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On the Chronological Position of Siba Culture Metal Artifacts, Northwest China

This study shows that bronze artifacts typical of the Siba culture (Gansu, China), such as cast convex plaques with loops, open-gap hook earrings with trumpet-shaped ends, and lamellar stemmed daggers, are similar to those from burials of the Late Krotovo (Cherno-Ozerye) and Andronovo (Fedorovo) cultures in Western Siberia, while the socketed celt-adze from the Ganguya cemetery is paralleled by those from Late Krotovo, Alakul, and Srubnaya complexes. Open rings with two opposed cast trumpet-shaped ends, open-gap hook earrings with trumpet-shaped ends, and cast convex plaques with loops, as well as stemless lamellar bronze knives with triangular section along the entire length, synchronize Siba with the cultures such as Munkh-Khairkhan, Late Qijia, Lower Xiajiadian, and Late Glazkovo. Therefore, radiocarbon dates of the Siba culture are confirmed, suggesting that it falls within the 1800–1400 BC interval. If so, Siba bronze knives with curved spines and I-beam-shaped section of handles, as well as cast convex plaques with loops, can be considered prototypes of Late Bronze Age types of the Karasuk and Irmen cultures. Populations of western China preserved earlier (Seima-Turbino?) traditions of metallurgy, having influenced the culture of the mountain-steppe zone of Northern Eurasia in the last third of the 2nd millennium BC.

Keywords: Siba culture, Late Krotovo (Cherno-Ozerye) culture, Andronovo cultural unity, Qijia culture, Munkh-Khairkhan culture, Glazkovo culture.

Introduction

Descriptions of individual bronze items that were attributed by Chinese archaeologists to the Siba culture (Gansu Province, China) (Li Shuicheng, Shui Tao, 2000) provided highly diverse evidence. Therefore, a number of Russian scholars perceive it as a “territorial association of sites of separate cultures” or a cultural community with an extremely wide chronological framework (from the Middle Bronze Age to Early Iron Age) (Molodin, Komissarov, Solovyev, 2016). The presence of bronze items belonging to the Final Bronze Age types (backed knives with I-shaped handles, convex cast plaques with loops, etc.) in the complexes of the Siba culture was

puzzling. According to a number of scholars, these finds could only be interpreted as resulting from the influence of the Karasuk culture, which creates a kind of “paradox”, since Siba sites are radiocarbon dated to an earlier period than Karasuk sites (Zhang Liangren, 2017). This approach is similar to the old theory of “stadiality”: “leading” types are strictly linked to a specific period. However, the “leading” positions of these types across the continent might have been preceded by centuries of their existence in a more limited region; the spread of even undoubtedly progressive technologies could have been hindered or interrupted for a long time for a number of reasons.

Unbiased consideration of the chronology of the Siba culture metal artifacts should include both radiocarbon

analysis of materials from its sites and cross-dating of metal items from the closed assemblages, using parallels from the regional column sequences of steppe and forest-steppe Eurasian cultures, including China. Until now, this work has been hampered by the fact that among the excavated Siba settlements and cemeteries, only the Donghuishan burial ground (Minle County), with the minimum number of bronze items, has been described in the literature (Minle Donghuishan kaogu..., 1998), and studies of bronzes of this culture by science-based methods often do not provide drawings, nor photographs, of the artifacts (see, e.g., (Huoshaogou Siba..., 2003)). The situation was significantly improved with the complete publication of evidence from the Ganguya burial ground in Jiuquan prefectural city (107 graves) (Jiuquan Ganguya, 2016)—one of the two largest excavated cemeteries of the Siba culture. Wang Lu's dissertation on technologies used in bronze production in the Qijia and Siba cultures (2018) contains photographs of items from burials at the major cemetery of Huoshaogou in Yumen county city. The first five (!) out of 312 complexes from this burial ground were described only at the end of 2021 (Gansu Yumen..., 2021). In the last decade, there appeared publications of evidence from the stratified site of Xichengyi in the Zhangye prefectural city, where the layers of the Machang culture were covered by six layers of the Siba culture, which were divided by the authors into two horizons (Zhang Xuelian et al., 2015), as well as large-scale excavations at the Mogou burial ground in Lintan County of Gansu Province, where over a thousand graves from the Qijia culture, adjacent to the Siba culture, were studied (see (Wang Lu, 2018; Wang Lu et al., 2022)).

Data on the absolute chronology of Siba sites

Publications of complete evidence from the Donghuishan and Ganguya cemeteries testify to the cultural homogeneity of the settled population who left them. This is confirmed both by the funerary rite and by the standard set of pottery, which dominated among grave goods. This allowed Li Shuicheng to propose a periodization of the Ganguya burial ground, using the approach traditional in Chinese archaeology, which stems from the “typological method” of O. Montelius (see (Su Bingqi, 1984)), based on the evolutionary features of pottery forms and their combinations in closed assemblages (Jiuquan Ganguya, 2016: 222–240). Eight radiocarbon dates obtained by the LSC-method from the wood discovered at Huoshaogou and Ganguya, after calibration, fit into the interval from the 20th to the turn of the 14th–13th centuries BC, with a probability of 95.4 % (Ibid.: 296–297). In 2005, fourteen samples of grains from cultivated plants and two samples

of charcoal were taken from the sequential layers in the cultural horizon of the Donghuishan settlement. These samples were dated in the laboratory at Peking University, using the AMS-method, to the range of the 18th–15th centuries BC, with a probability of 95.4 % (Flad et al., 2010). Later, two AMS-dates of 3330 ± 30 and 3300 ± 30 BP (1690~1520 and 1670~1500 cal BC; 95.4 %) were established in the same laboratory, using human bones from grave 47 at Huoshaogou (Gansu Yumen..., 2021: 21). In Xian, eighteen dates were obtained using the AMS-method on the materials from the Siba layers at the Xichengyi settlement: nine of these for layers 5 and 6 (early period) fit the chronological range of 1880–1680 cal BC with a probability of 68.2 %, and nine dates for layers 3 and 4 (late period) 1670–1530 cal BC (Zhang Xuelian et al., 2015: 39–41) (Fig. 1). These data, as well as typological similarity of Siba assemblages with materials from the sites of other cultures, allowed the Chinese scholars to attribute the Siba culture to the 19th–15th centuries BC (Lin Shirui, 2021).

Parallels to the Siba artifacts in materials from the Advanced Bronze Age sites in Eurasia

The presence of knives with curved spines and “tailed” knives with I-shaped sections of their handles, often with ring pommels, in the assemblages from the sites of the Siba culture is especially noteworthy in the light of data on their absolute chronology. Such items were found in burials M26, M44, M50 (blade fragment), M74, M94 upper, and M100 at the Ganguya burial ground (Jiuquan Ganguya, 2016: 185–187) (Fig. 2, 2–7) and in at least two graves (M137, M218) at Huoshaogou (Wang Lu, 2018: Fig. 5, 25, 29). A “tailed” knife with a thickened ring-shaped pommel and handle decorated by longitudinal wavy lines was discovered at the Xichengyi settlement, on the floor of dwelling F78, belonging to layer 3 (the second period of the Siba culture) (Chen Guoke, 2017: 79, 83, fig. 7, 1) (Fig. 2, 1). In addition, cast convex plaques with loops were found in burials M24, M27 lower, M36, and M79 at the Ganguya burial ground and in burials M14, M19, M44, M47, M56, M124, M136, and M262 at Huoshaogou; three socketed arrowheads with laurel-leaf blades and “spikes” were discovered in grave M100 at Ganguya (Fig. 2, 9–11, 16, 19–21) (Jiuquan Ganguya, 2016: 187–188; Wang Lu, 2018: 144, 148–150).

All these items find parallels in the materials from the Late Bronze Age sites of Siberia and East Kazakhstan, which clearly disagrees with the absolute ^{14}C dates of the Siba culture (no later than the 16th century BC). However, such parallels are insufficient to refute the

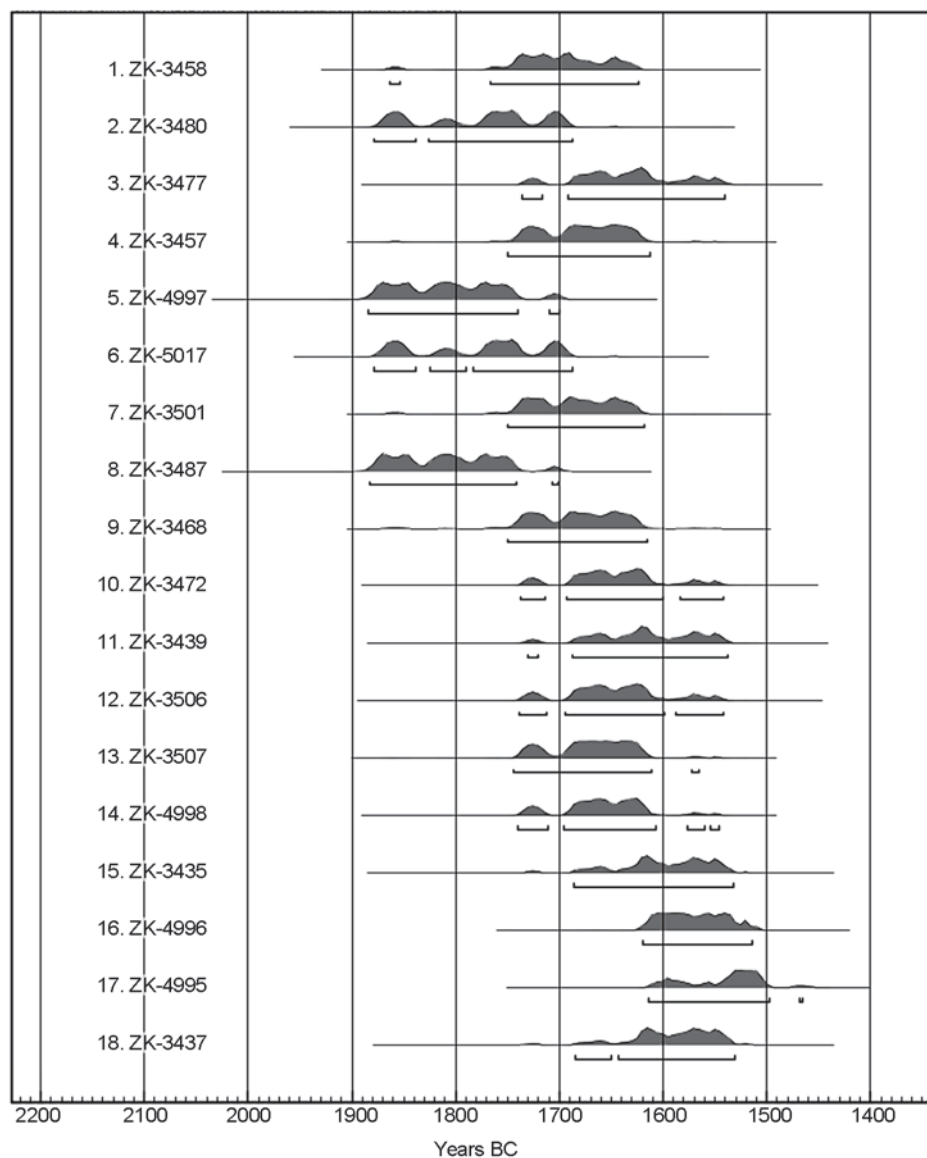


Fig. 1. Radiocarbon dates of the Siba culture layers at the Xichengyi settlement (after (Zhang Xuelian et al., 2015), using the OxCal v. 4.4.4 software).

1–9 – layers 6 and 5 (period 1); 10–18 – layers 4 and 3 (period 2).

radiocarbon dating. Cast convex plaques with loops, lamellar daggers, open-gap hook earrings with trumpet-shaped ends, belonging to the Siba culture metal artifacts (Fig. 2, 9–11, 13, 18–21, 24), occur at the sites on the periphery of the Andronovo cultural and historical community in Western Siberia, as well as in the adjacent East Kazakhstan Region. Such items were typical of the Late Krotovo (Cherno-Ozerye) culture of the Irtysh region and Baraba forest-steppe in the first half of the 2nd millennium BC, especially at the late “Cherno-Ozerye” stage (Fig. 3, 1–5, 7–12) (Gening, Stefanova, 1994: Fig. 2, 10, 12, 16, 17; Molodin, Grishin, 2019: 100–113, 142–153). A cast convex plaque with a loop was found together with a typical Fedorovo vessel in grave 25

at the Marinka cemetery near the village of Zevakino in the East Kazakhstan Region. Scholars attributed the assemblage to the “Marinka stage of the Kanay culture” (second quarter of the 2nd millennium BC) (Tkacheva, Tkachev, 2008: 98–99, 262–265, fig. 30, 8; 31, 3) (Fig. 3, 13). The Elovka I and II cemeteries (forest-steppe Ob basin) contain many similar items; however, owing to the problem of dating the Elovka culture, which is often considered a part of the Elovka-Irmen continuum (Titova, Troitskaya, 2008), we will limit ourselves to finds from the Elovka II burial ground burials with the predominantly Andronovo (Fedorovo) pottery, attributed by V.I. Matyushchenko to the Andronovo community. These are at least eight

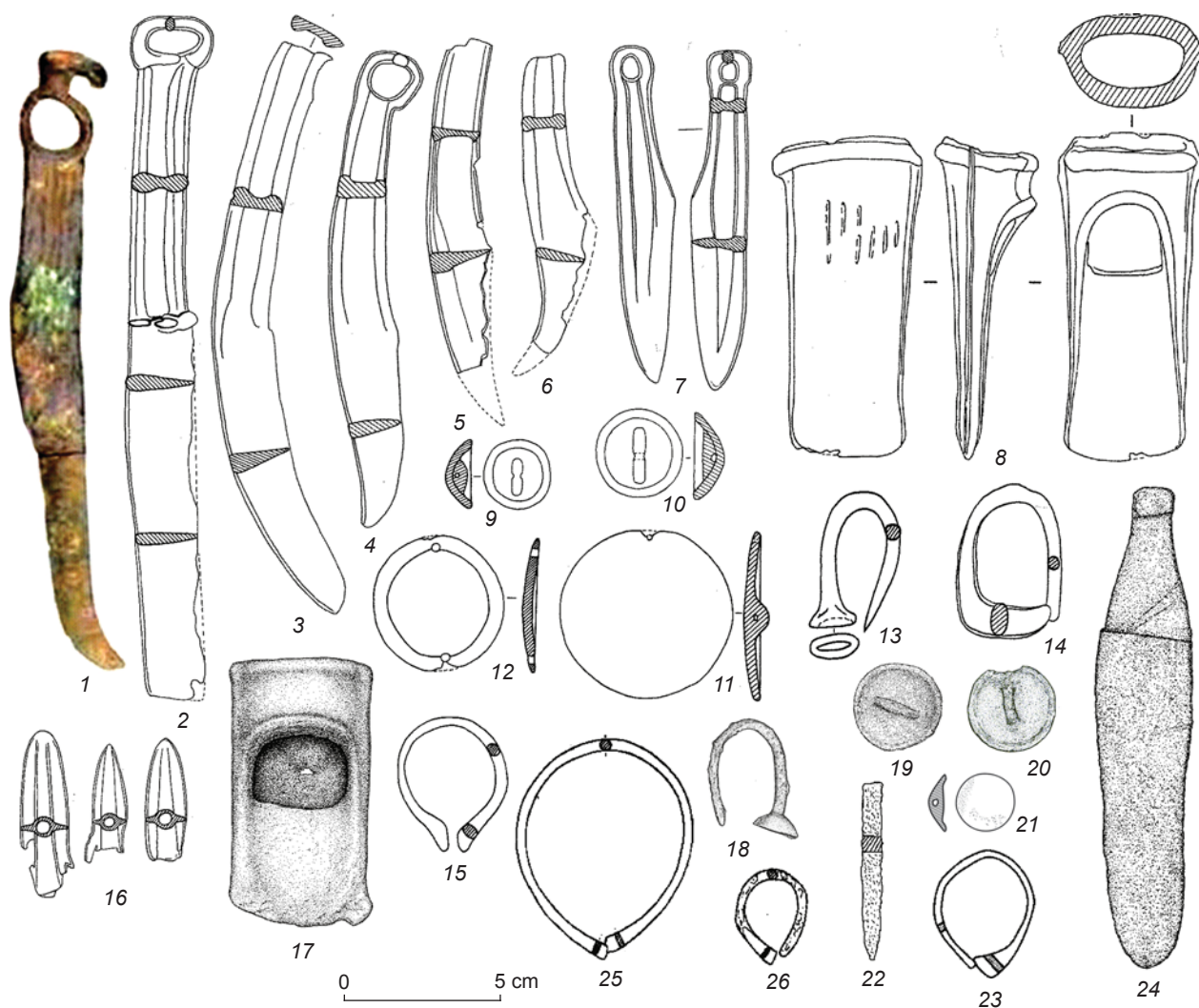


Fig. 2. Metal items of the Siba culture (after (Minle Donghuishan kaogu..., 1998; Jiuquan Ganguya, 2016; Gansu Yumen..., 2021; Yumen wenwu, 2014; Chen Guoke, 2017; Wang Lu, 2018)).

1 – Xichengyi, dwelling F78; 2–16 – Ganguya: 2 – grave M44, 3 – grave M26, 4, 6 – grave M74, 5, 16 – grave M100, 7 – grave M94 upper, 8 – grave M19, 9 – grave M27 lower, 10, 11 – grave M79, 12 – grave M44, 13 – grave M73, 14 – grave M14, 15 – grave M26; 17–24 – Huoshaogou: 17, 18 – grave not indicated in the source, 19 – grave M14, 20 – grave M56, 21–23 – grave M47, 24 – grave M153; 25, 26 – Donghuishan: 25 – grave M21, 26 – grave M79. 22 – gold, others – bronze.

assemblages, containing cast convex plaques with loops, lamellar daggers, and open-gap hook earrings with trumpet-shaped ends (Matyushchenko, 2004: 24, 25, 49, 66, 94, 111, 137, 155, 237, 241, 163, 164, 165, 171) (Fig. 3, 14–24).

It is also important to compare the socketed celt-adze from grave M19 at Ganguya with a similar item from burial 55 at Sopka-2/5 (see Fig. 2, 8; 3, 6; 4, 4, 6) (Jiuquan Ganguya, 2016: 184; Molodin, Grishin, 2019: 100–101). Both items have ridges along the edges of the socket, and a pronounced stop. A similar tool has also been found at the Huoshaogou site (see Fig. 2, 17) (Yumen wenwu, 2014: 141). Several similar celt-adzes and a casting mold for their manufacture have been found in Xinjiang (Li Xiao, Dang Tong, 1995:

41; Wang Linshan, Li Suyuan, Wang Bo, 2008: 40; Sichou zhi lu..., 2014: 102–103) (see Fig. 4, 1, 5). This casting mold, from Fukang county city, also served for casting socketed arrowheads with laurel-leaved blades, and might have belonged to the complex with a similar stone mold for manufacturing socketed spearheads and arrowheads with laurel-leaved blades, which was found there (see Fig. 4, 2) (Sichou zhi lu..., 2014: 115). A ceramic mold for casting the same kind of celt has been found “on the floor” of a rectangular room of copper-smelting complex 1, at the Atasu I settlement in Kazakhstan (see Fig. 4, 3) (Kadyrbaev, Kurmankulov, 1992: 33–34). The authors suggested that this building was constructed in the Alakul period, on the basis of several arguments, including the absence of pottery

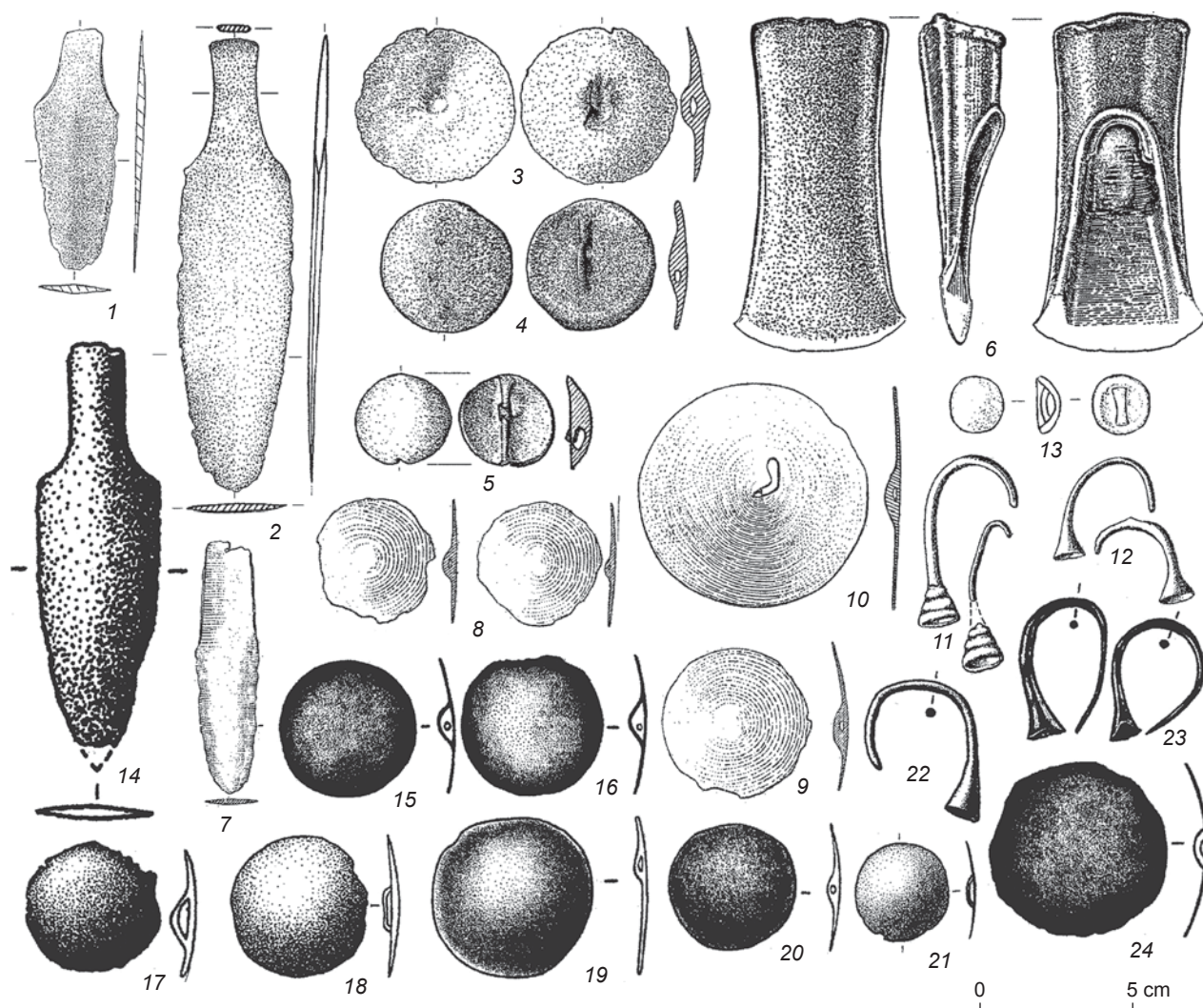


Fig. 3. Parallels to metal items of the Siba culture.

1–12 – Late Krotovo (Cherno-Ozerye) culture (after (Molodin, Grishin, 2019; Gening, Stefanova, 1994)): 1 – Sopka-2/5 (1 – burial 335, 2 – burial 54, 3 – burial 103, 4 – burial 146, 5 – burial 332, 6 – burial 55), 7–12 – Cherno-Ozerye I (7 – burial 91, 8 – burial 61, 9 – burial 96, 10, 11 – burial 5, 12 – burial 69); 13–24 – Andronovo (Fedorovo) culture (after (Tkacheva, Tkachev, 2008; Matyushchenko, 2004)): 13 – Marinka, grave 25, 14–24 – Elovka II (14, 17 – grave 3, kurgan 50, 15, 16 – grave 302, 18 – grave 158, 19 – grave 300, 20 – grave 307, 21 – grave 14, 22, 23 – grave 262, 24 – grave 209). Everything – bronze.

of the Zamaraevo or Ilyinskoye types, associated with the later construction of rounded structures here (Ibid.: 197). However, contrary to their stratigraphic observations, they dated the casting mold to the Late Bronze Age solely on the basis of the observation that a similar celt-adze was allegedly a part of the so-called hoard from the village of Palatsy in East Kazakhstan Region, together with a dagger of the “Karasuk type” (Ibid.: 230–231). Nevertheless, this “hoard” cannot be considered a closed assemblage, because it contained items from clearly different periods: an Andronovo bracelet with spiral-shaped ends converging to a cone, and the same “Karasuk” dagger dating back to no earlier than the 12th century BC (Chernikov, 1960: Pl. 10) (cf.: (Kovtun, 2019)). Thus, the casting mold

found at Atasu I should be synchronized with the period of constructing rectangular buildings and use of the “Atasu type” pottery*. To the west of the Baraba forest-steppe, three complexes with celt-adzes without eyelets and with open sockets, but without stops or ridges are

*Another false “assemblage” with a celt-adze from Kazakhstan is recorded in the catalog of the Bochum exhibition: an item similar to the ones in question was presented there as a part of the so-called Andreevsky hoard (village of Kabanbai in the Almaty Region) of the Late Bronze Age, although in fact this hoard contained another, typologically later, celt-adze with a frontal eyelet and without a ridge along the lower edge of the socket (see (Unbekanntes Kasachstan..., 2013: No. 183; Karabaspakova, 2011: 155, pl. 57, 2; Dzhumabekova, Bazarbaeva, 2013: 14–15, app. 2)).



Fig. 4. Casting molds (1–3), celt-adzes (4–8, 10), and a knife-dagger (9).

1, 2 – town of Liangheer, Ziniquanzi township, Fukang county city, Xinjiang (after (Sichou zhi lu..., 2014)); 3 – Atasu I settlement, Dzhezkazgan (now Karaganda) Region (after (Kadyrbaev, Kurmankulov, 1992)); 4 – grave M19 at Ganguya, Jiuquan prefectural city, Gansu Province (after (Jiuquan Ganguya, 2016)); 5 – Tacheng county city near the Sandaohe dam, Xinjiang (after (Li Xiao, Dang Tong, 1995)); 6 – burial 55 at Sopka-2/5, Novosibirsk Region (after (Molodin, Grishin, 2019)); 7 – Uk III settlement, Tyumen Region (after (Stefanov, Korochkova, 2000)); 8, 9 – Gladunino hoard, Kurgan Region (after (Korochkova et al., 2013)); 10 – Ilderyakovskiy hoard, Republic of Tatarstan (after (Bochkarev, 2017)). 1, 2 – stone; 3 – clay; 4–10 – bronze.

known. The Gladunino hoard (Kurgan Region) with such a tool, as well as knives-daggers with waisted blades (see Fig. 4, 8, 9), was attributed to the Alakul culture (Korochkova et al., 2013). A similar celt has been found in an Alakul culture dwelling at the settlement of Uk III (Tyumen Region) (Stefanov, Korochkova, 2000: 38–39) (see Fig. 4, 7). The Ilderyakovo hoard (Tatarstan) with such a tool was attributed by V.S. Bochkarev to

chronological group III (Srubnaya), contemporaneous with the Alakul culture (2017: 171) (see Fig. 4, 10). I suppose that this evidence makes it possible to date the assemblages with celt-adzes from Ganguya and Sopka-2/5 to the 18th–15th centuries BC.

Parallels to the grave goods of the Siba culture have also been discovered at the sites of other cultures of the Advanced Bronze Age. At least two metal open rings—

gold and bronze—with two cast opposing trumpet-shaped ends have been found at Huoshaogou (Fig. 5, 1, 2) (Yang Yunchang, Paul Jett, Chem Jianli, 2017: Fig. 1, 1; Yumen wenwu, 2014: 180). Such items were typical of the Munkh-Khairkhan culture of the 18th (19th) to 15th centuries BC (Mongolia, Tuva) and also appeared in the Glazkovo assemblages contemporaneous with it (Kovalev, Erdenebaatar, 2014; Kovalev, 2017: 62, fig. 4; Bokovenko, Kovalev, Lazaretov, 2019: 63–64,

fig. 19) (Fig. 5, 3, 4). At least two similar rings have been found in the assemblages of the Late Qijia culture at the Mogou cemetery, in Gansu Province (Fig. 5, 5, 6). Eight graves of the same culture at that cemetery (M112, M132, M212, M463, M611, M694, M769, and M771) yielded cast convex plaques with loops, and five graves (M72-B, M101, M110, M358-C, and M711) open-gap hook earrings with trumpet-shaped ends (Wang Lu, 2018: 66–76, Wang Lu et al., 2022: Fig. 2)



Fig. 5. Selected common varieties of artifacts of the Siba culture and cultures of the adjacent regions. 1–6 – rings with two cast opposing trumpet-shaped ends: 1, 2 – Siba culture, Huoshaogou (after (Yang Yunchang, Paul Jett, Chem Jianli, 2017; Yumen wenwu, 2014), 3 – Munkh-Khairkhan culture, Khar-Uulyn-Gozgor, kurgan 1/113, Bulgan Aimag, Mongolia (after (Bokovenko, Kovalev, Lazaretov, 2019)), 4 – Glazkovo culture, Sukhaya Pad I, burial 3, Irkutsk Region (after (Kovalev, 2017)), 5, 6 – Qijia culture, Mogou, graves M303-B, M358-C (after (Wang Lu, 2018; Wang Lu et al., 2022)); 7–14 – items of the Qijia culture, Mogou: 7 – grave M401-A, 8 – grave M463, 9 – grave M212, 10 – grave M112, 11 – grave M611-A, 12 – grave M110, 13 – grave M358-C, 14 – grave M72-B (after (Wang Lu, 2018; Wang Lu et al., 2022)); 15–19 – items of the Lower Xiajiadian culture: 15 – Weifang, excavation area T4, layer 3, 16 – Pingdingshan, sq. G104, layer 2, 17 – Zhangjiayuan, dwelling F4, 18 – Xiayuegezhuang, dwelling H5, 19 – Dadianzi, grave M453 (after (Zhongguo zao..., 2008)); 20, 21 – items of the Erlitou culture: 20 – Erlitou, grave 80IIM2, 21 – Xishicun, excavation T9 (after (1980 nian qiu Henan..., 1983; Zhongguo zao..., 2008)); 22, 23 – items of the Siba culture, Huoshaogou: 22 – grave M84, 23 – grave M47 (after (Gansu Yumen..., 2021)); 24, 25 – items of the Bayanlig culture (Khalikhyn-Bulag, kurgan 1, Bayanlig Sum of Bayankhongor Aimag; photo by A.A. Kovalev). 1 – gold; 23, 25 – stone; others – bronze.

(Fig. 5, 12–14). The Late Qijia culture is synchronized with the Erlitou culture (18th–16th centuries BC) (Zhongguo zao..., 2008: 198). Three AMS-dates for two burials belonging to the late stage of the Mogou cemetery (Siwa culture) fit the chronological range of 15th–13th centuries BC (Chen Jianli et al., 2012: 47), which confirms the conclusion that the Qijia graves that were made here at an earlier period can be dated to the first half of the 2nd millennium BC. The authors of a recent article consider the Qijia complexes at Mogou chronologically close to the fourth period of the Erlitou culture (1565–1530 BC) (Wang Lu et al., 2022: 82). Nevertheless, in grave 80IIIIM2 in Erlitou, belonging to the third period of the culture (ca 17th to early 16th century BC), a knife with a curved spine, thickenings along the edges of the handle, and a ring-shaped pommel has been found, imitating the Seima-Turbino prototypes and similar in design to the Ganguya knives (1980 nian qiu Henan..., 1983: 201–202, fig. 10, 9; Kovalev, 2013: 140) (Fig. 5, 20); and the layer of the same period yielded a bronze punch with rectangular cross-section (Zhongguo zao..., 2008: 143–144) (Fig. 5, 21). A bronze pick-punch was found in grave M47 at Huoshaogou (1980 nian qiu Henan..., 2021: 7) (Fig. 5, 22). Punches rectangular in cross-section were discovered by this author, together with Mongolian colleagues, during the excavations in Bayanlig Sum of Bayankhongor Aimag in Mongolia in two burial mounds of a previously unknown culture of the Advanced Bronze Age (which we named the “Bayanlig” culture) (Kovalev, Erdenebaatar, Iderkhangai, 2012). One of these mounds (Khalikhyn-Bulag-1) contained a combination stone tool similar to that from the grave goods of grave M84 at Huoshaogou (Brief report..., 2021: 10) (Fig. 5, 22, 24, 25). Open-gap hook earrings with trumpet-shaped ends, as well as rings with flattened ends, similar to the finds from Gansu (Fig. 5, 15–19), were discovered to the northeast of the Central Plain, at the sites of the Lower Xiajiadian culture (Hebei, Tianjin, Inner Mongolia). This culture is also synchronized with the third and fourth periods of Erlitou (Zhongguo zao..., 2008: 174–177).

Since 2013, this author has published some studies on synchronization of cultures of the first half of the 2nd millennium BC by the use of stemless lamellar single-edged knives with triangular section along the entire length (Kovalev, 2013, 2017; Kovalev, Erdenebaatar, 2014). New descriptions of finds from China (Wang Lu, 2018; Wang Lu et al., 2022) confirm attribution of the sites with these items to the 18th (19th)–15th centuries BC. Such knives were typical of the Petrovka, Late Krotovo, Munkh-Khairkhan, Glazkovo, Late Qijia culture, and the Lower Xiajiadian culture. Today, one can add the Huoshaogou cemetery to these sites (Wang Lu, 2018: 146, 150).

Conclusions

Thus, the Siba culture metal artifacts belong to the chronological horizon of cultures of the Advanced Bronze Age (Andronovo, Late Krotovo, Munkh-Khairkhan, Bayanlig, Erlitou, Lower Xiajiadian cultures, Late Qijia, Late Glazkovo, etc.): to the first half–mid 2nd millennium BC. The items that find parallels in the materials from the later sites of East Kazakhstan and Siberia can be considered the evidence of penetration of the corresponding forms from western China. Bronze knives of the Siba culture, with curved spines, I-shaped handles, and ring pommels, may be a heritage of the Seima-Turbino traditions. This fills in the chronological gap between the Seima-Turbino single-edged knives and similar items spread since the 14th century BC from Western Siberia to Manchuria (Irmen, Karasuk, Chaoaogou, Weiyinzi, Lijiaya cultures, etc.). After the period of Andronovo expansion, the population of western China, which had preserved the earlier traditions, influenced the emergence of the material culture of the mountain-steppe zone of Northern Eurasia.

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