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ORIENTAL TECHNOLOGIES IN THE PRODUCTION OF CAULDRONS OF LATE BRONZE AGE

The cultures of "valykova" ceramics occurred in the Great Eurasian Steppe during late Bronze Age. Its signature is a torus on the areola or the throat of clayey vessel. It is found on the crockery of the different cultures from Northern Balkans and Danube region to Altai. Scientists connect the spreading of this decorative element as well as some forms of metal products with Balkan-Carpathian influence. Such type of metalware as cauldrons are of particular interest, since they always and everywhere characterize the level of metalworking of cultures, workshops and masters. Since cauldrons were usually found outside the complexes, according to which chronology and cultural affiliation could be established. Therefore, until recently, they were not included in studies of metal products of cultures of the "valykova" community. But with the increase in the number of these products (40 copies are already known today), and the appearance of new finds of cauldrons in East Kazakhstan in the dated complexes of the Andronovo cultural community, provided scientists with an opportunity to study intercultural relations in the late Bronze Age. It should be noted that all metalware is a complex object for research. In addition to the morphological similarity of forged cauldrons to the forms of pottery in the cultures of the Late Bronze Age, it is necessary to take into account their production technology. The study of the shape of products, their manufacturing technology and ornamentation allowed us to trace the exchange of new ideas in the manufacture of cauldrons. As a result of detailed studying the individual technological methods used by the masters, it is possible to outline the direction of innovation and identify two impulses from east to west. The first is earlier. It began with the production of small cauldrons among the Sintashta and Petrovskaya (Early-Andronovo) cultures of East Kazakhstan, that is, before the addition of the cultures of "valykova" ceramics. It is characterized by the technology of connecting the frame to the pallet, called shrink-fitting, bottom insertion, smoothly processed surface and, sometimes, the absence of handles. Knowledge of this technology is observed from East Kazakhstan through the Volga region and the Don region, and then to the Right-Bank Ukraine. The second is later. This technology originated in the Volga region and spread to the west - through the Don region to the Right-Bank Ukraine. At this stage, the processing technology of the surface of its frame changes, the pallets are attached with rivets, and cast parts appear.

Key words: *the Great Steppe; Late Bronze Age; cauldrons; technology exchange.*

Introduction

On the lands of the Great Steppe, also known as the Eurasian Steppe on the edge of III-II millennium BC the Eurasian Metallurgical Province (EAMP) started to occur. It existed until XII/XI-IX/VIII century BC. It is divided into several chronological periods: an early phase (edge of III-II millennium BC), forming of Zrubna-Andronovo cultural block (XVI-XV/XIV century BC), development of the community of "valykova" ceramics cultures (KVK) (XV/XIV-XII/XI century BC), ending of Bronze Age (XII/XI-IX/VIII century BC) (Chernykh, 1983, p. 97-98; 1984, p. 255-256; Chernykh et al., 2002).

The main signature of "valykova" ceramics cultures is a torus ("valyk") on the area or the throat of clay vessel, which is found on the crockery of the different cultures from Northern Balkans and Danube region to Altai. Scientists connect the spreading of this decorative element as well as some forms of metal products with Balkan-Carpathian (western) influence.

For a long time such type of metal dinnerware as cauldrons was not found among metal products of roller society cultures, since they were often found outside complexes, that would have allowed to establish the chronology and so - cultural affiliation. Therefore studying the cauldrons have been a separate school for many years. Only findings of the cauldrons in Eastern Kazakhstan in dated complexes of Andronovo cultural society (instead of accidental finds) allowed to include cauldrons into studying intercultural connections of late Bronze Age.

Methods

The information about 40 cauldrons, both undamaged and fragmented is presented in a 2018 joint monograph (Hoshko, Agapov and Otroschenko, 2018). The technology of creating each of them is described in details. It is important to note, that studying metal products, without examining the technology, which is fully depends on the specifics of material handling, can lead to a false con-

clusions. That is what happened during the creation of the classification by the scientists (*Leskov, 1975; Bochkarev, 1972, p. 63-68; 2010, p. 185-208; Demydenko, 2005, p. 93-103; Otroschenko, 1997, p. 16-17; Otroschenko and Tupchienko, 2005, p. 177*), even though they had included some technological moments. However, it is important to understand what could have led the master during the creation of a cauldron, which accessible technologies could have existed at that time.

Results

As the result of attentive studying of forms and technologies of creating cauldrons we managed to discover the specifics of the cauldrons from Eastern Kazakhstan to Ukrainian territories and see an exchange of the new ideas on the lands of Great Steppe. We found that some technological actions mark the direction of innovative creation of the cauldrons. In this article only those artefacts are presented, which would allow to follow this path.

The birth of the technologies, which slowly spread up to Western Ukraine, occurred in Eastern Kazakhstan on the edge of III-II millennium BC - on the early phase of EAMP creation. Here on the artefacts of Petrovska culture and early Alakul period of Andronovo culture, small cooper cauldrons are found. Some of them have handles, some do not, some have pallets and some - flat bottom. We are interested only those with pallets, since they have a specific technology of connecting the pallets to the frame without rivets. Also they do not have handles (fig. 1, 1-2). It is a cauldron from the burial №1, kurgan 4 of Ashchisu grave, which is located 80 km to the east from Karaganda city (*Kukushyn, 2011, p. 103-109; 2012, p. 63-80*). Another was found in burial №2 of the fence №5 on the Nurataldy-I grave, in Shet district of Karaganda oblast (*Kukushyn et al., 2015, p. 135-141; Kukushyn et al., 2016, p. 85-92*). Their form resembles ceramic sharp-edged pots on the pallets of Sintashta and Petrovska culture.

What is the difference between said cauldrons and the rest? The special technology of connecting the frame to the pallet, called shrink-fitting. It is a connection of details inserted one into the other, with a compulsory engagement, which prevents mutual movement. It is gained by temperature deformation of details which have cylindrical or conic surfaces with small difference in the diameters. The heated detail covers cold one. The "sintering" occurs, therefore the connection becomes irreversible. No rivets needed for such connection. So, in that time masters were familiar with the quality of metal to expand at high temperatures and to squeeze at low.

With the formation of a community of cultures with "valykov" ceramics, as the connections became most active all around their area of spreading, this technology occurred in Volga region. Two cauldrons are known from there: lower part of unknown origin from Bulgar (fig. 1, 3) on the Middle Volga (*Chlenova, 1978, p. 133-136; Agapov and Hoshko, 2018, p. 82-88, fig. V. 1-6*) and on the Lower Volga, found in burial 16 near Komsomolskyi village in Astrakhan oblast, Krasnoyarsk district (fig. 1, 4) (*Boroffka and Sava, 1998, p. 17-113; Agapov and Hoshko, 2018, p. 144-148, fig. 1*). Komsomolsky cauldron, as well as Kazakhstan, has no handles. The burial near the cauldron in Komsomolsky is dated approximately XV/XIV-XIII/XII centuries BC (*Otroschenko, 1997, p. 16-17; Otroschenko and Tupchienko, 2003, p. 116; Bochkarev, 2010, p. 207*).

To the west, in the Don region in Borisoglebsk local museum of Voronezh oblast the small cauldron is located. Its photography, posted on the site of local museum, has

bad quality. However, in the area of joining frame with the pallet rivets cannot be seen (fig. 1, 5). Therefore, as I assume, the shrink-fitting was used here as well (*Agapov and Hoshko, 2018, p. 81, fig. IV, 1*).

Moving further to the west, similar technology can be found on the left shore of Dnipro, on the cauldron from Poltava oblast (fig. 1, 6) (*Agapov and Hoshko, 2018, p. 315, fig. XL, 1*).

The next dinnerware was accidentally found during field oration in the Lower Dnipro region on the edge of Mykolaiv and Kherson oblasts. It is the right coast of the Dnipro. Unfortunately, I do not have either photography or the drawing. Gladly I had an opportunity to examine and to describe it. The cauldron had no handlings (remember Ashchisu, Nurataldy and Komsomolsky). The connection of pallet with the frame - by shrink-fitting (*Agapov and Hoshko, 2018, p. 313*).

The most western cauldron with such connection technology of pallet is found in Ukrainian Forrest steppe (*Węgrzynowicz, 1999-2001, p. 31-46*) (fig. 1, 7). Generally it is connected to the Podillia village in Halych district of Ivano-Frankivsk oblast (*Agapov and Hoshko, 2018, p. 254-256*).

The Volga region can be considered as a contact zone, since here, apart from inserting the pallet by shrink-fitting, other new technological methods appear, such as inserting an additional bottom in the cauldron from Bulgar (*Agapov and Hoshko, 2018, fig. V, 4, 6*). Furthermore, in the cauldron from Podillia we have, though not additional, but inserted bottom, installed without rivets (*Węgrzynowicz, 1999-2001, p. 31-46*).

Characteristic signs of this group:

- The cauldrons are made of copper. The surface is leveled by wooden hammer.
- Shrink-fitting of the pallet (Ashchisu, Nurataldy and Komsomolsky, Bulgar, Podillia, from Poltava oblast and from the edge of Mykolaiv and Kherson oblasts);
- Insertion of an additional bottom (Bulgar);
- Inserted bottom without rivets (Podilya);
- No handlings (Ashchisu, Nurataldy and Komsomolsky, the edge of Mykolaiv and Kherson oblasts).

Another new technology of cauldron frame processing also occurs in Volga region. Initially we see it on the cauldron from Domashka (fig. 2, 1). It can be noticed due to traces of smith tools with narrow working edge, mostly vertical. Such processing allowed to stretch upwards casted ring workpiece. In this case, the diameter of the ring did not become much larger. The cauldron from Domashka was found in cultivated kurgan (*Agapov and Hoshko, 2018, p. 105*), therefore it is hard to determine its cultural affiliation. According to villagers words, under the pallet the small clay "cup" was found, which was approximately 20 cm in diameter, with an ornament under the circlet, similar to the ornament under the cauldron circlet. From the excavation, set on the finding location, three jar-like ceramics dinnerware with the admixture of chamotte and white crumb (*Agapov and Hoshko, 2018, p. 119, VIII, 12*). However, there is no certainty that these dinnerwares have direct connection to the cauldron. But ornamental motives on the cauldron are similar to those on ceramics dinnerware of Zrubna culture (*Agapov and Hoshko, 2018, p. 108, fig. VIII, 1; p. 118, fig. VIII, 11*). Because of this, we consider Domashka cauldron simultaneous to Bulgar and Komsomolsky (XV-XIV century BC). Therefore we link this date to the invention of the new technology of ring forming, which the frame consisted of, and its moving to the west.

At the North Caucasus, the cauldron known as Ivanivskiy, was found near Ivanovo-Shamshevo Kagalnitskiy

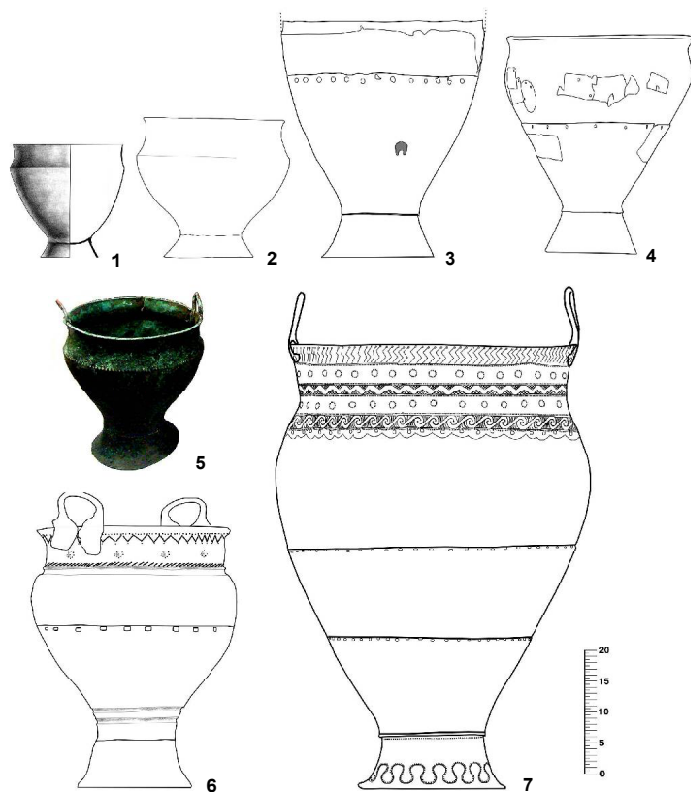
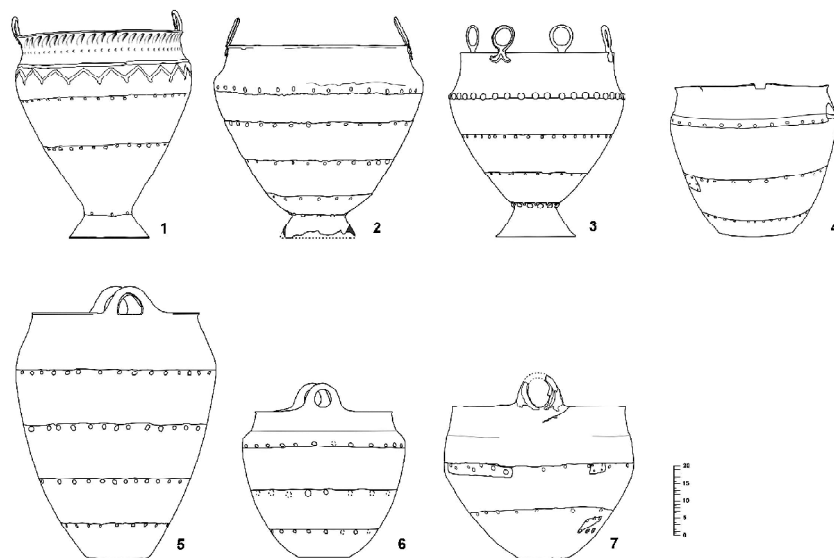


Fig. 1. Cauldrons with pallets, which are attached with shrink-fitting:

- 1 - Aschysu;
- 2 - Nurataldy;
- 3 - Bulgar;
- 4 - Komsomolskyi;
- 5 - Borysohlibskyi;
- 6 - from the Poltava region;
- 7 - Podillia.

Fig. 2. Cauldrons with vertical tracks on the body from blacksmith's tools:

- 1 - Domashka;
- 2 - Ivanivskiy;
- 3 - Matskova Luchka;
- 4 - Mykhailivka;
- 5 - Pokrovka;
- 6 - Novopavlivka;
- 7 - Mykolaiv regional museum.



district of Rostov oblast (*Ilukov, 2007, p. 117-122; Agapov and Hoshko, 2018, p. 128-136, fig. X, 1-7*). The whole surface of its frame is covered by the vertical traces, more visible, than of Domashka cauldron (fig. 2, 2). I consider Ivanivskiy cauldron to be more late, then the former, since during its creation the casting was used - handles and, presumably, rivets.

Furthermore, we find this technology in the Dnipro region. Here we see an active development of different forms. The cauldrons made both with pallets and without. Starting from Ivanivskiy cauldron, the technology develops from the creation of individual parts - handles, rivets, pallets, to casting workpieces of whole rings with handles.

The cauldron from Matskova Luchka Lubny district of Poltava oblast (middle stream of Dnipro left coast) (*Klochko and Kozyomenko, 2017, p. 146-147; Agapov and Hoshko, 2018, p. 186-195, fig. XVII, 1-6*) appears superior to Ivanivskiy, however handles, as the former, were casted on the circler according to the wax model and vertical traces of the forging are clearly seen on the rings (accept the first). Rivets with casted discs are inserted between first and second rings and the bottom part and the pallet (fig. 2, 3).

The transition from casting handles to founding them with upper ring is seen on the cauldron from Mykhailivka village Novovorontsovska district of Kherson oblast (fig. 2, 4) on the Dnipro left coast (*Agapov and Hoshko, 2018,*

p. 210-216, fig. XX, 1-5). Its whole frame is covered by deep clear vertical signs of smith tool, which seem to imitate "races" on the surface of ceramics pots (Otroshenko and Tupchienko, 2005, p. 177).

This technological detail makes it similar to two cauldrons on the Dnipro right coast from Kirovohrad oblast - from Pokrovka village Kirovohrad district (Otroshenko and Tupchienko, 2005, p. 176-184; Agapov and Hoshko, 2018, p. 260-271 fig. XXVIII 1-10) and from Novopavlivka village Mala Vyska district (fig. 2, 5-6 respectfully) (Agapov and Hoshko, 2018, p. 229-236, fig. XXIII, 1-6).

The last cauldron is from Mykolaiv Regional Museum (MRM) (fig. 2, 7). The technology of frame processing is similar to cauldrons from Mykhailivka, Pokrovka and Novopavlivka (Agapov and Hoshko, 2018, p. 198-209, fig. XIX, 1-10). Therefore such frame processing is clearly seen from east to west, from Volga region to middle Dnipro left coast and Dnipro right coast. We see gradual development of the technology of final frame processing with vertical narrow traces-"races", which is probably due to transferring from copper to another metal (Domashka) to bronzes (Matskova Luchka, Novopavlivka, Pokrovka, Mykolaiv regional museum). However I do not disregard the assumption of imitation of the ornaments in the ceramics as "races".

Some cauldrons are produced without pallets (Novopavlivka, Pokrovka, Mykhailivka).

Characteristic signs of this group:

- casting with forming forging of upper ring and handles;
- stretching upwards rings with hammer with narrow working surface, which results in "races" on the surface;
- casting handles according to wax models and adding by casting on the circlets;
- casting pallets;
- casing rivets.

Discussion

In the following table cauldrons are posted regarding their dating, made by authors of publishing new findings and already known dinnerwares from previous studying with respect to their creation technologies. The purpose of creating such table was to demonstrate spatial spreading of technological ideas of creating metal cauldrons, which moved from east to west, in the hands of stepper cultures of "valykova" ceramics community (tab. 1).

Thus, the attempted technological study of cauldrons, traces on their surface and other details adds additional opportunities to the traditional study of archaeological material.

Date	Kazakhstan	Nadvolzhya	Lower Don	Left bank of the Dnipro	Right bank of the Dnipro
XXI-XVII BC					
XV-XIV BC					
XIV-XIII BC					

Table 1. Spreading of technologies and ideas in the creation of cauldrons
Remarks: Arrows indicate the direction of technology movement

Conclusions

To sum up this research, I remind that the creation of cauldrons on the steppe (partly forest steppe) areas of North Eurasia began on the east on the early phase of the Eurasian Metallurgical Province forming, in the areas of Petrovska and Andronovo cultures of Kazakhstan. In the

Volga region not only east technologies were applied, but also local ideas of cauldron creation were generated and later passed further to the west (fig. 3). The technology of cauldron creation was mastered by all cultures of "valykova" ceramics community, since their form correlates with the design of main types of local ceramics dinnerware.

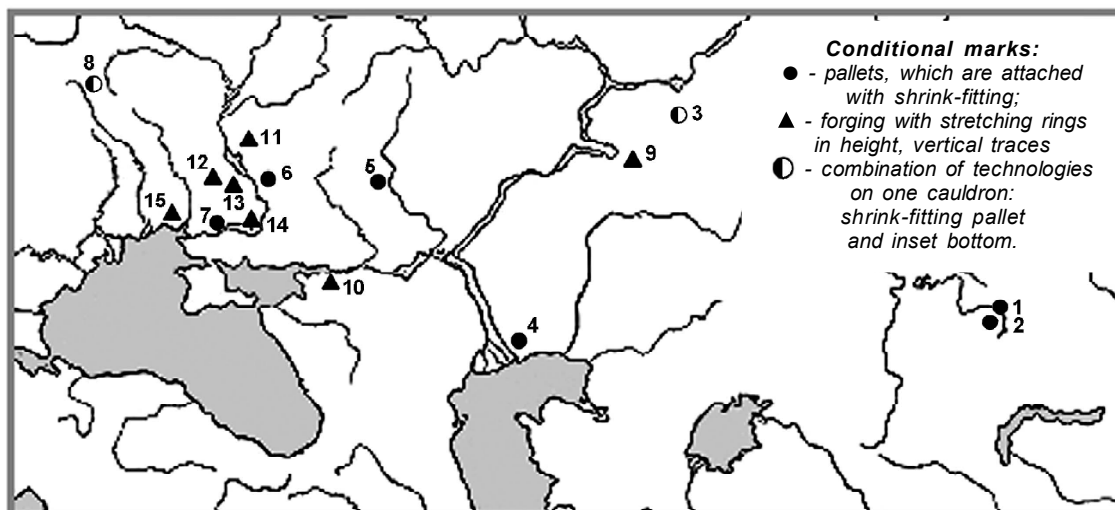


Fig. 3. Map of technology movement from east to west

1 - Aschysu; 2 - Nurataldy; 3 - Bulgar; 4 - Komsomolskiy; 5 - Borysohlibskiy; 6 - from the Poltava region; 7 - from the border of Mykolaiv and Kherson region; 8 - Podillia; 9 - Domashka; 10 - Ivanivskiy; 11 - Matskova Luchka; 12 - Novopavlivka; 13 - Pokrovka; 14 - Mykhailivka; 15 - Mykolaiv regional museum.

REFERENCES

Agapov, S. O., Hoshko, T. Y. (2018). Katalog. In: Goshko, T.Y., Agapov, S.O., Otroshchenko, V.V. *Metalevi kazany z Velykoho Stepu za doby piznoi bronzy*. Kyiv: Maidan, pp. 66-316 (in Ukrainian).
 Bochkarov, V. S. (1972). Kimmeriiskii kazany. *Arkheolohiia*. 5, 63-68 (in Ukrainian).
 Bochkarev, V. S. (2010). O metallicheskih kotlakh epokhi pozdney bronzy Vostochnoy Evropy. In: Bochkarev, V. S. *Kulturogenез i drevneye metalloproizvodstvo Vostochnoy Evropy*. St-Peterburg: Info-Ol, pp. 185-208 (in Russian).
 Goshko, T. Y., Agapov, S. O., Otroshchenko, V. V. (2018). *Metalevi kazany z Velykoho Stepu za doby piznoi bronzy*. Kyiv: Maidan (in Ukrainian).
 Demidenko, S. V. (2005). K voprosu o proiskhozhdenii klepanykh "kimmeriyskikh" kotlov severnogo Prichernomoria. In: *Drevnosti Evrazii: ot ranney bronzy do rannego srednevekovia. Pamyati V.S. Olkhovskogo: sb. statey* (Ed. Gulyayev, V. I.). Moskva: IA RAN, pp. 93-103 (in Russian).
 Ilyukov, L. S. (2007). Redkaya nakhodka iz Nizhnego Podonia. *Sovremennoye sostoyaniye i puti razvitiya Yuga Rossii: materialy regionalnoy nauchn. konf. Sistemnyye issledovaniya sovremennogo sostoyaniya i puti razvitiya Yuga Rossii (priroda, obshchestvo, chelovek)* (June 6-8, 2006, Azov) Rostov n/Donu, pp. 117-122 (in Russian).
 Klochko, V. I., Kozyrmenko, A. V. (2017). *Drevniy metall Ukrainy*. Kyiv: OOO "Izdatelskiy dom "SAM" (in Russian).
 Kukushkin, I. A. (2011). Metallicheskiye izdeliya ranneandronovskogo mogilnika Ashchisu (Tsentralnyy Kazakhstan). *Rossiyskaya arkheologiya*. 2. 103-109 (in Russian).
 Kukushkin, I. A. (2012). Mogilnik Ashchisu. Kurgan s metallicheskim sosudom. *Arkheologiya i istoriya Saryarki: sb. nauch. st.* Karaganda: KarGU, pp. 63-80 (in Russian).
 Kukushkin, A. I., Dmitriyev, E. A., Shokhatayev, O. S., Elibayev, T. A., Beysenbayev, E. E. (2015). Provedeniye nauchno-arkheologicheskikh issledovaniy kompleksa Nurataldy (rezultaty polevykh rabot). *Saryarqanyң tarixy men arxeologiyasy*. Qaraqandy, pp. 135-141. (in Russian).
 Kukushkin, I. A., Loman, V. G., Kukushkin, A. I. (2016). Pogrebeniye s metallicheskim sosudom v mogilnike Nurataldy-I (epokha bronzy). *Uralskiy istoricheskiy vestnik*. Ekaterinburg. 4(53), 85-92. (in Russian).
 Leskov, A. M. (1975). *Zaklyuchitelnyy etap bronzovogo veka na yuge Ukrainy*. Extended abstract of Doctor's thesis. (Archeology). Moskva, IA RAN (in Russian).

Otroshchenko, V. V. (1977). Do pyannia pro klasyfikatsiiu ta kulturnu nalezhnist klepanykh kazaniv. *Problemy istorii ta arkheolohii Ukrainy. K 140-letiyu so dnya rozhdeniya akademika Dmitriya Ivanovicha Bagaleyeva*. (Apr. 16-18, 1997 Kharkiv). Kharkiv, pp. 16-17 (in Ukrainian).
 Otroshchenko, V. V., Tupchienko, M. P. (2005). Bronzovi klepani kazany ta Donetskiy hirnychno-metallurhiinyi tsentr. *Problemy istorii ta arkheolohii Ukrainy*. (Jul. 21-25, 2003, Novozvanivka). Alchevsk, pp. 174-184 (in Ukrainian).
 Chlenova, N. L. (1978). "Kimmeriyskiy" kotel iz Bashkirii. *Voprosy drevney i srednevekovoy arkheologii Vostochnoy Evropy*. (Ed. Kozenkova, V.I). Moskva, pp. 133-136 (in Russian).
 Boroffka, N., Sava, E. (1998). Zu den steinernen "Zeptern/Stössel-Reptern", "Miniatursäulen und "Phalli" der Bronzezeit Eurasiens. *Archäologische mitteilungen aus Iran und Turan*. Berlin, 30, 17-113.
 Węgrzynowicz, T. (1999-2001). Kocioł z Podola. *Wiadomości Archeologiczne*. Warszawa, LV, 31-46.
 Chernykh, E. N. (1978). Metallurgicheskiye provintsii i periodizatsiya epokhi rannego metalla na territorii SSSR. *Sovetskaya arkheologiya*. 4, 70-77 (in Russian).
 Chernykh, E. N. (1983). Problema obshchnosti kultur valikovoy keramiki v stepyakh Evrazii. *Bronzovyy vek stepnoy polosy Uralo-Irtyshskogo mezhdurechia: sb. statey* (Ed. Zdanovich, G. B.). Chelyabinsk: Bashkirskiy universitet, pp. 97-98 (in Russian).
 Chernykh, E. N. (1984). Obshchnost kultur valikovoy keramiki Evrazii (k postanovke problemy). In: *Etnogenez narodov Balkan i Severnogo Prichernomoria. Lingvistika. istoriya. arkheologiya: sb. statey* (Ed. Gindin, L.). Moskva: Nauka, pp. 255-256 (in Russian).
 Chernykh, E. N., Avilova, L. I., Orlovskaya, L. B., Kuzminykh, S. V. (2002). Metallurgiya v Tsirkumpontyiyskom areale: ot edinstva k raspadu. *Rossiyskaya arkheologiya*. Moskva, 1, 5-23. (in Russian).

LIST OF REFERENCE LINKS

Агапов С. О., Гошко Т. Ю. Каталог. *Гошко Т. Ю., Агапов С. О., Отрощенко В. В. Металеві казани з Великого Степу за доби пізньої бронзи: монографія*. Київ: Майдан, 2018. С. 66-316.
 Бочкарьов В. С. Кіммерійські казани. *Археологія*. Київ, 1972. № 5. С. 63-68.
 Бочкарев В. С. О металлических котлах эпохи поздней бронзы Восточной Европы. *Бочкарев В. С. Культурогенез и древнее металлопроизводство Восточной Европы: монография*. Санкт-Петербург: Инфо-Ол, 2010. С. 185-208.
 Гошко Т. Ю., Агапов С. О., Отрощенко В. В. Металеві каза-

ни з Великого Степу за доби пізньої бронзи: монографія. Київ: Майдан, 2018. 327с.

Демиденко С. В. К вопросу о происхождении клепаных "киммерийских" котлов северного Причерноморья. *Древности Евразии: от ранней бронзы до раннего средневековья. Памяти В. С. Ольховского: сб. статей. / гл. ред. В. И. Гуляев.* Москва: ИА РАН, 2005. С. 93-103.

Ильюков Л. С. Редкая находка из Нижнего Подонья. *Современное состояние и пути развития Юга России: материалы региональной научн. конф. Системные исследования современного состояния и пути развития Юга России (природа, общество, человек)* (6-8 июня 2006 г., Азов). Ростов н/Дону, 2007. С. 117-122.

Клочко В. И., Козыменко А. В. Древний металл Украины. Киев: ООО Издательский дом "САМ", 2017. 368 с.

Кукушкин И. А. Металлические изделия раннеандроновского могильника Ащису (Центральный Казахстан). *Российская археология.* Москва: Наука, 2011. №2. С. 103-109.

Кукушкин И. А. Могильник Ащису. Курган с металлическим сосудом. *Археология и история Сарыарки: сб. науч. ст.* Караганда: Изд-во КарГУ, 2012. С. 63-80.

Кукушкин А. И., Дмитриев Е. А., Шохатаев О. С., Елибаев Т. А., Бейсенбаев Е. Е. Проведение научно-археологических исследований комплекса Нураталды (результаты полевых работ). *Сарыарканың тарихы мен археологиясы.* Караганда, 2015 ж. Б. 135-141.

Кукушкин И. А., Ломан В. Г., Кукушкин А. И. Погребение с металлическим сосудом в могильнике Нураталды-1 (эпоха бронзы). *Уральский исторический вестник.* Екатеринбург. 2016. №4(53). С. 85-92.

Лесков А. М. Заключительный этап бронзового века на юге Украины: автореф. дис. ... докт. ист. наук. Москва, 1975.

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СХІДНІ ТЕХНОЛОГІЇ У ВИРОБНИЦТВІ КАЗАНІВ ДОБИ ПІЗНЬОЇ БРОНЗИ

Історія дослідження казанів розпочалася ще в кінці ХІХ століття. Майже одразу ця тема виділилася в окремих напрямках в археології через те, що їх найчастіше знаходять поза комплексами, за якими можна було б встановити хронологію і, відповідно, культурну приналежність. Але зі збільшенням кількості цих виробів (на сьогодні їх відомо вже 40 примірників), і особливо з появою нових знахідок у Східному Казахстані найбільш ранні казанів в датованих комплексах андронівської культурної спільності, дозволили залучити казані, відомі на величезному просторі Великого Степу, від Східного Казахстану до Молдови, до вивчення міжкультурних зв'язків пізнього бронзового віку. Взагалі металевий посуд це складний об'єкт, що вимагає спеціального технологічного дослідження. Тому крім морфологічної схожості кованих казанів із деякими формами керамічного посуду культур доби пізньої бронзи, необхідно враховувати й технологію їхнього виробництва. Для пропонованої статті вибрані лише окремі казани, бо дослідження форми й технології їхнього виготовлення дозволяє простежити обмін новими ідеями між майстрами культур валикової кераміки. В результаті детального вивчення окремих технологічних прийомів, які застосовували майстри, можна намітити напрямки руху інновацій у формуванні казанів та виділити два імпульси, які йшли зі сходу на захід. Перший - більш ранній. Початок йому поклало виробництво невеликих казанків в середовищі синташтинської та петровської (ранньо-андронівської) культурах Східного Казахстану, тобто, ще до складання спільності культур валикової кераміки. Для них характерна специфічна технологія з'єднання корпусу казана із піддоном без заклепок, гладко оброблена поверхня корпусу та, часом відсутність ручок. Пізніше, ця технологія фіксується вже в Надволжжі й Донщині. Далі, просуваючись в західному напрямку, вона з'являється на Дніпровському Лівобережжі, а потім і на Правобережжі. Матеріалом для казанів на цьому етапі служила мідь. У міру просування у західному напрямку (в Надволжжі) виникає нова технологія - вставка дна, закріпленого без заклепок. Другий імпульс, більш пізній - із Надволжжя через Донщину на Лівобережжю й Правобережжю України. Казани виготовляються з бронзи. У зв'язку з цим змінюється й технологія формування корпусу, яка відстежується по вертикальних слідах від ковальських знарядь, піддони прикріплюються заклепками. Поступово з'являються відлиті деталі, як-то заклепки, ручки, піддони, а потім і цілі кільця з ручками.

Ключові слова: Великий Степ; доба пізньої бронзи; казани; обмін технологіями.

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