

## DISSERTATION ABSTRACTS

Compiled by Wen-Yi Huang\*

Fan, Rong. Ph.D. Yale University, 2021.

*Physiological Stress, Workload and Social Relations in Early Village Life before 5000 BP: Two Case Studies of Jiahu and Beiqian.*

The emergence of social inequality has long intrigued scholars across the globe. However, the issue of how and when social ranking emerged in early China remains understudied, because the archaeological features used to assess differentiation in social status, such as quantity and quality of grave goods and size of burials, are not discernable until the late Neolithic period, ca. 5000 BP, in China. Some scholars propose that social differentiation resulted from attitudes relating to natural factors, such as age and biological sex. Others think social differentiation was generated by social actions, such as the accumulation of differences during reciprocal exchanges. I hypothesize that social differentiation emerged from differences in health conditions, diet and labor in addition to age and sex and that it started before the Late Neolithic period in China.

My dissertation research is based on two case studies of Middle Neolithic sites in northern China: Jiahu (9000–7500BP, inland, Henan province) and Beiqian (5700–4900BP, coastal, Shandong province). These two sites had mixed subsistence strategies and have no indications of overt social ranking. In total, I evaluated 109 individuals from Jiahu (Phase I-17, Phase II-54, Phase III-38), and 43 individuals from Beiqian (Phase I-15, Phase II-10, Phase III-18). By examining their skeletal remains, I propose that social differentiation at Jiahu emerged from a combination of biological factors, such as sex and age, and social factors as evidenced by differences in both skeletal markers and mortuary treatment among spatially defined burial clusters in the cemetery. My research also reveals the importance of considering specific archaeological context when discussing issues such as trajectories to social complexity.

My dissertation employs osteological evidence, including dental changes resulting from physiological stress and diet in addition to discernible markers on bones produced by labor practices, to study the emergence of social complexity in China. Through an examination of skeletal parameters that reflect the general health and activity patterns

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of an individual's life, I investigate differences in health and workloads at several scales including comparisons of age, sex, intra-burial clusters, inter-burial clusters, intra-site, and inter-site patterns for all the phases at the Jiahu and Beiqian sites. Despite methodological challenges, the patterns of health indicators shows the process of incipient social differentiation. For instance, my study reveals that skeletal indicators for workloads are greater in certain segregated areas of the burials suggesting social differentiation within the community.

I take individuals—who interact with each other and form social relations through foodways and daily activities—as the most basic social unit. I explore how each individual relates to others in his/her social groups based on age, sex and spatially defined burial cluster in each community. To answer questions about social relations that archaeologists could not previously assess from traditional mortuary analysis, I analyze the osteological data in three steps. First, I assess the overall life quality of the population and social groups to determine the average range of stress and workload in that society. Second, I introduce a temporal scale to evaluate whether changes occurred in the overall life quality of these social groups between periods of the settlement. Lastly, I build an osteobiography for the individuals who stand out from the average patterns of their social group cohorts. Combining these osteobiographies with their mortuary treatment, such as grave goods and burial locations in relation to the other social members, I analyze the possible social roles of each individual and speculate what caused them to live a different life than their peers in terms of stress, diet and workload.

My results suggest that social differentiation existed beyond sex and age at Jiahu, while it was minimum at Beiqian. I reveal that Jiahu was a society with more individual autonomy where identity was expressed through mortuary practice. For example, individuals with skeletal markers of strenuous lives were buried with production tools that may indicate their occupations. By contrast, Beiqian society placed greater emphasis on community identity as evidenced by secondary commingled burials and skeletal markers of strenuous work across sampled burials, such as kneeling facets and degenerative joint diseases.

My research shows that contextualized osteoarchaeology provides additional evidence for long-standing debates on the emergence of social differentiation during the Neolithic period in China. It also cautions against ranking individuals solely based on mortuary treatment because of the challenge of understanding the concepts of wealth and value in ancient societies. An individual with a large quantity of grave goods could have been buried with his/her tools that he/she valued in life, but these objects might not have had a broader social esteem. Future

human osteobiographic studies will provide invaluable contributions to the discussions of initial social complexity.

Lin, Yi-Ling. Ph.D. Washington University in St. Louis, 2021.  
*Paleo-Environmental Pollution Of the Bronze Production During the Shang Period at Anyang, Henan Province, China*. Ann Arbor: ProQuest/UMI (Publication No. 28963331).

Paleo-environmental pollution is invested in both identifying anthropogenic activities and evaluating the environmental condition and its impact on humans to understand human-environment relationships and the human experience of the past. This project first investigates the environmental and health consequences of bronze production during the Shang period at Anyang. As a contribution to the growing scholarship in paleo-environmental and archaeological studies, this dissertation uses Shang bronze production in Anyang as a case study into how paleo-environmental pollution study can inform us about the on environmental and health conditions of lives in the Bronze Age China. Through geochemical analysis (ICP-MS, ICP-OES) of soil samples collected from different localities of the Shang Dynasty in Anyang, I investigate the condition in which severe metal pollution were released to the environment, and who were more vulnerable to that pollution based on their living and working environments. I demonstrate that bronze production workshop areas contain severe contamination of copper, lead, and tin in soil. This contamination caused by bronze production could cause hazards to the Shang bronze craftsmen as they worked and lived in the workshop areas. In addition, children who lived close to the workshop areas during Shang time were also threatened by these environmental pollutants. I then expand my focus to the methodology of paleo-environmental study. I review the current paleo-environment pollution research approach and argue that local paleo-environmental records collected at archaeological sites are more optimal in reflecting the environmental pollution of the Bronze Age, compared to offsite paleoenvironmental records. In addition, local paleo-environmental records can provide us with high-resolution information to study human experience at the individual level.

Wang, Qingzhu Wang. Ph.D. Yale University, 2021.  
*Copper Mining and Bronze Production in Shandong Province: A New Perspective on the Political Economy of the Shang State*.

This dissertation investigates the political economy and social dynamics in Shandong province, located to the east of the core area of the Shang state of China (ca. 1600–1050 BC), from the perspectives of bronze

production, distribution, and consumption. Influenced by the long tradition of centralized state power in China, Shandong has long been seen as an important area that was incorporated into the Shang Dynasty during the later Early Shang period (beginning ca. 1400 BC), mainly based on similarities in material culture. Considering an alternative to the “centralization” model, I propose a Negotiation Model, applying a network theory of states that sees the Shang as a decentralized state and the local elites in Shandong as active agents that may have contributed to the dynamics of the Shang state. The two competing models, the Centralization versus Negotiation Model, are tested by investigating how local elites in Shandong interacted with high elites in the Shang capitals in Henan through bronze production and exchange.

I apply a multi-proxy approach to test two pairs of contrasting material expectations: 1) whether bronze production existed in Shandong, and 2) whether local elites in Shandong managed to exploit local metal resources. My research includes three major aspects: 1) stylistic and scientific analyses (casting technology, alloy composition, trace elements, and lead isotope data) of bronze objects from multiple sites in Shandong, including Daxinzhuang, Liujiashuang, Xiaotun, Subutun, and Gucheng; 2) archaeometallurgical survey of possible copper mining and smelting sites in two copper-rich areas, Zouping and Laiwu; and 3) scientific analyses of metallurgical remains related to copper smelting and bronze casting from Daxinzhuang and Yingcheng in Shandong. This research reveals changes in bronze production and circulation in Shandong during different periods of the Shang and provides an opportunity to better understand the social and political dynamics of Shandong.

My surveys in copper-rich areas in Zouping and Laiwu and analyses of metallurgical remains related to bronze production at Yingcheng and Daxinzhuang provided evidence for major components of the operational sequence for the production of bronze objects in Shandong. I identified copper smelting slags from Yingcheng that are dated to the Shang period. The lead isotope data show that all the slags from Laiwu contain highly radiogenic lead, similar to the metallurgical remains and bronze objects from the Daxinzhuang early period (ca. 1350–1200 BC). The discovery of ceramic molds for producing vessels and my examination of copper ores, crucibles, and metal fragments provide new technical details about bronze production at Daxinzhuang.

My analysis of bronze objects from multiple sites in Shandong reveals that the nature of bronze production in Shandong (mainly at Daxinzhuang) changed over time. I argue that elites in Shandong changed their strategies for interacting with the high elites in the capital according to the dynamic socio-political situation. Even under the same political situation, elites from different sites would decide how they wanted to

collaborate or compete with the high elites based on their own interests. Thus, I argue that my Negotiation Model can better interpret the agency of local elites under the dynamic socio-political situation of a state. The decisions of high elites in the capitals and local elites in the surrounding areas both contributed to the dynamic nature of the Shang state.

My dissertation shows that studying the production and distribution of bronze objects, especially vessels, the most important high culture material during this period, provides a new perspective on the dynamic interaction between the high elites in the capitals and local elites in the surrounding areas. It also demonstrates the importance of incorporating multiple lines of evidence—including styles, casting technology, chemical composition, and lead isotope data—into the analysis of bronze objects in order to understand how the Shang states operated.

Wang, Fanghan. Ph.D. New York University, 2021.  
*Art, Agriculture and Frontier: Representing Granaries in Han China (206 B.C.E.-220 C.E.)*. Ann Arbor: ProQuest/UMI (Publication No.28320610).

Granaries are the most frequently represented architectural structure in Han China (206 BCE–220 CE). Even though they had existed in China since the pre-imperial period, granaries were never a major subject matter for artistic representation until the Han. Archaeological data inform us that granaries—represented as three-dimensional architectural models or in murals—suddenly emerged not only in significant numbers but also widely distributed across the vast territory of the empire. This rich corpus of material demonstrates multitudinous local variations for artistic expression, including the choice of media, style, decorative patterns, and pictorial motifs. Incorporating represented food storages into burials also became a legacy of the Han, persisting in the Chinese funerary practice long after the empire collapsed.

This dissertation provides a close reading on a range of granary representations from the frontier regions of Han and early medieval China, with the aim to reveal the complexity between art, agriculture, and frontier. By examining the visual and material remains with textual sources, I elucidate how art reflected agricultural activities on one hand and was appropriated to serve political and ritual purposes on the other. Focusing on the borderlands, this study also engages the discussion on the frontier imperialism by demonstrating how individuals utilized art to mediate and negotiate the imperial presence.

The dissertation is composed of four chapters, each based on one case study offering a comprehensive coverage of the historical span and the geographic spread of the Han Empire. The cases under investigation

are a group of granary models from the cemetery of Bayannur in west Inner Mongolia, an incised bronze granary model from a local magistrate's tomb in Hepu in Guangxi, the multiple granary images in the painted tomb of Horinger in south Inner Mongolia, and the visual program in a group of painted tombs at Foyamiaowan in Dunhuang, Gansu.

My research benefits from the recent development of new art history and its embrace of visual culture. My project is also facilitated by the revitalization of the study of material culture, especially considering objects as active agent in constructing and mediating social relations. It is further inspired by the study of empires, particularly the attention to imperial agents. Moreover, my inquiry marks one of the earliest attempts to bring environmental studies into art history.