doi:10.17746/1563-0110.2024.52.1.080-088

**M.A. Kudinova**
*Institute of Archaeology and Ethnography,*
*Siberian Branch, Russian Academy of Sciences,*
*Pr. Akademika Lavrentieva 17, Novosibirsk, 630090, Russia*
*E-mail: maria-kudinova@yandex.ru*

# Origin and Date of Cast-Iron Moldboards from Southern Siberia

*The study addresses the dating and provenance of cast-iron moldboards found in Southern Siberia (the Altai Mountains, Khakassia, and Tuva). For the first time, a similar artifact from the Katanda valley, Ust-Koksinsky District, Republic of Altai, is described. The traditional idea that such artifacts date to the Tang epoch (618–907) is unwarranted. New interpretations of inscriptions on moldboards are proposed, indicating ties with the metallurgic center in Qiyang, Shahe County, Hebei Province, China. Certain specimens could have been manufactured in Qiyang, while others may be local replicas of Chinese prototypes. The closest parallels are those from Northern China, dating to 900–1400 (Song, Liao, Western Xia, Jin, and Yuan states). Those from Southern Siberia likely date to th e 13th–mid-14th century, when that territory was part of the Mongol and Yuan empires. The appearance of Chinese moldboards and their replicas in Southern Siberia was caused by the establishment of military-agricultural settlements, and progress in agriculture and metallurgy under the auspices of Yuan governors, who needed food to supply the army.*

Keywords: *Southern Siberia, China, Middle Ages, moldboards, agricultural development, cast-iron production.*

## Introduction

In 2021, during the work of the Southern Altai team from the Institute of Archaeology and Ethnography of SB RAS at archaeological sites in the Katanda valley, Ust-Koksinsky District of the Altai Republic, a cast-iron moldboard broken into two parts was found on a plowed field (Polosmak, Dyadkov, 2021: 605). This was a massive object of irregular lenticular shape, with jagged protrusion in the upper part. Its maximum size was 29.5 × 29.5 cm; thickness 7–8 mm. A protrusion-lug and four eyelets for fastening were on its back. Between the eyelets, there was an inscription consisting of two Chinese characters (Fig. 1). The upper character 張could be read as *zhang*—one of the most common Chinese family signs. The inscription could have indicated the name of the craftsman who made the tool or name of the workshop. This new find compels us to revisit the issue of dating and establishing the origin of this category of artifacts, which will provide new information about the development of agriculture in the Altai Mountains and the entirety of Southern Siberia.

## Materials

At present, over thirty similar items are known in Russia. These are mainly accidental finds from the Minusinsk Basin and Tuva. About twenty specimens*

*The State Catalogue of the Museum Fund of the Russian Federation (https://goskatalog.ru/portal/#/) contains photographs

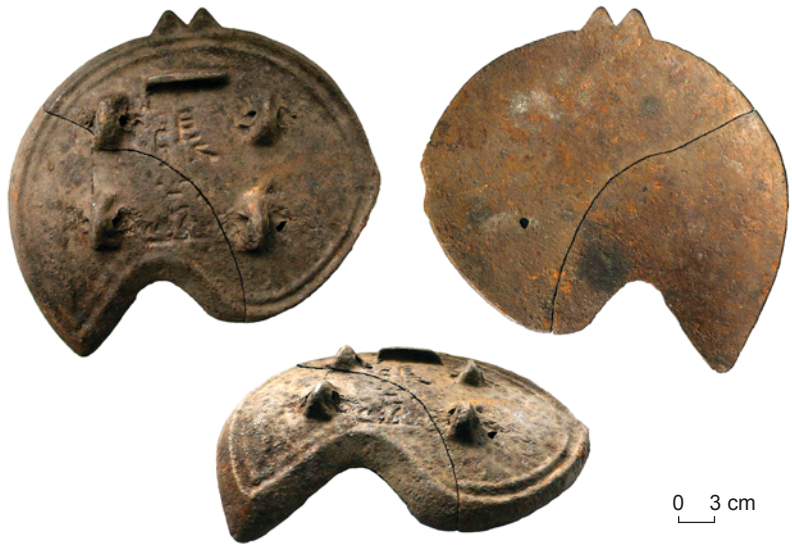


*Fig. 1*. Plow moldboard from the Katanda valley, Ust-Koksinsky District of the Altai Republic (*photo by the author*).

are kept in the collection of the Minusinsk Museum of Local History. Some of these were described by Y.I. Sunchugashev (1990: 34–35). Several more items are in the collections of the National Museum of the Republic of Tuva*. One cast-iron moldboard is on display at the Krasnoyarsk Regional Museum of Local History (Fig. 2, *1*). Apparently, it was brought from Tuva by A.P. Ermolaev (1919: 36). Two specimens (presumably from the Manchu period, second half of the 17th to early 20th centuries) are in the collections of the State Hermitage. One plow moldboard from the Khakass-Minusinsk Basin is kept in the State Historical Museum (Evtyukhova, 1948: 82–83; Kiselev, 1951: 570–571). Another one is in the Khakass National Museum of Local History (Kyzlasov, 2002: 73–74). The only specimen obtained during scholarly archaeological excavations is a lenticular moldboard (27.5 × 23.5 cm) discovered during the study of the 3rd Shagonar fortified settlement in Tuva (Fig. 2, *2*). Kyzlasov mentioned that this was a local product and not an imported item, since, unlike Chinese products, it was riveted from forged iron plates and not cast from cast-iron (1969: 63–64, pl. II, fig. 12; 1979: 155–156). In addition, another moldboard, similar to the specimens from Tuva and Khakass-Minusinsk Basin, was found in the Zakamensky District of the Republic of Buryatia, and is currently kept in the Buryatia History Museum.

In June 2012, a cast-iron moldboard was found on the right bank of the Bely Iyus River, 7 km south of the village of Maly Syutik, Ordzhonikidzevsky District of Khakassia. The subsequent destiny of the find is unknown. This was a massive lenticular item (31 × 27 cm), with four eyelets for fastening on the back. Between the eyelets, there were two Chinese characters張宜, which can be read as *zhang yi*. The authors of the publication offered the following translation of the inscription: "to establish in the proper order" (Botvich, Oborin, 2013: 216). However, these characters can also be interpreted as a proper name, since the first one designates one of the most common Chinese surnames (Zhang), while the second may be a personal name. Indication of the surname of the artisan, name or location of the workshop on the back of the item was typical of Chinese goods.

Only one similar item has been found so far in the Altai Mountains. This was a lenticular moldboard (28.5 × 25 cm), with four eyelets for fastening on the back and two Chinese characters in between. It was discovered in 1977 in the mound of a large kurgan on the bank of the Yustyd River (Kubarev, 1997: 220–221), and is currently kept in the collection of the Museum for the History

of 18 plow moldboards from the collection of the Minusinsk Museum of Local History. S.V. Kiselev mentioned twenty items (1951: 570), but provided accession numbers for only 19 of them (Ibid.: Nt. 1).

*The State Catalogue of the Museum Fund of the Russian Federation contains photographs of three plow moldboards kept in the National Museum of the Republic of Tuva. Information about two more items (with their accession numbers) is provided in the article by L.R. Kyzlasov (2002). Thus, there are at least five such items in the collection of this museum.

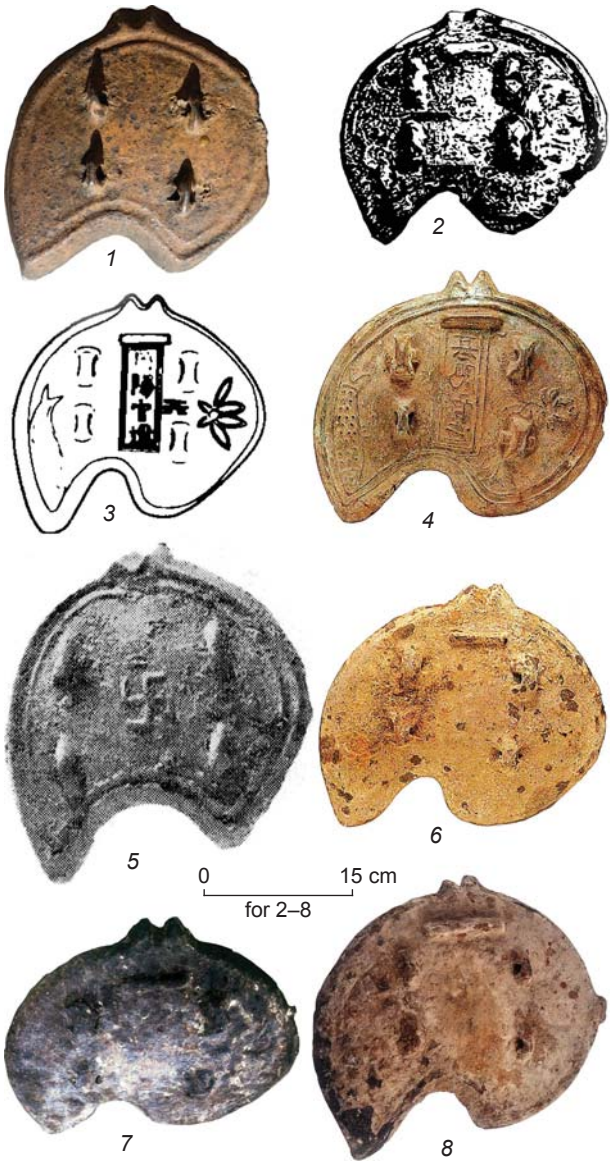


*Fig. 2*. Plow moldboards.
*1* – collection of the Krasnoyarsk Regional Museum of Local History (*photo by the author, not to scale*); *2* – 3rd Shagonar fortified settlement, Tuva (after (Kyzlasov, 1979: 156)); *3* – Khara-Khoto fortified settlement, Inner Mongolia (after (Guo Zhizhong, Li Yiyou, 1987: 11)); *4* – Museum of Inner Mongolia (after (Zhonghua nongqi tupu, 2001: 158)); *5* – Daguxiancun site, Beijing (after (Su Tianjun, 1963: Col. pl. 4)); *6* – Tuchenzi site, Inner Mongolia (after (Zhonghua nongqi tupu, 2001: 159)); *7* – Wuhai Museum (after (Xi Xia wenwu…, 2014: 893)); *8* – Hohhot, Inner Mongolia (after (Ibid.: 911)).

and Culture of Peoples of Siberia and the Far East IAET SB RAS. The state of preservation of this item precludes an unambiguous decipherment of the inscription. However, it can be assumed that it should be read in the same way as the inscription on the moldboard from the Ordzhonikidzevsky District of Khakassia. Furthermore, another item with a similar inscription is kept in the Minusinsk Museum of Local History (Inv. No. AJ-1197). This is a lenticular plow moldboard (30.5 × 27.5 cm), with four eyelets for fastening on the back side and two Chinese characters in between, the first of which is 張 *zhang**. Thus, it can be assumed that four tools—two from the Altai Mountains, one found in Khakassia in 2012, and the moldboard from the Minusinsk Museum of Local History—were made in the same production center.

## Problems of attribution

Chinese cast-iron moldboards that were discovered in Southern Siberia have been traditionally dated to the Tang period (618–907) in Russian archaeological literature. When scholars bring up this dating, they refer to the work of L.A. Evtyukhova from 1948. However, according to the original source, this dating was based on oral communication by some unnamed Chinese experts who participated in preparing an exhibition of Chinese art in Moscow and examined the only item from the collection of the State Historical Museum (Evtyukhova, 1948: 82). This version is described in more detail in the book by S.V. Kiselev. In 1940, the item was examined by the curators of the Beijing Museum of the Former Imperial Palace (Gugong)—art historian Fu Zhenlun and paleographer-calligrapher Li Naizhi. On the basis of epigraphic evidence, they unanimously attributed the creation of that tool to the pre-Tang period, most likely to the 5th century AD. In addition, Kiselev mentioned that on the back of the moldboard, "there is a relief inscription 'man-made'" (1951: 570), but he did not indicate when or who translated it. However, the published drawing (Evtyukhova, 1948: 83, fig. 165) and photograph (Kiselev, 1951: 571, pl. LIII, fig. 2) of that item exclude the possibility of such translation of the inscription. The characters should be read as 綦陽 *Qiyang*, which is the name of a place famous for its ironworks. The modern village of Qiyangcun is a part of the town of Qicun in Shahe County of the Xingtai Prefecture-level city, in Hebei Province of Northern China. Information about production of cast iron in this area has survived in local gazetteers (地方志 *difangzhi*) from various periods.

*For a photo and description of the item, see the State Catalogue of the Museum Fund of the Russian Federation. URL: https://goskatalog.ru/portal/#/collections?id=14363371 (Accessed September 11, 2022).

Extraction of iron ore, production of cast iron, and organization of state-owned workshops in Shahe County in the Han and Wei periods* was first mentioned in the 15th juan "Hedong Circuit. Part 4" ("Hedong dao. Si") of the geographical work "Illustrated Description of Districts and Counties During the Reign of Yuanhe" ("Yuanhe junxian tuzhi"), written in 813 by the scholar and dignitary Li Jifu (758–814) (1983: 428). The "Description of Shahe County", compiled in 1609 by the local official Gu Shiyan, states: "The administration of cast iron production is located in the Qiyang settlement; <when> under Han and Wei, officials were appointed to <manage> the production of cast iron, an inspector was sent here" (铁冶司在綦阳镇，汉魏立铁冶官，分守于此*Tieyesi zai Qiyang zhen, Han-Wei li tieye guan, fenshou yuci*) (cited after (Zhao Mengkui, 2017: 59)). More detailed information is contained in the "Description of Shahe County", compiled in 1940 by a team of authors led by Wang Yansheng: "Shunde is located in the lands north of the Yellow River. It was an important place for the imperial court. There are many high mountains and beautiful hills in this area. Since a long time ago, ore mining and metal smelting have been profitable in this area. Qicun is located there. In the 5th year of the reign of Huangyou (1053), officials began to be appointed. There used to be a temple near the foundries. It existed for a very long time and almost collapsed, but the inspector of the foundry Mr. Zhang, restored it in its original place" (顺德在河朔，为朝廷一襟要。其地多隆岗秀阜，坑冶之利，自昔有之。綦村者即其所也。皇祐五年，始置官吏，冶之旁旧有神祠，历载既久，将就倾圮，冶吏监侯张即故址而新之。*Shunde zai Heshuo, wei chaoting yi jinyao. Qidi duo long gang xiu fu, kengye zhi li, zixi youzhi. Qicun zhe ji qisuo ye. Huangyou wu nian, shi zhi guanli, ye zhi pang jiu you shenci, lizai jijiu, jiangjiu qingpi, yelijian hou Zhang ji guzhi er xin zhi*) (cited after (Ibid.)).

Information from historical sources is confirmed by archaeological and epigraphic evidence. In 1957, archaeological works in the Qicun township (transformed into a town in 1985) revealed traces of the developed metallurgical production, which existed here in the past. Fragments of iron ore and slag were found on the ground surface to the west of the entrance to the village of Qiyangcun. The remains of 17–18 blast furnaces, concentrated inside the ditch that the locals called "Iron Ditch" (铁沟 *Tiegou*), also survived in the area. Nearby, pieces of iron were found in a pile. Fragments of tiles and gray pottery were discovered near the ditch, at a distance up to 1.5 km from the village, which may indicate the existence of buildings there. In addition, traces of mining survived in the southern part of the township, and local folklore preserved stories related to iron mining at that mine. A stone stele half buried in the ground was found in the southern part of the village of Qiyangcun, behind the temple of the Bodhisattva Guanyin. The stele had the inscription: "The General Administration for iron foundry of Shunde District [in the territory of the modern prefecture-level city Xingtai in Hebei Province. – *M.K.*], the stele was set up in [the character has not survived. – *M.K.*] day of the 9th month of the 2nd year of the reign of Dade (1298)" (順德等處鐵冶都提舉司，大德二年九月□日立石*Shunde dengchu tieye dutijusi, Dade er nian jiuyue ... ri li shi*). The stele could have stood in front of the entrance to the administration office mentioned in the inscription. Another stone stele was discovered in the northern part of the village, on the eastern side of the temple of Xuan-di*. That stele had an inscription entitled "Record of the restoration of the temple of the patron deity of iron-smelting under the Great Song [the Chinese state, existed in 960–1279. – *M.K.*]" (大宋重修冶神廟記*Da Song chongxiu yeshen miao ji*). It was set up in the 8th month of the 4th year of the reign of Xuanhe (1122). Only a fragment of the inscription has survived: "…an important place for the imperial court. There are many high mountains without vegetation in this area. Since a long time ago, ore mining and metal smelting have been profitable here. Qicun is located here… since the 5th year of the reign of Huangyou (1053), officials began to be appointed. At first, annual income was still insignificant…" (…年始 置官吏，岁入之数初也甚微… *...chaoting yi jinyao, qidi duo long gang tu, kengye zhi li zixi youzhi, Qicun zhe ji qisuo ye... Huangyou wu nian shi zhi guanli, suiru zhi shu chu ye shenwei...*). Ren Zhiyuan (1957) assumed that the monument belonged to the pre-Song period; Tang Yunming (1959) tentatively dated it to the Song period.

Unfortunately, historical and cultural monuments in the village of Qiyangcun were seriously damaged in the subsequent years. In 1966–1970, during the "cultural revolution", stone steles with inscriptions about the development of metallurgy in Qiyangcun in

*That is, during the reign of the Chinese Han Empire (206 BC to 220 AD) and Kingdom of Wei during the Three Kingdoms period (220–266).

*One of the mythical five emperors, also known as Zhuan-xu and Gao-yang.

the Middle Ages were destroyed. Only two epigraphic evidences—tablets on a brick arch in the western part of the village—have survived until today. On the eastern wall, facing the village street, above the vault, there is the inscription "Pavilion for the Prosperity of Culture" (文昌閣*Wenchang ge*). Apparently, a small pavilion used to be built over the arch. On the western wall, facing the ruins of the metallurgical production complex, the inscription "Reflection of iron smelting" (映鐵冶*Ying tieye*) has survived. Archaeological complexes were also significantly damaged. When examining the site west of the village in 1977, the remains of only one semicircular blast furnace were found. The furnace was about 2.5 m high (the diameter of the surviving part was approximately 1.4 m), cut into the steep slope of a loess terrace. On the inside, the walls of the structure were reinforced with pebble stonework. Inside the furnace, pieces of burnt soil and fragments of iron and slag were found. In the 1980–1990s, the above-ground part of the archaeological site was completely destroyed by plowing, and remains of the blast furnace were covered with debris from the local mining and processing plant (Zhao Mengkui, 2017: 59).

Thus, the entire set of evidence indicates that in the village of Qiyang, there was a developed metallurgical complex, which emerged no later than the Song period, and possibly existed as early as the Han period. Production appears to have flourished during the Song and Yuan periods (1279–1368). However, to this day, metallurgy is one of the most important industries in the economy of this region.

It is known that plow moldboards were manufactured in Qiyang along with other products. In 2005, east of the village of Shamingcun, in the Hejin township of Wu'an County, Handan Prefecture of Hebei Province (at a distance of about 30 km south of the village of Qiyangcun), a cast-iron moldboard was found, with the inscription: "Cast <in the village> of Conghu in the west of Jiyang by <a craftsman from> the Chang clan" (基陽西叢鵠冶常氏*Jiyang xi Conghu ye Chang shi*). Apparently, Jiyang is a village of Qiyang. Conghu is the former name of the village of Quanhucun in the Cejing township of Shahe County, which is located approximately 15 km southwest of the modern village of Qiyangcun. The village of Quanhucun received its current name at the end of the Ming period, in the first half of the 17th century; therefore, the moldboard was made no later than that time (Wang Ronggeng, 2018: 113–114). In 2015, in the Pinglu District of Shuozhou Prefecture-level city, in Shanxi Province, a local peasant, while cultivating land, found a hoard of cast-iron agricultural tools, including two plow moldboards*. The items were severely damaged by corrosion, but traces of ornamental decoration were still visible on their surfaces. The inscription on one of them can be read as "Produced by the state-owned <workshops> of Jiyang" (基陽官造*Jiyang guanzao*). Local experts dated the tools to the Song Dynasty**.

Another moldboard with similar inscription was found during excavations at the fortified settlement of Khara-Khoto (Chinese: Heicheng, Heishuicheng)—the ruins of the Tangut town of Edzina. This was an important administrative center of the Western Xia (Xi Xia), known since 1032, which retained its significance even under the Mongols, and was destroyed by the troops of the Ming dynasty in 1372. This fortified settlement is located 25 km southeast of the village of Dalaihubu, in Ejin Banner of Alxa League, in the Inner Mongolia Autonomous Region. Two layers were identified at the site: one from the time of the Western Xia (1032–1226), and the other of Yuan Empire and Northern Yuan State*** (1286–1372). The lower boundary of the second period resulted from the fact that in 1286 the town became an administrative center of Yijinai District, and its reconstruction began. A cast-iron plow moldboard was discovered during the excavations in 1983–1984 in the layer of the Yuan period. This is a lenticular item (26 × 25 cm). A protrusion and four eyelets for fastening are on the back. An inscription of four characters, enclosed in rectangular frame, is between the eyelets. The first character is unreadable, but the next three (□陽官造 …*yang guanzao*) suggest that this item was also "manufactured by the Jiyang state-owned <workshops>". To the right of the frame, there is a mark in the form of *huaya* ('flower seal')—stylized monogram of Chinese characters, possibly the "signature" of the artisan who made the tool. On the left side of the moldboard, a fish is represented, and on the right side, a lotus flower (Guo Zhizhong, Li Yiyuo,

*In the news article, they were mistakenly called ploughshares, but the published photograph indicates that these actually were moldboards.

**"Shanxi Shuozhou cunmin gengzuo shi faxian songdai nongju, yi yanzhong xiushi (tu)" – "While cultivating land, a peasant from Shozhou, Shanxi, discovered agricultural tools of the Song period, which were seriously damaged by corrosion (photo)". October 12, 2015. (Official website of the state news agency "Zhongguo xinwenshe" (China News Service). URL: https://www.chinanews.com.cn/cul/2015/10-12/7564271.shtml (Accessed September 5, 2022)).

***This state existed in 1368–1388 in Mongolia after expulsion of the emperors of the Yuan dynasty from China.

1987: 11) (Fig. 2, *3*). In its shape, some decorative details, and content of the inscription, this moldboard is most similar to the specimen from the collection of the State Historical Museum, which is decorated with a pair of fish images. These two items could have been made at approximately the same time.

In addition, the collection of the Inner Mongolia Museum (Hohhot, China) contains a plow moldboard with an inscription in Chinese characters "Produced by the Jiyang state-owned <workshops>". Although its exact origin is unknown, it has also been dated to the Yuan period. This item is lenticular in shape (30 × 25.5 cm). On its back, there is a protrusion and four eyelets for fastening. Four characters in a frame are between the eyelets. A fish is to the left of the eyelets, and flower on a long curved stem is to the right (Fig. 2, *4*). Thus, its design is almost identical to that on the moldboard from Khara-Khoto (Fig. 2, *3*). However, unlike the items discussed above, this one was made of bronze and not cast-iron. Another remarkable detail is that the inscription was incorrectly applied to the casting mold, and therefore appeared on the moldboard in mirror image (Zhonghua nongqi tupu, 2001: 158). Judging by this feature and by the material, it may be assumed that this item was not produced in Qiyang workshops, but was a local imitation.

A specimen that is extremely similar to the moldboards from Khara-Khoto and Museum of Inner Mongolia is kept in the National Museum of the Republic of Tuva. It was cast of iron and has a lenticular shape (28.4 × 25.0 cm). A protrusion and four eyelets for fastening are on the back. An inscription of four characters enclosed in a frame is between the eyelets. A fish is depicted to the left of them, and lotus flower to the right*. The first two characters are unreadable, and only a part of the inscription can be reconstructed as □□官造 …*guanzao,* "produced by state-owned <workshops>…". A similar item was found in 2020 together with a cast-iron share in the Untakhan locality, near Salaga Ulus, Zakamensky District of the Republic of Buryatia, and is currently on display at the Buryatia History Museum. An inscription of four vertically placed characters in a rectangular frame was on the back of the item under the protrusion, between four eyelets for fastening. Two upper characters have not survived. The lower characters can be read as □□官造…*guanzao,* "produced by state-owned <workshops>…". A lotus flower is represented on the right of the frame.

An inscription containing a reference to Jiyang workshops also appears on a plow moldboard found in 1947 in a hoard of agricultural tools (four cast-iron moldboards, a bronze share, and the upper lid of a bronze mold for casting the share) in the village of Sosnovka in Tuva. The inscription consists of two characters (綦易*Qiyi*) carved into the surface, and was made during casting of the item (Kyzlasov, 2002: 77, fig. 5). In 1957, the characters were read correctly by B.I. Pankratov and V.S. Kolokolov. Pankratov proposed two translation options: the literal "very convenient", and more expanded, but in no way substantiated "make every effort to cultivate the fields" (Kyzlasov, 1969: 139, 143, 155–156; 2002). However, in our opinion, it would be correct to interpret these characters as a proper name—a modified name of the village of Jiyang. All the tools from the hoard were made by local artisans, which is also confirmed by the discovery of the mold lid along with the tools (Kyzlasov, 2002: 73–74). The foundry workers could have tried to copy the mark that was placed on high-quality products of Jiyang workshops, which came to Tuva, but made a mistake in writing the second character, having cast 易*yi* instead of 陽*yang*. The same hoard also contained a plow moldboard with the inscription "23rd year of <the reign of> Zhiyuan [1286]" (至元二十三年 *zhiyuan ershisan nian*), which makes it possible to date the entire complex to the late 13th century. These characters were applied to the casting mold in such a way that on the finished product they appeared in mirror image (Ibid.: 73–77, fig. 4).

Incorrect interpretation of the inscription on the moldboard from the State Historical Museum might have been caused by "translation difficulties". The translator could have assumed that the inscription named the manufacturer of the tool (a specific person or workshop), and this was taken as a literal meaning of the characters. Archaeological and epigraphic evidence of metallurgical production in Jiyang, at the time when inscriptions on plow moldboards from the collection of the State Historical Museum (before 1940) and from the Sosnovka hoard (in 1957) were translated, was still unknown.

## Parallels from China

Dating of the plow moldboards under consideration can be clarified by considering a wider circle of

*For a photograph and description of the item, see the State Catalogue of the Museum Fund of the Russian Federation. URL: https://goskatalog.ru/portal/#/collections?id=33076531 (Accessed September 11, 2022).

archaeological evidence from China, where dozens of similar items have been discovered—from the Han period to the ethnographically modern period. These are items of various shapes and sizes, usually made of cast-iron, less often of bronze; tools made of different metals existed at the same time (Zhonghua nongqi tupu, 2001: 155–159; Chen Wenhua, 1994: 218–224, 237, 240, 244, 246–247, 249). The greatest similarity to plow moldboards from Southern Siberia is manifested by some types of moldboards common in the northern regions of China in the 10th–14th centuries. This was the time when the Chinese Empire of the Northern Song (960–1127), Khitan Liao (916–1125), Tangut State of the Western Xia (1038–1227), Jurchen Jin Empire (1115–1234), and Mongol Yuan (1279–1368) existed in this region. Only some of the tools were discovered during archaeological excavations; others were accidental finds, and the exact dates of their manufacture cannot always be established.

In addition to the above-described plow moldboard from Inner Mongolia, three more items were found during scholarly research of archaeological sites. One of these was discovered in 1958 at a site from the Liao and Jin periods, near the village of Daguxiancun in Shunyi District of Beijing. This was a cast-iron moldboard of lenticular shape (35.5 × 32.0 cm). Four eyelets for fastening were on the back. A swastika 卐 *wan* was between the eyelets (Su Tianjun, 1963: 140) (see Fig. 2, *5*). Another cast-iron moldboard was found during the excavations of one of the fortresses belonging to the defensive system of the Great Wall in the Jurchen Jin Empire. The site is located in the northern part of Tongliao Prefecture-level city, in Inner Mongolia. The moldboard was discovered in a pile of ash and household waste next to one of dwellings in the southeastern part of the fortress, surrounded by an internal wall. This was a lenticular item (34.0 × 23.5 cm), but its outline was more rounded than that on the other examined items. On its back, there were four eyelets for fastening. In the upper part, a character 火 *huo* was carved, the literal meaning of which is "fire"; however, it can also mean "ten soldiers" or be a family name (Shao Qinglong, 1984: 163, 168, 170–171). Another moldboard was discovered during the excavations at the Tuchengzi site of the Yuan period in Horinger County of Hohhot Prefecture-level city, in Inner Mongolia (it is now kept in the Inner Mongolia Museum). This is a massive cast-iron item of lenticular shape (29.5 × 25.0 cm), with protrusion and four eyelets for fastening on its back (Zhonghua nungqi tupu, 2001: 159) (Fig. 2, *6*).

Among accidental finds, noteworthy are two lenticular moldboards of cast-iron found in Inner Mongolia. These are believed to have been produced in the Tangut state of Western Xia. The first item (28.7 × 23.8 cm) was transferred to the Wuhai Museum (Wuhai Municipal District, Inner Mongolia) in 1989 (Fig. 2, *7*). The second item (30.6 × 25.5 cm), found in 2010 by a resident of Hohhot, is in the Alashan Museum (Bayan-Hot town, Alxa Left Banner, Alxa League, Inner Mongolia) (Fig. 2, *8*) (Li Yufeng, Du Jianlu, 2018: 345; Xi Xia wenu…, 2014: 892–893, 910–911). Another item of similar shape, measuring 26.5 × 19.5 cm, was found in Fengning Manchu Autonomous County of Chengde Prefecture-level city in Hebei Province, and was tentatively dated to the time of the Jurchen State of Jin (Bai Guang, Zhang Hanying, 1990: 88, 90).

## Conclusions

Thus, at present, there are no grounds for dating all the plow moldboards discovered in Southern Siberia to the Tang period. Most likely, these items appeared in Siberia in the 13th–14th centuries, when Southern Siberian lands came under the rule of the Mongol Empire and then of the Yuan Empire as a part of Lingbei Province. First information about Chinese artisanal and agricultural colonies in Tuva in the Mongol period is contained in the "Description of the Journey to the West of the Real Man Changchun" ("Changchun zhenren xi you ji"), written by the Taoist monk Changchun (1148–1227), who traveled from China to Central Asia in 1221–1224 (see (Plotnikov, 2019: 338)). As L.P. Potapov pointed out, juans 7, 11, 12, and 15 of the "Basic Records" ("Ben ji") of the "History of Yuan" ("Yuan shi"), compiled in 1369–1370 under the leadership of Song Lian, testify to creation of military-agricultural settlements in the Qianzhou region, in the upper reaches of the Yenisei River, in order to supply the Mongolian troops with food. These settlements were provided with seeds, draft animals (oxen), and agricultural tools. Both local residents (the Kyrgyz people) and forcibly resettled Chinese and Jurchens could live in these settlements (Potapov, 1953: 106). The presented data correlate with the evidence from the settlement complexes of the Mongolian period, studied on the territory of the Tandinsky and Ulug-Khemsky Districts of the Republic of Tuva. Residential, administrative, and religious buildings in these settlements were built according to Chinese

models. Traces of ancient irrigation canals were found around the sites. Judging by the discovered plant remains, the colonists grew wheat, barley, millet, and other crops. Metallurgical production was also well developed (Plotnikov, 2019: 338–343). All this information encourages us to correct the current idea that the "agriculture in the Khakass-Minusinsk Basin lost its former development as a result of the Mongol domination in the 13th–16th centuries" (Sunchugashev, 1990: 84).

The second chapter "The Rebellion of the Northern Princes" of the historical work "Complete Records of Events in the History of the Yuan" ("Yuan shi jishi benmo"), composed by Chen Bangzhan in 1606, says that in 1309, the governor of Lingbei Province, in his report to the Emperor, proposed to establish military-agricultural settlements on the northern slopes of the Altai Mountains in order to keep in subjection the Chagatai princes who lived on the southern slopes (Potapov, 1953: 106). Similar settlements existed among the Jurchens in the early 13th century, which is known from the written sources and confirmed by archaeological evidence from the Russian Primorye (see (Artemieva, Sorokin, 2021: 67)).

The appearance of Chinese agricultural tools and the manufacture of replicas thereof in Southern Siberia could have been associated with the establishment of military-agricultural settlements and the development of agriculture and iron casting under the patronage of the Yuan governors, who needed food to supply the army. This is consistent with the results of paleogeographic studies in Tuva, which showed that the maximum development of irrigated agriculture in the region happened in the Uyghur-Mongol period (mid 8th–14th centuries), when sophisticated systems of irrigation canals were built (Prudnikova, 2005, 2018). These conclusions can also be extended to the Altai Mountains. Additional information about the time and place of manufacture of medieval agricultural tools discovered in the Altai, Khakassia, and Tuva can be provided by inscriptions in Chinese characters on their surface, whose reading and interpretation has not yet received sufficient attention.

## Acknowledgments

This study was supported by the Russian Science Foundation, Project No. 22-78-10121. The author expresses her deepest gratitude to N.V. Polosmak for providing materials and assistance in working on the article.

## References

**Artemieva N.G., Sorokin V.S. 2021**
Chzhurchzhenskiye orudiya dlya uborki urozhaya (po materialam Shaiginskogo gorodishcha). *Vestnik Novosibirskogo gosudarstvennogo universiteta*. Ser.: Istoriya, filologiya, vol. 20. No. 3: Arkheologiya i etnografiya: 66–77.

**Bai Guang, Zhang Hanying. 1990**
Hebei Fengning nongye kaogu gaishu [A brief review of the agricultural archaeology of Fengning Manchu Autonomous County of Hebei]. *Nongye kaogu*. No. 1: 86–90. (In Chinese).

**Botvich I.Y., Oborin Y.V. 2013**
Orudiya zemledeliya iz Khakasii: Novye nakhodki. *Sotsialno-ekonomicheskie problemy Sayano-Altaya; Prilozheniye k "Vestniku KrasGAU",* iss. 8: 216–221.

**Chen Wenhua. 1994**
Zhongguo nongye kaogu tulu [Catalogue of finds of agricultural archaeology of China]. Nanchang: Jiangxi kexue jishu chubanshe. (In Chinese).

**Ermolaev A.P. 1919**
Kratkiy otchet ob issledovaniyakh v Uryankhaiskom krae v 1915–1918 gg. *Sibirskie zapiski*, No. 4/5: 34–39.

**Evtyukhova L.A. 1948**
Arkheologicheskiye pamyatniki eniseiskikh kyrgyzov (khakasov). Abakan: Izd. KhakNIIYaLI.

**Guo Zhizhong, Li Yiyou. 1987**
Nei Menggu Heicheng kaogu fajue jiyao [Summary of the archaeological excavations of Khara-Khoto, Inner Mongolia]. *Wenwu*, No. 1: 1–23. (In Chinese).

**Kiselev S.V. 1951**
Drevnyaya istoriya Yuzhnoi Sibiri. Moscow: Izd. AN SSSR.

**Kubarev G.V. 1997**
O zemledelii na Altae v drevnetyurkskuyu epokhu. In *Izvestiya laboratorii arkheologii: Mezhvuzovskiy sb. nauch. tr*., V.I. Soenov (ed.), iss. 2. Gorno-Altaisk: Izd. Gorno-Alt. Gos. Univ., pp. 220–223.

**Kyzlasov L.R. 1969**
Istoriya Tuvy v sredniye veka. Moscow: Izd. Mosk. Gos. Univ.

**Kyzlasov L.R. 1979**
Drevnyaya Tuva (ot paleolita do IX v.). Moscow: Izd. Mosk. Gos. Univ.

**Kyzlasov L.R. 2002**
Klad zemledelcheskikh orudiy s nadpisyami XIII v. na Verkhnem Yenisee. In *Drevnosti Altaya: Mezhvuzovskiy sb. nauch. tr*., V.I. Soenov (ed.), iss. 8. Gorno-Altaisk: Izd. Gorno-Alt. Gos. Univ, pp. 73–88.

**Li Jifu. 1983**
Yuanhe junxian tuzhi [Illustrated Description of Districts and Counties During the Reign of Yuanhe]. Beijing: Zhonghua shuju. (In Chinese).

**Li Yufeng, Du Jianlu. 2018**
Xi Xia lihua kao [Investigation of ploughshares from Western Xia]. *Song shi yanjiu luncong*, No. 2: 336–348. (In Chinese).

**Plotnikov A.Y. 2019**
Tuva v mongolskoye vremya. In *Istoriya Sibiri*. In 4 vols. Vol. 2: Zheleznyi vek i Srednevekovye, V.I. Molodin (ed.). Novosibirsk: Izd. IAET SO RAN, pp. 338–344.

**Polosmak N.V., Dyadkov P.G. 2021**

Arkheologicheskiye issledovaniya Katandinskoi doliny. In *Problemy arkheologii, etnografii, antropologii Sibiri i sopredelnykh territoriy*, vol. XXVII. Novosibirsk: Izd. IAET SO RAN, pp. 600–607.

**Potapov L.P. 1953**

Ocherki po istorii altaitsev. Moscow, Leningrad: Izd. AN SSSR.

**Prudnikova T.N. 2005**

Prirodnye zakonomernosti razvitiya oroshaemogo zemledeliya v drevnei Tuve. Cand. Sc. (Geography) Dissertation. Krasnoyarsk.

**Prudnikova T.N. 2018**

On ancient agriculture in arid regions of Central Asia: The case of the Uvs Nuur Basin. *Archaeology, Ethnology and Anthropology of Eurasia*, vol. 46 (1): 66–75.

**Ren Zhiyuan. 1957**

Shahe xiande gudai yetie yizhi [Ancient iron-making site in Shahe County]. *Wenwu cankao ziliao*, No. 6: 84. (In Chinese).

**Shao Qinglong. 1984**

Nei Menggu Huolinhe kuangqu jindai jiehao bianbao fajue baogao [Report on excavations of a fortress on the Great Wall of the Jin period in the area of a coal mine in the Khoren-Gol River basin, Inner Mongolia]. *Kaogu*, No. 2: 157–174. (In Chinese).

**Su Tianjun. 1963**

Beijing chutude Liao, Jin shidai tieqi [Ironware from the Liao and Jin eras found in Beijing]. *Kaogu*, No. 3: 140–144. (In Chinese).

**Sunchugashev Y.I. 1990**

Pamyatniki oroshaemogo zemledeliya srednevekovoi Khakasii. Abakan: Khakas. otd. Krasnoyar. kn. izd.

**Tang Yunming. 1959**

Hebei Xingtai faxian song mu he yetie yizhi [A burial and an ironwork site from the Song period discovered in Xingtai, Hebei]. *Kaogu*, No. 7: 369. (In Chinese).

**Wang Ronggeng. 2018**

Handan diqu tieye yizhi chubu diaocha yanjiu [Preliminary survey and study of ancient iron smelting workshops in Handan district]. Ph.D. Dissertation. Beijing. (In Chinese).

**Xi Xia wenwu. Nei Menggu bian. 2014**

[Cultural sites of Western Xia. Inner Mongolia], Ta La, Li Liya (eds.). Beijing; Tianjin: Zhonghua shuju; Tianjin guji chubanshe. (In Chinese).

**Zhao Mengkui. 2017**

Shahe lishi wenhua tanmi [Exploring the mysteries of history and culture of Shahe]. Shijiazhuang: Hebei kexue jishu chubanshe. (In Chinese).

**Zhonghua nongqi tupu. 2001**

[Atlas of Chinese agricultural tools], Sun Shuyou (ed.), vol. 1. Beijing: Zhongguo nongye chubanshe. (In Chinese).

*Received August 23, 2022.*
*Received in revised form September 12, 2022.*