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Chronology and cultural affiliation of the early burials of the Tazhegul burial ground

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Abstract. This paper introduces materials obtained during scientific research at the Tazhegul archaeological complex. The complex is located near the village of Abylaykhan in the Burabay district of the Akmola region. A topographic description of the valley is provided, which contains numerous sites from various periods – from the Early and Late Bronze Ages to the modern period. This paper aims to highlight the research findings on monuments dating back to the initial stage of the complex's formation. The methods and materials section describes the process and results of the study of two objects: stone enclosure No. 1 and a small extension to enclosure No. 2. The first site is located in the lower, northern part of the valley, while the second was discovered in the upper southern part, in the stratigraphic layer beneath the Kazakh Kystau. Radiocarbon dating of the sites yielded dates ranging from the 4th to the 3rd millennia BC. The literature review and discussion section provides a comparative typological analysis of similar sites studied in other regions of Kazakhstan. This allowed the authors to hypothesize about the unified processes of cultural genesis that occurred across much of Kazakhstan during the Early Bronze Age. The article focuses on Early Bronze Age sites in the Burabay mountain forest massif of Northern Kazakhstan, the materials from which are important for addressing certain issues concerning the origins of archaeological cultures of this period. New materials, the first ever discovered in the study area, reveal evidence of burial structures and a burial rite similar to the Yamnaya culture. The authors document and analyze cultural layers of different periods within the complex. Monuments with characteristics of the Yamnaya culture are overlain by a cultural layer of the Nura-Fyodorovo archaeological culture. This paper presents information on reliably identified sites of the Nura-Fyodorovo archaeological culture located near the Tazhygul complex. The discussion section provides a comparative analysis of the characteristic features of the Yamnaya archaeological culture and the Nura-Fyodorovo culture sites that succeeded it. In conclusion, the researchers formulate and express the concept that the formation of regional groups of the Nura-Fyodorovo culture could have occurred on the basis of the Yamnaya culture monuments.

Keywords: Northern Kazakhstan; Burabay mountain forest massif; landscape; archaeological micro district; Bronze Age; burial ground

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Хронология и культурная принадлежность ранних погребений могильника Тажегул

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Аннотация. В научный оборот вводятся материалы, полученные в ходе научного исследования археологического комплекса Тажегул. Комплекс расположен у села Абылайхан в Бурабайском районе Акмолинской области. Дана топографическая характеристика долины, где зафиксировано большое количество разновременных памятников – ранней и поздней бронзы, нового времени. Целью работы является освещение материалов исследования памятников, которые датированы начальным этапом формирования комплекса. В разделе «Методы и материалы» описаны процесс и результаты исследования двух объектов - каменной ограды №1 и небольшой пристройки к ограде №2. Первый объект расположен в нижней, северной части долины, второй обнаружен в верхней южной части, в стратиграфическом слое под казахским кыстау. Радиоуглеродный анализ памятников дал дату IV–III тыс. до н.э. В части «Литературное ревью и обсуждение» приведены сравнительно-типологический анализ однотипных памятников, изученных на территории других регионов Казахстана. Это позволило авторам высказать гипотезу об единых процессах культурогенеза, которые происходили на большей части Казахстана в раннем бронзовом веке. В статье акцентируется внимание на памятниках эпохи ранней бронзы Бурабайского горнолесного массива Северного Казахстана, материалы которых являются важными при решении некоторых проблем происхождения археологических культур этого периода. Новые материалы впервые на изучаемой территории показывают признаки погребальных конструкций и погребального обряда, близкого к ямной археологической культуре. Авторы фиксируют и анализируют разновременные культурные напластования на территории комплекса. Памятники с характеристиками ямной культуры перекрываются культурным слоем нуринско-федоровской археологической культуры. В работе приводятся сведения о достоверно известных памятниках нуринско-федоровской археологической культуры, расположенных рядом с комплексом Тажегул. В разделе обсуждения дается сравнительный анализ характерных признаков ямной археологической культуры и сменивших их памятников нуринско-федоровской культуры. В заключение исследователи формулируют и высказывают концепцию, что сложение региональных групп нуринско-федоровской культуры могло происходить на базе памятников ямной культуры.

Ключевые слова: Северный Казахстан; Бурабайский горнолесной массив; ландшафт; археологический микрорайон; бронзовый век; могильник

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Тәжеғұл қорымының ерте жерлеу хронологиясы мен мәдениеті

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Аңдатпа. Аталмыш жұмыста Тәжеғұл археологиялық кешеніндегі ғылыми зерттеулер барысында алынған материалдар ғылыми айналымға енгізілген. Кешен Ақмола облысы Бурабай ауданындағы Абылайхан ауылының маңында орналасқан. Алқаптың топографиялық сипаттамасы берілген, ол әртүрлі кезеңдерге - ерте және соңғы қола дәуіріне және қазіргі кезеңге жататын көптеген орындарды көрсетеді. Бұл жұмыстың мақсаты – кешеннің қалыптасуының бастапқы кезеңіне жататын ескерткіштер бойынша зерттеу нәтижелерін көрсету. Әдістер мен материалдар бөлімінде екі нысанды зерттеу процесі мен нәтижелері сипатталады: №1 тас қоршау және №2 тас қоршауға жапсырылып салынған қосымша тас қоршауы зерттелді. Бірінші нысан алқаптың төменгі, солтүстік бөлігінде орналасқан, екіншісі жоғарғы оңтүстік бөлігінде, Қазақ Қыстауының астындағы стратиграфиялық қабаттында табылды. Ескерткіштердің радиокөміртекті мерзімін анықтау біздің дәуірімізге дейінгі IV-III мыңжылдықтарды көрсетті. Әдеби шолу және талқылау бөлімінде Қазақстанның басқа аймақтарында зерттелген ұқсас ескерткіштерге салыстырмалы типологиялық талдау жасалған. Бұл авторларға ерте қола дәуірінде Қазақстанның көп бөлігінде орын алған мәдени генезистің біртұтас үрдістері туралы гипотеза жасауға мүмкіндік берді. Мақалада Солтүстік Қазақстанның Бурабай таулы орман массивіндегі ерте қола дәуірі ескерткіштеріне назар аударылады, олардан алынған материалдар осы кезеңдегі археологиялық мәдениеттердің шығу тегі туралы кейбір мәселелерді шешу үшін маңызды. Зерттелетін аймақта алғаш табылған жаңа материалдар жерлеу құрылымдары мен ямная мәдениетіне ұқсас жерлеу ғұрпы туралы айғақтарды көрсетеді. Авторлар кешендегі әр кезеңдегі мәдени қабаттарды анықтап, талдайды. Ямная мәдениетінің ерекшеліктері бар орындардың үстінен нұра-фёдорово археологиялық мәдениетінің мәдени қабаты жатыр. Бұл мақалада Тәжіғұл кешенінің маңында орналасқан нұра-фёдорово археологиялық мәдениетінің нақты орындары туралы ақпарат берілген. Талқылау бөлімінде Ямная археологиялық мәдениетіне тән белгілер мен оларды алмастырған нұра-федоровская мәдениетінің ескерткіштеріне салыстырмалы талдау жасалған. Қорытынды бөлімінде зерттеушілер нұра-федоров мәдениетінің аймақтық топтарының қалыптасуы Ямная мәдениет ескерткіштері негізінде болуы мүмкін деген концепциясын тұжырымдап және аталмыш гипотезаны талқылауға салады.

Түйін сөздер: Солтүстік Қазақстан; Бурабай таулы орман массиві; ландшафт; археологиялық шағын аудан; Қола дәуірі; қорым

Introduction

In 2021, the Burabay Archaeological Team was established at the A.Kh. Margulan Institute of Archaeology. Its goal is to study Bronze Age sites in Northern Kazakhstan. That same year, permanent research began at the Kyzyl-Tobe Bronze Age burial ground. The burial rite and the collection of items accompanying the burial allowed the ancient cemetery to be attributed to the Nura-Fyodorovo archaeological culture. The first radiocarbon dates were obtained from samples of human teeth and ribs. During the 2022 field season, a group of Institute specialists came to a picturesque valley adjacent to the northeastern part of the Burabay mountain-forest massif. This elongated depression is located 15 km northeast of the village of Burabay and 1.5 km southwest of the village of Abylaykhan (Burabay district, Akmola region). The valley is an elevated area with a relatively flat surface, its long side running from southwest to northeast, 2.5 km long and 1.5 km wide. This section of the lowland is distinguished by two springs: one flows around the valley from the northern side, simultaneously serving as a natural boundary, while the second spring flows from the southern side. The source of the northern spring is a deep gorge (sai) in the northwestern part of Uytas Hill. It is at this convenient location that a modern Kazakh winter hut, Tazhygul (in Kazakh: Тажығұл), currently stands and functions. The stream in the southern part, which the indigenous inhabitants of the village of Abylaykhan call "Kara Bulaq," begins at the northern foot of the Ornek hill, in the middle of a birch grove. Both springs are currently functioning, and their waters flow throughout the valley and reach the outskirts of the modern village of Abylaykhan. The valley is filled with uplands on the southern side. The landscape is characterized by low hills typical of this natural and geographical zone, and along the bed of the southern spring, birch groves have been preserved, extending from west to east and reaching the outer forests of Burabay. The northern part opens up to a flat steppe. This plain has been a favourite place and a convenient natural landscape niche for human habitation throughout history, as evidenced by the concentration of a large number of historical and cultural monuments. The number of archaeological sites from different periods in a relatively small area is impressive and requires further practical and theoretical explanation. A preliminary survey of the site and excavated material revealed the presence of artifacts from a Neolithic site.

Along the springs, dwelling depressions dating to the Bronze Age have been identified, arranged in a linear system. The entire area, from southwest to northeast, is occupied by Bronze Age burial structures—enclosures with earthen embankments, and some without embankments. In the center of the stone enclosures without embankments, inconspicuous rectangular stone receptacles (boxes) constructed from several granite slabs are found. All these ancient monuments are overlain by a cultural layer of Kazakh wintering sites dating from the 18th to early 20th centuries (Fig. 1). This area (according to preliminary inspection) contains the structures of seven winter huts. The largest winter hut, a farmstead-type structure, is located in the upper part, closer to the Kara Bulaq Spring. It should be noted that a thorough examination of the cultural layer of the Kazakh winter hut yielded a significant number of Early Iron Age ceramic fragments. It is possible that a permanent settlement from the Early Iron Age will be

discovered beneath the Kazakh winter hut structures – a pattern repeatedly documented by the renowned Kazakh archaeologist A.Z. Beisenov (Beisenov, Loman 2019: 36–45; Beisenov 2019).

The dwellings of other Kazakh winter camps located along the valley line are spaced 100 meters apart. Another winter camp, larger in area, is located right in the middle of a birch grove, also adjacent to a small spring. The architectural features of the Kazakh winter camps in this area are characterized by the use of large granite slabs in their construction. Ruins and foundation remains are clearly visible on the surface, allowing their architectural layout to be clearly seen.

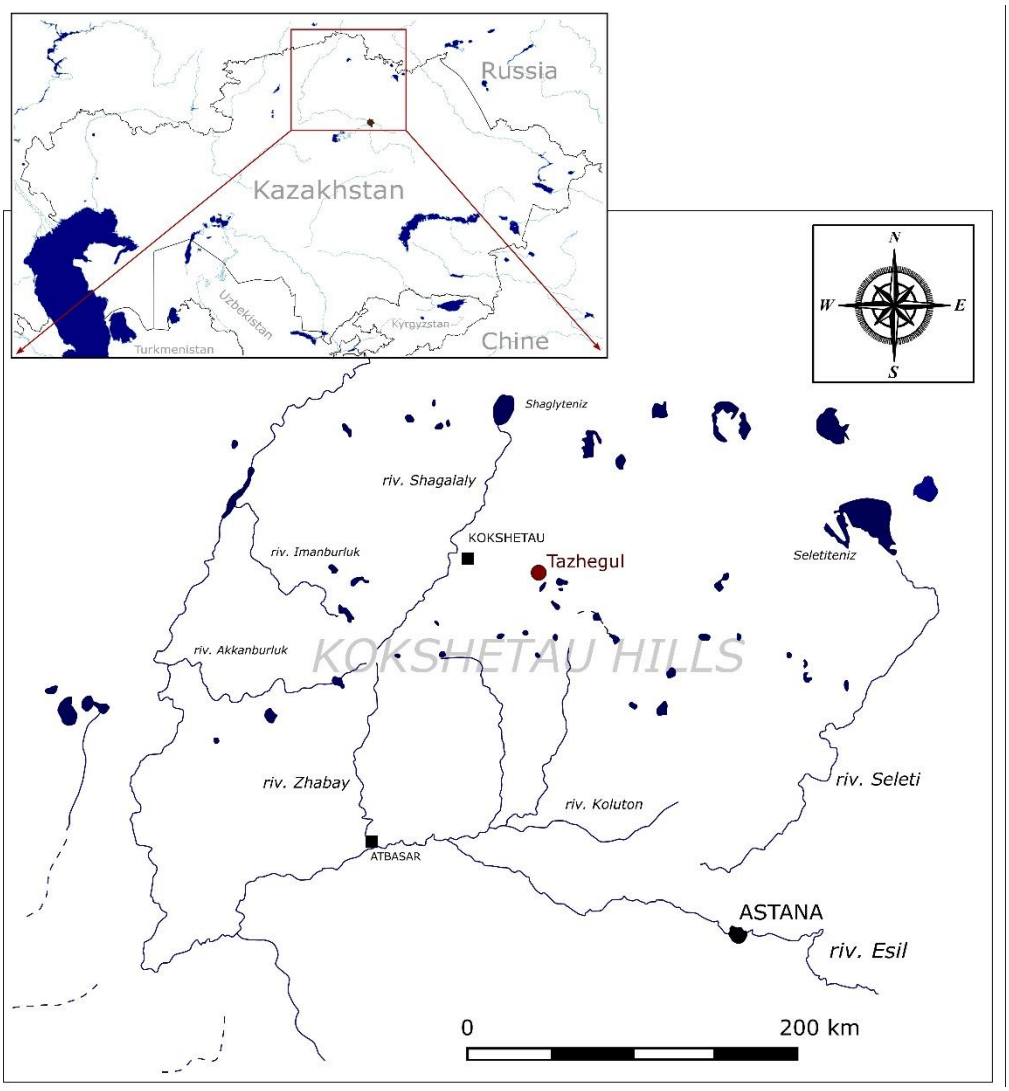


Fig. 1. Location of the monument

Methods and Materials

The monuments were studied using standard field archaeological excavation methods, which are the primary form of scientific study of archaeological sites and are necessary for comprehensive documentation and subsequent scientific analysis of the monuments. Stationary

archaeological excavations are preceded by a detailed survey and photographic documentation of the monument in the context of the surrounding area. A detailed visual and instrumental survey was then conducted, with the sites planned for excavation plotted on a satellite map using a Garmin Etrex 10 PS336 GPS data collector. Topographical and planigraphic surveys were then conducted. The sites were divided into sectors, with stratigraphic margins included. To ensure consistent elevation references throughout all excavations, an absolute elevation system was used, and benchmarks were selected from which all excavation sites were leveled. During the survey, the embankments were removed in stages, in 10-cm layers. The survey was carried out using hand tools.

During the work, the entire subsurface area was explored. Instrumental recording, photography, and drawing documentation were conducted at all stages. Site plans were drawn up and their stratigraphy described. The sites and the exploration process were filmed remotely using a DJI Mini 2 quadcopter. All recovered artifacts were processed in a laboratory, followed by a comparative historical analysis.

Literature Review

The history of archaeological exploration in the region is linked to the beginning of geological exploration in Northern Kazakhstan in the 18th and 19th centuries. Geological expeditions searched for minerals, primarily copper, lead, and gold. They collected information about mining sites from local populations. As a result, a large number of ancient mines, shafts, and workings were mapped. Direct examination of the workings and mines in the 19th and early 20th centuries revealed that they were associated with gold mining. Subsequently, geologists who inspected the workings, based on artifacts discovered near the workings and mines and comparing them with excavation materials, concluded that the earliest of these belonged to the Andronovo archaeological culture of the Bronze Age.

Based on the results of geological surveys in the vicinity of Burabay, four groups of placer mines were identified, which began to be developed in the Bronze Age: 1) to the north of Lake Maloye Chebachye; 2) to the north of Lake Bolshoe Chebachye; 3) in the basin of Lake Balpash with the Sarybulak valley; 4) around Lakes Kopalykol and Karasor. Of these, the known workings are Kokuzek I, II, Bulatshalkar, Zhuantobe, Zhanasu I, II, III, IV, Karasor I, II (Margulan 2001: 13-14, 39).

The first professional excavations in Burabay are associated with B.N. Zhdanov and P.I. Preobrazhensky, who conducted archaeological excavations at the Borovoe burial ground in 1927. The site was located on the northeastern outskirts of the village of the same name, on the low bank of a lake. The burial ground consisted of 122 stone enclosures of various shapes. Judging by the ceramic vessels and tools discovered in the burial structures, the burial ground dated to the Late Bronze Age. In 1954, exploration of the Borovoe burial ground resumed.

An archaeological expedition from the Institute of History, Archaeology, and Ethnography of the Academy of Sciences of the Kazakh SSR, led by K.A. Akishev and A. Orazbaev, explored 32 enclosures, 30 of which belonged to the Fyodorovo archaeological culture. In addition, enclosures belonging to the Alakul and Sargary-Alekseyevka archaeological cultures were investigated at the burial ground. A settlement belonging to the Sargary-Alekseyevka culture (second half of the 2nd millennium BC) was discovered near the burial ground, and the Buyrek-

kol burial ground, belonging to the Fyodorovo archaeological culture, was discovered in the vicinity of the Burabay mountain forest massif (Orazbaev 1958: 216–294).

In the mid-20th century, S.S. Chernikov worked in the region. He focused on the major ancient nonferrous metal mining center of Mynshukur-Stepnyak, located 50 km southeast of the Burabay placers. The main center with workings in Mynshukur covers over 20 square kilometers. In the southwest, the workings extend to Lake Saule, and in the northwest, to Lake Zhukey. Large-scale ancient workings were located within the town of Stepnyak. They resembled enormous open-pit mines developed along the strike of ore veins. Thick waste heaps up to several meters high jutted out from the quarries' sides. The largest ancient quarry on the international vein was 150 meters long, 20 meters wide, with an open-pit depth of 6 meters, and an underground depth of 18 meters or more. The ancient underground workings on the international vein consisted of stopes 30 meters vertically deep and were completely exhausted during the Bronze Age. Numerous mining and ore-crushing tools, hundreds of stone mortars, pestles, and fragments of hand-molded ceramics have been found near ore crushing, beneficiation, and washing sites. Traces of ancient miner and metallurgist camps have been discovered within the boundaries of Stepnyak's main production center in the Kystaukaragay tract, near Lake Ashchikol, near the Elizavetinsky mine near Lake Chelkar, and in the valley of the Kozhagulbulak Spring, 1.5 km southwest of the main international vein. Gold panning sites have been identified 4 km east of Stepnyak. In addition to gold mining, copper mining operations have been discovered in the Stepnyak area. Oxidized ores such as malachite and azurite were mined. The majority of the mine workings, based on the accompanying finds of metal tools, are attributed to the Sargara culture, while a smaller portion belongs to the Fyodorovo culture (Margulan 2001: 41–42; Chernikov 1948: 13–32).

For several decades thereafter, archaeologists' attention focused on other regions of Kazakhstan. Only in 1981, following reconnaissance by the North Kazakhstan Archaeological Expedition between Stepnyak and Burabay in the area of Lake Zhukei, were four groups of burials discovered, which were identified as separate cemeteries. Two of these, Zhukei I and Zhukei II, were studied. Based on ceramic material, the Zhukei II cemetery was dated to the final stage of the Bronze Age and attributed to the Sargara culture. One complex in the Zhukei I cemetery was associated with the Begazy-Dandybai culture of Central Kazakhstan (Martynyuk, Zdanovich 1985: 142–152).

This was followed by a two-decade break, which ended with a series of archaeological explorations. In the early 2000s, 11 new Eneolithic and Bronze Age sites were discovered: the Blue Bay Eneolithic site; the Akylbay burial ground; the Zhanatalap enclosure; the Zhanatalap I burial ground; the Zhanatalap II burial ground; the Kotyrkol II burial ground; the Zhukey III burial ground; the Zhukey VI burial ground; the Kyzyluyim I burial ground; the Kyzyluyim II burial ground; the Shat VII enclosure. In 2019, the authors of this article monitored archaeological sites in Burabay and its surrounding area. Two burial grounds were discovered near the village of Ablaykhan: Kyzyltobe, Tazhegul, and the settlement of Zhumakay. The Kyzyltobe burial ground and the settlement of Zhumakay were dated to the Bronze Age, while the Tazhegul burial ground dates from the Bronze Age to the Middle Ages. West of the village of Madaniyat, a Bronze Age settlement, Akkayin, was discovered, while east of Lake Saule, a Bronze Age settlement and an ancient mining site were detected. Traces of metallurgy were located near the Urumkay forestry enterprise. From 2019 to 2022, archaeological research was conducted

on five granite enclosures of the Kyzyl-Tobe burial ground (Nos. 9, 13, 27, 29, and 50). One of the goals was to identify Bronze Age architectural traditions. Three enclosures – Nos. 9, 13, 27, and 29 –contained burials according to the Fyodorovo burial rite. Enclosure No. 50 was found to be a ritual and memorial site, without burials. From 2022 to 2024, research was conducted on the Taskamal megalithic complex in the Burabay mountain forest. The monument had been discovered by chance earlier, but its interpretation as a significant ancient cultural site occurred during this period. The research determined that the Taskamal complex was built on a natural ridge covered in pine forest, located between two marshy areas. The plan is a zigzag with nearly right angles, consisting of three main linear sections. The two outer lines of the zigzag are artificial stone structures made of granite blocks and slabs, oriented northwest-southeast. On the north side, the northwestern wall is adjoined by an artificially constructed terrace with a central rectangular platform and a long ramp. The wall is a megalithic masonry structure consisting of a single row of dressed granite boulders and blocks. The total length of the wall is 304 meters. It extends along a northwest-southeast axis. It occupies the crest of a natural ridge, which extends along the same axis and slopes from southeast to northwest. All of the wall's masonry is dry laid, with large boulders, blocks, and slabs tightly fitted together.

At 130 meters from the observation deck, where the ramp transitions to the open terrace, a relief image of a bull or cow was found on the outer side of the wall. Based on a combination of features, the monument was dated to the 3rd or late 3rd–2nd millennia BC (Yarygin et al., 2024). The upper date quite naturally aligns the site with other monuments of the Fyodorovo, Alakul, or Sargara-Alekseyevka cultures. Currently, based on all archaeological research in the region, approximately 46 Late Bronze Age monuments – cemeteries, settlements, mines, and workings – have been identified in Burabay and its environs, dating to the Bronze Age. However, a possible reduction in the date to the 3rd millennium BC raised questions regarding the builders' cultural interpretation.

Results

Preliminary results of a study of an Early Bronze Age enclosure, the materials from which shed light on some issues concerning the origins of archaeological culture. The site is located 50 meters north of the Kara Bulaq Spring. The stone enclosure was identified by inconspicuous flat stones that were closely packed together and carefully laid to form a fence. Before excavations, only the western part was clearly visible, while the opposite side was heavily turfed. Nearby were the ruins of another structure associated with Kazakh wintering sites. To fully enclose the stone fence, a 16 × 14 m excavation pit was created; excavations were conducted in sectors, each measuring 4 × 4 m. After removing the first layer and performing horizontal clearing at the -0.20 m level, the entire structure was revealed. It was constructed of flat stones laid flat and tightly fitted together. The architectural features and construction techniques used in the fence's construction included the use of medium-sized, oblong-shaped natural stones, averaging 0.60 m in length. The stones were laid flat with their long sides facing each other, arranged radially; when the circle was complete, the fence formed a perfect circle. In places, a second row of masonry, constructed of flat slabs, was visible. The fence's diameter along the outer walls was 10.4 m. At the -0.30 m level, a second fence line was identified. It was also laid out of stones, but had a rectangular plan, with its long sides oriented along the west–east axis and measured 4.8

× 2.8 m. In the central area of the inner, second rectangular fence, a tombstone structure made of broken stone was cleared. The rectangular tombstone structure measured 2.2 × 1.2 m. Its long sides were oriented along the west–east axis, and it was constructed of broken stone; the interior was entirely paved with stones (Fig. 2).

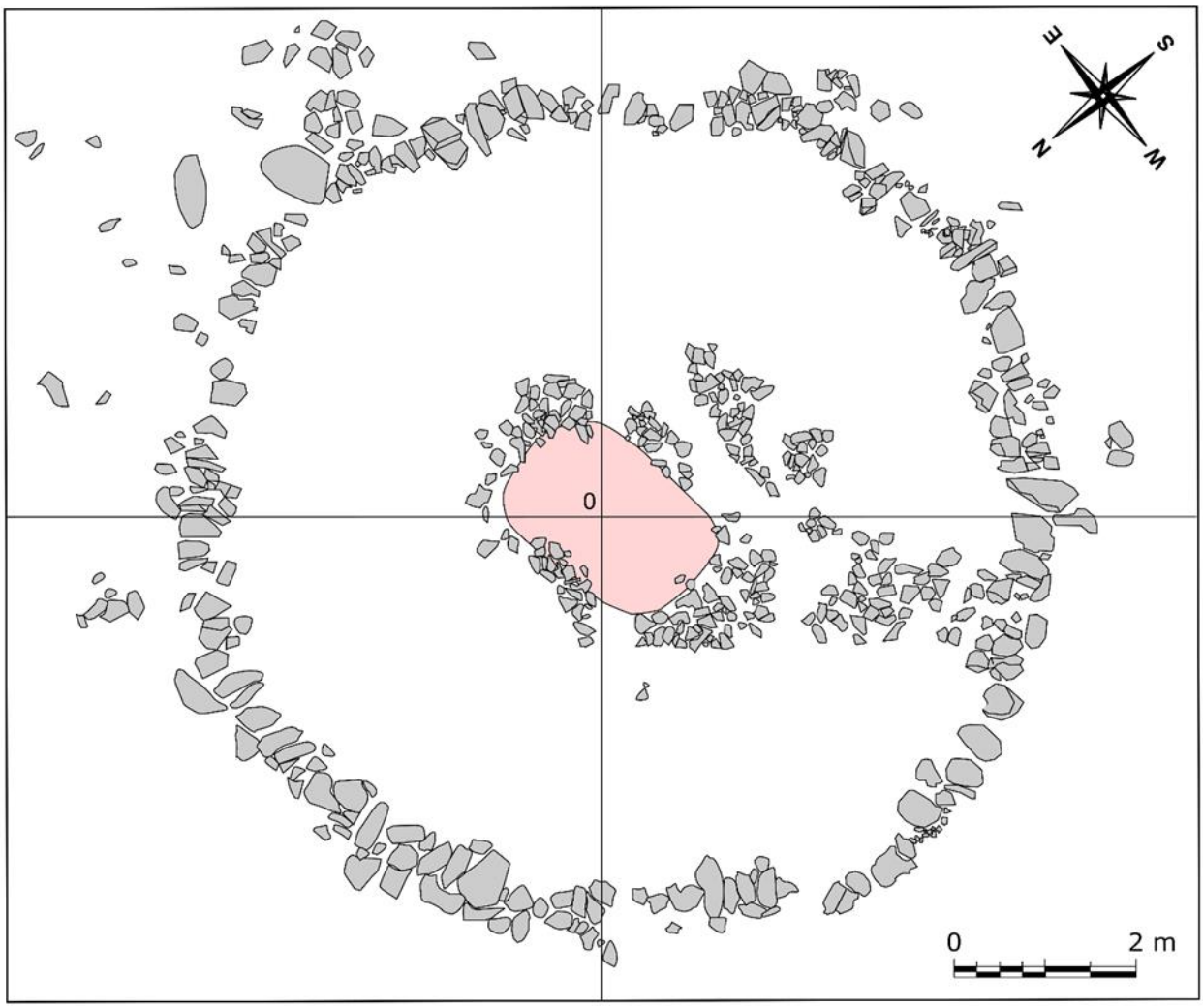


Fig. 2. Tazhegul burial ground. Enclosure No.1

After the grave structure was recorded, it was dismantled. A grave spot measuring 2.8 × 1.55 m was discovered beneath it. Within the grave spot, a rectangular burial chamber with rounded corners, measuring 2 × 1.1 m, was discovered, with its long axis-oriented northwest – southeast. During excavation of the gravel pit, a square stone was found at the -0.40 m level in the northwest corner, along with scattered human bones, bones of a sacrificial animal, and fragments of ceramic vessel rims. At the -1.2 m level, in the bottom part of the gravel pit, individual bones of a human skeleton were found. Judging by the undisturbed limb bones, the deceased was buried in a crouched position on his right side, with his head facing west. Apart from human bones, nothing else was found in the burial; it was most likely looted in ancient

times. In the southeastern part, outside the enclosure, a small extension was excavated. It was made of rectangular stones, oriented with its long axis along the west–east line, and measured 2.6 × 1.4 m.

Historical and cultural affiliation. According to preliminary data and several consistent criteria, the site displays characteristics of the late Yamnaya archaeological culture. The topography and arrangement of the burial structures correspond to a linear principle. The following features are characteristic of this culture: a separate burial structure in the form of a stone enclosure was constructed for each deceased individual; an individual burial chamber was in the center of the enclosure. The enclosure was constructed using a wall-laying technique in which the masonry is laid in horizontal rows, with the stones laid flat. At a later stage, multiple lines of enclosures were constructed; in this case, the studied site had two stone enclosures: one outer, circular, and the other, inner, square. Funerary practices included inhumation in a simple earthen pit. Judging by the position of the human skeleton, the deceased was most likely laid on his back with his knees raised. A fragment of the rim of a jar-shaped vessel with a high neck and a smooth profile was discovered. Judging by the rim fragment, the ceramic vessel had thick walls, and the dough was uneven at the fracture, with coarse-grained impurities clearly visible. The rim's surface is covered with a single wide band of fluting, a precipitous molded ridge, and a design consisting of prominent ribbed lines slanted to the right. As evidenced by the enclosure materials of the Tazhygul burial ground, this monument was left by tribes who performed a post-funeral rite involving the sacrifice of certain animals, with their bones buried outside the outer enclosure.

Fence No.2 (an extension to the main stone fence). The extension was discovered accidentally during the exploration of the cultural layer and the structure of a Kazakh wintering hut. Beneath a 0.70-meter-thick cultural layer, a stone embankment was discovered. The enclosure is constructed of stone boulders arranged in a single row. The boulders are carefully matched to each other and arranged in dense rows to form the lines of a rounded enclosure. In terms of its construction technique, the large enclosure is identical to Mound No.1 (a stone enclosure) at the Tazhygul burial ground. The stone embankment of the extension is round, 2 meters in diameter, and 0.4 meters high. The foundation of the extension is composed of large stones, and the central portion is filled with medium and small jagged stones. The architectural feature of this embankment is that the outer line of the fence is made of stones installed vertically and arranged radially, forming a circle along the outer border of the embankment. After clearing the interior of the stone embankment, only the outer enclosure of the extension was left. Horizontal clearing was performed in the central section, revealing a burial spot in the northern segment of the enclosure at a depth of 1.10 m below the present-day ground surface. The rectangular gravel pit, measuring 2 × 0.90 m, is oriented west to east with its long axis. The pit is filled with a humus layer of soil. At a depth of 0.6 m below the ancient ground surface, the poorly preserved skull and bones of a child, five to six years old, were discovered. Based on the surviving bones, it can be assumed that the skeleton was flexed on its right side, with the head facing west (Fig. 3). A rib and teeth of the buried child were removed for radiocarbon dating.

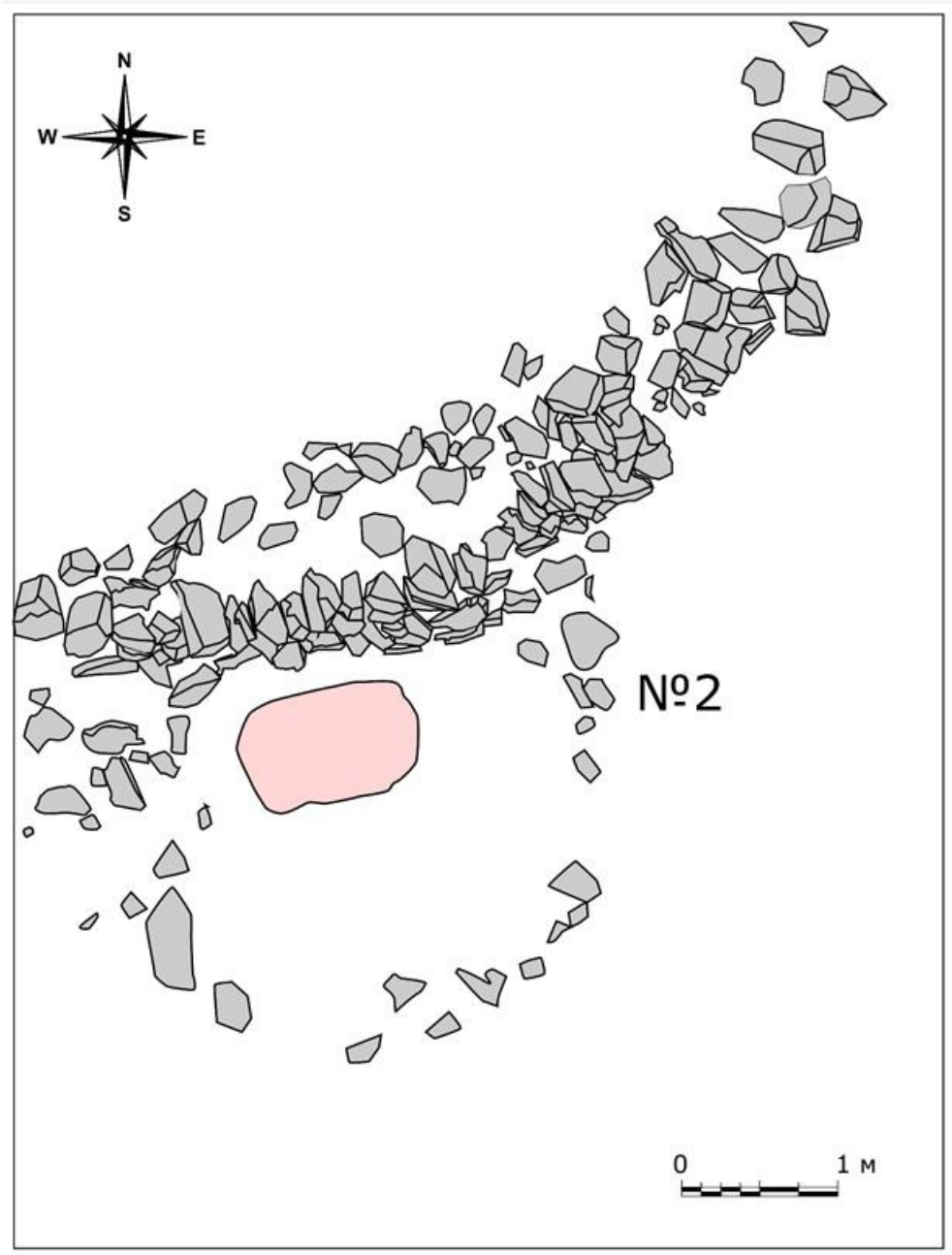


Fig. 3. Tazhegul burial ground. Annex No.2 to the main enclosure, with a child's burial

Discussions

The earliest site with a radiocarbon date is the settlement of Belkaragay I, located in northwestern Kazakhstan (Kostanay Region). The site is located in the Belkaragay tract, on the edge of a forest. The Belkaragay tract contains a sand quarry, in the central part of which a large amount of excavated material was discovered on a flat surface. Beyond the sand quarry, 60 meters to the northeast, on the southern slope of a terrace, several dwelling pits arranged in a row were identified. The dwelling pits are clearly visible on the surface; due to their depth in the

dense forest, they are constructed according to a linear layout using honeycomb structures. The streets run along a northwest-southeast axis, and a modern dirt road divides the settlement in the central part. The dwelling pits are circular, measuring 3 × 4 meters; larger ones are also found, and paired dwelling pits are common. The ceramic assemblage of the settlement is represented by semi-ovoid vessels with sharp bottoms and straight or inwardly curved upper edges with ridges on the inner surface. The ornamentation was applied using the techniques of incision, retreating prick, and "walking" comb. There are fragments of ceramics whose production technology is based on textiles; also, some fragments show traces of knocking on the vessel walls, which were made with a spatula wrapped in string. The ornamentation on Belaragay ceramics is applied with impressions of rope and serrated stamps, and pit indentations are also common. The lithic inventory is represented primarily by a plate assemblage with a traditional assortment: retouched blades, corner burins, notched blades, points, occasional geometric microliths, end-scrapers on blades, scrapers on flakes, and double-sided worked dart and arrowheads.

In 2023, two radiocarbon dates were obtained in two laboratories: 1) in the Vilnius Radiocarbon laboratory: the calibration date for sigma 1 is the end of the 32nd – end of the 31st century BC, for sigma 2 – the end of the 32nd – end of the 30th century BC; 2) in the 14C HRONO laboratory of the Centre for Climate, Environment and Chronology at Queen's University Belfast: the calibration date for sigma 1 is the end of the 34th – end of the 33rd century BC, for sigma 2 – the end of the 34th – end of the 33rd century BC. Overall, it can be concluded that the settlement was inhabited from the beginning of the 4th – 3rd millennium BC.

In the Turgai Trough, the settlement of Semiozernoe 2, whose materials are interpreted as Sintashta-Petrovsk, can be considered an early site. The typology and classification of the ceramic collection from Semiozernoe 2 have been compared with materials from the well-known Arkaim site, suggesting a contemporaneous settlement and similar cultural traditions (Evdokimov et al. 2016: 30–40).

To date, the results of new radiocarbon dates obtained from materials at the Kamysty settlement are known. Based on the combined results of analyses of all established dates, the site can be dated to the 17th century BC. Calibration radiocarbon dates obtained using the AMS method from samples of the Khalvay 3 and 5 burial complexes are available, covering the historical period of the 21st–19th centuries BC (Panyushkina 2015). The Bestamak burial ground, radiocarbon dates for which were obtained using the OxCal 4.2.4 program using the Intal_13 calibration curve and taking into account the total interval of all calibration dates, are dated to the late 21st–15th centuries BC (Logvin 2019: 138). The burial inventory of the Bestamak burial ground has analogues in the Sintashta burial ground, and the total interval of the Sintashta calibrated dates covers the period 2010–1770 BC for sigma 1 and 2200–1650 BC for sigma 2. The dates were obtained from samples from sites located in the Urals and the south of Western Siberia (Molodin et al. 2014: 140).

To elucidate the historical processes that took place during the Early Bronze Age, sites studied in northeastern and northern Kazakhstan are compared with archaeological sites in Western Kazakhstan. Early Bronze Age sites in Western Kazakhstan are represented by Yamnaya culture burials dating back to the 3rd millennium BC (Kushaev 1993). Yamnaya archaeological sites were investigated on the left bank of the Ilek River, in the Shoktybay III burial mound (Chingirlau district, West Kazakhstan region). A burial was discovered with a burial rite characteristic of the

Yamnaya culture, and the use of ochre was also noted (Drozhevsky 2002: 45–52). A burial rite using ochre was also recorded at another burial ground, Mamai I, located 7 km south of the village of Kokterek (Khromtau district, Aktobe region). A human burial was excavated in burial mound no. 3; the lower limbs, the area beneath them, and the bottom of the burial chamber were covered with ochre. The grave goods included a pot-shaped vessel, a bronze dagger, and a white marble mace pommel (Kushaev 1993).

Early Bronze Age burials have been investigated at the Kresty cemetery. Two burial mounds here contain burials of the Yamnaya culture (Mound No.3, Burial 4; Mound No. 10, Burial 2). In both cases, the human skeletons show traces of ochre filling; the buried individuals are accompanied by richly ornamented egg-shaped and jar-shaped pots, bronze ornaments, and stone tools. At the Ilekshar cemetery, located 2 km east of the village of Ulguli (Chingirlau district, West Kazakhstan region), metal and bone objects were found in the materials from Mound No.3, which clearly demonstrate the age, sex, and social structure of the Yamnaya culture population (Gutsalov 2006). A series of radiocarbon dates was established based on materials from the Kumsai I burial ground, which contains 168 enclosures. The radiocarbon date, obtained from human bones and wood remains from the ceiling, was 4290 ± 40 years ago (Bisembayev et al. 2015: 368). Collective and individual burials of the Yamnaya culture were studied at this site. The combined results of all analyses allow us to date this archaeological site to the 3rd millennium BC (Bisembayev et al. 2016: 103–109).

Overall, the Early Bronze Age sites studied in Western Kazakhstan span the chronological range from the 3rd millennium BC to the early 2nd millennium BC (Kushaev 1993). The events that occurred within a single historical space – from the western to the eastern regions of Kazakhstan during the 3rd millennium BC – are well illustrated by anthropological materials from Western Kazakhstan sites. Analysis of craniological collections from the Shoktybay III, Kumsai, and Zhirenkop burial grounds revealed that the skulls and individual human bones, possessing distinct morphological characteristics, belonged to representatives of the Yamnaya and Afanasevo cultures (Khokhlov, Kitov 2012: 70).

The identified and studied Early Bronze Age sites in Kazakhstan are interconnected, on the one hand, with Eastern European and, on the other, with Southern Siberian complexes. According to calibrated radiocarbon dating, in the first half of the 3rd millennium BC, the territories of eastern Kazakhstan, Altai, and southern Siberia were inhabited by tribes of the Afanasevo archaeological culture (Görsdorf et al. 1998). From the west, tribes of the Yamnaya archaeological culture – representatives of the Circumpontic metallurgical province – advanced and migrated.

Conclusion

Radiocarbon dating was conducted in the 14C HRONO laboratory of the Centre for Climate, Environment and Chronology at Queen's University Belfast: the calibration date for sigma 1 is the late 32nd to late 31st centuries BC, and for sigma 2, the late 32nd to late 31st centuries BC. Overall, the materials from the Tazhygul burial ground can be dated to the second half of the 3rd millennium BC. According to preliminary data, signs of the ancient Yamnaya culture have been detected in this area for the first time. In light of new archaeological discoveries in northern Kazakhstan, the migration routes and eastward expansion of the Yamnaya culture tribes can be

traced. This is evidenced by sites such as the Belkaragay settlement in the Kostanay region, the Tazhygul burial ground in the Akmola region, and the Shiderti settlement and burial ground in the Pavlodar region. The materials and burial rites find parallels in the Yamnaya culture. This is also consistent with the absolute chronology obtained through radiocarbon dating, which covers the second half and the end of the 3rd millennium BC. Analysis of metal objects found in the cultural layers of Afanasievo archaeological sites revealed that the metal contained arsenic, most likely obtained through alloying during ore smelting. The presence of rare silver jewelry in the Afanasievo complexes of the Minusinsk Basin is also noteworthy (Grushin et al. 2006: 23). All these data point to the emergence and development of mining and metallurgy in this area. As noted previously, new evidence indicates the penetration of populations associated with the ancient Yamnaya archaeological culture and possessing mining and metallurgy skills into the northern regions of Kazakhstan from the west. In other words, these new tribes arrived from the Circumpontic metallurgical province. Sites belonging to the Afanasievo archaeological culture have been identified in the northeast. The comparability of the parameters of Afanasievo metallurgy with those of the Yamnaya culture allows us to unequivocally assign the Afanasievo culture to the Early Bronze Age. Accordingly, the sites discovered in northern Kazakhstan, which have parallels with both archaeological cultures, should be considered within the context of the general historical processes occurring in the region.

Archaeological materials and radiocarbon dating results currently confirm that the Early Bronze Age in Northern Kazakhstan spanned the early second half of the 3rd millennium BC to the turn of the 3rd and 2nd millennia BC. To avoid terminological confusion regarding concepts such as post-Botai, pre-Andronovo, Vishnevsky, Shiderty, and so on, we propose classifying all sites dating from the second half of the 3rd millennium BC to the 20th century BC as Early Bronze Age sites. As mentioned above, the Early Metal Age in Northern Kazakhstan begins in the second half of the 3rd millennium BC, with the development of copper: copper alloying with arsenic occurred, and it was during this period that the plate technique of metalworking emerged.

The next important issue is the chronology of Late Bronze Age archaeological sites. Based on the analysis of new materials, a series of radiocarbon dates has been obtained, with the lower dating reaching the 18th century BC. The question of determining the upper dating remains open, and in this regard, the materials from the Tazhygul burial ground are relevant, as they may shed light on the understanding and solution of this problem.

Thus, materials from sites in the Burabay district of Northern Kazakhstan are of key importance in the study of Early Bronze and Late Bronze Age sites. Continuing comprehensive research using natural science methods is a priority. At this level of research, typology and classification of burial structures and artifacts – material culture objects – are being conducted; radiocarbon dating plays an important role. These practical scientific procedures make it possible to expand the evidence of the material and spiritual achievements of prehistoric society and determine the content, level of social development, and internal chronology of archaeological cultures of the Early and Late Bronze Age.

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K. Auezov – a specialist in the study of Bronze Age mining monuments, analyzed hypotheses regarding the origin and spread of the Nurin-Fedorovo tribes. S.A. Yarygin made a significant contribution to writing in the historical context and edited the final part of the article. S.K. Sakenov conducted a critical analysis of the available data on the research topic during the preparation of the manuscript. Historiographical analysis identified important scientific issues and actively developed the key principles and concepts. Kulmaganbetova G.K. – preparation of the text of the article, search for analogies of funerary and ceramic complexes, analysis of key sections, design of the material in accordance with the requirements of the editorial committee.

Авторлар үлесі

Қ.Әуезов қола дәуірінің тау-кен ескерткіштерін зерттеу жөніндегі маман нұра-федорово археологиялық шығу тегі мен таралуына қатысты болжамдарды талқылап соған қатысты мәліметтерді жинады. С.А.Ярыгиннің тарихи контекст жазуға және мақаланың қорытынды бөлігін жазуға қосқан үлесі зор. С.Қ. Сәкенов қолжазбаны дайындау барысында зерттеу тақырыбы бойынша қолда бар деректерге сыни талдау жүргізді. Тарихнамалық талдау маңызды ғылыми мәселелерді анықтап, негізгі қағидалар мен тұжырымдамаларды белсенді түрде дамытты. Г.К. Күлмағанбетова – мақала мәтінін дайындау, жерлеу және керамикалық кешендердің ұқсастығын іздеу, негізгі бөлімдерді талдау, редакциялық комитеттің талаптарына сәйкес материалды ресімдеу.

Вклад авторов

К. Ауезов – специалист по изучению памятников горного дела бронзового века, в процессе работы исследователь осуществил анализ гипотез относительно проблем происхождения и распространения нуринско-федоровских племен. С.А. Ярыгин внёс значительный вклад в написание исторического контекста и редактирование заключительной части статьи. С.К. Сакенов в ходе подготовки рукописи провёл критический анализ имеющихся данных по теме исследования. В ходе историографического анализа были выявлены важные научные проблемы, активно разрабатывались основные положения и концепции. Кульмаганбетова Г.К. – подготовка текста статьи, поиск аналогии погребального и керамического комплексов, анализ ключевых разделов, оформление материала в соответствии с требованиями редакционного комитета.

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