

LUMINOSITY, SPIRIT, AND THE ROLE OF CLAPPER-BELLS IN THE FORMATION OF A CHINESE METALLURGICAL TRADITION

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Abstract

This article explores the manner in which the Eurasian metallurgical tradition was transformed into an indigenous tradition on the Chinese Central Plains. It argues that the association of luminosity with the divine has a cognitive foundation, which accounts for the use translucent stones and shiny metals, including copper, bronze, silver, and gold as mediums for religious artifacts throughout the world. In China, this association was the primary impetus for the development of an indigenous metallurgy based on a piece-mold and coring technology. Although the technology ultimately concentrated on the production of ritual vessels, it was first developed at Yanshi Erlitou 偃師二里頭 for the production of clapper-bells (*ling* 鈴), which had similar round hollow bodies.

We further explore the history of clapper-bells, arguing that they were a development of a Central Plains tradition dating back to the Yangshao 仰韶 period (5000–3000 B.C.E.). We argue that their religious significance at Erlitou lay in the previously unheard sound produced when the two luminous substances, jade and bronze, struck against one another. Thus, religious interlocutors at Erlitou used them to contact the ancestral spirits. Later, in the Yinxi 殷墟 period of the Shang Dynasty (ca. 1300–1050 B.C.E.), bronze clapper-bells were worn by dogs buried in tombs. We propose that their role there was a development of the earlier one; that is, they were used to contact the occupant's ancestral spirits as he was guided by the dog in the underworld.

Introduction

In the late third millennium B.C.E., metallurgy began to enter China from the Eurasian Steppe. In the second millennium, an indigenous metallurgical tradition took form at Yanshi Erlitou (ca. 1750–1530) on the

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Central Plains of Henan Province.¹ This new tradition was distinctive both in terms of the casting technology and the contents of the alloy. As A. M. Pollard et al. have stated,

Although, in all probability, bronze technology was introduced to China from the Steppe, the bronze-making traditions that emerged were distinct from those in the rest of Eurasia. The products of the many diverse bronze-making groups within China shared a combination of technical features unique to the area, namely an almost exclusive concentration on complex casting using decorated ceramic multiple-piece molds (rather than a combination of casting, forging and cold working), and the addition of lead to the predominant alloy of tin and copper.²

That is, a new, indigenous method of casting bronze, which was different from that introduced from the Steppe, was created after the introduction of metallurgy. This method of casting using piece-molds was made possible by the established tradition of high-temperature kilns for the production of ceramic vessels used in ancestral offerings.³ Moreover, the Steppe artifacts were predominantly copper or arsenic copper, whereas the bronze artifacts in the new tradition were primarily tin-bronze and used lead so that lower temperatures could be used in casting.

This new metallurgical tradition was also distinctive in the religious purpose to which it was put. Most of the metal artifacts found in the Steppe regions are small utilitarian objects, such as fishhooks, awls, and knives, or personal items, including bodily ornaments. In contrast, the bronze culture that developed on the Central Plains was focused primarily on the production of ritual vessels. As Mei Jianjun et al. have observed, “current archaeological evidence has presented a striking contrast between Northwest—North China and the Central Plains of China in terms of the uses of early metals, with personal ornaments predominating in Northwest-North China, while ritual vessels were most significant in the Central Plains of China.”⁴ These vessels, like the ceramic vessels that preceded them, were used for offerings to ancestral and nature spirits.

1. All dates given herein are B.C.E.

2. A.M Pollard, P. Bray, P. Hommel, Y. K. Hsu, R. Liu and J. Rawson, “Bronze Age Metal Circulation in China,” *Antiquity* 91 (2017), 674–75.

3. This point was first made by Noel Barnard, *Bronze Casting and Bronze Alloys in Ancient China* (Canberra: Australian National University and Canberra, 1961).

4. Jianjun Mei, Pu Wang, Kunlong Chen, Lu Wang, Yingchen Wang, and Yaxiong Liu, “Archaeometallurgical Studies in China: Some Recent Developments and Challenging Issues,” *Journal of Archaeological Science* 56 (2015), 221–32. See also Jianjun Mei, “Qijia and Seima-Turbino: The Question of Early Contacts between Northwest China and the Eurasian Steppe.” *Bulletin of the Museum of Far Eastern Antiquities* 75 (2003), 31–54; Jianjun Mei, *Copper and Bronze Metallurgy in Late Prehis-*

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In the following, we will discuss how this transformation in the technology and role of metallurgy took place. Traditionally, the development of bronze casting in ancient civilizations was understood in terms of social evolutionary theory. This was patterned on Darwin's theory of natural selection. The underlying assumption is that technological progress in ancient times was driven by the desire for material benefit. People preferred bronze tools and weapons because they were more effective than stone ones and that gave them an advantage over their neighbors. While the utility of bronze for weapons and tools was not entirely ignored when metallurgy entered China, we propose that the primary allure of metal was utilitarian but only in the larger—religious—sense; that is, people thought that metal could be used effectively in the performance of ritual sacrifice because of its luminosity. By using ritual artifacts made of luminous metal, the rulers could gain the approval and support of the spirits upon which they believed their lives and the welfare of their state depended.

We will first briefly discuss the cognitive association of luminosity and the divine. We will then trace the introduction of metallurgy in the Central Plains, with particular attention to the types of artifacts found at Shenmu Shimao 神木石峁 in Shaanxi Province (2300–1800 B.C.E.) and Xiangfen Taosi 襄汾陶寺 in Shanxi (2300–1900 B.C.E.) which served as intermediaries between the Steppe region and the Central Plains culture of the Mount Song region. It is widely recognized that the bronze tradition of the Central Plains was focused primarily on the production of ritual vessels. However, we will argue that this new technology was inspired in the first instance by the desire to produce metal clapper-bells (*ling* 鈴). The piece-mold and coring technology created to produce the hollow body of clapper-bells was then developed for ritual vessels, but this was a later development. Thus, we will examine the history and significance of clapper-bells as pottery artifacts in the Neolithic and then as bronze ones with jade clappers at Erlitou. We argue that the significance of clapper-bells at Erlitou lay in the new sound produced when jade struck against bronze. This sound was taken as a means of establishing contact with the ancestral spirits.

Luminosity and Spirituality

In ancient cultures throughout the world, translucent stones, such as jade, nephrite, turquoise, and gemstones, and shiny metals, such as gold, silver, copper, and bronze were commonly used to make reli-

toric Xinjiang: Its Cultural Context and Relationship With Neighbouring Regions (Oxford: Bar, 2000).

gious artifacts. We propose that this is because of a conceptual association between their luminosity and ideas of spirituality or divinity. This association is not only culturally and geographically widespread, but historically persistent. For example, in European cultures, Jesus and the Christian saints are traditionally portrayed with haloes or rays of light radiating outward. Even today, rays of light are used in cartoons and animated films to signify supernatural powers. And we still wear gemstones and gold bands to sanctify our relationships. The apparent universality and historical persistence of this association suggests that it is cognitive.

According to Lakoff and Johnson, conceptual metaphors are “mappings across conceptual domains that structure our reasoning, our experiences, and our everyday language.”⁵ Some conceptual metaphors are “primary” because they are “embodied”; that is, they are a consequence of our physiological nature and common experience of the world. Some examples are: AFFECTION IS WARMTH, HAPPY IS UP, SAD IS DOWN, INTIMACY IS CLOSENESS. These metaphors are part of our cognitive unconscious, and we acquire them automatically, but they are learned rather than innate. For example, we conflate affection with warm temperature from our experience of physical intimacy in infancy.

Primary metaphors are universal to the extent that we share a common physiology and experience of the world, but they are also culturally and linguistically filtered. As Maria Ortiz has explained,

[They are] part of our cognitive unconscious, inherent to the human being, a consequence of the nature of the brain, the body and the world we live in. We acquire them automatically and cannot avoid them. In the same way as physical experiences are universal, so are primary metaphors. But, in spite of being universal they are learnt and so each culture filters and adapts them in a different way.⁶

Accordingly, primary metaphors should occur cross-culturally. Thus, Joseph Edward Grady identified scores of metaphors found in diverse cultures, which he took to be primary. One of these was “LIGHT IS GOOD.” He explains its cross-cultural applicability in terms of feelings of

5. George Lakoff and Mark Johnson, *Philosophy of the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York: Basic Books, 1999), 47.

6. Maria J. Ortiz, “Primary Metaphors and Monomodal Visual Metaphors.” *Journal of Pragmatics* 43 (2011), 1569; see also Ning Yu, “Metaphor from Body and Culture,” in *The Cambridge Handbook of Metaphor and Thought*, ed. Raymond W. Gibbs, Jr. (New York: Cambridge University Press, 2008) 247–61.

safety and fear in the presence or absence of light.⁷ At a more fundamental physiological level, however, like other animals, we are physiologically attuned to the presence or absence of light, which is governed by celestial bodies; we wake when there is sunlight and go to sleep when the sun sets and the moon rises. We suggest that the association of luminous metals and stones with the spirit world is also the consequence of a primary conceptual metaphor. This primary metaphor can be rendered in Classical Chinese as: *ming zhe shen ye* 明者神也, “what is bright is numinous.”

This metaphor will be readily familiar to anyone acquainted with the early Chinese textual tradition. Both terms, *shen* and *ming*, have complex philological histories. *Ming*, “bright,” is a conventional description of ancestral and other spirits in early texts and bronze inscriptions. Even earlier, the oracle bone character for *shen* is a pictograph of lightning. However, the oracle bone graph was also used as a loan character meaning “spirit” (*shen*). Thus, the addition of the altar semantic (示) to the word meaning spirit served to distinguish the two meanings.

The source of this primary metaphor is probably a conflation of the light emitted by celestial bodies, the sun, moon, and stars, and their presumed divine power. Translucent stones and shiny metals shared this quality of luminosity. Thus, divine power was also imputed to them. Accordingly, ritual artifacts made with these materials were especially effective in communicating with the spirits.

The Introduction of Metallurgy from the Eurasian Steppes

Metal artifacts are commonly discovered in Chinese archaeological sites from around the turn of the second millennium B.C.E. The earliest such sites are in the Northwest, along Hexi 河西 corridor and the upper reaches of the Yellow River, where they are associated with the Qijia 齊家 (ca. 2300–1500) and the Siba 四坝 (or Huoshaogou 火燒溝) cultures (ca. 1900–1500).⁸ However, metal artifacts have also been found in sites in the Northeast, including the Daihai 岱海 cultures of Central

7. Joseph Edward Grady, *Foundations of Meaning: Primary Metaphors and Primary Scenes* Ph.D. dissertation (University of California, Berkeley, 1997), 27, 292.

8. Kathryn M. Linduff and Jianjun Mei, “Metallurgy in Ancient Eastern Asia: Retrospect and Prospects,” *Journal of World Prehistory* 22.3 (2009), 271; Chen Jianli, 陳建立, “Xian Qin shiqi yejinshu zhongxi jiaoliude liangci langchao” 先秦時期冶金術中西交流的兩次浪潮, *Zhongguo shehui kexueyuan gudai wenming yanjiu zhongxin tongxun* 中國社會科學院古代文明研究中心通訊 29 (January 2016); Beijing Keji Daxue Yejin yu Cailiao Yanjiusuo 北京科技大學冶金與材料史研究所 and Gansusheng Wenwu Kaogu Yanjiusuo 甘肅省文物考古研究所, “Huoshaogou Siba wenhua tongqi chengfen fenxi ji zhizuo jishu de yanjiu” 火燒溝四坝文化銅器成分分析及製作技術的研究, *Wenwu* 2003.8, 86–96.

Inner Mongolia.⁹ These regions are within a crescent-shaped cultural communication belt that was also connected with Western Eurasia.¹⁰ Accordingly, metallurgy was not introduced at one time and place, but repeatedly over a period of time.¹¹

Shenmu Shimao 神木石峁 and Xiangfen Taosi 襄汾陶寺

Two major settlements, Shimao 石峁 and Taosi 陶寺, prevailed along the Yellow River at the turn of the second millennium B.C.E. and were especially important as intermediaries between the Eurasian Steppe cultures and the Songshan region in the Central Plains. The Shenmu Shimao site is in modern Shaanxi Province near the upper reaches of the Yellow River. The Xiangfen Taosi site in the Linfen 臨汾 basin of southern Shanxi province is located on the Fen 汾 River, a tributary of the Yellow River. Roughly contemporaneous, they were probably antagonistic during at least some of the long period in which they coexisted. Nevertheless, they shared many cultural features.¹²

The Shimao settlement, covering approximately 400 ha., was larger in area than that of Erlitou.¹³ It was walled in stone and perched on a hill above the surrounding landscape. Some of the stones in the walls have carved images from an earlier time. The topography and the use of stone for walls at Shimao contrasts with Shandong Longshan period settlements, which were generally built in river valleys and walled in tamped earth. However, the structure of its core area, with its three main walled enclosures—a palace region and inner and outer enclosures—was similar.¹⁴ Most of the metal artifacts discovered at Shimao were not

9. Jianjun Mei, "Qijia and Seima-Turbino."

10. Tong Enzheng 童恩正, *Shilun woguo cong dongbei zhi xinan de biandi banyuexing wenhua chuanbodai* 試論我國從東北至西南的邊地半月形文化傳播帶, *Wenwu yu kaogu lunji* 文物與考古論集 (Beijing: Wenwu, 1987), 17–43; Anke Hein, ed., *The Crescent-Shaped Cultural-Communication Belt: Tong Enzheng's Model in Retrospect* (Oxford: Bar, 2016); Jessica Rawson, "China and the Steppe: Reception and Resistance," *Antiquity* 91 (2017), 375–88.

11. Katheryn Linduff, "The Emergence and Demise of Bronze-Producing Cultures outside the Central Plain of China," in *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*, ed. V. H. Mair (Philadelphia: The University Museum, 1998), 619–43.

12. Shao Jing 邵晶, "Shimao yizhi yu Taosi yizhi de bijiao yanjiu" 石峁遺址與陶寺遺址的比較研究, *Kaogu* 2020.5, 65–77, translated as Jing Shao, "A Comparative Study of Shimao and Taosi," *Chinese Archaeology* 21 (2021), 151–61.

13. Shaanxisheng kaogu yanjiuyuan 陝西省考古研究院, et al., "Shaanxi Shenmuxian Shimao yizhi" 陝西神木縣石峁遺址, *Kaogu* 2013.7, 15–24; Shaanxisheng kaogu yanjiuyuan 陝西省考古研究院, ed., *Faxian Shimao gucheng* 發現石峁古城 (Beijing: Wenwu, 2016).

14. Zhouyong Sun et al., "The First Neolithic Urban Center on China's North Loess Plateau: The Rise and Fall of Shimao," *Archaeological Research in Asia* 14 (2018), 33–45.

scientifically excavated, so they have no archaeological context and cannot be dated with assurance. Nevertheless, there is a clear relationship between many of these artifacts and those of the Northwestern Qijia and Siba cultures.

Taosi, further down the Yellow River, was also a regional center of great importance in this period (2300–1900). Although it shared many cultural features with Shimao, it had a closer relationship with the Central Plains cultures and was more significant as a cultural predecessor to Erlitou culture than Shimao. The site is best known for an early observatory, apparently used to mark seasonal changes by viewing the position of the rising sun. The size of the settlement, which was enclosed with tamped earth walls, approached that of Erlitou (almost 300 ha).¹⁵ Although the settlement hierarchy had three-levels, as opposed to Erlitou's four, many of the sub-settlements in the Taosi hierarchy were very large.¹⁶

Six metal artifacts have been excavated at Taosi. They are all copper or arsenic copper and include a toothed *huan* 環-bracelet, a vessel fragment, and clapper-bell, a loop, a small flat frog-shaped artifact, and a round *huan* with arc-shaped perforations. The frog-shaped artifact and *huan* with arc-shaped perforations are unique artifacts. The loop is similar to others found in the Steppe region. We will not discuss these three artifacts further here because they do not appear to be important for understanding the development of metallurgy. However, the other three artifacts are significant in this regard. The toothed *huan*-bracelet, like the loop, was a personal ornament that has equivalents at Shimao and in the Qijia culture. This type of toothed disk has not been found at Erlitou, but we will argue that it is related to other artifacts found there that have a pattern of concentric circles inlaid in turquoise. Thus, it supports the

15. Zhongguo shehui kexueyuan kaogu yanjiusuo Shanxi gongzuodui 中國社會科學院考古研究所山西工作隊 and Linfen diqu wenhuaju 臨汾地區文化局, "Shanxi Xiangfen Taosi yizhi shouci faxian tongqi" 山西襄汾陶寺遺址首次發現銅器, *Kaogu* 1984.12, 1069–71+1068; Zhongguo shehui kexueyuan kaogu yanjiusuo Shanxi dui 中國社會科學院考古研究所山西隊, Shanxisheng kaogu yanjiusuo 山西省考古研究所, and Linfenshi wenwuju 臨汾市文物局, "Shanxi Xiangfenxian Taosi chengzhi jisiqiu daxing jianzhu jizhi 2003 nian fajue jianbao" 山西襄汾縣陶寺城址祭祀區大型建築基址 2003 年發掘簡報, in *Xiangfen Taosi Yizhi yanjiu* 襄汾陶寺遺址研究, ed. Jie Xigong 解希恭 (Beijing: Kexue, 2007), 100–118 (originally published in *Kaogu* 2004.7); Zhongguo shehui kexueyuan kaogu yanjiusuo Shanxi dui, Shanxisheng kaogu yanjiusuo, and Linfenshi wenwuju, "Shanxi Xiangfenxian Taosi chengzhi faxian Taosi wenhua zhongqi daxing hangtu jianzhu jizhi" 山西襄汾縣陶寺城址發現陶寺文化中大型夯土建築基址, *Kaogu* 2008.3, 3–6.

16. See Li Liu and Xingcan Chen, *The Archaeology of China: From the Late Paleolithic to the Early Bronze Age* (Cambridge: Cambridge University Press), 222.

hypothesis of the cultural relationship between Qijia, Shimao, Taosi, and the bronze culture of Erlitou.¹⁷

The vessel fragment is evidence of early experimentation in casting, which also took place on the Central Plains. The clapper-bell is of key importance because it was cast using an early form of the piece-molds and coring technology developed at Erlitou, first for casting bronze clapper-bells and then for casting ritual vessels.

Toothed *Huan*-Bracelets

The copper *huan* 環 found at Taosi was affixed to a slightly larger round jade *huan*. The metal was arsenic copper, and it was open cast. Together, they formed a bracelet, which was worn on the arm of the occupant of the tomb. The copper *huan* was “toothed”; that is, it has toothlike protrusions around the rim. The outer diameter of the rim of the copper *huan* was 12.5 cm.; that of the inner hole that was 7.8 cm.¹⁸ The jade *huan* was slightly larger than the bronze one and it was not toothed. Thus, when the copper disk was placed against the jade one, there was an alternating pattern of metal and stone around the rim (see [Figure 1](#)).¹⁹

A number of copper-toothed *huan* have been found along the Hexi corridor in the Northwest, including at Shimao. Often they were found rather than excavated and the original archaeological context has been lost, so we do not know how many of them were originally buried together with round jade *huan*. However, two round jade *huan* book-ending six toothed copper ones were found on a human arm bone in a cemetery at Shimao (see [Figure 2](#)). The excavation was not conducted by archeologists, but radiocarbon dating of the collagen of the arm bone

17. Jessica Rawson, “Shimao and Erlitou: New Perspectives on the Origins of the Bronze Industry in Central China,” *Antiquity* 91 (2017), 1–5 at 4. See, however, the metallurgical analysis in Chen Kunlong 陳坤龍, Yang Fan 楊帆, Mei Jianjun 梅建軍, Shao Anding 邵安定, Shao Jing 邵晶, and Di Nan 邸楠, “Shaaxi Shenmushi Shimao yizhi chutu tongqi de kexue fenxi ji xiangguan wenti” 陝西神木市石峁遺址出土銅器的科學分析及相關問題, *Kaogu* 2022.7, 58–70. This article demonstrates that many of the metal articles found at Shimao were imported, so this is also possibly true for the toothed *huan*.

18. Shao Jing, “Shimao yizhi yu Taosi yizhi de bijiao yanjiu,” 69.

19. Guojia wenwuju 國家文物局, ed., 2001 *Zhongguo zhongyao kaogu faxian* 中國重要考古發現 (Beijing: Wenwu, 2002), 24–27; Gao Jiangtao 高江濤 and He Nu 何弩, “Taosi yizhi chutu tongqi chutan” 陶寺遺址出土銅器初探, *Nanfang wenwu* 2014.1, 91–95; Li Jaang, Zhouyong Sun, Jiang Shao, and Min Li, “When Peripheries were Centres: A Preliminary Study of the Shimao-centered Polity in the Loess Highland, China,” *Antiquity* 92 (2018), 1008–22. Rawson, “Shimao and Erlitou.” Rawson relates this form to the Karasuk Culture (1400–1200) but that culture is too late to have influenced the sites discussed herein.



Figure 1. Toothed metal and jade *huan*, Shanxi Xiangfen Taosi, Tomb M11. From Guojia wenwuju 國家文物局, eds. *Zhongguo zhongyao kaogu faxian.2001* 中國重要考古發現. 2001 (Beijing: Wenwu, 2002), 27.



Figure 2. Jade and copper *huan*, found on arm bone in tomb, Shaanxi Shenmu Shimao. From Shenmushi Shimao wenhua yanjiuhui 神木市石峁文化研究會, eds. *Shimao yuqi* 石峁玉器 (Beijing: Wenwu, 2018), 144 (no. 067).

indicated a date of ca. 1800 B.C.E.²⁰ This discovery both confirms the supposition that the *huan* were worn as bracelets and demonstrates that there was already an interest in combining jade and metal.

20. Sun, Zhouyong, et al., "The First Neolithic Urban Center on China's North Loess Plateau."

In the context of discussions of the culture and the metallurgy of the Steppe, *huan* and other artifacts worn on the body are conventionally described as “personal ornaments.” While it is clear that they were worn on the body, the “personal” implies that their purpose was bodily beautification and obscures the alternative possibility that such artifacts were worn during rituals, as well as in burial, and had a religious significance in the Steppe cultures that we do not have sufficient evidence to understand.

The Motif of Concentric Circle of Crosses

Copper toothed *huan*-bracelets have not been found at Erlitou. However, a round bronze disk inlaid in turquoise and found at Erlitou, has a pattern around the rim that may be related to the pattern produced by a metal toothed-*huan* stacked against a round jade one.²¹ This disk was found in 1975, in a pit that had previously been disturbed. It was inlaid in turquoise and is illustrated in X-ray form in Figure 3 (left). The disk is round, 17 cm. in diameter and .5 cm. thick. Sixty-one square pieces of turquoise are spaced around the rim producing an alternating pattern of jade and copper. It also has two concentric circles of crosses made up of inlaid turquoise tesserae. The center of the disk is not perforated. It is also undecorated.

The crosses on this disk are wider at the tips. In an important early article that hypothesized the importation of metallurgy into China from the Bactria Margiana Archaeological Complex, Louisa Huber argued that this cross-motif derives from an aesthetic tradition of the Bactrian and Turkmenistan region, with the Northwestern Qijia culture acting as an intermediary. Her evidence included crosses and clusters of crosses excavated at Shahdad, Iran, which are wider at the ends than in the center.²² The Bactria Margiana motifs include both individual and

21. Zhongguo kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國科學院考古研究所二里頭工作队, “Yanshi Erlitou yizhi xin faxian de tongqi he yuqi” 偃師二里頭遺址新發現的銅器和玉器, *Kaogu* 1976.4, 259–63 at 261, fig. 5. This disk is sometimes described as a mirror. However, similar disks, which are undecorated, are often convex and may have holes at the rim suggesting they were attached to something else. See Chen Guoliang 陳國梁, “Erlitou wenhua tongqi yanjiu” 二里頭文化銅器研究, in *Zhongguo zaoqi qingtong wenhua: Erlitou wenhua zhuanji yanjiu* 中國早期青銅文化——二里頭文化專題研究, ed. Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所 (Beijing: Kexue, 2008), 142, fig. 7.

22. Louisa G. Fitzgerald-Huber, “Qijia and Erlitou: The Question of Contacts With Distant Cultures,” *Early China* 20 (1995), 17–67. For further examples of the cross pattern, see Huang Mingchong 黃銘崇 (Hwang Ming-Chong), “Maixiang zhongqi shidai: zhutong jishu de shuru yu zhongguo qingtong jishu de xingcheng” 邁向重器時

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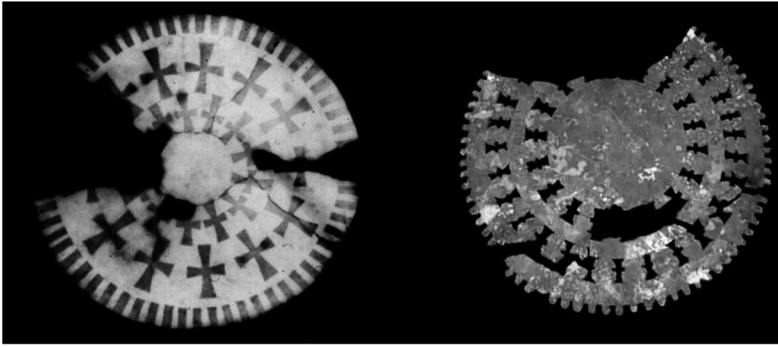


Figure 3. Left: X-ray of turquoise inlaid disk, Henan Yanshi Erlitou, Sector V Tomb KM 4:2. Right: bronze disk of the Qijia culture. Left: after Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, “Yanshi Erlitou yizhi xin faxian de tongqi yu yuqi” 偃師二里頭遺址新發現的銅器與玉器, *Kaogu* 1976.4, 261, fig. 5. Right: Image courtesy of Yi Hua 易華.

clusters of crosses, but to the best of our knowledge, examples concentric circles of crosses have not been discovered. Nevertheless, a Qijia culture copper toothed disk does have concentric circles of what appears to be a modified form of this type of cross; that is, the vertical lines are wider at the tips and the horizontal ones are abbreviated (Figure 3, right).²³ This modified cross pattern survives in the form of perforations in the copper, an indication that it was originally inlaid with turquoise. It probably also had a backing, either of stone or metal. Because this disk was not scientifically excavated, it cannot be dated.

A similar pattern of two concentric circles of crosses, also inlaid in turquoise, is found on a bronze *yue* 鉞-axe in the Shanghai Museum (see Figure 4). It was not scientifically excavated but metallurgical analysis confirms an Erlitou period dating.²⁴ The form of this type of broad-edge *yue*-axe derived from a jade ritual form of the southern Liangzhu 良渚 culture (3300–2200) centered around the Yangzi River delta and Taihu 太湖 lake. The Liangzhu culture was the major regional center of the Yangzi River region in this period. Its jade industry was highly devel-

代——鑄銅技術的輸入與中國青銅技術的形成, *Zhongyang yanjiuyuan lishi yuyan yanjiusuo jikan* 中央研究院歷史語言研究所集刊, 85.4 (2014), 622.

23. Liu Xuetang 劉學堂, “Qijia tongqi xicheng dongjie” 齊家銅器西承東接, *Sichou zhi lu* 2015.13, 37–44. The attribution to Qijia culture is by Liu Xuetang of Xinjiang University; the artifact was not scientifically excavated.

24. Zhou Ya 周亞, “Shanghai bowuguan cang xiangqian lüsongshi shizhiwen fangyue guanचा” 上海博物館藏鑲嵌綠松石十字紋方鉞觀察, in *Erlitou yizhi yu Erlitou wenhua yanjiu* 二里頭遺址與二里頭文化研究, ed. Du Jinpeng 杜金鵬 and Xu Hong 許宏 (Beijing: Kexue, 2006), 200–205.



Figure 4. Turquoise inlaid bronze *yue* 钺-axe, Shanghai Museum. Image courtesy of Hu Jialin 胡嘉麟.

oped and the jades were distributed widely. Both their ritual forms and the motifs that decorated them influenced the ritual forms found in the early Bronze Age. Their most important jade ritual forms were *bi* 璧-disks, and *cong* 琮-tubes, as well as *yue*-axes. *Bi*-disks are similar in shape to *huan* but they have wider rims in proportion to the central hole. *Cong*-tubes are square on the exterior with a round opening.

The artisans at Erlitou drew upon a wide range of other regional cultures, co-opting motifs and cultural forms for their own purposes, and then reflecting them outward. This axe is a particularly creative example. A turquoise-inlaid circle encloses two concentric circles of crosses with a round opening at their center. Thus, the design marked in turquoise inlay appears to be a *bi*-disk; that is, the *bi* and *yue* forms have been combined in this new technology of bronze inlaid with turquoise (again a combination of shiny stone and metal). In this case, the crosses are not wider at the tips; that is, they are like crosses found in the Central Plains tradition, including at Erlitou and in the Shang period. There are six crosses in the inner circle and twelve in the outer one. We do not know whether the numerology of the Shang period can be dated back to Erlitou. If so, the numbers of these crosses are possibly numerologically significant. Six was an important number in many contexts, including the oracle bone divination and Shang cosmology. From the point of view of the center, there were six directions, above, below, north, south, east,

and west.²⁵ There were also six ritual cycles of 60 days (*zhou ji* 周祭) in a 360-day year, and 12 moons (months).

Metal Fragments of Vessels

The earliest metal vessels yet discovered are from Phase 3 of the Erlitou site and all of them were cast using a ceramic core and piece-molds. However, three fragments of metal that appear to be the remnants of vessels have been discovered from earlier periods.²⁶ None of them are very large and, if they are vessels, there is no evidence about how they were cast. The earliest is from Taosi. It is thicker along an edge, apparently the rim of a water basin (*pen* 盆) or similar vessel, and has the maximum dimensions of 3.7×4.4 cm. It is arsenic copper and has been dated to 2100–2000.

The other two fragments of what appear to be vessels are from major settlements in the Mount Song region that pre-date Erlitou. One was found at Dengfeng Wangchenggang 登封王城崗. Dated to a late phase of the site, ca. 2050–1994, it is roughly contemporaneous with the Taosi fragment. However, it is bronze; that is, it is a copper-tin alloy, rather than arsenic copper.²⁷ The Wangchenggang fragment is 5.7 cm. by 6.5 cm. and slightly rounded, so the archaeologists thought it might be a vessel fragment.²⁸ Gao Guangren and Shao Wangping suggested that it came from the bulbous leg of a *gui* 鬯-pouring vessel, similar to pottery *gui* found in the Dawenkou culture the East Coast. This identification is based on the illustration in a Qing dynasty bronze catalogue of such a *gui*. However, that catalogue also records an inscription on the vessel and no inscribed bronzes have been found in the Erlitou—or even the Erligang period that followed it, so it is not likely to depict a vessel from the turn of the second millennium B.C.E.²⁹

The other fragment is somewhat later and was found at Xinmi Xinzhai 新密新砦, the immediate predecessor of Erlitou as a domi-

25. Sarah Allan, *The Shape of the Turtle: Myth, Art, and Cosmos in Early China* (Albany: State University of New York, 1991), 102.

26. Xu Hong 許宏, *Heyi Zhongguo: Gongyuanqian 2000 nian de zhongyuan tujing* 何以中國: 公元前 2000 年的中原圖景 (Beijing: Sanlian shudian, 2014), 83–88. The dates of the vessel fragments given below follow those given therein.

27. Xu Hong 許宏, “Lizhi yicun yu liyue wenhua de qi yuan” 禮制遺存與禮樂文化的起源, *Gudai wenming* 3 (2004), 87–101 at 95.

28. Henansheng wenwu kaogu yanjiusuo 河南省文物研究所 and Zhengzhoushi Bowuguan 鄭州市博物館, “Zhengzhou xin faxian Shangdai jiaocang qingtongqi” 鄭州新發現商代窖藏青銅器, *Wenwu* 1983.3, 13, pl. 1.

29. Gao Guangren 高廣仁 and Shao Wangping 邵望平, “Shiqian tao gui chulun” 史前陶鬯初論, *Kaogu xuebao* 1981.4, 427–59.

nant settlement in the Mount Song region. It is copper rather than tin-bronze and dates to ca. 1850–1750; that is, it was manufactured at about the time of the rise of the Erlitou settlement. According to the Erlitou archaeologist, Xu Hong 許宏, it appears to be the spout of a pouring vessel, such as a *gui* or *he* 盃.³⁰

These metal fragments suggest that people may have attempted to cast ritual vessels in the early second millennium B.C.E. However, there is no other evidence to suggest successful production of metal vessels at these sites. If they are the remains of vessels, they probably represent small-scale experimentation that was not sufficiently successful to lead to further development.

As we shall discuss below, the breakthrough in developing a viable piece-mold technology suitable for casting bronze vessels was made in connection with the production of clapper-bells and only later applied to ritual vessels.

Clapper-bells

We use the term “clapper-bell” as a translation for *ling* 鈴: bells that have clappers and hang downward, their sound generated by motion. The purpose is to distinguish them from “chime-bells,” such as *nao* 鐃 and *zhong* 鐘, musical instruments that were sounded by striking the exterior. Because they hang or dangle, they are sometimes called *xuan ling* 懸鈴, “hanging clapper-bells” in Chinese. This term is especially common for the clapper-bells of the late Shang and early Western Zhou that were hung inside the bases of bronze vessels. They are also called *she ling* 舌鈴, “tongue-bells,” which distinguishes them from bells that contain round balls (*wan* 丸), commonly called “jingle bells” in English.

As we shall discuss below, clapper-bells have a long history in pottery before they began to be cast in bronze.

The Taosi Copper Clapper-Bell

The most surprising metal discovery at Taosi was a small copper clapper-bell. This is because it was cast with bivalve mold and a suspended core. Thus, it is the earliest example of piece-mold casting with a suspended core yet discovered. Moreover, the artifacts first cast using this technology at Erlitou were also clapper-bells.

30. Liu Yu 劉煜, Liu Jianyu 劉建宇, and Zhao Chunqing 趙春青, “Henan Xinmi Xinzhai yizhi chutu tongqi fenxi” 河南新密新砦遺址出土銅器分析, *Nanfang wenwu* 2016.4, 108–14; Xu Hong, *Heyi Zhongguo*, 86.

The Taosi clapper-bell was only 2.15 centimeters in height. It is copper (with a small amount of naturally occurring lead and trace of zinc: 97.86% cu, 1.5% pb, and .16% zn).³¹ The top is flat and somewhat deteriorated, but it originally had two holes, which would have been used to suspend the clapper.³² Traces of woven textile are also apparent on the exterior. The tomb in which it was found (M3296) was rudimentary, just over two meters long, and included no other artifacts. Although the tomb was not richly furnished like the Erlitou tombs, it was placed in the same general position, near the waist on the left side (Figure 5).

The social context of the Taosi burial is difficult to understand. The Erlitou tombs with clapper-bells were not particularly large, but they were well-furnished and included turquoise mosaics as well as clapper-bells, so the occupants probably had a special status. Moreover, Tomb M3, the earliest of the Erlitou tombs with clapper-bells, was placed in a central position in the courtyard of an ancestral temple. As we shall discuss further below, these tombs were probably those of religious interlocutors who used these artifacts in ritual performance. In contrast, this tomb does not even have a single pottery vessel. Moreover, it was placed near a pottery workshop.³³ Two possible explanations have occurred to us: (1) The occupant of the Taosi tomb was also a religious interlocutor and used the clapper-bell in ritual performance but died away from home and did not have descendants at the place of burial to provide him with wine or food offerings;³⁴ (2) He was an artisan associated with the manufacture of the clapper-bells and the copper clapper-bell signified some unusual role in this regard, perhaps to do with the experimental casting.

31. Zhongguo shehui kexueyuan kaogu yanjiusuo Shanxi gongzuodui, "Shanxi Xiangfen Taosi yizhi shouci faxian tongqi," 1068.

32. Miyamoto Kazuo has argued that one of them was probably chiseled after casting. He has also argued that the cloth was used in the casting process rather than to wrap the bell in the burial. Miyamoto Kazuo 宮本一夫, "Erlitou wenhua tongling de lai yuan yu fazhan" 二里頭文化銅鈴的來源與發展, in *Xia Shang duiyu wenhua* 夏商都邑與文化, ed. Xu Hong, vol. 1 (Beijing: Zhongguo shehui kexue, 2014), 329–41.

33. Deng Lingling, "Taosi yizhi taoling gongneng tanxi."

34. We use the term "wine" herein in its general sense of an alcoholic drink. In ancient China, these drinks were grain-based, but could include fruit and aromatic plant materials. See, for example, Patrick E. McGovern, *Ancient Wine: The Search for the Origin of Viniculture* (Princeton: Princeton University Press, 2013); Liu Li 劉莉, Wang Jiajing 王佳靜, Chen Xingcan 陳星燦, et al. "Yangshao wenhua dafangzi yu yanyin chuantong: Henan Yanshi Huizui yizhi F1 dimian he taoqi canliuwu fenxi" 仰韶文化大房子與宴飲傳統: 河南偃師灰嘴遺址F1地面和陶器殘留物分析, *Zhongyuan wenwu* 2018.1, 32–43.

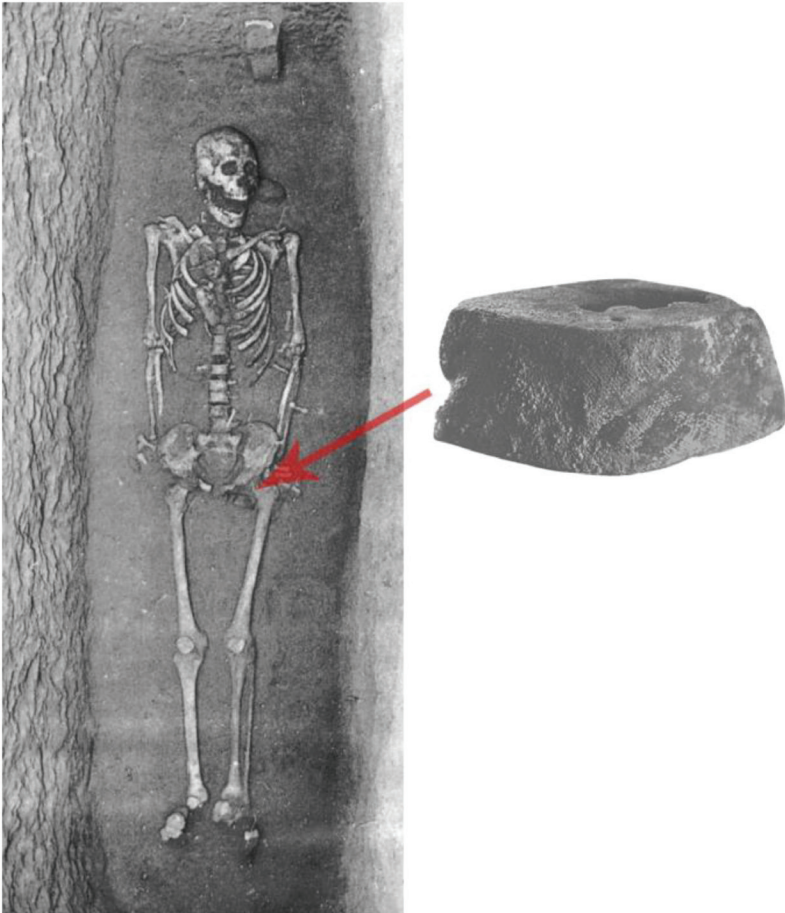


Figure 5. Tomb M3296 with copper bell, Shanxi Xiangfen Taosi. After Zhongguo shehui kexueyuan kaogu yanjiusuo Shanxi gongzuodui 中國社會科學院考古研究所山西工作隊 and Linfen diqu wenhuaju 臨汾地區文化局, “Shanxi Xiangfen Taosi yizhi shouci faxian tongqi” 山西襄汾陶寺遺址首次發現銅器, *Kaogu* 1984.12, pl. 3. 1; Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所 and Shanxisheng Linfenshi wenwuju 山西省臨汾市文物局, eds., *Xiangfen Taosi: 1978–1985 nian kaogu fajue baogao* 襄汾陶寺 1978–1985 年考古發掘報告 (Beijing: Wenwu, 2015), vol. 4, pl. 297.

Pottery Clapper-Bells in the Neolithic Period

Pottery clapper-bells have a long history on the Central Plains, dating back the Yangshao period (5000–3000). Like those found in the Longshan period, they are generally very small and commonly have a flat

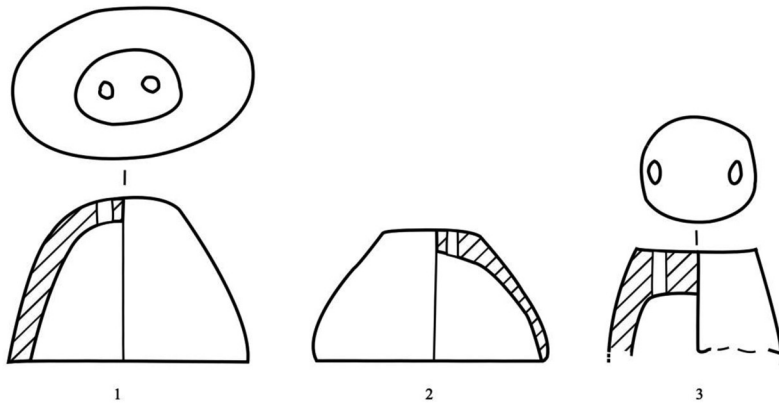


Figure 6. Pottery clapper-bells of the Yangshao period. 1, 3: Henan Zhengzhou Dahecun 鄭州大河村; 2: Shaanxi Nanzheng Longgangsi 南鄭龍崗寺. After Gao Wei 高煒, “Shiqian tao ling jiqi xiangguan wenti,” 史前陶鈴及其相關問題, in Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所, ed., *Ershiyi shiji de zhongguo kaoguxue* 二十一世紀的中國考古學 (Beijing: Wenwu, 2002): 224.

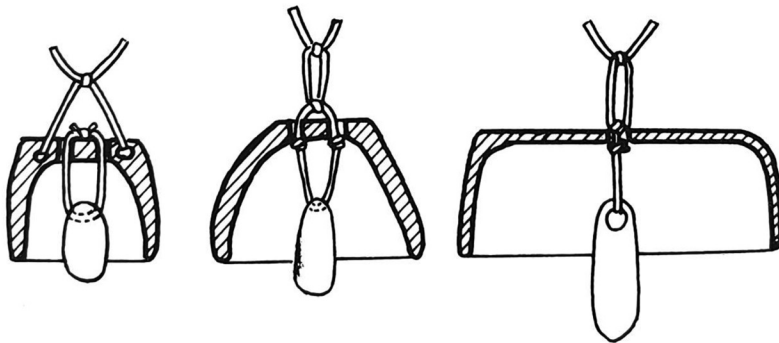


Figure 7. Methods of hanging Neolithic pottery clapper-bells. Left, with 4 holes; middle, with 2 holes; right, with 1 hole. After Li Chunyi 李純一, *Xian Qin yinyueshi* 先秦音樂史, revised edition (Beijing: Renmin yinyue, 2005), 26, Fig. 9.

top with one or two holes for suspending the clapper. These may also be used for the attachment of a tie, or there may be additional holes (see Figures 6 and 7).³⁵

35. Gao Wei 高煒, “Shiqian tao ling ji qi xiangguan wenti” 史前陶鈴及其相關問題, in *Ershiyi shiji de zhongguo kaoguxue* 二十一世紀的中國考古學, ed. Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所 (Beijing: Wenwu, 2002), 223–41 [at 224]; Li Chunyi 李純一, *Xian Qin yinyueshi* 先秦音樂史, revised edition (Beijing: Renmin, 2005), 25–26.

Pottery Clapper-Bells from Taosi

Besides the copper clapper-bell, seven pottery clapper-bells have also been found at Taosi. Clappers have not been found, which suggests that they were made of an organic material.³⁶ They vary somewhat in cross-section, but they are similar to one another and to the copper clapper-bell in their small size, profile that is wider at the bottom than at the top, flat tops, and in having two holes at the top for suspending the clapper.

Similar pottery clapper-bells have been found Shimaoguo and at Laohushan 老虎山 culture sites in Inner Mongolia,³⁷ and some scholars have thus proposed that this type of clapper-bell was introduced into the Central Plains from the Steppe.³⁸ However, there is a long history of pottery clapper-bells on the Central Plains, dating back the Yangshao period (5000–3000), including the convention of a flat top with two holes for suspension.³⁹ In the Longshan period, these are found at sites of the Shijiahe 石家河 culture (2500–2000) in the Yangzi River valley and extend up along the eastern region to Inner Mongolia. Thus, it seems likely that the pottery clapper-bell tradition of the Laohushan culture was an extension of one that originated in the Central Plains, rather than having been introduced from the Steppe region.

In any case, the Taosi copper clapper-bell is so close in form to the pottery clapper-bells found at the same site that we may reasonably assume that it was modeled on them. This same type of pottery clapper-bell, with different pattern striations on the exterior, has also been found at the late Longshan period site Zhengzhou Xinmi 鄭州新密 in the Mount Song region. It is 4.3 cm. in height, with two holes in the flat top and a similar oval section (see [Figure 8](#)).⁴⁰ We have seen that a metal fragment of a vessel from this region was also found at the site. Thus, we see that the Mount Song region also shared a tradition of pottery clapper-bells that were similar to those found at Taosi.

36. Cf. Kubota Shinji 久保田慎二, "Taosi yu Erlitou tongling de chuxian beijing" 陶寺與二里頭銅鈴的出現背景, in *Xia Shang duyi yu wenhua*, ed. Xu Hong, 1:315–28, who argues that the Neolithic bells did not have clappers.

37. Shao Jing, "Shimaoguo yizhi yu Taosi yizhi de bijiao yanjiu," 70.

38. Deng Lingling, "New Perspectives on the Function of 'Clapper-Bells': Metal Lings in the Early Bronze Age of China," *Archaeological Research in Asia* 27 (2021), 100303, <https://doi.org/10.1016/j.ara.2021.100303>.

39. Gao Wei, "Shiqian tao ling ji qi xiangguan wenti"; Chen Guoliang 陳國梁, "Zhongguo zaoqi lingxingqi: yi xinshiqi shidai zhi Erligang wenhua de taoling he tongling weili" 中國早期鈴形器 以新石器時代至二里崗文化的陶鈴和銅鈴為例, *Gudai wenming* 2018.12, 28–70.

40. Tang Wei 湯威, "Zhengzhou Xinmi chutude Xinzhaiqi taoling" 鄭州新密出土的新石器時代的陶鈴, *Wenwu* 2012.1: , 82–84.

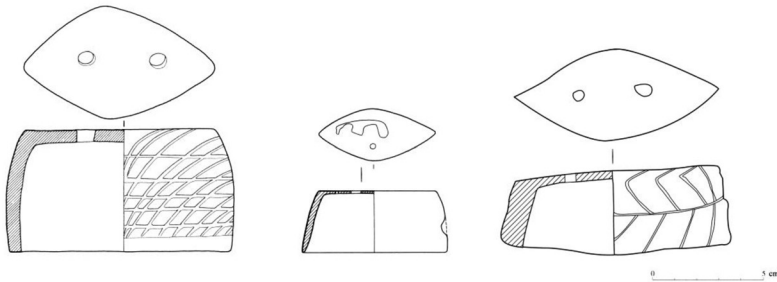


Figure 8. Clapper-bells. Left: pottery clapper-bell, Xiangfen Taosi; center: copper clapper-bell, Xiangfen Taosi; right: pottery clapper-bell, Zhengzhou Xinmi. After Zhongguo shehui kexueyuan kaogu yanjiusuo and Shanxisheng Linfenshi wenwuju, ed., *Xiangfen Taosi: 1978–1985 nian kaogu fajue baogao*, 304, fig. 3-104-1, 667, fig. 4-146 and Tang Wei 湯威, “Zhengzhou Xinmi chutude Xinzhaiqi taoling” 鄭州新密出土的新石器陶鈴, *Wenwu* 2012.1, 82, fig. 2.

Evidence of a Religious Context: A Clapper-Bell from Tianmen Shijiahe 天門石家河

To the best of our knowledge, only five pottery clapper-bells have been Yangshao period tombs.⁴¹ In both the Yangshao and Longshan (3000–2000), other pottery clapper-bells are found in contexts that are not explicitly religious, such as in ash pits, earth-fill, or on the site surface. Nevertheless, a design cut into the wet clay on a clapper-bell found at the middle Yangzi River valley site of the Tianmen Shijiahe site in Hubei Province (2500–2000) is an abbreviation of a fanged-face motif that is of central importance to the iconography of the Shijiahe culture, so it probably had a religious meaning. The clapper-bell is 4.5 cm. in height and has the same flat top and two holes in the top as the clapper-bells discussed above. The flared shape of the body of the Shijiahe pottery clapper-bell is similar to the shape of the bronze clapper-bells at Erlitou (see Figure 9).

Thus far, we have focused our attention on the relationship between Erlitou and the cultures of the North–Northwest that were connected to the Eurasian Steppe. Shijiahe is in the opposite direction. However, the Erlitou site was also connected to this region by its tributaries south of Mount Song. Moreover, Shijiahe culture or Shijiahe culture-influenced artifacts have been found at the Erlitou site. For example, a Shijiahe-style jade baton (*bingxingqi* 柄形器) decorated with a face motif was found

41. Chen Guoliang, “Zhongguo zaoqi lingxingqi,” 68 (*fubiao* 附表 3) lists two from Shaanxi Nanzheng Longgangsi 陝西南鄭龍崗寺 M430, M431 and three from Jiangsu Province: Pixian Liulin 邳縣柳林 M118 and Pixian Dadunzi 邳縣大墩子 M253 and M325.

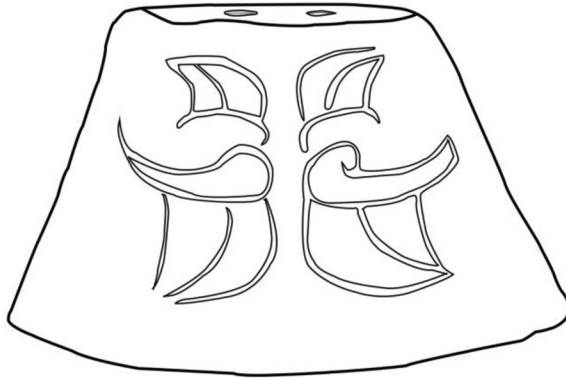


Figure 9. Pottery clapper-bell with abbreviated fanged tooth design, excavated at Tianmenshi Shijiahe Sanfangwan 天門市石家河三房灣 in 1956. After Hubeisheng bowuguan 湖北省博物館編, *Hubei chutu wenwu jingcui* 湖北出土文物精粹 (Beijing: Wenwu), 2006, 36.

together with the turquoise-inlaid bronze disk with concentric circles of crosses discussed above. Moreover, another Shijiahe-style jade baton in the form of a raptor (*yingxingqi* 鷹形器) was found at Erlitou Tomb M₃ in Sector V, which contained a bronze clapper-bell and a turquoise mosaic on an organic backing. These artifacts have also been found at Shimao and even in tombs at Yinxu, apparently transmitted from ancient times. Thus, the ritual usage of pottery clapper-bells at Shijiahe might have a relationship to that at Erlitou.

The Importance of the Suspended Core

The metal artifacts imported to China from the Steppe are generally flat because they were open-cast or cast with two molds. However, bells and vessels are similar in having relatively large round or oval hollow interiors. Casting hollow artifacts using an assembly of molds required the use of a suspended core, as well as at least two outer molds. Some scholars have found a possible source for the use of a core at Taosi and Erlitou in Eurasian-influenced socketed weapons found along the Steppe borderland. Hwang Ming-chong made the case for socketed axes, which require the use of coring, as the model for the Taosi and Erlitou bells and the inspiration for later piece-mold casting.⁴² See [Figure 10](#).

Another possible influence, as Hwang observed, was socketed spearheads with a hook on the side that originated with the Seima-Turbino cultures of the Eurasian Steppes. Lin Meicun and Liu Xiang have argued that

42. Hwang Mingchong, "Maixiang zhongqi shidai," 631–35.

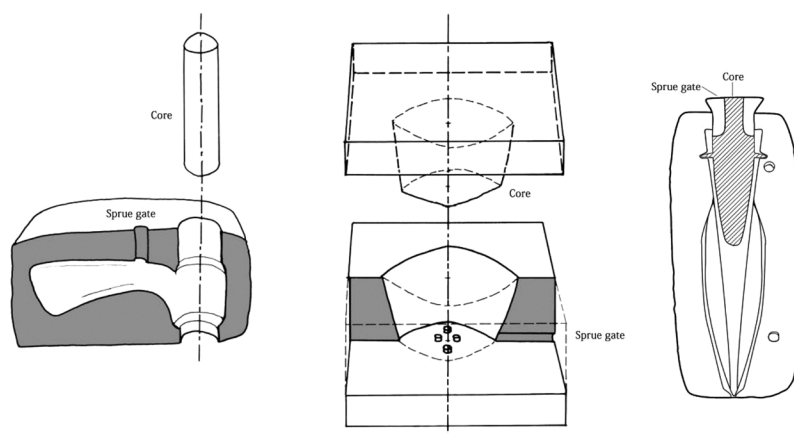


Figure 10. Left: reconstruction of the stone mold, core, and sprue gate for a Eurasian Steppe socketed axe. Center: reconstruction of the ceramic mold, core, and sprue gate for the Taosi copper clapper-bell. Right: reconstruction of the stone mold and core for a spearhead found at Xinjiang Fukang Ziniquanzi 新疆阜康滋泥泉子. After Huang Mingchong 黄铭崇 (Hwang Ming-Chorng), “Maixiang zhongqi shidai: zhutong jishu de shuru yu zhongguo qingtong jishu de xingcheng” 邁向重器時代——鑄銅技術的輸入與中國青銅技術的形成, *Zhongyang yanjiuyuan lishi yuyan yanjiusuo ji kan jikan* 中央研究院歷史語言研究所集刊, 85.4 (2015), 631, fig. 19 (left and center); Liu Xiang 劉翔, “Ouya caoyuan shuqiong tongqi zhuzao jishu qi yuan yu chuanbo” 歐亞草原豎盞銅器鑄造技術起源與傳播 *Kaogu* 2022.3, 329, fig. 10 (right).

some of these were cast in China and conclude that “from the metallurgical perspective in particular, the bronze casting of spearheads indicates the origin of piece-mold casting and core-casting technology, which influenced the bronze vessel casting method in China”⁴³ While this hypothesis is certainly possible, the evidence is indirect. To our knowledge, no socketed axes or spearheads have been excavated at Taosi or at Erlitou. Moreover, few spearheads have been found in clearly dateable archaeological contexts. Thus their relative chronology with respect to the copper and bronze clapper-bells found at Taosi and Erlitou is not clear.

The casting technology used at Erlitou is more highly developed and substantially different from that found in the borderlands and the Hexi corridor. For example, the weapons cast in the borderlands primarily used stone molds and they were mostly made of pure copper or arsenic copper. The clapper-bells and vessels cast at Erlitou used ceramic molds and a late Longshan-period-style kiln that had already developed to

43. Meicun Lin and Xiang Liu, “The Origins of Metallurgy in China,” *Antiquity* 91 (2017), 1–6; See also Jessica Rawson, “China and the Steppe: Reception and Resistance.”

reach high temperatures. Moreover, the alloy was primarily tin-bronze with the innovation of added lead. The basic form of clapper-bells and vessels, in which hollow cavities were the *raison d'être* of the artifact and therefore relatively large, is also very different from the weapon sockets. Thus, while the existence of socketed weapons could have served as an intellectual resource in the invention of the piece-mold and coring technology developed at Erlitou, their artisans produced what was essentially a new technology.

Clapper-Bells as the First Artifacts to Be Cast in Bronze with a Piece-Mold and Coring Technology

The earliest pieces of evidence of the use of this new technology are clapper-bells. In total, six bronze clapper-bells have been found at the Erlitou site. They are all tin-bronze rather than the arsenic copper that was used for the clapper-bell at Taosi. They are also more substantial artifacts, with heights from 7 to 9.3 cm. compared with the 2.1 cm. of the Taosi bell. The tops of the bronze bells are flat with one or two holes, following the tradition of the Taosi copper and Longshan period pottery clapper-bells. However, a bridge has been added across the holes on the top, so that the tie used to suspend the clapper did not need to be used for hanging the bell. A flange is also found on one side, where the molds joined, a predecessor of the flanges later used on ritual vessels.⁴⁴ Besides these bronze clapper-bells, two pottery clapper-bells dated to Erlitou Phase 3 have also been found at the site. They lack the flange but otherwise resemble the bronze clapper-bells found at Erlitou.⁴⁵ Since the earliest bronze clapper-bells pre-date them, they were probably modeled on them, rather than vice versa (see [Figure 11](#)).

Very few bronze vessels from the Erlitou period have been excavated at other sites. However, another bronze clapper-bell that resembles those found at Erlitou was excavated in 1972 in the Huai River valley at Feixixian Dadunzi 肥西縣大敦孜 in Anhui Province. Only minimal details of that excavation have been reported.⁴⁶ More recently, in 2019, late Erlitou period bronze artifacts were excavated at the nearby site of Sanguan-

44. Chen Guoliang, "Erlitou wenhua tongqi yanjiu," 137–38.

45. Zhongguo kexueyuan kaogu yanjiusuo Luoyang fajuedui 中國科學院考古研究所洛陽發掘隊, "Henan Yanshi Erlitou yizhi fajue jianbao" 河南偃師二里頭遺址發掘簡報, *Kaogu* 1965.5, 222 and pl. 5.4. Details about where the pottery clapper-bells were found are not recorded in the report.

46. Anhuisheng bowuguan 安徽省博物館, "Zunxun Maozhuxi de zhishi, zuohao wenwu bowuguan gongzuo" 遵循毛主席的指示·做好文物博物館工作, *Wenwu* 1978.8, 3.

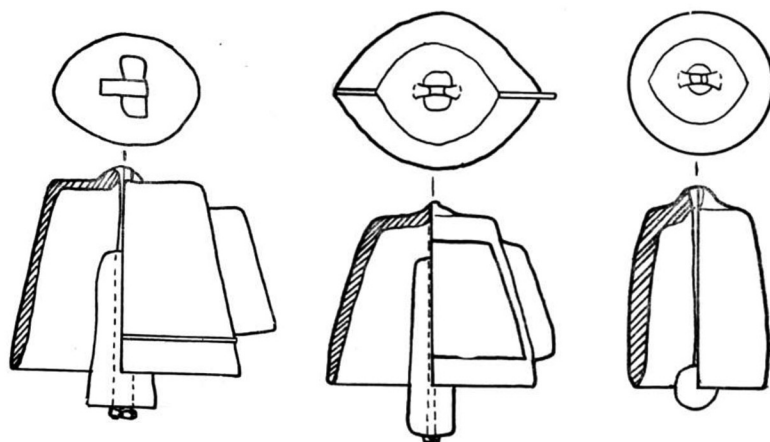


Figure 11. Bronze and pottery clapper-bells, Henan Yanshi Erlitou. Left: Bronze, Sector IX, Tomb M4: 1 (Erlitou Phase 2); Center: Bronze, Sector VI, Tomb M11: 2 (Erlitou Phase 2); Right: Pottery, Sector II, T13 ⑥ (Erlitou Phase 3). After Li Chunyi 李純一, *Zhongguo shanggu chutu yueqi zonglun* 中國上古出土樂器綜論 (Beijing: Wenwu, 1996), 89, 91 (Chart 24).

miao 三官廟, also in Anhui, Feixixian. They do not include ritual vessels and are mainly weapons, including two ritual *yue*-axes, but they also include an Erlitou-style bronze clapper-bell with a flange on one side. The pottery forms conform to local styles, so this would seem to be an Erlitou outpost or incursion, perhaps related to the transportation of ores.⁴⁷ Although a full excavation report has not yet been published, skeletons found in a nearby ditch suggest either a military disaster or an incidence of human sacrifice.⁴⁸

In retrospect, clapper-bells with their oval, hollow bodies are a logical first step in the development of a technology for casting ritual vessels that have similar hollow bodies; that is, once the artisans discovered how to use a suspended core and piece-molds to make clapper-bells, the same technique could be extended to the production of vessels. Moreover, once cores were used as the foundation for hollow interiors, two outer molds could easily be extended to three—or more. Nevertheless, we have no reason to think that, when clapper-bells were cast in bronze,

47. “Sanguanmiao site of the Erlitou period in Feixi, Anhui,” in *Major Archaeological Discoveries in China in 2019*, ed. Guojia wenwuju (Beijing: Wenwu, 2020), 48–52; Qin Rangping 秦讓平, “Anhui Feixi Sanguanmiao yizhi faxian Erlitou shiqi yicun” 安徽肥西三官廟遺址發現二里頭時期遺, *Zhongguo wenwu bao* August 23, 2019.08.23, 8.

48. Fang Lin 方林, “Feixi Sanguanmiao yizhi chutu qingtong bingqi de niandai ji xiangguan wenti” 肥西三官廟遺址出土青銅兵器的年代及相關問題, *Wenwu jian ding yu jianshang* 文物鑒定與鑒賞 2022.20, 6–9.

the artisans already thought of using the same technique to cast vessels. Clapper-bells were already cast in Erlitou Phase 2 and vessels appear only in the latter part of Phase 3. This temporal lag suggests that the casting method was created in order to cast clapper-bells, and vessels came later.

The significance of clapper-bells

The priority of clapper-bells in the development of piece-mold technology brings forth the question: why clapper-bells? We suggest that they had a two-fold significance: (1) With their bronze exterior and jade clapper, they combined two luminous materials thought to embody divine power; (2) The resonance of the sound made when jade struck against bronze. Before the production of bronze, “jade”—that is, hard translucent stone, mostly nephrite—was the medium of greatest prestige for the production of ritual artifacts other than vessels. As discussed above, bronze and jade were both luminous, a quality that was associated with divinity, including the celestial bodies and the ancestral spirits. Music, performed on such instruments as stone chimes and drums, was already an important part of ritual performance. However, when the jade clapper struck against the bronze exterior, these two materials created a new, far-reaching, never-before-heard sound. This sound was then used as a means of contacting the ancestral spirits to whom sacrifice was regularly made.

Clapper-bells at Erlitou

All six of the bronze clapper-bells found at Erlitou were found in tombs. The tombs are medium-sized—all of them a little over two meters in length—so they were probably not those of rulers. As the excavator Xu Hong has observed, the bronze contents of these tombs can be divided into three stages. In the earliest (Erlitou Phase 2), the only bronze artifact was a clapper-bell.⁴⁹ An example is Tomb M₃ in Sector V, excavated in 2002. This tomb also included a turquoise mosaic of a dragon (Figure 12). It was made up of about two thousand pieces of turquoise, affixed to an organic backing, such as cloth, leather, or wood, that had entirely decayed. It was 64.5 cm. long. The trapezoidal head with human-shaped eyes lay on the chest near the shoulder and the snake-like tail rested across the body. The occupant was also attired

49. Xu Hong, “Erlitou M₃ ji suizang lüsongshi longxingqi de kaogu beijing fenxi” 二里頭 M₃ 及隨葬綠松石龍形器的考古背景分析, *Gudai wenming* 10 (2016), 39–53.



Figure 12. Tomb M₃, Sector V, Henan Yanshi Erlitou. Left: Bronze clapper-bell with turquoise mosaic of a dragon on an organic backing. Right: Clapper-bell in profile, seen from above, and jade clapper. Image courtesy of Xu Hong 許宏.

in an elaborate necklace of cowry shells and a headdress to which three spirals of white pottery were attached.⁵⁰ The tomb was one of a group

50. Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, "Henan Yanshishi Erlitou yizhi zhongxinqu de kaogu xin faxian" 河南偃師市二里頭遺址中心區的考古新發現, *Kaogu* 2005.7, 15–20, translated as Erlitou Fieldwork Team, Institute of Archaeology, Chinese Academy of Social Sciences, "A Large Turquoise Dragon-Form Artifact Discovered at the Erlitou Site," *Chinese Archaeology* 5.1 (2005), 10–12; Zhu Naicheng 朱乃誠, "Erlitou Wenhua 'long' yicun yanjiu" 二里頭文化'龍'遺存研究, *Zhongyuan wenwu* 2006.4, 15–21, 38; Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, *Erlitou: 1999–2006* 二里頭 1999–2006 (Beijing: *Wenwu*, 2014), vol. 2, 999–1006.

of six in the courtyard of Temple-palace 3, which Xu Hong takes as an ancestral temple. It is in the most prominent position among this group, closest to the axis of the courtyard. This suggests that the occupant had high status and a special relationship to the ancestral temple, perhaps in the performance of ancestral rites.⁵¹

The other two tombs that included clapper-bells but no other bronze artifacts were also Phase 2. However, their assemblages are not assessable. One (M₄, Sector IX, excavated in 1982) was disturbed before excavation. The other (M₂₂, Sector V, excavated in 1962) was highly unusual—the grave goods were relatively abundant, but the tomb was only a half meter wide and the bell was missing its clapper. This suggests that the circumstance in which the person was buried was somehow irregular.

In the second stage, a turquoise-inlaid bronze plaque was included in addition to the bronze clapper-bell. This stage is exemplified by Tomb M₄ in Sector V, which belongs to Erlitou Phase 2 or perhaps Phase 3.⁵² These bronze plaques are also included in third-stage tombs (see Figure 13).

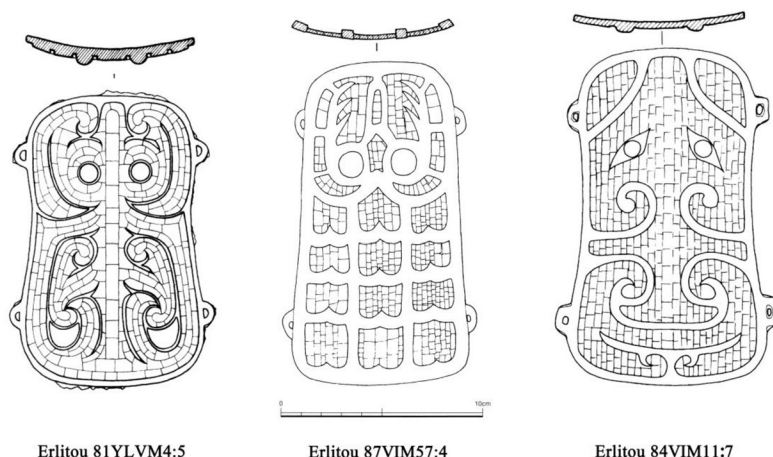
The plaques were all found near the middle of the tombs. They have two loops on each side, rounded corners, and are a little narrower at one end. The backs are also slightly bowed. The designs vary, but they all have face motifs with two eyes, either human-shaped or round, at the narrow end, and an abstract design at the wide end. The loops suggest that they were tied or sewn onto something else, perhaps clothing since there are also traces of fabric. Their positions in the middle of the tomb suggest that they were worn on the body, perhaps on the chest.⁵³ Huang Tsui-mei has reconstructed the positions of the bodies in these tombs to argue that they were worn on the arm.⁵⁴ However, the bodies had completely decomposed and her reconstructions of the positions of the bodies are based upon the placement of the plaques, making her argument circular. Moreover, the measurements of the plaques are 14.2 cm. by 9.8 cm. (Tomb M₄, Sector V), 16.5 by 8–11 cm. (Tomb M₁₁, Sector VI), 15.9 by 7.5–8.9 cm. (Tomb M₅₇, Sector VI). These measurements are too

51. Xu Hong, *Zui zao de Zhongguo* 最早的中國 (Beijing: Kexue, 2009), 102–4.

52. Zhongguo Shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, “1981-nian Henan Yanshi Erlitou muzang fajue jianbao” 1981年河南偃師二里頭墓葬發掘簡報, *Kaogu* 1984.1, 37–40. This tomb had been disturbed, so the evidence is not conclusive.

53. Sarah Allan, “The Taotie Motif on Early Chinese Ritual Bronzes,” in *The Zoomorphic Imagination in Chinese Art and Culture*, ed. Jerome Silbergeld and Eugene Wang (Honolulu: University of Hawai'i Press, 2016), 35–36.

54. Huang Cuimei 黃翠梅 (Huang Tsui-mei), “Gongneng yu yuanliu: Erlitou wenhua xiang lüsongshi tongpaishi yanjiu” 功能與源流: 二里頭文化鑲綠松石銅牌飾研究, *Gugong xueshu jikan* 33:1 (2015), 97–122.



Erlitou 81YLM4:5

Erlitou 87VIM57:4

Erlitou 84VIM11:7

Figure 13. Turquoise-inlaid bronze plaques excavated at Henan, Yanshi Erlitou. From Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, ed., “1981 nian Henan Yanshi Erlitou muzang fajue jianbao 1981” 1981年河南偃師二里頭墓葬發掘簡報, *Kaogu* 1984.1, 38, fig. 5.1; “1987 nian Yanshi Erlitou yizhi muzang fajue jianbao” 1987年偃師二里頭遺址墓葬發掘簡報, *Kaogu* 1992.4, 296, fig. 2.1; “1984 nianqiu Henan Yanshi Erlitou yizhi faxian de jizuo muzang” 1984年秋河南偃師二里頭遺址發現的幾座墓葬, *Kaogu* 1986.4, 321, fig. 6.1.

large for the plaques to be worn on bare arms, but it is possible that they were tied onto very wide sleeves.

The plaques were all found in tombs that also have clapper-bells. This suggests that, whether on the arm or on the torso, they were worn in ritual activities that also include ringing the clapper-bells. The mosaics on the plaques depict two-eyed motifs with human-shaped or round eyes that are set within animal-like faces on the narrower end and an abstract design on the wide end. The motifs are reminiscent of various two-eyed motifs found on Neolithic jades and presage the *taotie* motif that decorated bronzes of the Shang period. The most likely explanation for this particular combination of artifacts is that the occupants were religious interlocutors or spirit mediums who performed offering rites to the ancestral spirits.⁵⁵ The clapper-bells would have been used to contact the spirits and the two-eyed bronze and turquoise plaques signified enhanced their spiritual power in the performance of these rites.

In the third stage of development, a bronze *jue* 爵-wine pouter is found with a bronze clapper-bell and turquoise inlaid bronze plaque.

55. Sarah Allan, “Erlitou and the Formation of Chinese Civilization: Toward a New Paradigm,” *Journal of Asian Studies* 66.2 (2007), 461–96 at 485; Allan, “The Taotie Motif on Early Chinese Ritual Bronzes,” 28.

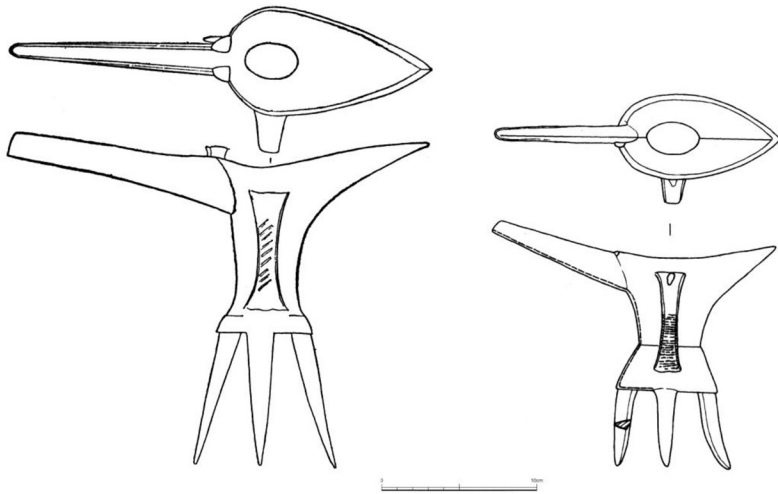


Figure 14. Bronze *jue* Excavated at Erlitou from Sector VI, Tomb M11 (left) and Sector VI, Tomb M57 (right). After Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui, “1984 nian qiu Henan Yanshi Erlitou yizhi faxian de jizuo muzang” 1984年秋河南偃師二里頭遺址發現的幾座墓葬, *Kaogu* 1986.4, 320, fig. 5, and Zhongguo shehui kexueyuan kaogu yanjiusuo Erlitou gongzuodui 中國社會科學院考古研究所二里頭工作隊, “1987 nian Yanshi Erlitou yizhi muzang fajue jianbao” 1987年偃師二里頭遺址墓葬發掘簡報, *Kaogu* 1992.4, 296, fig. 2.

Accordingly, the Phase 4 tombs, M57 and M11, each had a bronze clapper-bell, a turquoise-inlaid bronze armlet, and a bronze *jue* (see Figure 14).⁵⁶

The use of *jue* in Erlitou tombs continues a Longshan Neolithic tradition in which wine vessels were the core vessels of a ritual assemblage. Whereas bronze clapper-bells and turquoise-inlaid plaques have been found only in this group of tombs, bronze *jue* have been found in other tombs. Moreover, *jue* made of pottery or bronze, together with 觚-goblets made of pottery, lacquer, or bronze, were the core artifacts of tomb assemblages until the Early Western Zhou dynasty. At Erlitou, the *gu* have decomposed, leaving only the round pottery disks that have been placed in their bases and traces of red earth.⁵⁷ The ubiquity of this pair of vessels suggests that the offering of wine was a necessary stage to begin communication with the ancestral spirits.⁵⁸ Thus, if these occu-

56. Xu Hong, “Erlitou M3 ji suizang lüsongshi longxingqi de kaogu beijing fenxi,” 50; Yan Zhibin 嚴志斌, “Qi gu, yuan taopian, yu bingxingqi” 漆觚、圓陶片與柄形器, *Zhongguo guojia bowuguan guanankan*, 2020.1: 6–22.

57. Xu Hong, “Erlitou M3 ji suizang lüsongshi longxingqi de kaogu beijing fenxi.”

58. Xu Hong, “Erlitou M3 ji suizang lüsongshi longxingqi de kaogu beijing fenxi.”

pants of the tombs were religious interlocutors in their lifetime, they would have used the bronze clapper-bells to establish contact with the ancestral spirits and then, adorned with the turquoise mosaics, poured a wine-offering from a brilliantly shining bronze *jue*. After death, they and other people who were also buried with these vessels, would use them to offer wine.

Clapper-Bells between the Erlitou and Yinxu Periods

Very few clapper-bells have been found between the Erlitou and Yinxu periods; furthermore, the archeological context in which they were found at Yinxu is very different from that at Erlitou. Nevertheless, we will argue below that their role at Yinxu carries a similar meaning to that at Erlitou; that is, they were still a means of contacting the ancestral spirits. This supports our understanding of their meaning at Erlitou.

For the Erligang period, only one bronze clapper-bell has been found: in a tomb at the Yanshi Shangcheng 偃師商城 site, a walled settlement about six kilometers from Erlitou. However, two mold pieces for casting clapper-bells were also found in a bronze foundry at the Zhengzhou Shangcheng 鄭州商城 site.⁵⁹ Thus, the absence of bronze bells during the Erligang period is probably due, at least in part, to the limitations of archaeological excavation at Zhengzhou.

The tomb measured 2.66 m × 1.5 m and had an inner and outer coffin. It had a “waist pit” (*yaokeng* 腰坑)—a specially constructed pit beneath the coffin—that contained the remains of an animal. It also had a second level ledge (*ercengtai* 二層台) around the perimeter on which offerings were placed. Both are typical of Shang tombs. The species of the animal is not identified in the archeological report. However, dogs had begun to be buried in waist pits around this time, so we may reasonably assume that it was a dog. Significantly, a turquoise mosaic, with an organic backing that had decomposed, was found in the coffin near the waist of the occupant. The clapper-bell was placed on the second level ledge. It was 8.5 cm. in height, had a single flange and a flat top with holes for suspension, and a bridge across them for hanging, like the Erlitou period clapper-bells. This tomb dates to the fourteenth century B.C.E.⁶⁰ Thus, it

59. Henansheng wenwu kaogu yanjiusuo 河南省文物考古研究所, ed., *Zhengzhou Shangcheng: 1953–1985 nian kaogu fajue baogao* 鄭州商城: 1953–1985年考古發掘報告 (Beijing: Wenwu, 2001), 381.

60. Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所, ed., *Yanshi Shangcheng* 偃師商城 (Beijing: Kexue, 2013), 374–75, 655–56, 729.

is two centuries later than the Erlitou tombs discussed above. The combination of clapper-bell and mosaic is reminiscent of the Erlitou tombs.

Two bronze clapper-bells were also found in a tomb (M102) at Gaocheng Taixi 藁城台西 in Hebei Province, a transitional site between the Erligang and Yinxu periods. They were placed between two people, who had been buried together in a single coffin. One is in a supine position; the other has flexed legs and faces him. The clapper-bells were found between them near their waists.⁶¹

Clapper-Bells in the Yinxu Period

We have not been able to find other examples of bronze or pottery clapper-bells before the Yinxu period. Moreover, pottery clapper-bells are absent at Yinxu.⁶² However, bronze clapper-bells are suddenly plentiful. More than 350 bronze clapper-bells have been excavated at the Yinxu site.⁶³ Their role has clearly changed. They are no longer found as prized possessions buried with people adorned with turquoise mosaics and they no longer have jade clappers. Indeed, it is estimated that over ninety percent of the clapper-bells found at Yinxu were hung around the necks of dogs.⁶⁴ Moreover, dogs found in building foundations or buried beneath walls do not wear clapper-bells, so the purpose hanging clapper-bells around the necks of dogs was related to their role as death attendants. These bells are often decorated with *taotie* motifs, which are commonly inverted; that is, the mouth of the creature is at the top of the bell and the eyes at the bottom. This is possibly related to their role in guiding the dead through the underworld; that is, the bell was intended to be seen by the spirits above. It is also possible that the underworld was seen as an inversion of the world above (see [Figure 15](#)).

At Yinxu, clapper-bells are found in two contexts: tombs and sacrificial pits associated with royal tombs. These sacrificial pits were made in association of the burial and may be considered an extension of the mortuary rites involved in burial. Besides dogs, some clapper-bells are found on other animals—primarily horses (or their chariots), but there

61. Hebeisheng wenwu yanjiusuo 河北省文物研究所, *Gaocheng Taixi Shangdai yizhi* 藁城台西商代遺址 (Beijing: Wenwu, 1985), 154–56.

62. Deng Lingling, “New Perspectives on the Function of ‘Clapper-Bells,’” 11.

63. This approximation was made in the 1990s; see Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所, ed., *Yinxu de faxian yu yanjiu* 殷墟的發現與研究 (Beijing: Kexue, 1994), 321–22.

64. Yue Hongbin 岳洪彬, “Tan Shang ren de ‘Huangquan guannian’: cong Yinxu tongling shang zhuangshi de daozihuang shoumianwen shuoqi” 談商人的‘黃泉觀念’—從殷墟銅鈴上裝飾的倒裝獸面紋說起, *Zhongguo wenwu bao*, August 18, 2006, 7.

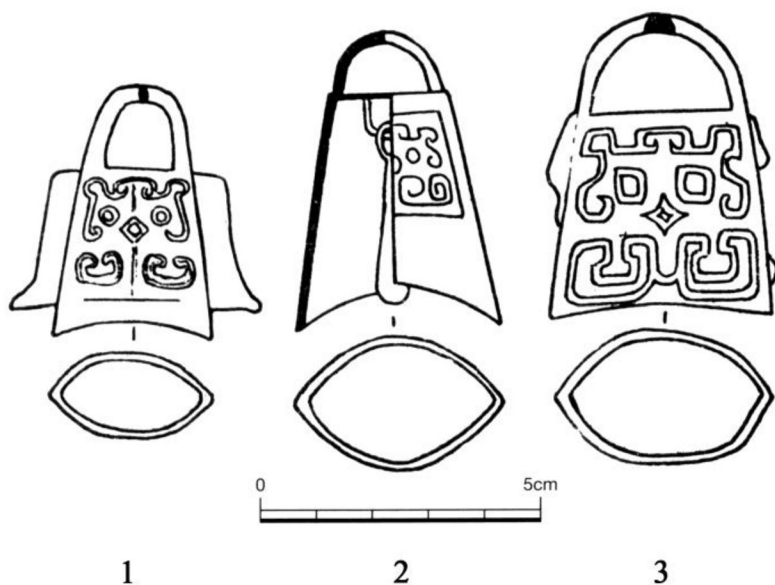


Figure 15. Clapper-bells with upside-down *taotie*, Yin Xu Xiqu 殷墟西區. (1) Tomb M823:1; (2) Tomb M263:15; (3) Tomb M265:1. After Zhongguo shehui kexueyuan kaogu yanjiusuo Anyang gongzuodui 中國社會科學院考古研究所安陽工作隊, “1969–1977 nian Yin Xu xiqu muzang fajue baogao” 1969–1977年殷墟西區墓葬發掘報告, *Kaogu xuebao* 1979.1:93, fig. 68: 14–16.

are also examples of elephants, a pair of cows, and a monkey. One pit also has a human with a clapper bell buried close to his wrist.⁶⁵

In tombs, the dogs are commonly found in “waist pits.” Conceptually, these pits are the entry to the underworld, known in later times as the Yellow Springs (*huang quan* 黃泉). That this belief was already present in the Shang period is evident from the construction of the royal tombs. The Anyang archaeologist, Yue Hongbin compared the depth of the bases of these tombs to the water level, which was determined by contemporaneous Shang period wells and discovered that the bases had been deliberately constructed to meet the water level.⁶⁶ Thus, the dogs in the waist pit

65. See Wang Xiuping 王秀萍, “Yin Xu chutu tongling de ‘yue’ yong gongneng chutan” 殷墟出土銅鈴的“樂”用功能初探, *Nanjing yishu xueyuan xuebao* (*Yinyue yu biao'yan*) 南京藝術學院學報(音樂與表演) 2018.1, 39–45. Wang suggests that clapper-bells could be considered as musical instruments, but she also observes that their archaeological distribution in tombs is distinct from other musical instruments, such as chimes, bells, and ocarinas. Our argument is that they played a distinctive role at Yin Xu, which reflects their evolution from the special role of clapper-bells at Erlitou.

66. Yue Hongbin, “Zailun Shangdai de ‘Huangquan guannian’: cong Yin Xu wangling he shuijing shendu de bijiao delai de qishi” 再論商代的‘黃泉觀念’——從殷墟王

below the coffin were intended to guide the tomb occupants through the watery underworld so that they could join their ancestral spirits. In this context, we may reasonably assume that the role of the clapper-bells was similar to that of the bronze clapper-bells at Erlitou; that is, their sound was a means of contacting the spirits.

Dogs, with clapper-bells, may also be found in other parts of tombs, for example on the “second-level ledges” (*erceng tai* 二層台) constructed around the perimeter of the tomb, which contained various types of offerings, and in the earth-fill. Their role there was probably similar to that of the dogs with clapper-bells in the sacrificial pits that accompanied the royal tombs at Yinxu. With the exception of the monkey, these animals are ones that could be used for transportation. For example, horses, which were buried together with chariots, sometimes wore clapper-bells around their necks. Similarly, two cows yoked together, presumably because they drove a cart, also wore bells.⁶⁷ The elephants sacrificed in pits also wore clapper-bells. In contrast, other cows, as well as sheep and goats, which were frequently offered as food sacrifices, are not found with clapper-bells around their necks. That is, the dogs and other animals and humans who were buried with clapper-bells accompanied the dead to the spirit world, with their bells serving to contact the ancestors who had predeceased them. The monkey and the human are anomalies, but they were presumably also intended to accompany their master after death.⁶⁸ In sum, while the role of clapper-bells at Yinxu was not the same as at Erlitou, it had a distinctive role among other mortuary artifacts. We suggest that this reflects its evolution from that played by clapper-bells at Erlitou.

In the late Shang and Zhou periods, clapper-bells begin to be found within the bases of bronze vessels. Sun Ming 孫明 has identified eight Shang and thirteen Western Zhou ritual vessels that had bronze bells suspended, within the base of the vessel, from a knob at the bottom of the bowl. The Shang vessels include five *gu*-goblets, one *zun* 尊-wine vessel-, and a *dou* 豆-food-serving vessel. A *zu* 俎-altar for meat sacrifices, from the late Shang or early Western Zhou, also had two clapper-bells suspended at each end of the stand.⁶⁹ This new practice appears

陵和水井深度的比較得來的啟示, *Zhongyuan wenwu* 2018.5, 38–48.

67. Zhongguo shehui kexueyuan kaogu yanjiusuo Anyang gongzuodui 中國社會科學院考古研究所安陽工作隊, “Anyang Wuguanacun beidi Shangdai jisikeng de fajue” 安陽武官村北地商代祭祀坑的發掘, *Kaogu* 1987.12, 1062–1070 at 1145.

68. Zhongguo shehui kexueyuan kaogu yanjiusuo Anyang gongzuodui, “Anyang Wuguanacun beidi Shangdai jisikeng de fajue,” 1065, fig. 7.

69. Sun Ming 孫明, “Shang Zhou shiqi xuanling qingtong liqi yanjiu” 商周時期懸鈴青銅禮器研究, *Beifang minzu kaogu* 2015. 2, 153–64; Sun Ming, “Shang Zhou shiqi xuanling qingtong liqi shangxi” 商周時期懸鈴青銅禮器賞析, *Shoucangjia* 2016.4, 16–20. See

footnote continued on next page

to have originated in North China rather than the Central Plains. It is unusual because the bells have been incorporated into the offering rites and the implements used therein. Nevertheless, the clapper bells may have retained their role in establishing communication with ancestral spirits; that is, they would have rung when the vessels were moved, thus alerting them to the presence of offerings.⁷⁰

In sum, although the archaeological distribution of bronze clapper-bells in the Yinxu period was different than that at Erlitou, their unusual role at Yinxu reflects a degree of continuity. That is, they remained a means of contacting the ancestral spirits.

Conclusion

When metallurgy was introduced to China from Western Eurasia around the turn of the second millennium B.C.E., its primary attraction was its luminosity, which was associated with spiritual power. This attraction, which is shared by other metals and translucent stones, has a cognitive basis and probably also played a major role in the development of bronze casting in other Bronze Age civilizations. In China, offering rites were the focus of religious practice, and ritual vessels became the focus of the bronze culture developed on the Central Plains. However, the unique technology used in China for casting bronze vessels was first developed in order to make bronze clapper-bells rather than ritual vessels. These shared a hollow body with bronze vessels and served as the foundation for the development of the piece-mold and coring technology used in casting vessels. At Erlitou, the bronze clapper-bells had a ritual purpose of their own. By combining luminous metal with jade clappers, they were doubly numinous. Moreover, when jade struck metal, it created a new sound that was then used as a means of establishing contact with the ancestral spirits. Thus clapper-bells were used in performance by religious interlocutors.

There is little evidence of this role for clapper-bells after the Erlitou period and very few have been found between the end of that period and the Yinxu period. At Yinxu, they reappear primarily worn around

also Zhang Changping 張昌平, "Shang, Xi Zhou shiqi dailing qingtongrongqi jiqi nanchuan" 商、西周時期帶鈴青銅容器及其南傳, in *"Zhoubian" yu "Zhongxin": Yinxu shiqi Anyang ji Anyang yiwai diqu de kaogu faxian yu yanjiu* "周邊"與"中心": 殷墟時期安陽及安陽以外地區的考古發現與研究, ed. Li Yongdi 李永迪 (Taipei: Zhongyang yanjiuyuan lishi yuyan yanjiusuo, 2015), 251–75.

70. For the small number of unusual burial types not discussed here, see Feng Guangsheng 馮光生, "Wan Shang tongling bianxi" 晚商銅鈴辨析, *Zhongguo yinyuexue* 中國音樂學, 2018.1, 31–44, 4.

the necks of dogs who were buried with their owners as death attendants. In that case, the idea was generally the same; that is, when the dogs guided their owners through the Yellow Springs, the sound of their clapper-bells alerted the ancestors who had pre-deceased them to their coming.

閃亮、靈魂，以及銅鈴在中國青銅傳統形成中的作用

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摘要

本文探討了歐亞冶金傳統轉變為中國本土傳統的方式。文章認為“閃亮”與神聖性的關聯有其認知基礎，世界各地都使用透亮的石頭和有光澤的金屬（包括紅銅、青銅、銀和金）來製作宗教器物。在中國，這種關聯是促進以塊範法和懸芯技術為基礎的中國本土冶金術發展的主要動力。儘管該技術最終集中於生產以容器為代表的青銅禮器，但它最早在偃師二里頭出現時卻用於製作銅鈴。銅鈴與容器相似，都有著圓形的空腔。

我們進一步探討了早期鈴的歷史，認為它們有著中原本土的淵源，最早可以追溯到仰韶時期（西元前 5000–3000 年）的陶鈴。我們認為銅鈴在二里頭文化中的宗教意義源于玉石和青銅這兩種“閃亮”的物質，以及相互撞擊時產生的從未出現過的新聲響。二里頭的巫（宗教人員）用銅鈴溝通祖先的靈魂。後來，商代殷墟時期（約西元前 1300–1050 年），墓葬中的狗常見佩戴銅鈴的情況。我們認為這是銅鈴早期功能的發展與延續，即墓主人于死後世界中在狗的引導下通過銅鈴溝通祖先。

Keywords: bronze metallurgy, primary metaphor, clapper-bells, piece-mold technology

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