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A summary of the study of prehistoric life in China

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ABSTRACT. *The progress and breakthrough of prehistoric research in China since the beginning of the 21st century is the trend and result of the deepening of the origin of Chinese agriculture and the development of the theory of man land relationship. Through the quantitative statistics of the existing achievements, we find that: 1. The research on prehistoric life can be divided into three stages: preliminary exploration (2000-2010), steady progress (2011-2015) and vigorous development (2016 to date). 2. The spatial category involved in the study of prehistoric industry is characterized by "more in the north than in the south, and uneven distribution in various regions", while the temporal category is dominated by the whole period study of the Neolithic age. 3. Prehistoric life research is mainly based on a variety of comprehensive methods, among which animal Archaeology and plant archaeology are the most widely used. 4. The development trend of the research path of prehistoric industry is to establish the theory of prehistoric industry type, the alternative index system and the comprehensive research method system.*

KEYWORDS: *Chinese prehistoric industry, achievement statistics, time category, space category, research path*

1. Introduction

After the initial exploration in 1950-1965, the basic stagnation in 1966-1976 and the recovery and deepening in 1977-1990, the research on the origin of agriculture in China has been deepened in different degrees. [1] The research focus has been on restoring the production and life style of human society and explaining the social development and its dynamic mechanism. Prehistoric industry is the scientific research that adapts to this change, and it is the trend and result of deepening research on the origin of agriculture in China. Under the guidance of the academic situation of theorization, technicalization and multi-disciplinary exchange and integration, the prehistoric study of life and industry analyzes the relationship between the formation of human social and cultural status and geographical

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environment from a multi-dimensional perspective, which is essentially the scientific research content of the theory of human land relationship.

Prehistoric industry refers to a whole set of activities formed by prehistoric human beings obtaining survival materials, which is an important economic basis for the development of prehistoric society. The concept of birth and occupation usually has two meanings. In a broad sense, production includes gathering, fishing and hunting, agricultural planting and livestock raising, which reflects the combination mode of activities needed to obtain survival materials. In a narrow sense, farming only refers to the agricultural production activities of human society. This paper is based on the general concept of "Shengye". There are also other names such as "livelihood" and "employment economy", which are all expressed as shengye in this paper.

2. Statistics of achievements in prehistoric studies

The statistics of published time, quantity and category of existing achievements is the data basis for longitudinal observation and horizontal analysis of a certain research problem, which can reflect the stage of research process and the gradual progress of research depth. According to statistics, there are more than 100 journal papers, newspaper articles and works related to Chinese prehistoric life, among which 82 papers are published in China and the research objective is Chinese prehistoric life. The situation of prehistoric life mentioned in the public archaeological excavation report is not included in the statistical scope.

Table 1 shows the temporal and spatial classification of prehistoric students by the time period and space involved in the existing achievements horizontally, and the publication time and quantity of existing achievements vertically. According to Mr. Su Bingqi's theory of archeological cultural floristic types, the Neolithic culture can be divided into six regions: Shaanxi, Henan and Shanxi, Shandong and a part of its neighboring provinces, Hubei and its adjacent areas, the lower reaches of the Yangtze River, the southern region with Poyang Lake Pearl River Delta as the central axis, and the northern region with the Great Wall as the center. [2] Due to the limitation of archaeological data at that time, there are still blank areas in the six major regions divided by Mr. Su Bingqi. According to the existing research results, this paper adds three geographical spaces, namely, the North-South region of the Huaihe River (mainly refers to the Jianghuai and Huanghuai regions), Xinjiang region, southwest region (mainly including Yunnan, Guizhou, Sichuan and Tibet Autonomous Region). Although there is no clear archeological cultural flora in these three areas, the absolute age of some excavated sites is basically clear, and the mode of living and working also has obvious characteristics. In this paper, nine regions are taken as the criteria of spatial category. The Neolithic sites adjacent to the same cultural system can be judged according to the process of the emergence, development and extinction of culture. Therefore, this paper takes three absolute time periods of the Neolithic age as the criteria of time category. In the early Neolithic age, 9000-7000 years ago, 7000-5000 years ago, 5000-4000 years ago. [3]

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Four of the 82 articles dealt with two regions, so four data were repeated in the statistics.

Table 1 Statistics of the temporal and spatial studies of Chinese prehistoric life

Published time	Shaanxi,Henan and Shanxi neighboring areas					Part of Shandong and neighboring provinces			Hubei and adjacent areas		The lower reaches of the Yangtze River			The southern region with Poyang Lake and Pearl River Delta as its axis			The northern area centered on the Great Wall					The north and south of Huaihe River					Xinjiang region		South west China		Total
Number Space-time	E	M	L	L &M	F	E	M	L	L	F	M	L	F	E	L	F	E	M	L	E &M	M &L	F	E	M	L	E &M	F	L	F	L	F	
2000-2010	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0	1	0	2	0	0	0	0	0	0	1	1	9
2011-2015	1	0	2	0	2	1	2	1	0	2	0	0	0	0	1	1	3	2	4	0	1	1	0	0	0	0	1	0	0	1	1	27
2016-2020	1	1	4	1	1	1	2	2	0	2	2	1	4	1	0	3	3	2	1	1	1	7	1	1	1	1	0	1	2	0	2	50
Total	2	1	6	1	3	2	4	3	1	4	2	1	4	2	1	4	6	6	5	2	2	10	1	1	1	1	1	1	2	2	4	
	13					9			5		7			7			31						5						3		6		86

(Remarks: E: early phase; M: metaphase; L:Later period; F:full time)

Table 2 Statistics of research methods of existing achievements in Chinese prehistoric studies

Time Quantity Research path Research	Ecological environment	Human skeleton and animal remains	plant remains	Tools remains	Settlement remains	Single research method	Two or more research methods
2000-2010	4	5	2	5	2	4	5
2011-2015	10	19	21	11	5	2	23
2016-2020	8	33	32	10	6	20	28
Total	22	57	55	26	13	26	56
The ratio of the total number of articles in each research path to the total number of papers published (%)	26.51	69.51	67.07	31.33	15.66	31.33	68.29

Table 2 shows the research methods of existing achievements, it is mainly from the perspective of ecological environment, human skeleton and animal remains

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(human teeth, human bones, fish, wild animals, herbivorous animals and omnivorous animals), plant remains (large plants and micro plant remains), tool remains (bone clam, stone tools, pottery) and settlement remains (farmland, cellar, house site and tomb, pottery kiln), this paper studies prehistoric life by means of environmental archaeology, animal archaeology, plant Archaeology and settlement archaeology. The time and quantity of the published results are still the longitudinal, which shows the development and diversity of prehistoric research methods.

3. A study on the time and space of prehistoric life in China

Human beings choose their careers according to the natural environment. From the micro point of view, the regional differences of prehistoric natural environment shape different production and life styles; from the macro perspective, the long-term climate fluctuations and the changes of geographical elements in a large space cause the regional differences of production and living. With the evolution, exchange and renewal of prehistoric civilization, people in different cultural areas can actively select, move and expand their boundaries. They regulate the development form of life through different ways of resource utilization, tool manufacturing technology, and building construction methods, so as to achieve the maximization of survival materials. The regionality and chronology of prehistoric industry reflects the dynamic adaptability of human beings in the dynamic relationship between nature and culture. In view of the space-time characteristics of prehistoric industry, the existing achievements are strictly based on the theory of archeological cultural floristic types, with the development sequence of archaeological culture as the time line of the chronological study of the career, and the archaeological cultural area as the spatial scale of the regional study of the birth industry. It is an important aspect to discuss the research status, development trend and weak links of Chinese prehistoric industry.

(1) A longitudinal study on the research status of space and time

There are 82 research articles on Chinese prehistoric life. Nine papers were published from 2000 to 2010, 25 from 2011 to 2015, and 48 from 2016 to now. From the perspective of the number of papers published, the number of papers published during the 20 years has increased significantly, which reflects that the research progress of prehistoric industry has three stages. In the real sense, the research on prehistoric industry started at the beginning of the 21st century after the "agricultural origin fever". During the first 10 years, it was in the preliminary exploration stage, with few achievements and Limited space-time involved. The number of papers published in 2011-2015 increased significantly compared with the previous period, the research space was further expanded, and the focus of research space-time distribution became more prominent, which was the steady progress stage of prehistoric industry research; Since 2016, the number of papers published has doubled compared with the previous period, exceeding the sum of the previous 15 years. The research space has expanded to the whole country, and macro research of large regions has become the mainstream in the whole period. The study of prehistoric life has entered a vigorous development stage.

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1. Preliminary exploration stage (2000-2010)

The first prehistoric research articles on the trace of stone tools unearthed from Zhaobaogou site (Archaeology collection, 2006) and the research on the micro trace of fine stone leaves unearthed from Xinglongwa and Zhaobaogou sites (Western archaeology, 2006) are the earliest prehistoric research articles in China. The study of prehistoric life began in the northern region with the Great Wall as the center. Five articles were published, accounting for 55.56% of the total. There are 1 article in Hubei and its neighboring areas, the southern region with Poyang Lake Pearl River Delta as the central axis, and 2 articles in the southwest region. The number of existing achievements in the north and the south is basically the same. The adjacent areas of Shaanxi, Henan and Shanxi, Shandong and a part of neighboring provinces, the lower reaches of the Yangtze River, the north and south of Huaihe River and Xinjiang are all in the blank stage. The time category of prehistoric study of each region is concentrated in two forms: one is to study the birth and death of a certain archaeological culture as the time limit to study the birth and death of this archaeological culture distribution area. Second, the whole Neolithic period is taken as the standard to analyze the development of its life and career. However, both of them have the mistake of mixing the remains of different periods together to discuss students' career. According to the evolution sequence of pottery, the prehistoric culture, environment and life of the upper reaches of Dadu River is divided into four periods and five sections. Based on this time-space framework, this paper studies the students' career, it is the first attempt to study students' employment on the basis of the theory of floristic type.

2. Steady progress stage (2011-2015)

In this stage, the research space is further expanded, and the focus of spatial and temporal distribution becomes more and more prominent. The research space is still focused on the northern area with the Great Wall as the center. On the basis of the early stage, 8 new studies were conducted in the early, middle and late Neolithic period, and 3 papers were added in the middle and whole period, accounting for 44% of the total published papers. Results have been achieved in the neighboring areas of Shaanxi, Henan and Shanxi, Shandong and a part of neighboring provinces, and the north and south of Huaihe River. There are 5 articles in Shaanxi, Henan and Shanxi provinces, accounting for 20% of the total number of papers published. Among them, "Research on the resources, technology and employment of the Yellow River, the Yangtze River and the Xiliao River Basin from 3500 BC to 1500 BC" (China cultural relics daily, 2012) and "comparative study on the prehistoric mode of employment between the upper reaches of the Western Liaohe River and the Central Plains region" (Journal of Liaoning Normal University (SOCIAL SCIENCE EDITION), 2015). The two articles are a comparative study of prehistoric life in the north and the neighboring areas of Shaanxi, Henan and Shanxi centered on the great wall area. There are three new articles in the middle Neolithic period and one in the late Neolithic period in Shandong and some neighboring provinces. Two full-time Neolithic studies were added in Hubei and its adjacent areas. In the whole period of Neolithic age, there are 1 article in the southern region with Poyang Lake Pearl River Delta as the central axis, the South-North region and the southwest

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region of Huaihe River, and the South and southwest region of the late Neolithic age. However, the lower reaches of the Yangtze River and Xinjiang are still in the blank stage. The research time is mainly the late Neolithic period and the whole period, with 17 papers in total, accounting for 68% of the total published papers.

3. Vigorous development stage (2016-2020)

In this stage, the number of papers published increased rapidly, the spatial scope extended to the whole country, and the whole period of Neolithic research occupied the mainstream. In this stage, the research still focused on the northern part of the great wall area, with a total of 15 articles, accounting for 30.61% of the total number of papers. Among them, there were 7 studies on the whole period of Neolithic age, which was the most studied content in this stage. A preliminary study on the employment situation of the middle reaches of the Yellow River and North China from 10000 to 5000 years ago (southern cultural relics, 2018) and an analysis of the mode of employment from the late Yangshao era to the Longshan era in Northern Shaanxi (Journal of Liaoning Normal University (SOCIAL SCIENCE EDITION), 2018) fill up the blank of the study on the employment in Shaanxi, Henan and Shanxi provinces in the middle Neolithic age. The lower reaches of the Yangtze River and Xinjiang have stepped out of the blank stage, especially in the lower reaches of the Yangtze River, which started late but developed rapidly. It has published 2 papers in the middle and late Neolithic period, 1 article in the late Neolithic period, and 4 articles in the whole period, with a total of 7 articles, which are second only to the northern part of the great wall area, the neighboring areas of Shaanxi, Henan and Shanxi, Shandong and a part of neighboring provinces. Although Xinjiang is not as far as the lower reaches of the Yangtze River, it has also published one article in the late Neolithic age, two in the whole period, and three in total. In contrast, although the study of prehistoric life in Hubei and its adjacent areas started earlier, its development is still in a stagnant stage for the time being.

(2) A horizontal analysis of space time research

On the whole, the spatial study of Chinese prehistoric industry shows a situation of "more in the north than in the south, and the distribution of each flora is uneven". There are 28 articles in the northern region centered on the Great Wall, 11 in the adjacent areas of Shaanxi, Henan and Shanxi, 9 in Shandong and some parts of neighboring provinces, 7 in the lower reaches of the Yangtze River and the southern region with Poyang Lake Pearl River Delta as the central axis, 6 in the Southwest region, 5, 4 and 2 in the north of Huaihe and Henan, Hubei and adjacent areas, and Xinjiang. In addition, the two articles "Research on the resources, technology and production of the Yellow River, the Yangtze River and the Xiliao River Basin from 3500 B.C. to 1500 B.C." and "a comparative study on the prehistoric mode of production between the upper reaches of the Western Liaohe River and the Central Plains" mainly discussed the northern region centered on the great wall and the adjacent areas of Shaanxi, Henan and Shanxi. The regional characteristics of the industrial economic structure in northern China at the beginning of the introduction of crops and livestock in the western part of the old continent (Huaxia archaeology, 2017) and the Bioeconomics in the pre Qin period in the upper reaches of the

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Yangtze River respectively discuss the northern region and Xinjiang region, the southwest region, Hubei Province and adjacent areas with the great wall area as the center.

1. The northern area centered on the Great Wall

The northern area with the Great Wall as the center is the key area of prehistoric research. From east to west, it includes the northeast area with ZHAOMENG as the center, Hetao area with Longdong as the center, Gansu, Qinghai and Ningxia as the center. [4] Among them, Hetao area is the weakest in prehistoric research, and some achievements have been made in Northeast China and Gansu Qingning area.

Western Liaoning Province is the beginning and focus of the study of prehistoric life in northern China. There are 11 papers published, accounting for 37.93% of the total. The early, middle and late Neolithic archaeological culture pedigree of "Xinglongwa (Chahai) culture - Zhaobaogou culture - Hongshan Culture" has been formed in the early, middle and late Neolithic age, which provides a space-time basis for scientific exploration of prehistoric life in western Liaoning. There are 4 early Neolithic achievements in western Liaoning, 2 in the middle and 5 in the late Neolithic period, which basically clarify the status of prehistoric life. The early Neolithic period in western Liaoning was dominated by gathering and hunting activities. Agriculture appeared in the middle of the early stage, and was still at the primary agricultural level until the early late stage. In the middle period, agriculture began to play a role in human life. [5] In the late stage, fishing and hunting economy was the main mode of production, and various economic modes such as picking, animal husbandry and farming coexisted. [6] Millet as a representative of crops dominated, gathering and fishing were still an important supplement to human survival resources at that time. [7] According to the research on life industry from Neolithic Age to bronze age in eastern and northern Hebei Province (Liaoning Normal University, 2017), the connection between Northeast Hebei and Western Liaoning is reflected in the fact that the development process of the two regions is not simply in a certain form, but a mixture of agriculture, fishing and hunting, gathering, animal husbandry, handicraft and other forms. [8]

Nenjiang River Basin and Sanjiang plain to its East are also important areas of prehistoric research in northern China. Research on Neolithic life style of Nenjiang River Basin (Archaeology, 2007) and "from Angangxi bone fishing and hunting tools - livelihood mode of prehistoric ancestors in Nenjiang River Basin" (popular archaeology, 2017) all explained that the Neolithic life in Nenjiang River Basin was mainly fishing and hunting activities, which was a kind of "fishing and hunting Neolithic culture" with regional characteristics. [9] "Study on the way of life and business in the Neolithic Age in Sanjiang Plain" (Jilin University, 2009) describes the way of life of the ancestors of the Sanjiang Plain in the Neolithic age, mainly fishing and hunting. [10] Analysis of the change of the mode of living in Northeast China from hunting to agriculture from changes in the way of food acquisition (Jilin University, 2007) and preliminary study on the life of Northeast China from the Neolithic Age to the pre Qin period (southern cultural relics, 2016) both take the whole northeast region as the research space, and the latter divides the northeast

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region into two large regions for a long period of time. It is believed that the northern part of Northeast China was mainly collecting and fishing in the Neolithic age, while a small amount of crops began to appear in the southern part of Northeast China at least 8000 years ago. At that time, it was possible to raise livestock. During the whole Neolithic age, the behavior of planting crops and raising livestock developed slowly in the northern and southern areas of Yanshan, but gradually became the main mode of production in the southern part of Liaodong Peninsula. [11]

The situation of prehistoric industry in central and Southern Inner Mongolia is basically clear. A preliminary study on the mode of life and industry of Shihu mountain type (Agricultural Archaeology, 2018) starts from a case study, and considers that farming is the main mode of living in the area where the Shihu mountain type is located, but collection is still an important means to obtain food. The hunting level is relatively high, and there is still a certain degree of fishing and hunting activities as a supplement.

At this time, although domestic animals have been domesticated, the scale is small and the degree is low. [12] A preliminary study on the mode of livelihood in the Neolithic Age in central and Southern Inner Mongolia from the perspective of production tools (Agricultural Archaeology, 2019) discusses from a macro perspective that agriculture and raising livestock were the main means of production in the early and middle Neolithic period in central and Southern Inner Mongolia, supplemented by means of fishing, hunting and gathering. In the late Neolithic age, the way of living had a fundamental change. Handicraft industry such as architecture and pottery developed into a new way of living with equal emphasis on agriculture and hunting. [13]

With the establishment and improvement of the archaeological cultural pedigree in Gansu, Qinghai and Ningxia, the research on its prehistoric life has also made achievements. The main research achievements in the Qinghai River Valley area are "Discussion on the ancient environment and life mode reflected by the animal and plant remains of jinchankou site" (Journal of Qinghai Normal University (PHILOSOPHY AND SOCIAL SCIENCES EDITION), 2014) and "A preliminary study on the differences of Qijia culture and career mode in Qinghai River Valley" (Journal of Qinghai Normal University (PHILOSOPHY AND SOCIAL SCIENCES EDITION), 2015), through case study and overall study, the results show that there are differences and differentiation in the three river valley areas: the Yellow River Valley, the Huangshui River Valley and the Datong River Valley. [14] "The upper and lower reaches of the Yellow River" and "cultural transformation in the upper reaches of the Yellow River" and "the upper reaches of the Yellow River" and "the upper reaches of the Yellow River" and "the upper reaches of the Yellow River" and "the upper reaches of the Yellow River". It is considered that although the main line of "hunting and gathering - millet based agriculture - millet and millet dry farming - combination of agriculture and animal husbandry" is relatively unified in Gansu, Qinghai and Ningxia, the production mode itself and its transformation are very complex, and there is a situation of repeated production mode. [15]

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Research on the employment economy of Peiligang era in northern China (Shandong University, 2014) and the settlement life and employment mode selection of Peiligang era in northern China (Agricultural Archaeology, 2018) focus on the long process of the whole northern region from collecting and hunting to developing into agricultural production.

2. The neighboring areas of Shaanxi, Henan and Shanxi

The adjacent areas of Shaanxi, Henan and Shanxi are the hinterland of Chinese civilization, including Henan, Shaanxi, Shanxi and parts of Southern Hebei. The focus of the study of Shaanxi prehistoric industry is the Northern Shaanxi and Guanzhong areas. In Northern Shaanxi Province, the late Neolithic period is the main research area. The mode of life and business in the late Longshan period in Northern Shaanxi Province: Taking the remains of plants and animals from the muzhuzhuliang and shengedaliang sites as examples (Agricultural Archaeology, 2017), four articles, including "analysis of the mode of living from the late Yangshao era to the Longshan era in Northern Shaanxi" (Journal of Liaoning Normal University (SOCIAL SCIENCE EDITION), 2018) and other four articles basically summed up the development process of the three stages of the mode of living in Northern Shaanxi, that is, the late Neolithic period was dominated by agriculture, supplemented by animal husbandry and supplemented by hunting. In the early stage of the late Neolithic period, it was dominated by mixed farming and animal husbandry, supplemented by hunting. Finally, in the late Neolithic age, the mode of production was mainly animal husbandry, supplemented by agriculture and supplemented by hunting culture. [16] "The biological archaeological evidence of the evolution of human life mode in Guanzhong area in the Neolithic Age" (ACTA Anthropologica Sinica, 2018) clarifies the temporal and spatial differences and development context of prehistoric industry in Guanzhong area.

There are two research articles on prehistoric life in Shanxi Province, which only relate to the late Neolithic age. There are three research articles on prehistoric industry in Henan Province, namely, the dynamic research on the life form of Jiahu Site in Wuyang (University of science and technology of China, 2014) and the Enlightenment of stable isotope analysis on the economic complexity of prehistoric industry: Taking the Wadian site in Yuzhou, Henan Province as an example (Chinese archaeology, 2017), all of them are mainly case studies. But at present, only the Jiahu Site has been systematically excavated and studied in the early Neolithic sites, and there is a lack of specific details of the living conditions of other sites, [17] and the comparative study of different periods and regions is also seriously lacking. A preliminary study on the living conditions of the middle reaches of the Yellow River and North China from 10000 to 5000 years ago (southern cultural relics, 2018) clarifies that prehistoric industry in the upper reaches of the Yellow River and North China has experienced a gradual development from collecting, fishing and hunting to cultivating crops and domestic animals. The process of gathering, fishing and hunting as a supplement, [18] and further explains the differences of the development of industry between Shaanxi and Henan.

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3. Part of Shandong and its neighboring provinces, the lower reaches of the Yangtze River, and the southern region with Poyang Lake Pearl River Delta as its axis

The study of prehistoric industry in Shandong and some neighboring provinces is based on the framework of "Beixin Dawenkou Longshan culture". Haidai area has the most research results, Liaodong Peninsula and Haizhou Bay area have also made some achievements. There are 2 early, 3 and 2 late achievements in the Neolithic Age in Haidai area. The development of prehistoric industry in Jiaodong Peninsula, northern Shandong, Central South Shandong, western Shandong and Northern Anhui has been basically clarified, but there has never been a full-time study of prehistoric industry. "The economic and social progress of life in Haizhou Bay Area during the Longshan period" (Agricultural Archaeology, 2013) and "from fishing and hunting to food production: stable isotope records of animal domestication at Xiaozhushan site, Guanglu Island, Dalian" (southern cultural relics, 2017) respectively illustrate the late Neolithic and mid Neolithic life forms in Haizhou Bay area and Liaodong Peninsula.

The lower reaches of the Yangtze River mainly include Ningzhen area, Taihu Lake area and Ningshao plain area. [19] The research focuses on "Majiabang Songze Liangzhu" culture sequence, which is the most widely distributed in Taihu Lake area. The study on the life form of the lower reaches of the Yangtze River from the Neolithic Age to the pre Qin period (I) (II) (southern cultural relics, 20182019) studies the lower reaches of the Yangtze River as a whole region. Based on the establishment of archaeological cultural flora in the lower reaches of the Yangtze River, it is found that in the early Neolithic age, there were agricultural factors represented by rice cultivation. In the middle stage of the Neolithic period, the agricultural economy was in full swing, and the economic model supported by rice intensive production and pig feeding was established. [20]

The spatial scale of the study of southern China takes "Lingnan" as the center, including the whole territory of Guangdong and Guangxi, as well as parts of Hunan and Jiangxi provinces. A number of articles, represented by the research on the temporal and spatial framework and livelihood mode of Neolithic culture in Lingnan area (Jilin University, 2016), first systematically combed the temporal and spatial framework of Neolithic archaeological culture in Lingnan area, then studied the sequence and types of the division, and then summarized the evolution of prehistoric life in Lingnan area. In addition, there are also studies on the life economy and its development stage in the cultural area in the middle reaches of Xijiang River (Huaxia archaeology, 2011) and the livelihood mode of innovation bridge culture and the origin of prehistoric agriculture in Guangxi (Journal of the Central University for Nationalities (PHILOSOPHY AND SOCIAL SCIENCES EDITION), 2020), etc.

4. Southwest region, Huaihe River north and south area, Hubei and adjacent areas, Xinjiang region

The study of prehistoric industry in Southwest China mainly focuses on the Western Sichuan Plateau, Hengduan Mountain Area in Northwest Yunnan and the

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middle reaches of Nujiang River. A preliminary analysis of prehistoric culture, environment and living industry in the upper reaches of Dadu River (Sichuan cultural relics, 2007), and archaeological observation of life economy from Neolithic Age to early iron age in Western Sichuan Plateau Area (JOURNAL OF SOUTHWEST UNIVERSITY FOR NATIONALITIES (HUMANITIES AND SOCIAL SCIENCES EDITION), 2014) .This paper discusses the types and distribution of the Western Sichuan Plateau, and compares and analyzes the similarities and differences between the upper reaches of the Minjiang River and the Dadu River Basin. "Analysis of animal remains and life mode of karuo site: Observation of prehistoric agriculture in Hengduan Mountain Area (Sichuan cultural relics, 2007)" and "Research on human activities and utilization of animal and plant resources from Paleolithic to bronze age in Northwest Yunnan" (Lanzhou University, 2016) respectively combed the living conditions of Hengduan Mountain area and the middle reaches of Nujiang River from the perspective of individual cases and the whole.

The north and south areas of Huaihe River mainly refer to Jianghuai and Huanghuai regions. Among them, the research on the lower reaches of Huanghuai river is the most comprehensive. A preliminary study on the ways of life and business for the ancestors to obtain animal resources in the lower reaches of Huanghuai River in the early and middle Neolithic Age (southern cultural relics, 2018)

And "a preliminary study on the life of the lower reaches of the Huanghuai River from the late Neolithic period to the end of the Neolithic period" (southern cultural relics, 2017) basically clarified the development of prehistoric life in the lower reaches of the Huanghuai river. The relationship between prehistoric environment and industry economy in prehistoric Jianghuai region (Chinese agricultural history, 2013) discusses the relationship between prehistoric environment and living industry in Jianghuai region. However, Jianghuai is a transitional zone, and the relatively narrow region makes the development of prehistoric culture here, although there are sporadic, short-term and synchronous prosperity in individual points, there is no significant performance in general, [21] so the overall study of prehistoric life is difficult. In the middle and lower reaches of Huaihe River, the second phase of shunshanji site and houjiazhai site are taken as case studies.

The study of prehistoric industry in Hubei and its adjacent areas includes Nanyang Basin in the middle reaches of the Han River and the Three Gorges area of the Yangtze River. Types of prehistoric sites and characteristics of living environment in the Three Gorges area of the Yangtze River (Journal of Jiangsu Institute of Education (NATURAL SCIENCE EDITION), 2008). And "prehistoric living and living in the Three Gorges area" (Nanjing Normal University, 2014) elaborated the dynamic relationship between the spatial distribution, environmental characteristics and the diversity of life and career development of prehistoric sites in the Three Gorges area. The geographical distribution, transmission path and production mode of Neolithic culture in Nanyang Basin (ACTA geographica Sinica, 2015) shows that the prehistoric industry of Nanyang basin is: collection and fishing

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millet farming in the early Neolithic age, rice farming in the middle period and rice millet mixed operation in the late Neolithic age. [22]

Archeological observation of prehistoric nomadic life: analysis of prehistoric settlement in Western Tianshan Mountain, Xinjiang (western region research, 2018) and Research on Xinjiang's life industry from Neolithic Age to pre Qin period (southern cultural relics, 2019) point out the characteristics of farming and animal husbandry in Xinjiang.

4. The research path of Chinese prehistoric life

The scientific theory and method of reconstructing the production and life style of prehistoric society and explaining the evolution and dynamic mechanism of prehistoric industry by using the information of relics and remains is the research path of prehistoric industry. The choice of research path deeply reflects the trend of multi-disciplinary integration and quantitative analysis of prehistoric studies, and determines the quality and development prospects of research. The effective analysis of the research path of the existing achievements is helpful to better understand and update the theoretical basis and research methods of prehistoric life.

(1) Theoretical basis

The space-time theory of prehistoric study is based on the theory of archeological cultural flora type. According to the cultural stages and the division of cultural regions, it is the space-time framework of prehistoric career discussion. In terms of time, it solves the problem of mixing the remains of different cultural periods together, but at the same time, it shows some limitations in the space category. Production is a collection of production modes to obtain food, which reflects an economic form. Therefore, the employment space is more economic space reflecting the optimal allocation and regeneration of resources. The archaeological cultural area refers to a community of relics and relics with corresponding appearance characteristics created by human beings within a certain space-time range and reflecting their various social activities and related to the environment, [23] the emphasis is on the homogeneity of cultural features. The relationship between cultural space and employment space is an open question. If, under the prospect that the study of prehistoric employment restoration in each region is complete enough, according to the division standard of homogeneity of students, the space limit of archaeological cultural area can be broken through, the stage performance of the development of life industry can be divided into stages, the space-time framework of prehistoric employment can be established, and the theory of prehistoric birth industry type can be formed. On the basis of the theory of prehistoric birth industry type, we can better promote the research on the relationship between the production area and the cultural area, the relative level of the industry, the center area of the industry, the relationship between the evolution track of the industry and the natural environment.

The establishment of the theory of prehistoric origin type can follow the following principles: 1. Making clear the spatial attribute of "district" is the

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geographical space to show the homogeneity of students and occupations. "System" is the attribute of time, which expresses the historical development of a certain area. "Type" is the subordinate space of "district", and also has spatial attribute, which shows the heterogeneity of endogenous industry in "district". 2. In addition to archaeological data as the main information reference, we should also consider the driving role of ethnic attributes, the theoretical origin of archeological cultural flora types and the changes of natural environment on the employment areas. 3. The regional characteristics and development paths of these areas are different, and the development stages and levels are roughly synchronized. 4. The production areas are not isolated but closely related. Such as production tools improvement, crop dissemination, agricultural technology exchange, etc.

(2) Research methods

The change of prehistoric research methods is closely related to the establishment of science and Technology Archaeology and the development of technology. Since the 1920s, Chinese Archaeology began to establish a discipline system and gradually developed, realizing the transformation from epigraphy to modern archaeology. In this period, scientific and technological archaeology was still in its infancy. In the 1980s, with the development of science and technology, archaeology and science and technology were increasingly linked. The main achievements of this period are carbon 14 dating technique and Mr. Zhu Kezhen's preliminary study on climate in China in the past 5000 years. Since the 1980s, the development of scientific and technological archaeology shows the characteristics of international, multi-disciplinary and comprehensive, and the research of scientific and technological archaeology runs through the whole process of archaeological research, and the research in all aspects is basically systematic, and the combination of various methods is achieved. [24] At present, the research methods of prehistoric life include five categories. The first is the shaping effect of natural ecological environment such as climate and landform on human activity space and cultural form; the second is to analyze the stable isotope of human and animal bones to reflect the acquisition of meat resources in human diet structure and the relationship between human and animals; The third is to use the large plant and micro plant remains for flotation analysis, sporopollen analysis, Phytolith analysis and starch grain analysis to explain the occurrence and evolution of agriculture; the fourth is to use tool remains to carry out micro trace analysis to clarify the production mode; the fifth is to use the settlement form, scale and other settlement heritage information to explain the life and cultural development of human society.

According to table 2, we can roughly see that from the initial stage of exploration, the research methods of prehistoric life show the characteristics of diversity and comprehensiveness. The number of articles using single and multiple research methods is almost the same. In the stable development stage, the methods of animal Archaeology and plant archaeology have been widely used, and the research on prehistory based on various methods has become the mainstream. The vigorous development stage continues the development trend of the previous stage, and the animal and plant archaeological methods are still in a strong momentum, while environmental archaeology, settlement archaeology and tool remains analysis are

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relatively slow. Due to the gradual specialization and scientization of scientific and technological archaeological methods, the number of articles on prehistoric life with a single method has increased greatly. As a whole, prehistoric studies are still based on a variety of comprehensive methods, accounting for 68.29% of the total achievements. Human skeleton analysis and animal and plant archaeology are the most widely used methods, accounting for 69.51% and 67.07% of the total achievements respectively.

(3) System establishment

As prehistoric life includes many specific forms, a single remains information can not accurately reflect the situation of life in a certain space-time range, so it is a more scientific method to carry out the research of prehistoric life with a variety of remains information. Based on the existing research approaches, this paper puts forward the concept of "alternative index system of prehistoric employment". The alternative index system of prehistoric employment refers to an organic whole composed of several relatively independent and interrelated surrogate information indicators reflecting the inherent nature of prehistoric employment. The first level indicators generally include ecological environment, tool remains, plant remains, animal remains and settlement remains. Then, according to the specific situation in a certain space-time range, appropriate secondary alternative indicators or more should be selected within each level of alternative indicators to form a multi-level alternative index system for prehistoric life, and a comprehensive analysis of convergence and divergence is carried out step by step under the same production system. In the practical process of the research, we should try our best to ensure its integrity and systematicness. We can't draw one-sided conclusion only by single index. As a substitute index, it should have obvious response to the change of employment, clear response principle and clear meaning of employment substitution. Taking animal remains as an example, the ratio of the number of wild animal remains to those with obvious domestication can be used to infer the occurrence and development of animal husbandry, especially the relative decrease of herbivorous animals and the increase of omnivorous animals in domestic animals, and the degree of human settlement and industrialization can be inferred. Only when the human settlement life has begun to take shape and the agricultural planting develops efficiently, can a certain number of omnivorous animals appear when human beings have the ability to store food.

Similarly, although there are various and highly specialized methods in prehistoric studies, a single research method can only solve one aspect of the problem, and cannot explain the overall form of the study. It is necessary to establish a comprehensive research method system to sum up and analyze the information of remains with the "alternative index system of prehistoric life". Under the joint action of the two systems, the scientificity of prehistoric research can be guaranteed. The establishment of research method system depends on many factors, such as the possession of remains information, the scale and complexity of alternative index system, the research level and experience of researchers. Therefore, it is necessary to accelerate the development of environmental archaeology, settlement archaeology and tool remains analysis in a relatively slow stage, continue to maintain the

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development trend of human skeletal remains and animal and plant archaeological methods, cultivate technical talents related to scientific and technological archaeology, and establish an international, multidisciplinary and comprehensive research team, so as to realize the specialization and optimization of various research methods.

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