Chariotry and Prone Burials: Reassessing Late Shang China's Relationship with Its Northern Neighbours

Jessica Rawson¹ · Konstantin Chugunov² · Yegor Grebnev³ · Limin Huan¹

Published online: 2 July 2020
© The Author(s) 2020

Abstract

In place of the traditional view that raids and invasion from the north introduced new weapons and chariots to the Shang (c. 1200 BC), we argue that archaeological evidence illustrates the presence of several regional groups at or near the late Shang centre, Anyang. Here we review burial practices at Anyang dating to the late second millennium BC, and describe a substantial group of prone burials that reflect a ritual practice contrasting with that of the predominant Shang elite. Such burials occur at all social levels, from victims of sacrifice to death attendants, and include members of lower and higher elites. Particularly conspicuous are chariot drivers in some chariot pits. An elite-level link with chariots is confirmed by the burial of a military leader in tomb M54 at Huayuanzhuang at Anyang, with tools that match exactly those of chariot drivers. Given that prone burial is known to the north, in the Mongolian region that provided chariots and horses to the Shang, a route can be traced eastwards and southwards, down the Yellow River, and then through mountain basins to Anyang. Our inference is that a group originally from outside the Central Plains can be identified in these distinctive burials. This marks a first step towards understanding the heterogeneity in the central population of the late Shang.

Keywords Shang · Yinxu · Anyang · Prone burial · Eurasian steppe · Mongolia · Chariot · Tools

✉ Jessica Rawson
jessica.rawson@merton.ox.ac.uk

¹ Institute of Archaeology, University of Oxford, 36 Beaumont Street, Oxford OX1 2PG, UK

² State Hermitage Museum, St. Petersburg, Russian Federation 191186

³ Merton College, University of Oxford, Merton Street, Oxford OX1 4JD, UK

Introduction

China's two first dynasties, the Shang (c. 1500–1046 BC) and the Zhou (1046–256 BC), are central to all accounts of early China. They mark the beginning of Chinese history in the proper sense as, from c. 1200 BC, they have left us contemporary inscriptions. Both dynasties occupied the principal agricultural region known as the Central Plains (Fig. 1), with a network of connections that extended their contacts north in a search for horses, and south for metals. Both dynasties are renowned for extraordinary cast bronze vessels used for offering food and alcohol to their ancestors (Bagley 1999). Metallurgy, in the form of knives, tools, and personal ornaments, had first been introduced to the high mountains and plateaux north of the Central Plains, termed here ‘the Arc’, during the early second millennium BC (Rawson 2017). Prior to the Shang, bronze was employed in a completely innovative way, from about 1600 BC at Erlitou, to cast the first vessels. Enormous urban sites at Zhengzhou (1500–1300 BC) and Anyang (1200–1046 BC), as well as other centres, have revealed large vessel sets within tombs and hoards (Campbell 2018, pp. 51–99).

As these vessels were employed in sets for ceremonial banquets for the ancestors, they can be taken to indicate the regions that were part of the cultural domains of the Shang and the Zhou. Other regions—in which some vessels have been found, but these were not used in sets—lay outside the political and cultural reach of these dynasties. We are primarily concerned here with the late Shang kings, who had

Fig. 1 Map of the eastern Steppe, the Arc (with its three zones) and the Central Plains, with major sites mentioned in the article

their capital at Anyang. They viewed their ancestors in a generational sequence, and arranged their banquets accordingly; they also engaged with these ancestors through other ritual activities, particularly with divinations (Keightley 1999). Records of these divinations were carved into the ox scapulae and turtle plastrons employed and stored in archives. Among the topics recorded was the need for the ritual killing of animals and human victims, who were often identified by the name *Qiang* 羌. These *Qiang* are often understood as having been human sacrifices (a term which will be examined below). Ritual deposits in pits are major features of the Shang royal cemetery at Xibeigang at Anyang, where the eastern tomb group in particular was surrounded by hundreds, even thousands, of sacrifices of animals and humans (Fig. 2).

The late Shang dynasty was renowned for its engagement in war. Like sacrifice, war is extensively mentioned in the inscriptions on the oracle bones. Because the Shang saw themselves at the centre of their world, their enemies lay around them

Fig. 2 Plan of Yinxu and Xibeigang (bottom left). Figures in blue are large royal tombs. Figures in grey are sacrificial pits. On the northeastern border of Yinxu is Huanbei Shang City, a pre-Yinxu walled settlement (c. 1400–1300 BC). Modified from Zhongguo (2014, Fig. 1); Campbell (2012, Fig. 3)

in various regions named *fang* 方 ('direction' or 'land'). In this period, the chariot, a war machine, was introduced from the north, as were northern weapon types. We examine here the connections between this dramatic shift in warfare and the occurrence of burials where the individual was interred in a prone position, a practice that became particularly widespread in this period. Among the people buried in this position were chariot drivers, many of the human victims, and some members of the elite.

As the oracle bone inscriptions make clear, at Anyang the Shang employed specialists and followed rituals as essential aspects of their rulership (Keightley 2012, pp. 232–235). We can be sure that careful attention was paid to the ordering of tombs and of sacrificial pits at the royal cemetery, as well as to the deposition of bodies and the provision of offerings. Body position was especially important, and it follows that a prone position in death would undoubtedly have been an explicitly chosen feature. Here we explore the tomb orientation and body position that characterise both the chariot drivers and one major military leader. We suggest that these particular individuals, found among the burials at Anyang and at other Shang centres, reflect the presence of a regional sub-group who were critical in the introduction of chariots from the north.

We have known for some decades that chariots originated in western Siberia and reached northern China across the steppe, with early observations by Hayashi (1959), Watson (1971) and Piggott (1974). Fuller accounts were given by Shaughnessy (1988), Wu'en Yuesitu (2007), and Wang (1998); for a new and expanded discussion of the steppe origins see Chechushkov and Epimakhov (2018).

Chariot rein holders and northern knives and tools were recognised by Loehr (1956) and Watson (1971) as following prototypes known from South Siberia and Mongolia. These observations were developed for a wider audience in a path-breaking essay by Lin (1986), followed by extensive studies by Wu'en Yuesitu (2007) and Yang (2016), with the Russian perspective presented by Kuzmina (2004). An important, recent discussion of newly excavated material is set out by Zhu (2013). What has been lacking, with a few exceptions (Wu 2013), is an account of the ways in which chariots and the northern weapons and artefacts, notably the chariot tools, have been found together. Further, to gain a fuller understanding of the role of these northern technologies in the hands of the late Shang, we here emphasise the roles of minority groups within late Shang society, living at Anyang, in bringing them to the Central Plains. Northerners have, from the days of the great Chinese historian Sima Qian (active c. 100 BC), received a bad press (Watson 1961, p. 154). In his vivid presentation of the lifestyle of the Xiongnu and their tendency to raid and indeed engage in warfare, Sima Qian writes that 'in periods of crisis they take up arms and go off in plundering and marauding expeditions'. Historians today continue to set out the social and cultural differences between the northerners and the inhabitants of the Central Plains, seeing the dark side of raiding and war, rather than any benefits that the two sides might have derived from each other (Li 2006). It has been difficult to explore the relations between the steppe and the Central Plains as contact was not direct. People, animals and technologies, exchanged in both directions, had to pass through the Arc (Rawson 2017). This broad area of land around the large Yellow and Yangtze drainage basins extends from the Bohai Bay in the east, across

present-day northern China and south along the eastern edge of the Tibetan Plateau, to present-day Yunnan. It was first identified in the 1980s (Tong 1987) as a region with a strong dependence on pastoral economies and a large variety of material cultures very different from those traditionally ascribed to the Central Plains. In the present discussion, the northern area of the Arc is divided into three sections, as shown in Fig. 1. In each of these, communication from north to south is determined by the south-flowing rivers. Recent excavation and research have made it possible to track the movement of people, tools, horses and chariots during the Shang period down the Yellow River where it flows south from Inner Mongolia.

Burial, Death Attendants, and Sacrifices

Continuous excavations at Anyang from the 1920s to the present (2020) have revealed the preoccupation of the late Shang rulers with elaborate burials, in which they were accompanied by death attendants in their tombs and by extraordinarily high numbers of human victims placed in pits around those tombs in ritual offerings. As several authors have pointed out (Reinhart 2015; Campbell 2018), there has been considerable reluctance to discuss the purposes and procedures that led to the burial of such large numbers of people. It is essential to accept that late Shang ritual practice was led by deep religious beliefs about the universe and the distribution of power within it. Both the tombs of the late Shang kings and the many divination records demonstrate the power of the ancestors in support of their descendants. In the context of beliefs about the continuing demands of dead royal ancestors, we need to recognise that people buried within or near the major tombs with their own coffins and what may be recognised as their own grave goods were understood to have continuing roles in the afterlife as attendants. Although they are often described as victims, their implied social position in this afterlife was clearly very different from that of those interred in the ramps of the royal tombs or in the pits around them. In some literature in Chinese, the first type are termed ‘companions’ (*renxun* 人殉), while the second type is termed ‘human sacrifice’ (*rensheng* 人牲).

To help us interpret the intended functions of people buried as attendants in such major tombs, we can look at the nine men buried at the base of tomb M1001 at Xibeigang, possibly the tomb of King Wu Ding 武丁 (Fig. 3). One attendant was buried under the floor of the coffin chamber and the other eight were at the same depth in the corners of the shaft. Each is crouched in a small pit, armed with a weapon, and accompanied by a dog; at least five appear to be prone, a burial position we discuss below (Liang and Gao 1962, pp. 28–30). The eight have bronze *ge* 戈 blades, but the individual at the centre has a blade made of stone. The weapons and the dogs suggest that these attendants were chosen to serve as guards in the afterlife.

Further individuals interred on secondary ledges and ramps would have been understood as fulfilling other functions in their attendance on the deceased. These were not victims within the Shang construction of the universe, as their deaths were considered in the light of being thereby guaranteed a future life in the service of the Shang kings and other elites. The practice preserved in a large tomb, M1 at

Fig. 3 Anyang Houjiazhuang M1001 illustrating burials of sacrifices and death attendants. **a** Plan of Houjiazhuang M1001 tomb. After Liang and Gao (1962, Figs. 14, 16). **b** Plan of the base of the tomb with an example of a sacrifice buried prone (dotted box). After Liang and Gao (1962, Figs. 10, 11)

Wuguanqun, within the royal cemetery at Xibeigang, can be interpreted in this way: the double ramped tomb had a large rectangular coffin chamber surrounded by the customary ledge containing numerous burials. On the west side, where male burials were concentrated, one individual was interred with ritual vessels. Jade ornaments and weapons were found in this and other graves. On the eastern side, a number of burials, mainly of females, were documented (Guo 1951, pp. 15–19).

In so far as we can interpret the motives and concepts of the Shang, numerous inscriptions on the oracle bones inform us about the other group, the *rensheng*, or human sacrifices, and indicate the necessity of distinguishing those who were to accompany the rulers (and various other members of the elite) in the afterlife from those human victims who were offered as sacrifices as part of the Shang effort to obtain the support of High God, Di 帝, the Natural Powers, and their ancestors in their enterprises, particularly in war:

Making cracks on *gengchen* 庚辰 (day 17) divined: (we) offer to Yang (the Mountain Power) three *Qiang*, three young penned sheep (*lao* 牢), and split open (*mao* 卯) three young cows (Keightley 2012, p. 66).

It is a general, but reasonable, assumption that the people called *Qiang* who were mentioned in such inscriptions were buried in the numerous well-organised pits around the royal tombs. On many occasions, mass groups of decapitated bodies were thrust into single pits, with their skulls interred separately (Campbell 2012).

Pits might hold a single individual but could hold up to thirty or even forty, piled on top of each other (Huang 2004, p. 53). An assessment of body positions shows that many of these victims were buried prone (Zhongguo 1977, pp. 33–36). Along with these burials in pits, we can also document rows of bodies beheaded and placed prone on the four ramps of the royal tomb M1001, sometimes identified as the tomb of Wu Ding, thought to be the first late Shang king to have ruled from Anyang (Liang and Gao 1962, pp. 38, 40). The extreme violence that these burials record may have been exactly what the Shang saw as necessary in their search for contact with and support from the High God, the Natural Powers, and the ancestors.

The greatest numbers of human sacrifices date from the early Anyang period, under King Wu Ding (c. 1200 BC), as estimated by Huang (2004, pp. 79–80). While such sacrifices also took place outside Anyang, the majority of evidence (described in detail by Chang (1980, pp. 119–124) is found at the major royal cemetery at Xibeigang, especially around the eastern tomb group and at the precinct of the temple-palace sites at Xiaotun.

Prone Burial

Any survey of the burials of both death attendants and of human sacrificial victims at Anyang indicates that significant numbers are described as having been buried prone. These prone burials are one element in our discussion of the introduction of the chariot to the Central Plains. To date there has been little general understanding, either from a general theoretical perspective or from an appreciation of the specific historical situation in late Shang China, of why these prone burials occurred. Before the Anyang period just a few prone burials are known, from the Erlitou (c.1750–1500 BC) and Zhengzhou periods; these rare examples include a tomb orientated east–west in which three bodies lay prone, buried with bronze vessels (Huang 2004, pp. 44, 47, 106).

In death, it was standard for Shang elite individuals to be placed in a supine extended position (Fig. 4a) and interred in a rectangular pit, orientated north–south, often with a wooden coffin chamber. The chamber might contain one or two coffins (Fig. 4c). Often constructed level with the lid of the coffin chamber was a secondary ledge, on or within which grave goods and even death attendants were interred. Many of the tombs at Anyang had a dog buried below the coffin. High-level elite tombs in the royal cemetery had up to four ramps (either one, from the south: two, from south and north; or four, from all four cardinal points). Elite tombs outside the cemetery generally did not have ramps, but they often had abundant grave goods. People below this level who were still accorded formal burials in lineage cemeteries, as at Dasikong, had many fewer grave goods (Zhongguo 2014, pp. 244–261). These we will consider as lower elites (Fig. 4d).

A striking divergence from this predominant supine interment position can be observed among some of the people excavated in what are termed the sacrificial pits, as well as among some of the death attendants in elite tombs and some of the actual central burials. The most immediate feature of such burials is that the bodies were placed in a prone rather supine position, so that their backs would have been visible

Fig. 4 Examples of the two principal burial positions discussed here. **a** Supine extended, the main Shang position. After Yang and Yang (1979, Fig. 21). **b** Prone position adopted by the regional group with northern connections. From late Shang tombs in the western sector of Yinxu. After Yang and Yang (1979, Fig. 22). **c** Tomb M121 at Qiangzhangda, Shandong Province, showing the tomb occupant in supine extended position with a dog pit below the waist. The tomb is oriented north–south. After Zhongguo (2005, Fig. 86). **d** Tomb M446 at Anyang Dasikongcun, with the tomb occupant in prone position. The tomb is oriented east–west. After Zhongguo (2014, Fig. 231)

when looking from above, prior to the bodies being covered over (Fig. 4b). Other deviations from Shang ritual are also evident in these central prone burials, as the body orientation is often east–west rather than north–south (Fig. 4d). We may thus speculate that the interred individuals were unlikely to have belonged to the main populations of either low or higher Shang elites, but rather to one of several different cultural or regional groups. Following this logic, Shang society at Anyang must have been composed of several different populations.

The prone burials have been assessed by several Chinese scholars, who have concluded that, while they are numerous at Anyang, they are rare on the Central Plains both before and after the late Shang period (Hu 2016; Meng 1992; Zhang 2016). With much published research and analysis of burial practices available on the Shang, we know that this unusual burial position was used at many cemeteries at Anyang, with up to thirty per cent of the people buried prone. Important examples are also found at other Shang-related tombs in Shandong, Hebei and Shaanxi. The practice of prone burial declined steeply soon after the Zhou conquest of the Shang (Zhang 2016, pp. 149–153).

The royal burials and the sacrifices at Anyang are contemporary with the arrival of the chariot, which is recognised as having spread across Eurasia, entering China from the north. It may be that the sudden increase in prone burials was in some way connected with this military innovation: importantly, chariot drivers interred in pits with their chariots were also often (though not universally) buried prone. In this discussion, chariot drivers are a significant further category of death attendant. The proportion of charioteers buried prone with their horses and chariots was high, both at such sites in Anyang—as Xiaotun M20, M164 (Shi 1970a, p. 16); Dasikong M175, M226 (Ma et al. 1955; Zhongguo 2014, pp. 466–471); Guojiazhuang M52 (Zhongguo 1998, p. 128); Meiyuanzhuang M40 and M41 (Yang and Liu 1998)—and also at Qianzhangda, in Shandong (Zhongguo 2005, pp. 126, 135).

Chariot drivers must have had a range of skills, managing the horses as well as the wooden chariot with its large and seemingly fragile wheels (Chechushkov and Epimakhov 2018, p. 436). We have some hints of the range of skills required from a set of very distinctive tools, shown in Fig. 5a, found in the box of chariot burial M41 at Meiyuanzhuang at Anyang (Wu 2013, p. 50; Yang and Liu 1998). As we shall see below, almost all of these tools had prototypes in the Arc to the north, or further northwest in the steppe. Shown in Fig. 5a at top (not to scale) is a bow-shaped rein holder (*gongxingqi* 弓形器), consisting of a broad band with two loops carrying jingles. The reins could, it is assumed, have been twisted around the loops. These were important for all those we recognise as chariot drivers or chariot owners/users, both those found buried in chariot pits and those of the elite associated in death with chariots. Some of the rein holders were decorated with horse heads, which, along with the jingles, are features of northern bronzes from the Arc and not typical of standard Shang weapons or vessels developed at Anyang. Nevertheless the rein holders were almost certainly cast at Anyang.

Below the rein holder in Fig. 5a is a single-edged curved knife with an oval ring terminal similar to some we see in sacrificial pits; on the far right is a whip end. The artefacts at 5a below the rein holder and knife are socketed axes accompanied by a small spade-like bronze—all tools for repairing the woodwork of the

Fig. 5 Chariot burials with attendants in prone position and their tools. **a** The tool set from chariot burial M41 at Meiyuanzhuang. After Yang and Liu (1998, Fig. 17). **b** Plan of Anyang Xiaotun M20 chariot pit. After Shi (1970a, Fig. 8)

chariot. As socketed axes were such a standard tool in other parts of Eurasia, their specific use with chariots in this context has very rarely been considered, but although these tool sets are occasionally identified as agricultural tools, since they are almost universally found with other chariot fittings we should reject this identification. It is also clear that they were introduced from the north: careful typological work has shown them to originate in Siberia with the Seima-Turbino phenomenon and Andronovo complex, and subsequently to have been taken east to Mongolia (Yang et al. 2020, pp. 85, 102, 107, 110).

The high proportion of prone burials among the guards under the tomb chamber in tomb M1001 and among the charioteers accompanying the elite indicate that their skills in fighting and defence were valued in an afterlife. The crouching position of the guards under the coffin of tomb M1001, and their weapons, suggest that some attack from below, from the netherworld, was anticipated.

While we can easily imagine the roles envisaged for the dead guards and the charioteers, the intended roles of victims in 80 sacrificial pits (among a group of a thousand pits in the northeastern section of the royal cemetery) are much more challenging. As many as ten individuals, often without skulls, were placed in a

single pit. Those in charge of the ritual decided to bury all these victims in prone position and to provide them each with a curved knife, some without grips, some having grips with round holes, and a few with animal heads. The 80 pits held more than seven hundred such knives (Fig. 6). The knives were often accompanied by a single shaft-hole axe and a sharpening stone, underlining the functional purpose of the knives as tools and defining the identity of the victims (Gao 1967). In many cases, the weapons were unfinished local replicas, but they are all recognisable as copies of knives and axes associated with the Arc (Cao 2014; Zhu 2013). These knives are often curved, with a single cutting edge defining their purposes, which may have included cutting loose ropes or leather harnesses and skinning animals. The seven hundred knives and other weapons might also indicate that these people were a fighting force, as well as concerned with the management of animals, or they may have been a conquered and captured group of northerners.

It is very unlikely that such knives signalled membership of any elite. Ritual specialists at Anyang must have understood these distinctive features, the prone position and the northern-type weapons, as marking the identity of these people in terms of a cultural or regional group. These burials in pits pose a question. Were the interred individuals understood to be like the charioteers and the guards, that is, intended as a defensive force in the afterlife? Or were those buried in such pits captives, put to death to concretely symbolize a Shang victory over enemy forces, presumably from

Fig. 6 Three knives from the group of more than seven hundred from 80 pits with prone sacrifices with knives, axes and sharpening stones, from Anyang Xibeigang. After Gao (1967, pls. 1, 2, 7)

the Arc? While we can recognise some form of planning by the ritual specialists, we have great difficulty in interpreting the roles of the human victims in such pits and on the ramps of the royal tombs, where prone burials are also found.

The Burial of Ya Chang and Its Context at Xiaotun

We now examine the issues of the prone burials, northern tool sets, and ideas about an afterlife in greater depth in relation to an impressive burial at Anyang Huayuanzhuang: Tomb M54 (Zhongguo 2007a) (Fig. 7). The principal burial is that of a man, buried prone, and named on his weapons and ritual vessels as Ya Chang 亞長. The term *Ya* is sometimes taken to indicate a military official (Yan 2013, pp. 174–175), and what remains of Ya Chang's skeleton shows that he suffered major wounds and probably died in battle. He was thus clearly a warrior or leader in warfare. Nearby is a major chariot pit, M20 (Fig. 5b) (Shi 1970a, b). More significantly, Ya Chang's tomb is near the central temple-palace area at Xiaotun, and southeast of the famous tomb of Fu Hao 婦好, one of the principal consorts of King Wu Ding 武丁 (Zhongguo 1980) and the only female head of an army. This location alone shows that Ya Chang was an important member of the Shang elite. In addition, the area covered by his tomb—which can be taken as having some kind of proportional relationship to status—is similar to that covered by the tomb of Fu Hao. Ya Chang was accompanied by 15 attendants, also buried prone, and 15 dogs, whereas Fu Hao

Fig. 7 A major tomb with an elite burial in prone position, illustrating the attendants, a dog in the pit below the coffin and the very large number of grave goods. **a** Tomb M54 at Anyang Huayuanzhuang. After Zhongguo (2007a, Fig. 62). **b** Artefacts in tomb M54. After Zhongguo (2007a, Fig. 77)

had 16 attendants and six dogs (her skeleton did not survive, although one of her attendants, whose skeleton can still be examined, was also buried prone).

While Ya Chang was undoubtedly recognised as a major member of the Shang elite, if we look more closely at the tomb contents, we find several unusual features in addition to the prone position. Important for this discussion is the exceptional quality of the chariot fittings in his tomb, which included six very fine rein holders, all elaborately inlaid with turquoise. This is a feature often seen on chariot fittings and some weapons, but very rarely on other late Shang bronzes. As the only other chariot fittings with such carefully executed turquoise inlay were found in pit M20 (Fig. 5b) and in the chariot pits at the royal cemetery at Xibeigang, it is likely that Ya Chang's came from a similar workshop (Li 2009, pls. 85–89, 91–106). In addition, Ya Chang was supplied with the standard tools, such as socketed axes, chisels and spades, for repairing the woodwork of chariots. In the light of the high quality of the bow-shaped fittings and the complete set of tools in his grave, we may infer that Ya Chang was almost certainly a major leader of chariots in warfare.

Ya Chang's curved knives, which are part of his chariot tool set, are especially relevant for understanding his background and thus his prone burial. He had one knife with an oval ring as a terminal and a bowed grip, along which were geometric patterns (Fig. 8a); these patterns are typical of knives from the Arc rather than from Anyang; similar items have been found at Suide and Shilou to either side of the northern Yellow River, where it flows south—a region we will discuss below (Zhu 2013, pp. 7–8). A small pointed and curved bronze with a jingle (Fig. 8b) also has a parallel at Shilou (Zhu 2013, p. 7). Two other knives, both with animal heads, are also highly significant: the upper one (Fig. 8c) has a horse head that imitates a northern type, while the oval eye is a characteristic of objects made at Anyang (we can compare the eye with those on a jade and a bronze made in the late Shang: Zhongguo 2007a, Fig. 144; Zhongguo 2005, Fig. 232). The animal head on the other knife (Fig. 8d) is that of a stag and is more rounded in form than that of the horse, having part of an antler rising directly above the eye. Rather than a curved oval shape, this eye is completely circular and formed with an outer ridge and so resembles a tiny tube. It thus belongs to a totally different tradition. These knives enable us to track connections from their origins in the north down a route to the Shang capital.

While the military leader in tomb M54 has sometimes been identified as coming from the south (He 2013), his chariot fittings, tools, and especially his knives suggest that we should look to the north, the sources of the chariot and horses. In addition, the tomb held some other very unusual items that confirm his northern connections. First of all, the man's head and part of his body were wrapped with a textile, now decayed, to which were attached 150 jade beads and more than a thousand cowries. Ornament attached to clothes was more typical of northern Eurasia than of the Central Plains. He also had a very unusual solid stone artefact, with three sunken holes (Fig. 9a) in which traces of colour remain (Zhongguo 2007a, p. 214). Although this artefact has later counterparts in small bronzes with four tubes (Yang and Yang 1979, p. 97), this Shang tradition did not survive. This object type can be interpreted as a palette, and this again indicates steppe connections as later stone palettes, filled with colour, were found together with tattoo kits at the cemetery at Filippovka (Fig. 9b) (Yablonsky 2011, table XI:7.9). In addition to this stone palette,

Fig. 8 Three knives and a jingle from tomb M54 of Anyang Huayuanzhuang. After Zhongguo (2007a, Figs. 126, 127)

Ya Chang was accompanied by some gold items, and almost all the gold items found at Anyang have connections with the Arc (Rawson 2018, pp.111–112). In this grave were two exceedingly thin sheets of gold in the form of discs. One displays circles made by small indented points, with a six-pointed star at the centre (Fig. 9c)—a form of decoration found primarily on chariot fittings. Figure 9e shows the facings

Fig. 9 Two unusual artefacts from tomb M54 at Anyang Huayuanzhuang, with comparative items. **a** Stone receptacle for coloured pigment from tomb M54 at Anyang Huayuanzhuang. After Zhongguo (2007a, Fig. 100). **b** Two palettes for colour excavated at Filippovka. After Yablonsky (2011, pl. XI:7.9). **c** Circular gold foil appliqué decorated with a star from tomb M54. After Zhongguo (2007a, pl. 57). **d** Bow-shaped item with jingles decorated with a star to compare with Fig. 9b, from tomb M132 at Qianzhangda, Shandong Province. After Zhongguo (2005, p. 331). **e** Yoke linings also with stars, from tomb M20 at Anyang Xiaotun. After Shi (1970b, pls. 64, 66)

of a chariot yoke with decoration in the form of six-pointed stars from tomb M20 at Anyang Xiaotun (Shi 1970b, pls. 64, 66), while Fig. 9d shows an arched rein holder, with jingles at the two ends, from a chariot burial at Qianzhangda, east of Anyang (Zhongguo 2005, p. 331).

Fu Hao, King Wu Ding's consort, was also buried with distinctively northern bronzes. Her four mirrors represent rare artefact types at Anyang and are generally associated with the Arc. Her grave also contained a number of curved knives with ring terminals, one with an ibex head, all of which we should probably now see as tools for a chariot driver; pins with jingles accompanied these (Linduff 2006). Her six bow-shaped rein holders are conspicuous for their elaborate decoration, as is her complement of tools for repairing chariots (Zhongguo 1980, pl. 75). These chariot tools, associated with northern knives, are highly unusual grave goods for a woman: they indicate that Fu Hao, like Ya Chang, also buried with his attendants in the same general area of Xiaotun, was a leader with numerous chariots. These were roles in life, and there was an expectation that they would be carried on in the afterlife, in defence of a central ritual site threatened by spirit enemies.

Other burials in the same area reinforce the perceived importance of chariot warfare to supernaturally defend religious centres. The famous chariot burial, M20, was unearthed in the early period of excavation before the Second World War. A figure in the excavation report reproduced a drawing by one of the excavators, Shi (1970a, Fig. 8) (Fig. 5b). In the centre, we see the oval outline of one chariot box; another which survives is less clearly discernible. Near the bottom of the drawing we can see the two yokes for the horses, whose heads appear along the lower border. At the top are two charioteers, laid east–west and buried prone. Horse-headed knives, made at Anyang, also appear in the pit, and a dagger axe and spear show that the chariot was for warfare. There are also two rein holders. Early excavations at Anyang revealed several other chariot burials in the same area. The archaeologists concluded that they were arranged for a 'specific purpose' (Li 1977, p. 111). A pit with a single horse and groom was found in the same area. Nearby, in tomb M10, were further prone sacrifices, with northern knives and axes and whetstones (Zhu 2013, p. 16).

Southern Mongolian Tombs and Ornament of Animal Heads

The people buried prone at Anyang and the frequent simultaneous interest in single-edged curved knives and chariots draw us to the only currently known significant regions where prone burials have consistently been found and where such weapons were used. These are located in the steppe of southern and eastern Mongolia (Kovalev and Erdenebaatar 2010, pp. 104–105). The authors of the paper in which the features of this culture were first fully formulated suggest that the area includes both southern Mongolia and part of Inner Mongolia, south of the Yinshan mountains (Ma 2015, pp. 278–285). These graves are defined as belonging to the Tevsh regional group (Amartuvshin 2016) (Fig. 10). Only about two dozen of these monuments have been investigated (Amartuvshin 2016; Kovalev and Erdenebaatar 2010; Miyamoto and Obata 2016; Volkov 1972, p. 556).

Fig. 10 Map illustrating the Ulaanzuukh-Tevsh sites with those with deer stones and the route south to Anyang mentioned in the paper. Major sites are named on the map: Anyang, Zhukaigou, Lijiaya, Shimao, Nianzipo, Qianzhangda. Other sites are marked with numbers: Central Zone: 1, Baode; 2, Erlitou; 3, Heidouzui; 4, Jingjie; 5, Liulin; 6, Lüliang; 7, Qingjian; 8, Shilou; 9, Suide; 10, Taixi; 11, Yulin; 12, Zhengzhou; Northwest: 13, Gamatai; Northeast: 14, Chaodaogou; 15, Zhangjiayuan. *Sources:* Mongolia Ulaanzuukh-Tevsh sites: after Amartuvshin (2016, map 4); Yinshan Mountains Ulaanzuukh-Tevsh sites: after Ma (2015, Fig. 1); Mongolian deer stones: after Volkov (2002, Fig. 1); Shang-related satellite sites: after Cao (2014, Fig. 4.2)

A further variant, designated as belonging to the Ulaanzuukh culture, has been located in eastern Mongolia (Tumen et al. 2013). Radiocarbon analysis of bones in the graves gives dates between 1300 and 1000 BC (Kovalev and Erdenebaatar 2010, p. 105; Miyamoto and Obata 2016, p. 64).

The position of the stones marking the several groups of Ulaanzuukh-Tevsh graves is diverse. Some of the Tevsh tombs are best recognised before excavation from a characteristic stone outline known as the ‘hourglass shape’ (Amartuvshin 2016, 72) (Fig. 11a). This resembles the shape of an animal skin spread taut over the ground, which may have been employed as part of the burial ritual. The same ‘hourglass’ shape is also seen at the Inner Mongolian tombs (Fig. 11c). However, other tomb shapes were also adopted for the prone burials, including those in the Ulaanzuukh group (Kovalev and Erdenebaatar 2009, p. 164; Tumen et al. 2013). They are united by a shared funeral practice in which the deceased was placed in a narrow pit, in a prone position, with the head towards the east (Fig. 11b). It seems very likely that we should trace the origins, perhaps the very distant origins, of some of the people buried in a prone position in Shang period tombs

Fig. 11 Tombs of the Tevsh culture. **a** Layout of a grave in Mongolia and **b** detail of the burial. After Kovalev and Erdenebaatar (2009, Fig. 5). **c** Plan of an hour-glass shape tomb in the Yinshan Mountains. After Ma (2015, Fig. 2)

at Anyang among these regional groups, coming from present-day southern and eastern Mongolia and Inner Mongolia.

Almost all the Ulaanzuukh-Tevsh tombs have been robbed. Finds usually include a few stone beads and animal bones, with, perhaps, other objects of stone. Surviving metal is very rare. But one example contributes directly to our account of contacts between the Shang-period Anyang and the north. A pair of U-shaped gold hairpins with ram's heads brings into the discussion decoration of metal-work with animal heads (Fig. 12a). These correspond directly with a specific knife type with animal heads, such as the one with a deer head from Huayuan-zhuang tomb M54 (Fig. 8d). Both the rams on the gold hairpins and the deer head on the knife share an unusual and highly distinctive form of absolutely circular, tubular-shaped eyes and horns that rise directly from above the eyes. The hairpins were found by V.V. Volkov at Tevsh Uul in an undisturbed tomb in 1971 (Volkov

Fig. 12 Three U-shaped hairpins from Mongolia. **a** Golden hairpins with ram heads from a Tevsh grave. After Kovalev and Erdenebaatar (2009, Fig. 5). **b** Damaged hairpin from Chandmani Khar uul. After Amartuvshin (2016, 86, Fig. 85)

1972, p. 555). A hairpin of similar outline (Fig. 12b) was found more recently in a tomb at Chandmani Khar Uul (Amartuvshin 2016).

The gold hairpins (Fig. 12a) are an extremely rare find; as a single example of the animal style with tubular eyes they cannot at this stage, without some further evidence, secure the origins of animal heads with tubular eyes in this region of Mongolia. However, a group of chance finds of animal-headed ornaments in the same style, along with a large bronze knife with a ram (or ibex) head, have come from the Ömnögovı and Övörkhangaı regions, which overlap with the Tevsh area (Fig. 13a). These strongly-formed heads all have eyes shaped as short tubes (Erdenechuluun and Erdenebaatar 2011). Many other knives from the Mongolian region (Fig. 13c) have parallels found in the Arc (Fig. 14d). Thus, it seems reasonable to suggest that some knives, such as the one with a stag head at Huayu-anzhuang (Fig. 8d), may be copies of or have associations with metalwork from southern Mongolia.

Another reason to consider the role of people from Mongolia relates to the Shang-period chariot. While the chariot, or light wooden vehicle drawn by two horses, was developed first at sites in the eastern Urals, for East Asia, sites in Mongolia provide important information on the transition to the Shang. Petroglyphs in

Fig. 13 Animal-style ornaments and dagger decoration. **a** Group of bronze ornaments in the shape of horned animal heads. From Ömnögovi and Övörkhangaï Provinces, Tevsh culture. Redrawn from Erdenechuluun and Erdenebaatar (2011, Figs. 77–79). **b** Dagger with an animal head, Tevsh culture from Bayankhongor Province, Mongolia. After Erdenechuluun and Erdenebaatar (2011, Fig. 292). **c** Jingle-head knife from Zavkhan Province, Mongolia. After Erdenechuluun and Erdenebaatar (2011, Fig. 308)

the Altai reaching into Mongolia show spoke-wheeled chariots (Jacobson-Tepfer 2008). While horses were domesticated further west, it has recently been discovered that people on the present-day Mongolian plateau moved directly from hunting to herding, including herding of horses (Jeong et al. 2018). Horses were especially valued, and their heads were ritually buried around the numerous stone monuments known as *khirigsuurs*, dating between 1300 and 700 BC (Allard and Erdenebaatar 2005). Some of the male horse heads have recently been examined and show signs of wear through traction, possibly while drawing chariots (Taylor 2017). Large standing stelae, the deer stones, are renowned for lively images not only of stags, but also of knives, daggers, shaft-hole axes and rein holders hanging from belts which are carved around many of them (Kovalev 2007; Volkov 2002). These different monuments, petroglyphs, *khirigsuurs* and deer stones have illuminated the key role of the Mongolia plateau as a major region of origin for chariot and horse use in East Asia (and their associated weapons and tools), and also the likely source for the chariots and horses employed at Anyang.

The Route from Southern Mongolia to Central China

Diverse people in the Arc acted as a bridge between the Mongolian steppe and Anyang, and here we review the archaeological evidence along the route that traverses this complex territory, by examining three characteristic features: prone burials, certain types of metalwork, especially knives (Fig. 14) and other chariot tools, and distinctive ceramics. All of these appear in tombs south of the Great Bend of the

Fig. 14 A series of curved knives to illustrate three principal contexts and categories. Top row: high quality knives from Anyang and the Yellow and Fen Rivers; middle row: a group of knives reported in 1962 from a hoard at Chaodaogou, Hebei Province; bottom row: three knives from horse or chariot burials at Anyang and one from Qianzhangda. **a** Stag-head knife from Anyang Huayuanzhuang. After Zhu (2013, Fig. 16). **b** Knife from Jingjiecun, Shanxi Province. After Li (2011, Fig. 4.1–10). **c** Knife from Suide, Shaanxi Province. After Shaanxisheng (2009a, p. 515). **d** Jingle-head knife from Ganquan, Shaanxi Province. After Shaanxisheng (2009b, p. 608). **e–h** Knives from Chaodaogou. After Zhu (2013, Fig. 6). **i** Knife with horse head from a chariot burial at the northern area of Anyang Xiaotun. After Shi (1970b, pl. 136). **j** Knife from Anyang Xiaotun. After Zhu (2013, Fig. 11). **k** Knife from Qianzhangda. After Zhongguo (2005, Fig. 246). **l** Knife from the tomb of Fu Hao, Anyang Yinxu. Redrawn from Zhongguo (1980, pl. 66)

Fig. 15 Examples of a prone burial at Zhukaigou, and one with northern-type knives, Inner Mongolia. **a** M1044 with its artefacts. After Neimenggu and E'erduosi (2000, Fig. 144). **b** M1040 with its artefacts. After Neimenggu and E'erduosi (2000, Fig. 189)

Yellow River, especially at the site of Zhukaigou, in Inner Mongolia. A direct link with the Ulaanzuukh-Tevsh burials is offered by two chance finds of hair ornaments from the area of the site. These are oval-shaped, as are the ones in Mongolia, but plain, without animal heads (Neimenggu and E'erduosi 2000, p. 122).

The cemetery at Zhukaigou has revealed several prone burials, including one of the two skeletons in tomb M1044 (Neimenggu and E'erduosi 2000, p. 186) (Fig. 15a). Another tomb, M1040, is well known for its weapons (Neimenggu and E'erduosi 2000, p. 224): the dagger shown in Fig. 15b, left, appears to be the antecedent of later versions in the steppe and in the northeast Arc. Figure 15b, right, shows a knife with a ring at the end of the grip of a generic type, found at many sites in the Arc, as well as in Mongolia (Wu'en Yuesitu. 2007, p. 166; Yang 2016, pp. 168–169); this type is ancestral to the curved knives at Anyang. The Zhukaigou knife is ultimately descended from curved knives with a hole at the end of the grip, prevalent in the Seima-Turbino phenomenon, originating, it is thought, in the Altai (Chernykh 1992, p. 221). A Shang style *ge* or halberd blade in this tomb, and early or middle Shang-period vessel fragments found at the site, must be an outcome of contact between these areas of Inner Mongolia, where prone burial was practised, and the Shang on the Central Plains.

Within the Arc, distinctive ceramics enable us to make further links between Zhukaigou and other sites in the Loess Plateau region. Three recurrent ceramic forms are found at Zhukaigou and at Shimao and other sites further south. They comprise a large jar, often rounded, on three short hollow legs (known as a *sanzu-weng* 三足甕); a wide mouthed tubular container (*dakouzun* 大口尊); and a cooking vessel (*li* 鬲) with three separate, bulging lobes (Tian and Han 2003) (Fig. 16). The site at Shimao was only recently discovered (Sun et al. 2018). Somewhat earlier in

Fig. 16 Characteristic ceramics of the Shimao-Zhukaigou tradition that were also found in Western Zhou tombs, most especially those of consorts of the Jin and Peng lords. **a** *Dakouzun* at Zhukaigou. After Neimenggu and E'erduosi (2000, Fig. 83). **b** *Sanzuweng* at Zhukaigou. After Neimenggu and E'erduosi (2000, Fig. 74). **c** *Li* at Zhukaigou. After Neimenggu and E'erduosi (2000, Fig. 193). **d** *Dakouzun* at Hengshui. After Song et al. (2006, Fig. 17). **e** *Sanzuweng* at Hengshui. After Song et al. (2006, Fig. 18). **f** *Li* at Nianzipo. After Zhongguo (2007b, Fig. 206)

date than Zhukaigou, Shimao (c. 2300–1800 BC), displays impressive and extensive stone construction, with a key element being the ritual burial of human skulls. This seems to prefigure the depositions of victims at Anyang (Sun et al. 2018).

As we go south from Shimao, the same ceramics recur in the Lijiaya area, a region with very clear links with the Shang. Lijiaya is a major fortified site, with remains of occupation and tombs dating from the late Shang into the Western Zhou, some containing prone burials, and some in an east–west orientation (Cao 2019). A small spatula with a snake or alligator head has led archaeologists to name a wider region with similar finds as belonging to the Lijiaya sphere or culture (Shaanxisheng Kaogu Yanjiuyuan 2013, pl. 25:3). Cao Dazhi, who has examined the bronzes of the region in great detail, provides a fruitful discussion of animal-headed knives, daggers and spatulas with snake or alligator heads found in this area and illustrates numerous examples of socketed axes and chisels of the types found with chariots (Cao 2014, pp. 418, 485–487, 510–513; see also Linduff et al. 2017, pp. 133–145). He compares local, excavated weapons with the carvings on deer stones (already mentioned) in present-day northern and central Mongolia (Kovalev 2007; Volkov

1995, 2002), arguing that the weapons found in the region along the Yellow River came from Mongolia, recognising important traits of similarity (Cao 2014, pp. 284–296). Although the weapons may have actually been local copies, Cao's suggestion of a contact with Mongolia is very far-sighted and highly pertinent. The deer stone region is to the north of and distinct from the Ulaanzuukh-Tevsh zones, but people in the two areas must have shared a taste for similar if slightly different knives and daggers and axes.

Cao has also published the large number of middle and late Shang bronze vessels and weapons from the Central Plains recovered from minor sites in the Lijiaya area, mainly from burials (Fig. 10). Most of these tombs have not been properly reported. One at Linzheyu is said to have a tomb in an east–west orientation (Wu 1972). Cao argues that, rather than being used in the ritual sets typical of the Central Plains, the Shang vessels may have been awarded to northerners in exchange for horses, perhaps originating as far away as Mongolia, that were taken down the banks of the Yellow River and then southeast to Anyang. He thus argues that the Shang vessels indicate a route along which horses were brought from the north to Shang centres.

We can follow this communication south of Lijiaya if we move to the east side of the Yellow River and its tributary, the Fen River in Shanxi Province (Shanxi-sheng 2006, p. 134). Three burials are reported at Jingjie in Lingshi, with one of the graves orientated east–west containing an interment in which had been placed a knife crowned by a ram's head with tubular eyes. Two of the tombs had death attendants and held valuable Anyang vessels. A multitude of weapons was accompanied by chariot fittings decorated with stars, and bronze whip ends. Here, therefore, the Shang had greater influence than further north in the Lijiaya centres. One of the Shang vessels has a small image of a horse on the base in thread relief. Images of horses are extremely rare: two small bronze models of horses have been found at Ganquan County slightly further south, on the west side of the Yellow River (Wang et al. 2007); and Fu Hao's tomb is famous for tiny jade silhouettes of horses. Taken together, we can suggest that in the late Shang, horses had gained particular importance (Zhongguo 1980, pl. 30:2).

The role of chariots, horses, and chariot drivers buried prone in the inferred movement south is confirmed by a group of tombs with chariot burials from Qiaobei in Fushan (Tian et al. 2006) (Fig. 17). The Qiaobei chariot is probably an early type, with a box smaller than the more advanced chariots from Anyang and Meiyuanzhuang. At the very front is a charioteer buried prone. In one of the larger tombs at the same site, M9, four attendants are buried prone. At both Jingjie and Qiaobei, chariot ownership and driving were central. Some distance southwest of the Shilou and Suide region and also from Jingjie, on the southern edge of the Loess Plateau, is the site of Nianzipo. Excavations revealed 136 burials, of which 64 were in the prone position, the rest in other postures (Zhongguo 2007b). The dating of the Nianzipo cemetery to Shang times is based on both the discovery of a Shang bronze of the late Anyang period and some radiocarbon evidence (Linduff et al. 2017, p. 153).

An interesting additional feature is that the shape of some burials at Nianzipo distantly resembles the hourglass shape of the Tevsh tombs (Zhongguo 2007b, pp. 254–264) (Fig. 18). The Nianzipo tombs held single skeletons laid prone, with their heads towards the east or northeast. While some tombs were lined with

Fig. 17 Chariot burial M1 at Qiaobei, Shanxi Province, where several large Shang period tombs have been excavated. After Tian et al. (2006, Fig. 5)

Fig. 18 Plans of the graves at Nianzipo, Shaanxi Province, which reproduce late forms of the Inner Mongolian hourglass tombs. After Zhongguo (2007b, Figs. 190, 196, 201, 206)

stone slabs (a general northern Eurasian tradition), others retained just individual slabs at the head and foot. As Alexei Kovalev has shown, this feature is also found in Mongolia (Kovalev and Erdenebaatar 2010, p. 104). It seems that the occupants of this cemetery originally had connections with Inner Mongolia or further north. Lobed vessels in such tombs can be related to the *li* found at Lijiaya, belonging to the Shimao-Zhukaigou tradition (Neimenggu and E'erdusi 2000, p. 237; Shaanxisheng 2013, colour pl. 20).

The burials at Nianzipo can be compared with tombs in the Bin County area of Shaanxi Province, where a few prone burials and many *li* vessels, similar to those at Nianzipo in the Lijiaya tradition, have been found (Liang 1999, pp. 79, 83; Dou et al. 2019, pp. 22, 24). While the abundance of Shang bronze vessels at Lijiaya sites and at Jingjie suggests strong contact from Anyang going north, the sites of Zhukaigou, Lijiaya, Qiaobei and Nianzipo indicate a southward movement of northerners favouring prone burial.

The conjunction of the Lijiaya ceramic tradition and prone burial reappears, considerably later, at the major Western Zhou Peng state cemetery, with 1299 burials (Xie et al. 2019), at Hengshui, near Houma. A recently excavated major tomb, M2158, held the tenth century BC lord of the Peng state: he was buried prone, as were his six attendants. He and his elites belonged to a regional group with distinctive northern features, taking the name of *Gui* 鬼. The west–east tomb plan is also relevant, as with its slightly bowed outlines and four angular corners it vaguely resembles (perhaps fortuitously) the hourglass shape, derived from an animal skin, characteristic of the tombs in the north (Fig. 19). Like Ya Chang, the central individual in this tomb wore a large number of shells, which had possibly

Fig. 19 Plan of tomb M2158 at Hengshui, Shanxi Province, of a lord of Peng, buried west–east in a prone position. After Xie (2019, Fig. 12)

decorated a cloth wrapped around the body. The tomb was overflowing with bronze ritual vessels, perhaps a consequence of numerous gifts from the Zhou king and his elite.

Not only the prone burial of this lord, but also ceramics in the tomb of a prominent consort of another Peng lord, buried in the same cemetery (Song et al. 2006), present strong evidence of relations with regional groups along the northern Yellow River. Although this woman was a member of the royal Zhou Ji lineage, she had a prominent display of 13 three-legged jars (*sanzuweng*) and three tubular containers (*dakouzun*). These are ceramics which descend from the Shimao-Zhukaigou tradition and survived at Lijiaya; they are not found in Zhou male tombs, but are quite frequent in tombs of consorts of rulers of the Jin state in the same Houma region, as described by Chen (2002) and Khayutina (2017) (see also Rawson 2013). Due to the geographic position of their domain, the Jin state had a porous frontier with the north. Marriage alliances with regional groups with northern connections were, it seems, a feature of the diplomatic strategies of the Jin. In the southern Fen River region, we see the continuation of a tradition that originated in the north of the Arc and was cemented along the Yellow River and in the southern Loess Plateau, most probably as people gradually moved south. The Peng cemetery provides strong evidence that we can associate prone burials with specific regional groups in the Shang period, with several examples also dating to the subsequent Zhou period.

In other areas of the Arc, prone burials are very rare, and the recorded animal-headed knives are often chance finds (Cao 2014, pp. 418–419). The one fully-reported example of a Bronze Age prone burial in the northwest of the Arc was found at Gamatai, in the Guinan County of Qinghai province on the northern edge of the Tibetan Plateau (Qinghaisheng and Beijing 2016). In the northeast of the Arc, contact with the Ulaanzuukh people in eastern Mongolia was a clear possibility (Tumen et al. 2013). Three prone burials have been located in a small group of east–west oriented tombs at Zhangjiayuan (Ji and Zhang 1993, p. 321). Individuals buried prone, occasionally in east–west orientated tombs containing some animal-head decorated metalwork, have also been found at Luan County in the same region near Tianjin (Zhang and Zhai 2016). Gold personal ornaments, a northern taste, were popular in such tombs. The coincidence of prone burials and gold personal ornaments, favoured in the steppe and not among the Shang, once more confirms the link of prone burials with northerners. Some northern knives and weapons (Zhu 2013, p. 11) are also present in a well-known hoard from Chaodaogou (Fig. 14e–h), south of the Yan Mountains (Zheng 1962; Varenov 1999).

Discussion

Prone burials are significant in the history of the late Shang on account of their association with chariots at Anyang. They are one of several features that appear to be innovations in late Shang rituals, which also include the introduction of ramps for large royal and elite tombs; widespread burial of dogs, not only below the coffins but in other positions; the presence of numerous attendants buried with the elite; and the chariot pits and thousands of sacrifices in pits that characterize

the royal cemetery and the burials at Xiaotun. Since during all periods of the late Shang and Zhou careful attention was paid to all rituals including burial, it is not likely that tomb orientation or body position were accidental. Up to thirty per cent of the excavated individuals, elites, death attendants and sacrifices have been revealed as buried prone. This is a relatively large percentage of the known population, and requires an extensive discussion. Such an investigation pertains to the much more difficult questions of the sources of these various ritual mortuary practices, which appear on present evidence to have arrived in the late Shang period. These are very large topics, so discussion here has centred on prone burial associated with the introduction of chariots, the management of horses and other issues of warfare and defence in the afterlife, marked by burial of northern tools and weapons.

In this paper, we have also concentrated on communication with southern and eastern Mongolia, and Inner Mongolia, where prone burial has also been found. The significance of a northern connection and contact with Anyang are supported by the introduction of chariots from the north and particular artefacts at sites along a route south at Zhukaigou, Lijiaya, Jingjie, Qiaobei and Nianzipo, as well as by some examples in the northeastern Arc, where gold ornaments typical of northerners were favoured. This connection is also matched with a shared use of typical ceramics at several sites.

In the context of the late Shang, we have paid particular attention to chariots and the tools employed with them, including the bow-shaped rein holder and curved knives with jingles and animal heads or oval loops as terminals. This set of artefacts, including rein holder, knife, and tools has hitherto not achieved the recognition it deserves as indicating both the active use of chariots in war and the identity of those who drove them. All of these artefacts relate to northern prototypes, found in Siberia or Mongolia (Kuzmina 2004). While, as mentioned, chariots and their horses have long been recognised as coming from the north, arriving in the late Shang period, the coincidence of the arrival at Anyang of prone burial, the chariots, and the set of chariot tools, marks a significant change in late Shang ritual practice and belief.

Constructing chariots, breaking and training horses, and managing them, both in driving pairs and day-to-day, are highly specialised skills, as is well known from the cuneiform text in Hittite, c. 1350 BC, on how to train pairs of horses and ensure their well-being (Kelekna 2009, pp. 98–99). Cao Dazhi reinforces this information with evidence from oracle bones that references a search for a well-trained horse to create a pair (Cao 2014, pp. 222–225). Fighting from chariots was a further specialised skill, and northerners who had mastered this may have been valued as members of Shang military forces. Once the chariot had been introduced to Anyang, the vehicles were probably built there locally. Horses, on the other hand, must have been repeatedly sought from the north, as Cao Dazhi has suggested. Moreover, if chariot fighting was a significant aspect of warfare, it is likely that it arose because northerners had first come south to attack the Shang using chariots. As we have seen, quite a number of the people managing chariots were buried prone, as was Ya Chang, who is likely to have been a military leader with a chariot force. A large number of prone burials are also found among the sacrificial pits, including the more than seven hundred individuals with northern knives, who may have been valued or feared for

their fighting skills. As already discussed, we cannot readily explain their role in the death rituals; they do, however, reinforce the connection between northerners, recognisable by their weapon set, and prone burial.

While at first sight the large numbers and the very different social positions of the people buried prone is puzzling, we have comparable cases, known not from burials but from oracle bone inscriptions. These mention the *Qiang* in several contexts (Luo 1991; Shelach 1996; Campbell 2018, pp. 115–116, 203–208). *Qiang* are often described as human victims to be sacrificed. But the word *Qiang* 羌 also occurs with the term *fang* 方, suggesting that *Qiang* were outsiders from a particular region (*fang*). The term *Duo Qiang* 多羌 could refer to ‘managers of the *Qiang*’. The term *Ma* 馬 for horse was used in similar ways. There are references to *Ma fang* 馬方, a region of the *Ma*, and indeed to attacking the *Ma*. When the term *Duo Ma* 多馬 occurs, David Keightley notes that, as horses were not used for riding within central China at this date, it is likely that *Duo Ma* referred to leaders of chariots (Keightley 2012, p. 325). As both the *Qiang* and the *Ma* peoples appear in several social or political roles, it is possible that people buried prone may also have fulfilled several roles, or have been a mixed community of several different groups. Some may have been leaders of the chariot forces, others may have been drivers, and yet others—those sacrificed with their knives and shaft-hole axes—may have supported the chariot forces, or may have challenged the Shang.

Further, while some of the people buried prone, especially among the sacrificed, may have recently come southwards and have been part of enemy forces, others may have come from elsewhere and have lived at Anyang for a period. Indeed, the limited isotopic analysis work relating to diet and geographical origins suggests that some people at Anyang had come from beyond the Shang centre, but had then spent part of their lives there (Cheung et al. 2017). It is thus possible that several different groups, with northerners among them, made up the population who were buried prone.

This paper, therefore, offers the following conclusions. The people buried prone at Anyang were among several distinctive groups making up wider Shang society. This heterogeneity was inevitable as the Shang defended their territory and engaged with neighbouring peoples, but also because they sought resources from the north, such as horses, chariots and their drivers, as well as ores from the south. While some weapons originating in the north came with these innovations, others, notably the rein holders and other tools, including copies of northern socketed axes, shaft-hole axes and knives, were made at Anyang but preserved customary techniques of northern chariot management and northern warfare. From the evidence of their weapons, we suggest that among the people buried prone there were some who had contacts with the north, having come south as chariot drivers and/or to join the Shang army.

In the many Shang battles and campaigns, a few of these individuals may have played important roles and have been awarded high elite burial in death. Ya Chang, the occupant of M54 at Anyang Huayuanzhuang died in battle, and his tomb may have been a reward for his military achievement. He was accompanied by exceptional late Shang bronze vessels, but they appear to have been assembled in an unusual way, perhaps in haste and following a battlefield death. His set of flasks (*gu* 觚), and cups (*jue* 爵), for example, was made up from two different groups. He had only

one square wine vessel on pointed legs (*fangjia* 方罍) and one square wine flask (*fangzun* 方尊), whereas a pair of both would have been more typical. In addition, the location of some of the inscriptions on the bronzes in the tomb is surprising: for example, a pair of inscriptions has, most unusually, been placed inside the neck of the *fangzun* (Zhongguo 2007a, pp. 117–118), and this may be a sign of a hasty addition or a change to attribute the vessel to Ya Chang after his sudden death. At the same time, other items, such as the colour palette and gold ornaments, retained references either to Ya Chang's possible northern origins or to the northern origins of his predecessors.

Thus, we argue that late Shang prone burials illustrate the diversity of the communities at Anyang. Among these were northerners who acted as chariot drivers, soldiers and leaders employed by the Shang to defeat other northerners. Some of the northern weapons found in Shang burials were brought from the north. Others were copies or Shang versions made and developed at Anyang to complement the identity and roles of their owners. The use of chariots and of a distinctive tool set in northern style indicates the close connections that the late Shang had with their northern neighbours. At the same time, we must recognise that although many outsiders lived within late Shang territory and the elites exploited the chariot—a northern machine—both were rapidly assimilated within what is today recognised as Shang material and ritual culture. A signal of that assimilation is the elaborate bronze decoration on both vehicles and horse harnesses that must have made the chariots glitter in the sun as they moved across the ground.

Acknowledgements Financial support for collaboration with Konstantin Chugunov from the State Hermitage Museum at St Petersburg was generously offered by Ian Taylor, whose contributions to exchanges between the School of Archaeology at the University of Oxford and the School of Archaeology and Museology at Peking University have been particularly important to developing research on communication between the steppe, the Arc and the Central Plains. We are grateful for comments on earlier drafts by Professor Zhu Fenghan and Professor Roderick Campbell.

Availability of Data and Material All data and materials used in this article are publicly accessible.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Allard, F., & Erdenebaatar, D. (2005). Khirigsuurs, ritual and mobility in the Bronze Age of Mongolia. *Antiquity*, 79(305), 547–563.
- Amartuvshin, C. (2016). Hourglass-shaped graves and prone burials. In G. Eregzen (Ed.), *Archaeological relics of Mongolia*. Ancient funeral monuments of Mongolia (Vol. 3, pp. 72–87). Ulaanbaatar: Science Press.
- Bagley, R. W. (1999). Shang archaeology. In M. Loewe & E. L. Shaughnessy (Eds.), *The Cambridge history of ancient China: From the origins of civilization to 221 BC* (pp. 124–231). Cambridge: Cambridge University Press.
- Campbell, R. B. (2012). On sacrifice: An archaeology of Shang sacrifice. In A. Porter & G. M. Schwartz (Eds.), *Sacred killing: The archaeology of sacrifice in the ancient Near East* (pp. 305–323). Winona Lake: Eisenbrauns.
- Campbell, R. B. (2018). *Violence, kinship and the early Chinese state: The Shang and their world*. Cambridge: Cambridge University Press.
- Cao, D. (2014). *The loess highland in a trading network (1300–1050 BC)*. Ph.D dissertation, Princeton University, Princeton.
- Cao, D. (2019). Lijiaya wenhua yizhi de diaocha ji xiangguan wenti. *Zhongguo Guojia Bowuguan guan-kan*, 7, 42–75.
- Chang, K. (1980). *Shang civilization*. New Haven: Yale University Press.
- Chechushkov, I. V., & Epimakhov, A. V. (2018). Eurasian steppe chariots and social complexity during the Bronze Age. *Journal of World Prehistory*, 31(4), 435–483.
- Chen, F. (2002). Jinhou mudi qingtongqi suojian xingbie yanjiu de xinxiangsu. In S. Bowuguan (Ed.), *Jinhou Mudi Chutu Qingtongqi Guoji Xueshu Yantaohui lunwenji* (pp. 157–196). Shanghai: Shanghai Shuhua Chubanshe.
- Chernykh, E. N. (1992). *Ancient metallurgy in the USSR: The early metal age*. Cambridge: Cambridge University Press.
- Cheung, C., Jing, Z., Tang, J., Weston, D. A., & Richards, M. P. (2017). Diets, social roles, and geographical origins of sacrificial victims at the royal cemetery at Yinxu, Shang China: New evidence from stable carbon, nitrogen, and sulfur isotope analysis. *Journal of Anthropological Archaeology*, 48, 28–45.
- Dou, H., Wang, Z., Zhai, L., Zhao, Y., & Qian, Y. (2019). Shaanxi Xunyixian Zaolinhetao yizhi Shang Zhou shiqi yicun fajue jianbao. *Kaogu*, 10, 15–32.
- Erdenechuluun, P., & Erdenebaatar, D. (2011). *The sword of heaven: Culture of bronze artefacts of the Bronze Age and Hunnu empire*. Ulaanbaatar: Collections of Erdenechuluun Purevjav.
- Gao, Q. (1967). Daofuzang zhong de tongdao. *Chungyang Yenchuiyuan Lishih Yuyen Yenchiuso chik'an*, 37(1), 355–381.
- Guo, B. (1951). 1950 Nian chun Yinxu fajue baogao. *Kaogu xuebao*, 5, 1–61.
- Hayashi, M. (1959). Chūgoku Senshin jidai no basha. *Tōhō gakuho*, 29(3), 155–284.
- He, Y. (2013). Yinxu Huayuanzhuang dongdi M54 muzhu zaiyanjiu. In Z. S. K. K. Y. X. S. Z. K. Yanjiushi (Ed.), *Sandai kaogu* 5 (pp. 110–117). Beijing: Kexue Chubanshe.
- Hu, J. (2016). *Shilun Shangwenhua fushenzang*. MA Thesis, Minzu University of China, Beijing.
- Huang, Z. (2004). *Gudai rensheng renxun tonglun*. Beijing: Wenwu Chubanshe.
- Jacobson-Tepfer, E. (2008). The emergence of cultures of mobility in the Altai Mountains of Mongolia: Evidence from the intersection of rock art and paleoenvironment. In H. Barnard & W. Wendrich (Eds.), *The archaeology of mobility: Old World and New World nomadism* (pp. 200–229). Los Angeles: Cotsen Institute of Archaeology, University Of California.
- Jeong, C., Wilkin, S., Amgalantugs, T., Bouwman, A. S., Taylor, W. T. T., Hagan, R. W., et al. (2018). Bronze Age population dynamics and the rise of dairy pastoralism on the eastern Eurasian steppe. *Proceedings of the National Academy of Sciences*, 115(48), E11248–E11255.
- Ji, L., & Zhang, J. (1993). Tianjin Jixian Zhangjiayuan yizhi disanci fajue. *Kaogu*, 4, 311–323.
- Keightley, D. N. (1999). The Shang: China's first historical dynasty. In M. Loewe & E. L. Shaughnessy (Eds.), *The Cambridge history of ancient China: From the origins of civilization to 221 B.C* (pp. 232–291). Cambridge: Cambridge University Press.
- Keightley, D. N. (2012). *Working for his majesty: Research notes on labor mobilization in late Shang China (ca. 1200–1045 B.C.)*. Berkeley, CA: Institute of East Asian Studies, University of California.
- Kelekna, P. (2009). *The horse in human history*. Cambridge: Cambridge University Press.

- Khayutina, M. (2017). The tombs of the rulers of Peng and relationships between Zhou and northern non-Zhou lineages (until the early ninth century BC). In E. L. Shaughnessy (Ed.), *Imprints of kinship: Studies of recently discovered bronze inscriptions from ancient China* (pp. 71–132). Hong Kong: CUHK Press.
- Kovalev, A. A. (2007). Dve traditsii ispol'zovaniya olennykh kamney Mongolii. In A. A. Tishkin (Ed.), *Kamennaya skulptura i melkaya plastika drevnikh i srednevekovykh narodov Yevrazii*. Trudy SAIP, Vypusk 3 (pp. 99–105). Barnaul: Izdatel'stvo Azbuka.
- Kovalev, A. A., & Erdenebaatar, D. (2009). Discovery of new cultures of the Bronze Age in Mongolia according to the data obtained by the Interational Central Asian Archaeological Expedition. In J. Bemmman, H. Parzinger, E. Pohl, & D. Tseveendorj (Eds.), *Current archaeological research in Mongolia* (pp. 149–170). Bonn: University of Bonn.
- Kovalev, A. A., & Erdenebaatar, D. (2010). Pozdnii bronzovyi vek i nachalo rannego zheleznogo veka Mongolii v svete otkrytii mezhdunarodnoi Tsentralno-Aziatskoi arkheologicheskoi ekspeditsii. In A. D. Tsybiktarov (Ed.), *Drevniye kul'tury Mongolii i Baykal'skoy Sibiri: Materialy mezhdunarodnoy nauchnoy konferentsii (Ulan-Ude, 20–24 sentyabrya 2010 g.)* (pp. 104–117). Ulan-Ude: Buryat State University.
- Kuzmina, E. E. (2004). Historical perspectives on the Andronovo and early metal used in Eastern Asia. In K. M. Linduff (Ed.), *Metallurgy in ancient eastern Eurasia from the Urals to the Yellow River* (pp. 37–92). Lewiston: Edwin Mellen Press.
- Li, C. (1977). *Anyang*. Seattle: University of Washington Press.
- Li, F. (2006). *Landscape and power in early China: The crisis and fall of the Western Zhou, 1045–771 BC*. Cambridge: Cambridge University Press.
- Li, Y. (Ed.). (2009). *Yinxu chutu qiwu xuancui*. Taipei: Chungyang Yenchuiyuan Lishih Yuyen Yenchiuso.
- Li, G. (2011). *Zhongguo beifang qingtongqi de Ouya caoyuan wenhua yinsu*. Beijing: Wenwu Chubanshe.
- Liang, X. (1999). Shaanxi Binxian Duanjing yizhi fajue baogao. *Kaogu xuebao*, 1, 73–96.
- Liang, S., & Gao, Q. (1962). *Houjiazhuang: Henan Anyang Houjiazhuang Yindai mudi 2: 1001 hao damu* (Vol. 1). Taipei: Chungyang Yenchuiyuan Lishih Yuyen Yenchiuso.
- Lin, Y. (1986). A reexamination of the relationship between bronzes of the Shang culture and of the Northern Zone. In K. Chang (Ed.), *Studies of Shang archaeology: Selected papers from the International Conference on Shang Civilization* (pp. 237–273). New Haven: Yale University Press.
- Linduff, K. M. (2006). Why have Siberian artefacts been excavated inside the ancient Chinese dynastic borders? In L. M. Popova, A. T. Smith, & D. L. Peterson (Eds.), *Beyond the steppe and the sown: Proceedings of the 2002 University of Chicago Conference on Eurasian Archaeology* (pp. 358–370). Leiden/Boston: Brill.
- Linduff, K. M., Sun, Y., Cao, W., & Liu, Y. (2017). *Ancient China and its Eurasian neighbors: Artifacts, identity and death in the frontier, 3000–700 BCE*. Cambridge: Cambridge University Press.
- Loehr, M. (1956). *Chinese Bronze Age weapons*. Ann Arbor: University of Michigan Press.
- Luo, K. (1991). Yinshang shiqi de Qiang yu Qiangfang. In Y. Wang (Ed.), *Jiagu yu Yinshang shi 3* (pp. 405–426). Shanghai: Shanghai Guji Chubanshe.
- Ma, J. (2015). Neimenggu Yinshan diqu zaoqi shibanmu de chubu diaocha yu yanjiu. In Neimenggu Bowuyuan, & Neimenggu Zizhiqiu Wenwu Kaogu Yanjiusuo (Eds.), *Zhongguo beifang ji Menggu, Beijiaer, Xiboliya diqu gudai wenhua* (pp. 278–286). Beijing: Kexue Chubanshe.
- Ma, D., Zhou, Y., & Zhang, Y. (1955). 1953 nian Anyang Dasikongcun fajue baogao. *Kaogu xuebao*, 1, 25–90.
- Meng, X. (1992). Tan Yinxu fushenzang. *Zhongyuan wenwu*, 3, 52–55.
- Miyamoto, K., & Obata, H. (Eds.). (2016). *Excavations at Daram and Tevsh sites: A report on joint Mongolian-Japanese excavations in outer Mongolia*. Fukuoka: Department of Archaeology, Faculty of Humanities, Kyushu University.
- Neimenggu, Z. W. K. Y., & E'erdusi, B. (2000). *Zhukaigou: Qingtong shidai zaoqi yizhi fajue baogao*. Beijing: Wenwu Chubanshe.
- Piggott, S. (1974). Chariots in the Caucasus and in China. *Antiquity*, 48(189), 16–24.
- Qinghaisheng, W. K. Y., & Beijing, D. K. W. X. (2016). *Guinan Gamatai*. Beijing: Kexue Chubanshe.
- Rawson, J. (2013). Ordering the exotic: Ritual practices in the Late Western and Early Eastern Zhou. *Artibus Asiae*, 73(1), 5–76.
- Rawson, J. (2017). China and the steppe: Reception and resistance. *Antiquity*, 91(356), 375–388.
- Rawson, J. (2018). Gold, an exotic material in early China. In K. M. Linduff & K. S. Robinson (Eds.), *How objects tell stories: Essays in honor of Emma C. Bunker* (pp. 109–135). Turnhout: Brepols Publishers.

- Reinhart, K. (2015). Religion, violence, and emotion: Modes of religiosity in the Neolithic and Bronze Age of Northern China. *Journal of World Prehistory*, 28(2), 113–177.
- Shaanxisheng, K. Y. (2009a). *Shaanbei chutu qingtongqi* (Vol. 2). Chengdu: Bashu Shuju.
- Shaanxisheng, K. Y. (2009b). *Shaanbei chutu qingtongqi* (Vol. 3). Chengdu: Bashu Shuju.
- Shaanxisheng, K. Y. (2013). *Lijiyaya*. Beijing: Wenwu Chubanshe.
- Shanxisheng, K. Y. (2006). *Lingshi Jingjie Shangmu*. Beijing: Kexue Chubanshe.
- Shaughnessy, E. L. (1988). Historical perspectives on the introduction of the chariot into China. *Harvard Journal of Asiatic Studies*, 48(1), 189–237.
- Shelach, G. (1996). The Qiang and the question of human sacrifice in the late Shang period. *Asian Perspectives*, 35(1), 1–26.
- Shi, Z. (1970a). *Xiaotun 1: Yizhi de faxian yu fajue 3. Yinxu muzang 1 (beizu muzang)* (Vol. 1). Taipei: Chungyang Yenchuiyuan Lishih Yuyen Yenchiuso.
- Shi, Z. (1970b). *Xiaotun 1: Yizhi de faxian yu fajue 3. Yinxu muzang 1 (beizu muzang)* (Vol. 2). Taipei: Chungyang Yenchuiyuan Lishih Yuyen Yenchiuso.
- Song, J., Ji, K., Tian, J., & Li, Y. (2006). Shanxi Jiangxian Hengshui Xizhoumu fajue jianbao. *Wenwu*, 8, 4–18.
- Sun, Z., Shao, J., Liu, L., Cui, J., Bonomo, M. F., Guo, Q., et al. (2018). The first Neolithic urban center on China's north Loess Plateau: The rise and fall of Shima. *Archaeological Research in Asia*, 14, 33–45.
- Taylor, W. (2017). Horse demography and use in Bronze Age Mongolia. *Quaternary International*, 436, 270–282.
- Tian, J., Fan, W., & Hou, P. (2006). Shanxi Fushan Qiaobei Shang Zhou mu. In Beijing Daxue Zhongguo Kaoguxue Yanjiu Zhongxin, & Beijing Daxue Zhendan Gudai Wenming Yanjiu Zhongxin (Eds.), *Gudai wenming* (Vol. 5, pp. 347–394). Beijing: Wenwu Chubanshe.
- Tian, G., & Han, J. (2003). Zhukaigou wenhua yanjiu. In Beijing Daxue Kaoguxi (Ed.), *Kaoguxue yanjiu* 5 (pp. 227–259). Beijing: Kexue Chubanshe.
- Tong, E. (1987). Shilun woguo cong dongbei zhi xi'nan de biandi banyuexing wenhua chuanbodai. In Wenwu Chubanshe Bianjibu (Ed.), *Wenwu yu kaogu lunji* (pp. 17–43). Beijing: Wenwu Chubanshe.
- Tumen, D., Khatanbaatar, D., & Erdene, M. (2013). Bronze Age graves in the Delgerkhaan Mountain area of eastern Mongolia. *Asian Archaeology*, 2, 40–49.
- Varenov, A. V. (1999). Chaodaogou i Yankhe: Pamyatniki epokhi Shan-In' s ordosskimi bronzami. In A. P. Derevyanko, & V. I. Molodin (Eds.), *Problemy arkheologii, etnografii, antropologii Sibiri i sopredel'nykh territoriy*. Tom V. Materialy VII Godovoy itogovoy sessii Instituta arkheologii i etnografii SO RAN. Dekabr' 1999 g. (pp. 306–311). Novosibirsk: Instituta arkheologii i etnografii SO RAN.
- Volkov, V. V. (1972). Raskopki v Mongolii. *Arkheologicheskie otkrytiia 1971 goda* (pp. 554–556). Moscow: Nauka.
- Volkov, V. V. (1995). Early nomads of Mongolia. In J. Davis-Kimball, V. A. Bashilov, & L. T. Yablonsky (Eds.), *Nomads of the Eurasian steppes in the Early Iron Age* (pp. 317–333). Berkeley: Zinat Press.
- Volkov, V. V. (2002). *Olenyye kamni Mongolii*. Moscow: Nauchnyy mir.
- Wang, W. (1998). Shangdai mache yuanyuan lice. In Zhongguo Shehui Kexueyuan Kaogu Yanjiusuo (Ed.), *Zhongguo Shangwenhua Guoji Xueshu Taolunhui lunwenji* (pp. 380–388). Beijing: Zhongguo Dabaik Quanshu Chubanshe.
- Wang, Y., Cui, F., & Li, Y. (2007). Shaanxi Ganquanxian chutu wan Shang qingtongqi. *Kaogu yu wenwu*, 3, 11–22.
- Watson, B. (1961). *Records of the grand historian of China. Translated from the Shih chi of Ssu-Ma Ch'ien. Vol. 2: The age of emperor Wu 140 to circa 100 BC*. New York/London: Columbia University Press.
- Watson, W. (1971). *Cultural frontiers in ancient East Asia*. Edinburgh: Edinburgh University Press.
- Wu, Z. (1972). Baodexian xinfaxian de Yindai qingtongqi. *Wenwu*, 4, 62–66.
- Wu, H. (2013). *Chariots in early China: Origins, cultural interaction and identity*. Oxford: Archaeopress.
- Wu'en Yuesitu. (2007). *Beifang caoyuan kaoguxue wenhua yanjiu: Qingtong shidai zhi zaoqi tieqi shidai*. Beijing: Kexue Chubanshe.
- Xie, Y., Zhuo, X., Fan, W., Wang, J., Yang, J., & Li, Y. (2019). Shanxi Jiangxian Hengshui Xizhou mudi M2158 fajue jianbao. *Kaogu*, 1, 15–59.
- Yablonsky, L. T. (Ed.). (2011). *Yestestvenno-nauchnyye metody v izuchenii Filippovskogo 1 mogil'nika*. Moscow: Institut arkheologii RAN.
- Yan, Z. (2013). *Shangdai qingtongqi mingwen yanjiu*. Shanghai: Shanghai Guji Chubanshe.

- Yang, J. (2016). *Ouya caoyuan dongbu de jinshu zhilu: Sichou Zhilu yu Xiongnu lianmeng de yunyu guocheng*. Shanghai: Shanghai Guji Chubanshe.
- Yang, X., & Liu, Y. (1998). Henan Anyangshi Meiyuanzhuang dongnan de Yindai chemakeng. *Kaogu*, 10, 48–65.
- Yang, J., Shao, H., & Pan, L. (2020). *The metal road of the eastern Eurasian steppe: The formation of the Xiongnu confederation and the Silk Road*. Singapore: Springer.
- Yang, B., & Yang, X. (1979). 1969–1977 nian Yinxu xiqu muzang fajue baogao. *Kaogu xuebao*, 1, 27–157.
- Zhang, M. (2016). *Shang Zhou muzang bijiao yanjiu*. Zhongguo Shehui Kexue Chubanshe: Beijing.
- Zhang, W., & Zhai, L. (Eds.). (2016). *Houqianyi yizhi kaogu fajue baogao ji Jidong diqu kaoguxue wenhua yanjiu*. Beijing: Wenwu Chubanshe.
- Zheng, S. (1962). Hebei Qinglongxian Chaodaogou faxian yipi qingtongqi. *Kaogu*, 12, 644–645.
- Zhongguo, K. K. Y. A. G. (1977). Anyang Yinxu nuli jisikeng de faxian. *Kaogu*, 1, 20–36.
- Zhongguo, S. K. K. Y. (1980). *Yinxu Fu Hao mu*. Beijing: Wenwu Chubanshe.
- Zhongguo, S. K. K. Y. (1998). *Anyang Yinxu Guojiazhuang Shangdai muzang: 1982 nian–1992 nian kaogu fajue baogao*. Beijing: Zhongguo Dabaike Quanshu Chubanshe.
- Zhongguo, S. K. K. Y. (2005). *Tengzhou Qianzhangda mudi* (Vol. 1). Beijing: Wenwu Chubanshe.
- Zhongguo, S. K. K. Y. (2007a). *Anyang Yinxu Huayuanzhuang dongdi Shangdai muzang*. Beijing: Kexue Chubanshe.
- Zhongguo, S. K. K. Y. (2007b). *Nanbinzhou Nianzipo*. Beijing: Shijie Tushu Chubanshe.
- Zhongguo, S. K. K. Y. (2014). *Anyang Dasikong: 2004 nian fajue baogao* (Vol. 1). Beijing: Wenwu Chubanshe.
- Zhu, F. (2013). You Yinxu chutu beifang shi qingtongqi kan Shangren yu beifang zuqun de lianxi. *Kaogu xuebao*, 1, 1–28.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.