexisted.

The spatial distribution of shell mound ruins in the Neolithic Age show that, in the Xi-Beijiang Delta, if we link Jiujiang, Foshan and Guangzhou as a line, we can find that shell mound ruins to the north and west of this line are all before the Spring and Autumn Dynasty, but to the south and east of this line are from the Qing, Han to Tang Dynasty. This fact indicates the propagation direction of the Late Primitive Culture in this region is from northwest to southeast. In the Dongjiang Delta, the shell mound ruins are mainly to the north and east of Shilong (Dongguan City). The propagation direction of the Late Primitive Culture is from east to west. The sandy land ruins are largely distributed in the estuary of the Zhujiang River, the coast and the islands, i.e. near today's Zhuhai City, Zhongshan City, Doumen County, Shenzhen City, Hong Kong and Macao. They chiefly formed in the early stage of the Late Neolithic Age, later than the shell mound ruins. Therefore, we can deduce that the general direction of propagation of Late Primitive Culture in the Zhujiang River Delta is from north to south.

The Late Primitive Cultural District of the Zhujiang River Delta is special in four respects. First, in environment aspect, the Late Primitive Culture had close relation to water. It can be regarded as a hydrophilous culture of the tropics and the tropical plain. Second, in economic structure aspect, although fishing was main economic activity, hunting, aquatic-gathering and fruit-gathering were coexisted. It can be defined as a mixed-typed economy-culture. Third, in religious belief aspect, dragons were their main totem object. The prototype of dragon is generally considered to be snakes, while a few scholars think it maybe is a crocodile^[11] or their mixed form^[12]. Finally, in production tools and pottery aspect, the polished stones were fewer, while chipped stones were more. The pottery was not fully developed.

The propagation of the rice-growing agriculture is very different from that of the Late Primitive Culture. I deduce how the rice-growing agriculture propagated in the Zhujiang River Delta mainly from the environmental change, the spatial distribution of archaeological ruins and ancient documents. In Bronze Age (3,500-2,500 a B.P.), it mainly distributed in the hills and terraces near Guangzhou and Panyu. During Qin-Han Dynasty (2,500-1,411 a B.P.), it propagated south to Chenchun (Shunde County), Daliang and Xingtian. In the Xi-Beijiang Delta, it propagated southeast to Jiangmen-Rongqi-Shiqiao linked line. During Sui-Tang-Southern Han Dynasty (1,411-1,021 a B.P.), except its further development in Guangzhou, Xiqiao-Longshan, Foshan-Dazhen and Shunde County, it also propagated south to Waihai (Xinhui County)-Longshui, mainly brought the hills,

diluvial and alluvial plain near Xinhui County under cultivation. In the Dongjiang Delta, because the Dongjiang River had less sand amounts and sedimentation speed was slow, river islands and mid channel islands formed slowly. Therefore, from Qin to Southern Han Dynasty, the rice-growing culture propagated west very slowly. Until Tang Dynasty, it just propagated along the alluvial plains of the Dongjiang River from Shilong to Zhongtang and Guancheng. During Song-Yuan Dynasty (1,021-624 a B.P.), the sand and loam became increasingly accumulated on the swamps of the Zhujiang River Delta because floods were more frequent than before and dyke-building began. In the front area of the delta, channels were silted quickly with a rate up to 12.7m/ a during 1883-1962 a C.D.^[2]. Sanjing Island, Muzhou Island, Wuguishan Island, Dahuangpu Island, Tanzhou Island and Huangge Island linked with the northern plain at that time. In the Xi-Beijiang Delta, the coast line moved to Liyuchong-Gujing-Shangheng-Xi'an-Gangkou-Baihua-Xiahe-Wuzhu-Hengdang-Huangge. The rice-growing agriculture propagated to the south of Shawan, Dahuangpu, Guzhen-Xiaolan, Waihai-Huicheng. In the Dongjian Delta, the coast line moved to Zhangpeng-Daojiao, and rice-growing agriculture propagated west to near Mayong (Dongguan County). During Ming Dynasty (624-348 a B.P.), most of the tributaries of Xijiang River and Beijiang River were silted, and the sand was largely accumulated in the south of Panyu, the north of Zhongshan and the east of Xinhui. The coast line had moved to near Modao gate. Huangyangshan Island, Zhugaoling Island and Nansa Island all linked with the delta. The Dongjiang Delta was basically completed. The rice-growing culture spread all over the north and the center area of the Zhujiang River Delta. The percentage of the cultivating wasteland arrived 40% in the Zhujiang River Delta, and 77% in Shunde County^[12]. During Qing Dynasty (348-81 a B.P.), the speed of sand accumulation was more quickly, so the tributaries in the delta were completely silted and Shiziyang became increasingly narrow. At the end of Qing Dynasty, the eight gates of Zhujiang River were formed like them today. The rice-growing agriculture had propagated to the front area of the delta during this period, and the rice-growing cultural district was formed.

The rice-growing cultural district is special in five respects. First, in environment aspect, the propagation of the rice-growing culture and the formation of the rice-growing cultural district have close relation to the sea-land change and the hydrographic net change of the delta. To some extent, we can believe the propagation of rice-growing culture is subject to the development of the coast line of the delta. On the whole, there are two propagation directions of the rice-growing culture in the Zhujiang River Delta. One is from northwest to southeast (in Xi-Beijiang Delta); the other is from east to west (in Dongjiang Delta). The general trend of propagation of the rice-growing culture is from north to south. Besides, rice agriculture is deeply affected by water. The rice-growing culture can also be regarded as a hydrophilous culture of the tropics and the tropical plain. Second, in

economic structure aspect, although the rice agriculture here originated and double-cropping rice prevailed very early and it had excellent ecological conditions, the development of farming techniques and the improvement of rice breeds were not able to be accomplished until Central Plains propagated its advanced cultivation techniques. From this viewpoint, the Zhujiang River Delta contributed less to Chinese rice-growing culture than Wuyue Culture and Central Plains Culture. Third, in the tools of production and daily life aspect, the need of bronze and iron implements promoted the development of metallurgical industry; and the need to fill and cook rice pushed forward the development of ceramic. Fourth, in way of life aspect, the people in the Zhujiang River Delta ate rice as staple food and aquatic products as foodstuffs, which was very different from the people in Central Plains who ate wheat and millet as staple food and the nomadic people in the Northern China who ate animal meat as staple food. Finally, in religious belief aspect, ram-totem and bird-totem prevailed in the delta at that time, because the people with ram-totem from the north of Guangdong Province brought rice-growing culture here and some migratory birds could eliminate injurious insects and weeds in rice growing period.

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