

Summary of Research on Ancient Water Conservancy Facilities in Wulongkou, Jiyuan City

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Abstract: The ancient water conservancy facilities in Wulongkou, Jiyuan, as the most important water diversion irrigation system in northwestern Henan, are an integral part of the research on the history of irrigation and engineering technology in China. As the material carrier of people's irrigation activities in this area in history, the ancient water conservancy facilities of Wulongkou in Jiyuan condensed the marks of different times, reflecting the technological level and irrigation ideas of different times. Sorting out related researches on ancient water conservancy facilities in Wulongkou will help us understand and clarify its historical, scientific, and artistic values, and clarify the situation and tasks of its protection and development. This is important for establishing a scientific outlook on water conservancy development with Chinese characteristics. Promoting the modernization of water conservancy has important practical significance.

1. Introduction

China is a large agricultural country, and water conservancy is the lifeblood of agriculture and the national economy. Since ancient times, the establishment of water conservancy projects has been regarded as one of the strategic measures for Anbang, the country, and the people. For this purpose, numerous water conservancy irrigation projects have been built and abundant farmland irrigation technologies have been accumulated. As early as the Neolithic Age, the ancestors began to use bone ploughs, stone ploughs and earthbreakers in low-lying areas to build ridges, drain fields, and divert water for irrigation. According to legend, more than 4,000 years ago, Dayu produced ditching technology in large-scale water control activities. Through the development of the Xia, Shang, and Western Zhou periods, a farmland ditching system was gradually formed. During the Spring and Autumn and Warring States period more than two thousand years ago, large-scale water storage engineering technology and large-scale irrigation channel engineering technology were produced. Dujiangyan in the Chengdu Plain in Sichuan is a testimony to the superb level of irrigation engineering technology during the Spring and Autumn and Warring States period. In northern China, due to the arid climate, low rainfall, large plains and low density of rivers, long-distance water diversion and irrigation channels are often built to adjust the water status of farmland and regional water conservancy conditions, enhance agricultural resilience and maintain food production. Stable development. The ancient water conservancy facilities in Wulongkou, Jiyuan City, Henan Province, which were built in the Qin Dynasty and have been in use today, are representative of the water diversion and irrigation canals built by the ancestors in northwestern

Henan.

2. Overview of Ancient Water Conservancy Facilities in Wulongkou

The ancient water conservancy facilities of Wulongkou in Jiyuan City are located in the northwestern part of present-day Henan Province. It is a water conservancy facility system that uses water from the Qin River for irrigation. The Qin River is a first-level tributary of the Yellow River. The basin is located in the southeast of Shanxi Province and the northwest of Henan Province. The geographical coordinates are $110^{\circ} 55'$ - $113^{\circ} 30'$ east longitude, $35^{\circ} 37'$ - $37^{\circ} 08'$ north latitude, and the main stream is 485 long. Km, the basin area is 13,532 square kilometers. The ancient water conservancy facilities at Wulongkou in Jiyuan City were built in the Qin Dynasty. Ditches were opened on the south bank of the Qin River to divert water. The descendants have been dredged and used to this day. They have created the ancient developed agricultural industry in northwestern Henan and witnessed the ingenious use of nature by the ancient Chinese working people. The wisdom and wisdom to transform nature. Today, the ancient water conservancy facilities in Wulongkou have preserved the seven canal head relics of Guangji, Yongli, Guangli, Daxingli, Xiaoxingli, Ganlin, and Guanghui. Among them, Guangji, Yongli, Daxingli, Xiaoxingli, The five canal heads of Guanghui are the relics of Ming dynasty projects, the head of Ganlin canal is the relics of Qing dynasty projects, and the head of Guangli canal is a modern water diversion and irrigation hub project rebuilt on the basis of the head of Lifeng canal of the Ming Dynasty in 1958. In 2013, Jiyuan Wulongkou ancient water conservancy facilities were approved by the State Council and announced as the seventh batch of national key cultural relics protection units.

3. Research Status of Ancient Water Conservancy Facilities in Wulongkou

Bingjun wrote “Guangli Canal's Experience in Strengthening Management, Organization and Leading Economic Water Use” in the Z1 issue of “New Yellow River” in 1952, and summarized the Guangli Canal's experience in economic water use from four aspects. In 1953, “New Yellow River” published an article “Guangli Canal Irrigation Management Experience” in the third issue. It pointed out that “on the basis of the 600,000 acres of irrigated land in Guangli Canal, in 1953, it was vigorously implemented to organize scientific water use. Experience, guarantee to expand the irrigated land area by 100,000 mu,” vigorously promote “strengthening democratic management system”, “watering team is an organization combining irrigation and agricultural technology”, “late autumn, early watering and early planting, so as not to miss the sowing season, Adjust the amount of water to expand the area of irrigated land and produce more food”, “promote the experience of border watering, Qi watering, frequent watering, shallow watering, and river-well two watering”, “close integration of irrigation and agricultural technology”, “implementing dead-time survivorship” “Six experiences of scientific water allocation system”. Niu Zhongxun wrote “Historical Research on Water Conservancy Irrigation of Qin River River in North Henan” in “History Monthly” in 1965 08. According to historical order, according to historical documents and field investigation, he investigated the history of water conservancy irrigation of Qin River and pointed out that Qin River was located in Jiyuan City. Above Wulongkou, there is a plateau river valley with little benefit of irrigation. Below Wulongkou, there is an impact fan-shaped plain. The working people in ancient times took advantage of the situation and gradually built huge irrigation canals along the slopes of the fan-shaped plain. Zhang Ruyi wrote “A Preliminary Study of Ancient Hydraulic Structures in Qin River Guangli Canal” in the 12th issue of “Journal of Hydraulic Engineering” in 1984. He introduced modern engineering technology knowledge into the construction of ancient hydraulic buildings in Guangli Canal. He made an analysis of the history of engineering in three aspects of the canal system. In 1987, Fang Yujin wrote “The Yellow River and

its tributaries in the Eighth Year of the Yellow River in Shunzhi” in the “Historical Archives” in 1987. “The Governor of the River Yang Fangxing played the six years of repairing money and food for the Qin River River in Hanoi County”, also for the study of Qin River River. Irrigation helps. In 1993, Zhang Ruyi wrote the book “History of the Qin River Guangli Canal Project”, and made a more detailed review of the changes in Guangli Canal. He has management experience in the irrigation area from four aspects: organization management, project management, water management, and production management. A brief discussion was conducted, and finally, his own suggestions were put forward for the rational development and utilization of the irrigation area. Ma Xueqin wrote “Farmland Water Conservancy in Northern Henan during the Ming and Qing Dynasties” in the third issue of “Ancient and Modern Agriculture” in 2000, which combed the history of water conservancy projects in the Qin River Guangli Canal Irrigation District. Wen Xiaoguo wrote the book “Summary of Qin River Water Conservancy” in 2001, which comprehensively introduced the development history of Qin River Water Conservancy. Zuo Huiyuan et al. in 2002 “Journal of North China Institute of Water Conservancy and Hydropower (Social Science Edition)” Issue 02 “The Cognitive Role of Ancient Water Conservancy Inscriptions in the Qin River Irrigation Area of the Lower Yellow River”, included some water conservancy inscriptions in this area to provide further research More first-hand information. Xie Shi wrote “Profit and Neighbors”-Irrigation Water Conservancy Development and Inter-county Relations in Northern Henan in the Ming and Qing Dynasties in the second issue of Qing History Research in May 2007. The article revolved around the two counties of Jiyuan and Hanoi during the Ming and Qing Dynasties. Water conservancy development in Heguangli channels, discussing how inter-county administration, local power and their interrelationships affect the water diversion technology, irrigation benefits, and farmland development in different periods, so as to reveal the 16th and 17th century irrigation in northern Henan System transformation and social changes in the history of water conservancy development. Hou Puhui, Henan University, in 2007, in his master's thesis “Research on Farmland Water Conservancy in Henan from 1927 to 1937”, outlined the management system, management institutions and their operations, and farmland water conservancy disputes in the Qin River Guangli Canal Irrigation Area. And its solution. The “Qin River Chronicles” compiled by the Yellow River Affairs Bureau in 2009 introduced the general situation, hydrology and development projects of the Qin River. In 2010, Li Guoyong of Zhengzhou University wrote “On Farmland Irrigation in Henan during the Ming and Qing Dynasties” in the 11th issue of Anhui Agricultural Sciences. He discussed canal irrigation, the basic form of farmland irrigation in Henan during the Ming and Qing Dynasties, and briefly analyzed and studied Qin River Guangli. Canal irrigation technology in canal irrigation area. In 2011, Cheng Sen of Shaanxi Normal University focused on the use of water resources in the irrigation area of Guangli Zhuqu irrigation areas in the lower reaches of the Qin River River in his doctoral dissertation “Study on the Regional Interaction of the Junction Area of Zhiyu, Shanxi, and Shandong during the Ming and Qing Dynasties”. The level of interaction between water conservancy development, the establishment of water use order, the process of water conflict and coordination. In 2012, Chen Liangjun and Li Baohong of the Cultural Relics Administration of Jiyuan wrote “Investigation and Analysis of Water Conservancy Facilities in Wulongkou, Jiyuan” in “Journal of North China Institute of Water Conservancy and Hydropower” (Social Science Edition) Vol. 28, Issue 5, in “Journal of Jiyuan Vocational and Technical College” Volume 11, Issue 3, “Archaeological Research on Wulongkou Water Conservancy Facilities”, analyzes the value of Guangli Canal from the aspects of geographical overview, regional distribution of cultural relics, channel construction, cultural relics and architectural features, and archaeological value. In 2013, Fei Xianmei of Zhengzhou University discussed the use of water resources in the Qin River Guangli Canal Irrigation Area in his doctoral dissertation “Research on the Water Dispute Resolution Mechanism in Western Henan

in the Qing Dynasty”, and then analyzed the types and disputes of water disputes Resolution methods, basis for dispute resolution, and experience and lessons. In 2014, Zhao Jianxin of Shaanxi Normal University used Guangli Zhuqu as an example in his master's thesis “Research on Farmland Water Conservancy in Huaiqing Prefecture during the Ming and Qing Dynasties”. Jiyuan County and the downstream counties analyzed the disputes over the water diversion and water use of the Qin River and the water conservancy management system. In 2014, Hou Xinxin of Jiangxi Normal University gave a brief overview of the natural geography and human environment of the Qin River River Basin in his master's thesis “Research on the Industrial and Commercial Economics of the Qin River River Basin Since the Ming and Qing Dynasties”, and proposed that every branch canal in the Guangli Canal Irrigation District There is a manager, and a special person is responsible for the affairs of the channel. In 2015, Wang Yongfeng of Henan University made a historical review of the farmland water conservancy in the Guangliqu Irrigation District of Qin River River in his master's degree thesis “Research on Water Conservancy in Northern Henan during the Ming and Qing Dynasties”, and analyzed Jiyuan County in the Guangliqu Irrigation District of Qin River River in the Ming and Qing Dynasties. The competition with Hanoi County for water resources was analyzed. The Jiyuan City Cultural Relics Work Team published “Jiyuan Qin River Cultural Relics” in 2015, which used surveying, mapping, recording, and recording of ancient cultural relics, ancient architectural sites, and various cultural relics around Qin River Gorge with historical, artistic, and technological value around the Qin River Gorge. Photo, video, and geographic information collection systems carry out multi-dimensional collection and sorting of cultural relic information. In 2016, Zhang Qing and Lu Juan of Jiyuan Water Conservancy Bureau wrote “Jiyuan Water Culture Overview” in the 7th issue of “Henan Water Conservancy and South-to-North Water Diversion”, which briefly explained the application of Qin River and Qin River water conservancy irrigation, and explained the hardships in the Qin River water conservancy project. The entrepreneurial spirit, the collective wisdom of the masses, and the management method of irrigation are affirmed. In the first national survey of movable cultural relics and the rescue and protection of cultural relics in the inundated area of the estuary reservoir in the Qin River River Basin, the Jiyuan City Cultural Relics Bureau carried out a relatively comprehensive rubbing preservation of the inscriptions in the Qin River River area.

The research on the Qin River closely related to the ancient water conservancy facilities in Wulongkou, Jiyuan, the current domestic academic circles mainly focus on the following three aspects: (1) Research on dike engineering. The research of this kind of articles focuses on the technical level, such as Li Yushu's “Flood-causing Rainstorm Characteristics in the Qin River River Basin”, Zhang Baishan's “Discussion on Diversion Measures for the Deformed Reach of the Qin River River”, and Niu Erwei's “Qinshui River Governance Effect” Analysis, Feng Lihai et al. “Qin River Dyke Grade Argumentation”, Shi Ji'an et al. “Assessment of the Ageing of Qin River Dangerous Dam Bank Engineering”, Ma Jixing et al. “Analysis of the Sustainable Utilization of Water Resources in the Qin River River Basin”, the above articles use modern technology Standards to evaluate the safety of the Qin River River embankment project and introduce the climatic and hydrological characteristics of the Qin River River Basin. Ge Zhaoshuai's “An Outburst Flood in History-The Great Flood in the Qin River Basin in the Year” uses physical geography to analyze the causes of the eighteen year Qin River flood in Chenghua. These results provide a theoretical basis and historical evidence for the analysis of the natural environment of the Qin River River Basin. (2) Research on river changes. Representative works in this area include Shi Nianhai's “Evolution and Management of Rivers in the Yellow River Basin”, Yang Guoshun's “A Preliminary Study of the Siltation of the Lower Qin River and the Evolution of the River Course”, “The Changes of the Yellow Qin River in Henan”, and Niu Zhongxun and Sun Zhongming's “Northern Henan Qin Historical changes in the lower reaches of the river.” These treatises examine the historical changes

in the lower Qin River River and point out that the Qin River River is a river with great changes. Such treatises provide basic ideas and methods for this article to study the evolution of Qin River irrigation technology. (3) Research on water conservancy projects and water conservancy disputes. This is the focus of the current academic research on Qin River. Such articles include Xie Shi's "“Benefiting the Neighbors”-Irrigation Water Conservancy Development and Intercounty Relations in Northern Henan in Ming and Qing Dynasties”, Niu Zhongxun's “Historical Research on Water Conservancy Irrigation in North Henan Qin River”, and Zhang Ruyi's “Cong Yin Qin Ancient The historical evolution of the canal sees its relationship with the evolution of the river course” etc. Such articles are only confined to water conservancy projects and water conservancy disputes, and do not involve the technology and changes of the Qin River irrigation water diversion hub, and the technical analysis of the water diversion irrigation hub.

4. Foreign Related Research

When studying the development process of water conservancy in my country, foreign academic circles pay more attention to the discussion of water conservancy and feudal autocratic power, local power, culture, religion and social relations, but foreign academic circles still lack research on the entire Qin River irrigation related issues .

Judging from the status quo of foreign research, Japan has made a lot of research on Chinese water conservancy. Okazaki Fumio's "History of Jiangnan Cultural Development" (Hongbundo 1940) and Ikeda Shizuo's "Study on Chinese Water Conservancy Geography" (Saisha 1940) were the beginnings of Japanese research on the history of Chinese water conservancy; in 1965, Japan established the "China "Water Conservancy History Research Association", published the "Chinese Water Conservancy History Research" agency magazine, organized the compilation of "Chinese Water Conservancy Collection-Dr. Sato's Returning Memorial" (Tokyo Guoshu Publishing Association 1981 edition) and "Chinese Water Conservancy Review-Ichi Sato "Memorial of Doctor's Retirement" (Tokyo Guoshu Publishing Association, 1984 edition), discusses the water conservancy project of Bianhe River in Song Dynasty; "Research on Water Conservancy History in Qing Dynasty" edited by Japan's "Chinese Water Conservancy History Research Association" and Professor Morita Akira at Osaka City University (Tokyo Yaji Study, 1974 edition), "Research on the Social History of Water Conservancy in the Qing Dynasty" (Tokyo Guoshu Publishing Association, 1990 edition), "Water Conservancy and Regional Society in the Qing Dynasty" (China Bookstore Co., Ltd. 2002 edition) An in-depth analysis of the close relationship between the development and management of modern water conservancy and social and economic development; Yoshinobu Yoshioka's "Song Dynasty Yellow River History Research" (Ochanomizushufang 1978), Nagase Mamoru's "Song Yuan Water Conservancy History Research" (Tokyo Guoshukankai 1983 edition), "A Research on the History of Chinese Water Conservancy" by Takashi Kounami (Okayama University's Department of Literature, 1993 edition), Tieshanhiro's "Research on the History of Agricultural Economics in the Qing Dynasty-From the structure and surrounding visual From a historical point of view, such as "Oki" (Ocha's Water Study House 1999), Nishioka Hiroaki's "Modern China's Cities and Water Conservancy" (China Bookstore Co., Ltd. 2004 edition), etc. , Socio-economic history and urban water conservancy, and comparative study of water conservancy in Japan and China.

In Europe and the United States, in 1957, American Sinologist Karl A.Wittf published his masterpiece "Oriental Despotism: A Comparative Study of Extreme Power" (China Social Science Press,1989), which believed that the authoritarian system of Eastern countries including China Originated from the need for integrated coordination of water conservancy and irrigation, strong management and control, and thus put forward his"water governance society-Oriental despotism";

British anthropologist Maurice Friedman in "Clan Organizations in Southeast China" (Shanghai People's Publishing House, 2000 edition) expounds the relevance of agricultural irrigation and clan; American scholar Du Zanqi's "Culture, Power and State" (Jiangsu People's Publishing House, 2003 edition) explains through the inspection of water management organizations in Xingtai area "How cultural networks integrate state power and local society into an authoritative system". In 1978, Needham published "History of Science and Technology in China" (Science Press). Most of the fourth volume of the book was devoted to the discussion of China's water conservancy projects, which played an irreplaceable role in the study of Chinese water conservancy history. The well-known American economist and Far East research expert, Desi Perkins, discussed the development of traditional Chinese agriculture since the Ming Dynasty in the book "The Development of Agriculture in China (1368-1968)" (Shanghai Translation Publishing House, 1984). The situation, reasons and historical prospects, based on Ji Chaoding's research, re-examined ancient Chinese water conservancy projects, and explored the historical trends of water conservancy construction through comparison; in March 2014, Beijing United Publishing Company published Steven Mison And Hugh Misson's book "Flowing Power: How Does Water Shape Civilization?" " , the book explains the relationship between water and the development of human society, studying water from a multidisciplinary perspective, using cross-regional research methods, and finally revealing the relationship between water and human civilization, and interpreting human history from the perspective of water.

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