

Saule Zh. Rakhimzhanova¹, Yelena K. Tusheva², Renaud Gosselin³, Viktor K. Merts⁴

¹*Margulan Institute of Archaeology, Almaty, Kazakhstan;*

²*Institute of Archaeological Research, Margulan University, Pavlodar, Kazakhstan;*

³*The National Center for Scientific Research (CNRS), Paris, France;*

⁴*The Center for Archaeological Research, Toraigyrov University, Pavlodar, Kazakhstan*

(*Corresponding author's e-mail: rakhimzhanova.saule@gmail.com)

Lithic Complex of the Middle Neolithic from Shatyrbulak Site (Kazakhstan)

This article presents the first publication of Neolithic lithics from excavations at Shatyrbulak Stone Age site in northeastern Kazakhstan, obtained during fieldwork in 2024. The site is located in the Maysky district of the Pavlodar region, 2 km northwest of the village of Zhana Akshiman, on the left bank of the eponymous spring, which flows into a freshwater lake. The aim of this study is a morpho-technological and typological analysis of the lithic industry at this multi-layered site, dating back to the Middle Neolithic. Specifically, the analysis focused on the shape and size of the artifacts, their location, regularity, and type of retouching, as well as fragmentation patterns. A total of 285 stone artifacts from layer 2 were studied. Overall, four cultural layers, ranging from the Mesolithic to the late Neolithic, were identified at the Shatyrbulak site. However, due to the excavation being conducted on the site's periphery, and the distribution of finds within the cultural layers being complicated by the sloping nature of the ancient surface and deep desiccation cracks along which some artifacts were displaced, the raw material characteristic is dominant. Layer 2, presented in the article, is the most vivid and complete of the available ones, also containing hearths and postholes. Other assemblages at the Shatyrbulak site yield significantly fewer artifacts, and their interpretation requires further research. Thus, it was established that the collection contains almost equal proportions of medium and small flakes and their fragments with retouching and tools (scrapers) attached to them, with a slightly smaller proportion of blades and blade-based artifacts. The blades were knapped using a pressure technique, while the flakes were also primarily obtained using a soft hammer and pressure technique (debitage). A high level of fragmentation is observed among both blade and flake blanks. We also concluded that the absence of primary knapping products indicates that the raw material was imported, in the form of core preforms. The composition of the collection finds parallels in materials from the stratified site of Shiderty 3 in the Pavlodar Region, the Yavlenka and Telman archaeological microregions of the Ishim River region, and the Solenoe Ozero 2 and Ekidin 24 sites in the Torgai Trough. A typological analysis of the collection revealed similarities with layers dating to the Middle Neolithic (6th-5th millennia BC). We consider that artifacts made on gray and pink flint are similar to sites from the Atbasar area. Thus, the materials from the Shatyrbulak site expand the territory of the Atbasar population to North-Eastern Saryarka.

Keywords: archeology, site, Stone Age, Neolithic, artifacts, typological analysis, technological analysis, classification, Atbasar culture, Northeastern Kazakhstan.

Сауле Ж. Рахимжанова¹, Елена К. Тушева², Рено Госселин³, Виктор К. Мерц⁴

¹Ә. Марғұлан атындағы Археология институты, Алматы, Қазақстан;

²Ә. Марғұлан атындағы Павлодар педагогикалық университеті жанындағы
Археологиялық зерттеулер институты, Павлодар, Қазақстан;

³Ұлттық ғылыми зерттеулер орталығының (CNRS) зерттеуші-инженері, Париж, Франция;

⁴Археологиялық зерттеулер орталығының директоры, Торайғыров университеті, Павлодар, Қазақстан

Шатырбұлақ тұрағының орта неолит кезеңінің шақпақтас кешені (Қазақстан)

Мақалада Солтүстік-Шығыс Қазақстандағы Шатырбұлақ тас дәуірі тұрағынан 2024 ж. далалық жұмыстар барысында қазбадан алынған неолиттік кешен материалы ғылыми айналымға енгізілгені қарастырылған. Тұрақ Павлодар облысы Май ауданының аумағында, Жаңа Ақшиман ауылынан солтүстік-батысқа қарай 2 км жерде, тұщы көлге құятын аттас бұлақтың сол жағалауында орналасқан. Зерттеудің мақсаты — неолиттің орта кезеңіне жататын бұл көп қабатты тұрақтың тас индустриясын морфологиялық-технологиялық және типологиялық талдау. Бұйымның пішіні мен өлшемі, орналасуы, жүйелілігі мен түрлері, сонымен қатар бөлшектену түрлері өзгеріске ұшыраған. 2-қабаттан жалпы 285 тас артефактісі зерттелді. Жалпы алғанда, Шатырбұлақ тұрағында мезолит дәуірінен кейінгі неолит кезеңіне дейін төрт мәдени топ тіркелді, алайда қазба жұмыстары тұрақтың шеткі аймағында жүргізілгендіктен, сонымен бірге көне жер бетінің ылди болуы мен кебу нәтижесінде пайда болған терең жарықтар арқылы артефактілердің бір бөлігінің араласуына байланысты мәдени топтардағы олжалардың таралуын айқындау күрделене түсті. Осыған байланысты шикізаттық белгі негізгі жіктеу критерийі ретінде қабылданды. Мақалада берілген 2-қабат басқаларының қасында ең көрнекті және толық. Онда ошақтар мен бағана шұңқырлары тіркелді. Шатырбұлақ тұрағының басқа кешендерінде артефактілердің саны әлдеқайда аз, олардың интерпретациясы үшін зерттеу жұмыстарын жалғастыру қажет. Осылайша, жинақта орташа мен ұсақ жаңқа, өңделген жаңқалар және олардың бөліктері мен жаңқалардан жасалған құралдар (қырғыштар) үлесі тең десе болады, ал тілікшелер мен олардан жасалған құралдар саны азырақ. Тілікшелер сығу техникасымен жарықшактанған, жаңқалар да негізінен жұмсақ соккыш арқылы және сығу бойынша алынған (дебитаж). Тілікше және жаңқа дайындамалары арасында олардың бөлшектенуі жоғары. Бастапқы жарықшактау өнімдерінің табылмауы шикізатты сырттан нуклеус дайындамасы ретінде алып келді деген қорытындыға әкелді. Кешен құрамының Павлодар облысындағы 3-Шідерті тұрағы, Есіл маңының Явленка және Тельман археологиялық шағын ауданы, сондай-ақ Торғай ойысындағы 2-Соленое Озеро және 24-Екідін тұрақтарының материалдарымен ұқсастықтары бар. Және кешенді типологиялық талдау барысында орта неолит кезеңіне (б.з.д. VI–V мыңжылдықтар) жататын кешендермен ұқсастықтар анықталды. Біздің ойымызша, сұр және қызғылт шақпақтаста жасалған артефактілер Атбасар мәдени ареалы ескерткіштерінің тас индустриясымен типологиялық жағынан жақын келеді. Осылайша Шатырбұлақ тұрағының материалы Атбасар қауымының қоныстану территориясын Солтүстік-Шығыс Сарыарқаға дейін кеңейтеді.

Кілт сөздер: археология, тұрақ, тас ғасыры, неолит, артефактілер, типологиялық талдау, технологиялық талдау, біліктік, Атбасар мәдениеті, Солтүстік-Шығыс Қазақстан.

Сауле Ж. Рахимжанова¹, Елена К. Тушева², Рено Госселин³, Виктор К. Мерц⁴

¹Институт археологии имени А. Маргулана, Алматы, Казахстан

²Институт археологических исследований при Павлодарском педагогическом университете имени А. Маргулана,
Павлодар, Казахстан

³Национальный центр научных исследований (CNRS), Париж, Франция

⁴Центр археологических исследований, Торайғыров Университет, Павлодар, Казахстан

Кремневый комплекс среднего неолита со стоянки Шатырбулак (Казахстан)

В статье впервые публикуются материалы неолитической коллекции с раскопок стоянки каменного века Шатырбулак из Северо-Восточного Казахстана, полученные в ходе полевых работ в 2024 г. Стоянка расположена в Майском районе Павлодарской области, в 2 км к северо-западу от села Жана Ақшиман, на левом берегу одноименного родника, впадающего в пресное озеро. Цель работы — морфо-технологический и типологический анализ каменной индустрии данной многослойной стоянки, относящейся к среднему периоду эпохи неолита. Так, анализу подвергались форма и размеры изделий, локализация, регулярность и разновидность ретуши, а также виды фрагментации. Всего было изучено 285 каменных артефактов из слоя 2. В целом, на стоянке Шатырбулак зафиксировано четыре культурных слоя от эпохи мезолита до позднего неолита, но в связи с тем, что раскоп был заложен на периферии стоянки, а распространение находок в культурных слоях осложнено склоновым характером древней поверхности и глубокими трещинами усыхания, по которым происходило смешение части артефактов, сырьевой признак является доминирующим. Представленный в статье

слой 2 является наиболее ярким и полным из имеющихся, в нем зафиксированы также очаги и столбовые ямы. Другие комплексы стоянки Шатырбулак насчитывают значительно меньшее количество находок, и для их интерпретации требуется продолжение исследовательских работ. Таким образом, было зафиксировано, что в коллекции имеются в почти равных долях средние и мелкие отщепы и их фрагменты с ретушью и орудия на них (скребки), при этом чуть меньшую долю составляют пластины и изделия на них. Пластины расщеплены отжимной техникой, отщепы также в основном получены посредством применения мягкого отбойника и отжима (дебитаж). Среди как пластинчатых, так и отщепных заготовок наблюдается высокий уровень их фрагментации. Также мы пришли к выводу, что отсутствие продуктов первичного расщепления указывает на то, что использовалось принесенное сырье в виде преформ нуклеусов. Состав коллекции находит аналогии в материалах стратифицированной стоянки Шидерты 3 в Павлодарской области, в Явленском и Тельманском археологических микрорайонах Приишимья, а также на стоянках Соленое Озеро 2 и Екидин 24 в Торгайском прогибе. В ходе типологического анализа коллекции выявлены аналогии со слоями, относящимися к эпохе среднего неолита (VI–V тыс. до н.э.). Так, по нашему мнению, артефакты, выполненные на серых и розовых кремнях, близки к кругу памятников атбасарского ареала. Таким образом, материалы стоянки Шатырбулак расширяют территорию распространения атбасарского населения на Северо-Восточную Сарыарку.

Ключевые слова: археология, стоянка, каменный век, неолит, артефакты, типологический анализ, технологический анализ, классификация, атбасарская культура, Северо-Восточный Казахстан.

Introduction

By now, the history of the study of Neolithic complexes in Kazakhstan spans several decades, with certain successes achieved by the turn of the 20th and 21st centuries. The first collections of the Neolithic period were obtained as a result of prospecting work and gatherings by local historians, collectors, and lovers of antiquities, during the 18th — first half of the 20th centuries. Among the names of the first researchers, it is worth mentioning I. Ya. Slovtsov, F.N. Usov, A.N. Sedelnikov, A. Beloslyudov, A.S. Sorokin, P.L. Dravert, F. Semenov, and G.A. Popov. The logical result of this process was the publication of a reference work accumulating all the data on the archaeology of Kazakhstan in cartographic and list form [1]. By the 1960s, the collection of archaeological data also included studies by geological parties and natural history expeditions of the 1930s, and after the establishment of the Academy of Sciences of the Kazakh SSR, materials on the Irtysh region prepared by E.I. Ageeva and A.G. Maksimova were also compiled. A little later, in the 1970s, L.A. Chala's studies of the Penki 1 and 2 sites were published [2], [3] and S.S. Chernikov [4] compiled a chronology of Stone Age sites for eastern Kazakhstan. All of the above-mentioned works laid the foundation for a primary understanding and perception of Holocene stone collections, compiled a primary chronology of sites, and determined further research directions.

The next stage of research was marked by the development of systematic regional expeditions, led by researchers such as V.F. Zaibert [5], [6], [7], V.N. Logvin [8], and V.K. Mertz. The long-term efforts of these scientists made it possible to first identify the Atbasar culture, and then the synchronous Makhandzhar culture [8]. By 1992, A. Yu. Chindin proposed in his candidate's thesis a general cultural-chronological scheme covering the Mesolithic-Eneolithic complexes of Central Kazakhstan in the established system of Neolithic antiquities [9].

In 2008, V.K. Merts, using materials from the multi-layered site of Shiderty 3 in his candidate's research, proposed a new fractional cultural-chronological scheme for the development of Holocene stone industries for Northeastern Kazakhstan [10], [11], which allowed for a different look at the relationship between the designated cultures and clarification of existing paradigms of the development of the Stone Age in the Irtysh region.

However, questions about chronological and cultural relationships and, consequently, the boundaries of the population distribution of the Atbasar and Makhandzhar complexes in the late Neolithic have become pressing. This undoubtedly requires the introduction of additional data obtained from the study of both multilayer and single-layer objects.

In this regard, the materials collected from the Shatyrbulak site are promising and complement the existing framework for the historical and cultural processes of the Neolithic in Northern Kazakhstan. V.K. Merts's long-term search for multilayered Stone Age objects in Northeastern Saryarka was successful in 2009, and a test pit was conducted at the site. In the pit, V.K. Merts identified four cultural horizons containing stone tools, ceramics, and animal bones dating from the Early Mesolithic (10th millennium BC) to the Late Neolithic (4th millennium BC) [12]. Of greatest interest to us in the context of the identified

problem are the complexes of the 2nd horizon on light-grey silicified rock close to the Atbasar-type industries, and this work is devoted to them.

Materials and Methods

Shatyrbulak site is located 2 km northwest of the district center, the village of Zhana Akshiman (Akshiman rural district, Maisky district, Pavlodar region) on the left bank of a spring of the same name, which flows into a small freshwater lake. The site is located on the southwestern shore of this lake and is 200 meters southwest of the farm and 100 meters northeast of the Shatyrbulak 2 burial ground (Fig.1). The site was discovered in 2009 during the identification of new archaeological sites in the Akshiman district by the Pavlodar archaeological expedition led by V.K. Merts. The site is located on a flat section of the bank, overgrown with tussocky steppe grass, and closer to the freshwater spring, where it turns into hummocky terrain. The site covers an area of approximately 1000 square meters.

During the 2024 field season, an archaeological team from the Margulan Institute of Archaeology, led by S.Zh. Rakhimzhanova, excavated a pit in the northeastern part of the site consisting of three adjacent squares with sides of 3 meters, covering a total area of 27 square meters. The squares were arranged in an L-shape, with 30-cm-wide soil margins left between them to allow for stratigraphic observations. Numerical designations were established along the north-south axis, and alphabetical designations along the west-east axis. Prior to work, the site surface was leveled; after the pit was divided, soil was removed in 2-3 cm-thick layers, with soil recorded every 5 cm. All soil was sifted as it was excavated. Archaeological finds, including stone artifacts, bone fragments, and ceramic vessels, were marked on-site, then their positions were recorded using a camera and a Leica TS-07 total station for further layer-by-layer analysis of the site's planigraphy and microlandscape. The excavation squares are laid out at an angle, with the highest hypsometric point located in the northern corner of square 2-B. The downward slope extends from there southward to a point 0.6 m below it. To the southeast, the slope is less pronounced, dropping 0.2 m.

Thus, the stratigraphic situation along the northeast-southwest axis is as follows:

0-7 cm — humified layer of black sandy loam with weak vegetation cover, highly rarefied and subject to water-wind slope erosion;

7-19 cm — dark gray sandy loam, complicated by deep thermal cracks in the underlying layer;

19-27 cm — black-brown sandy loam with shallower cracks;

27-43 cm — light brown sandy loam, complicated by filled molehills of burrowing animals;

43-51 cm — light yellow loam, which is the mainland.

At the lowest point of the excavation, the final layer cuts through a dense, black-gray, silty-loamy layer of sediments with no evidence of human activity. This layer is rich in fine organic matter and is associated with the functioning of a spring, which also contains naturally occurring clastic rocks.

After a further 25 cm drop, at profile AB-2, the light yellow loam was underlain by a medium- and fine-grained gravel lens. Areas of mixed yellow and gray-green viscous loam with dark brown ferruginous inclusions, the result of the filling of drainage gullies, were observed.

Based on the presented stratigraphic observations and planigraphic analysis, the presence of cultural remains was recorded in four archaeological layers (Fig. 2). Given the sloping microlandscape of the site, small artifacts were observed flowing down the slope and individual artifacts were penetrating the underlying layer through thermal cracks to a depth of 15-40 cm.

Layer 1 extends from the humus layer to the upper boundary of gray sandy loam, ranging in thickness from 10 to 15 cm, with rare inclusions of carbonate salts, crushed dehydrated animal bones, and a series of quartzite finds.

Layer 2 practically merges with Layer 1, underlying it. Its thickness ranges from 7 to 12 cm. A lens of light-gray silty sandy loam with a high carbonate content is rarely observed between it and the previous layer. This layer contains a noticeable increase in highly degraded animal bones, artifacts made on gray, pink, and gray-yellow flints, and occasional small, unidentifiable fragments of exfoliated ceramics. Planigraphically, layer 2, near the southern wall of square 2B, contains an oval hearth spot extending into the brow. The hearth fill consists of gray sandy loam with inclusions of yellow sand lenses, surrounded by a calcined area and a layer of dark brown sandy loam. Burnt flint artifacts and a small number of calcified bones were found in the upper part of the hearth fill. Six postholes were noted in this layer: four in square B2 and two in square B1. The diameter of the postholes ranged from 10 to 17 cm, and the depth ranged from 5 to 7 cm.

Layer 3 is found within a layer of light-brown sandy loam (30-40 cm below the modern surface). It is genetically related to a thin layer of fine-gravel lenses and underlying lenses of gray-yellow sandy loam. It contains finds of brown, black, and green flint, coated with a dense carbonate crust and significantly altered by chemical patina. Fragmented herbivore teeth are rare.

Layer 4 is located in the lower part of the light-brown sandy loam at the boundary of light-yellow loam and directly on it. It is identified by isolated finds of yellow and red jasperoids of varying degrees of patination, as well as occasional fragments of silicified rocks. A total of 1,431 artifacts were discovered during the excavations, including 1 276 stone artifacts, 22 ceramic fragments, and 133 osteological artifacts. The ceramics are heavily fragmented and cannot be reconstructed. The osteological material is also heavily fragmented: 16 % intact, 21 % fragmented, and 63 % unidentifiable. The osteological material includes saiga, horse, and possibly kulan bones.

To describe the stone tools, typological and technological methods of classification were used. The principles of classification and the typological scheme of the tool set of the stone tool collection are based on the generally accepted concepts and developments proposed and used in the description of stone tools in the works of M. -L. Inizan [13] and J. Tixier [14], as well as Iu.F. Kiriushin, T.I. Nokhrina, and V.T. Petrin [15], V.F. Zaibert [6] and V.I. Zaitov [16]. First of all, a selection of raw materials, its texture and color are determined in the collection from the cultural horizon, then the type of flaking (flake, blade, fragment) is determined, then the shape and size of the product is described, the localization, regularity, types of secondary processing in the form of retouching, debitage axis, types of fragmentation are described.

The flint material obtained from the second and third cultural horizons was primarily sorted by raw material. This is due to the specific arrangement of the cultural layers at the site, which lack sterile interlayers and the presence of deep desiccation cracks through which artifacts from the second (upper) layer penetrate into the underlying third layer (Early Neolithic), thus mixing the material.

This technological method allows us to identify lithic knapping production chains, determine dominant core shapes, tool blanks, processing methods, and the logic behind the production of finished products. The raw material groups were separated by texture and color to determine the characteristics and locations of extraction. The flake type (flake, blade, fragment) was then determined to determine the dominant lithic knapping technology. The shape and size of the tool were then determined, and the location, regularity, and types of secondary processing (retouching, secondary flakes, and fragmentation) were described. This allowed for the identification of markers indicating the technological chain from manufacture to the finished tool, as well as the identification of dominant and transitional tool types. The typological method allows for the correlation of the obtained data with previously published materials from neighboring regions within a single era, enabling the development of hypotheses regarding economic, cultural, or chronological differences based on similarities and differences in the typology of the collections.

The study sample included the entire complex of the Middle Neolithic period, obtained during excavations in 2024. Thus, 285 stone artefacts were analyzed: in square A2 there are a total of 156 artifacts, including chunks (8 pieces), a core (1 piece), core-like fragments (3 pieces), core rejuvenation flakes (1 piece), chips with retouching (5 pieces), chips and fragments of flakes without retouching (22 pieces), flakes without retouching (50 pieces), flakes with retouching (9 pieces), blades with retouching (32 pieces), blades without retouching (14 pieces), an arrowhead preform (1 piece), scrapers (5 pieces), lamellar flakes (5 pieces); In square B1, 66 artefacts were found: a flake without retouch (1 piece), chips and fragments (4 pieces), blades with retouch (12 pieces), blades without retouch (11 pieces), a trapezoid (1 piece), flakes without retouch (18 pieces), flakes with retouch (4 pieces), a lamellar flake with retouch (1 piece), a denticulate-notched tool (1 piece), scrapers (11 pieces), shaving tool (1 piece), and a notched tool (1 piece); In square B2, 63 items were discovered, including a core (1 piece), platform touch-up flakes (1 piece), core rejuvenation flakes (3 pieces), core-like fragments (4 pieces), secondary crested blades without retouching (4 pieces) and with retouching (4 pieces), blades with retouching (14 pieces) and without retouching (7 pieces), an insert (1 piece), a trapezoid (1 piece), flakes without retouching (9 pieces) and with retouching (8 pieces), scrapers (5 pieces), and a fragment of a uniface (1 piece).

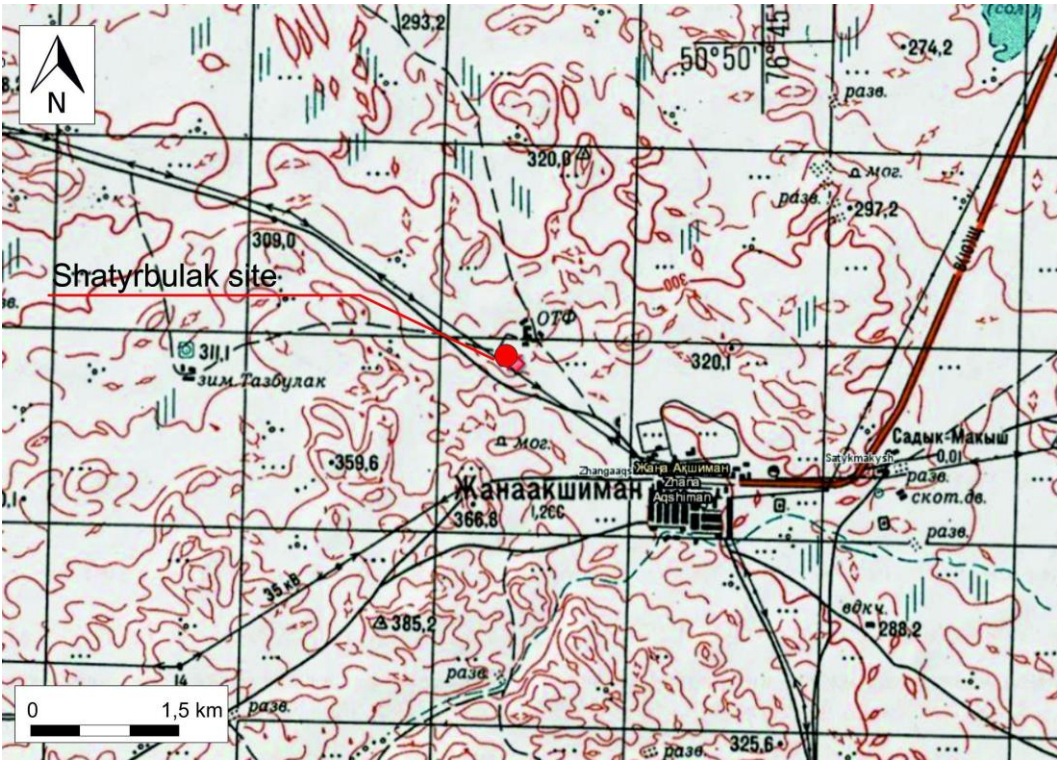


Figure 1. Location of Shatyrbulak site on the map

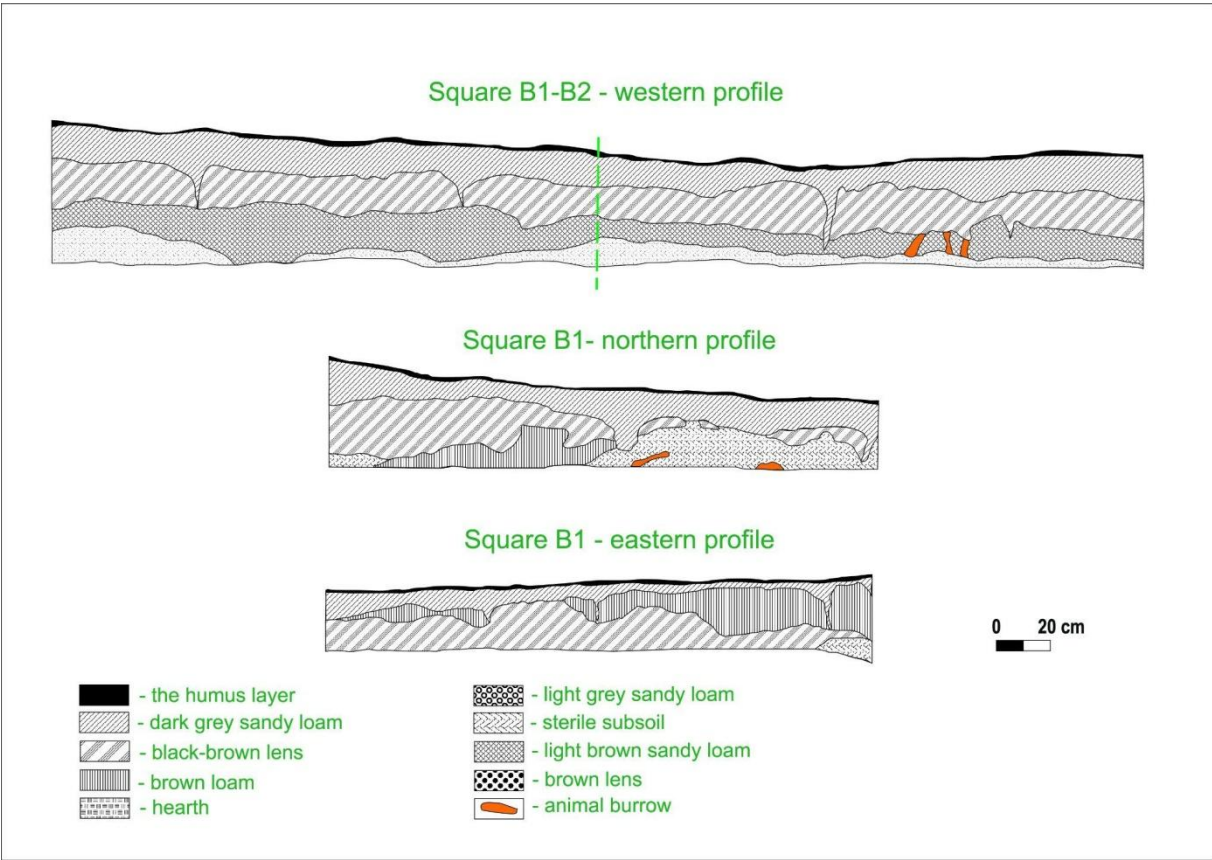


Figure 2. Stratigraphic profile of square B1 and B2, Shatyrbulak site

Results

A total of 156 flint stone artifacts were found in square A2 at a depth of 20-54 cm. These included chunks, cores, core-like fragments, flakes, chips, lamellar flakes, scrapers, a notched-denticulate tool, an arrowhead preform and a notched tool (Table 1).

Chunks (8 pieces). Dimensions: length 0.7-2.7 cm, width 0.8-3.5 cm, thickness 0.4-0.5 cm.

Flat-faced blade cores (1 piece). The platform is inclined toward the plane, the width of the negatives ranges from 0.5 to 1 cm. The dimensions of the piece are: length — 3.9 cm, width — 2.7 cm, thickness — 1.9 cm.

Core-like fragments (3 pieces) of gray flint bear traces of isolated facets on the edges and traces of deep creases on the removals. One of the items is a fragment of a massive flake, knapped by a direct blow from a hard hammer, which caused it to fracture. Dimensions: length — 1.3-1.6 cm, width — 0.9-2.5 cm, thickness — 0.5-1 cm.

Core rejuvenation flakes (1 piece) was obtained from the working part; the striking platform is broken off, the width of the flaking is 0.3-0.4 cm. The flaking negatives are unidirectional; therefore the core is considered a single platform. Dimensions: length — 3 cm, width — 2 cm, thickness — 1 cm.

Chips with retouching (5 pieces). Three of them have been retouched along one of the lateral surfaces, dorsally (2 pieces) and ventrally (1 piece). Dimensions: length — 1.3-2.7 cm, width — 1.6-3.3 cm, thickness — 0.4-0.9 cm. The other two have deep removals and cortical areas along the dorsal surface. There is a stiffening rib on the dorsal surface of one item. Retouching is applied along two edges: in one case longitudinally, in the other transversely. Retouching is short, scaly, semi-steep, regular, in one case irregular. Dimensions of the pieces: length — 4.9-6.2 cm, width — 2.9-3.1 cm, thickness — 1.5-1.6 cm.

Flakes and their fragments without retouching (72 pieces). Eleven pieces were knapped by direct blow with a soft hammer, seventeen by pressure. The butts of flakes are smooth (10 pieces), retouched (1 piece). The butt's angle is 85-90°. The flake width is 0.3-1.3 cm. The bulb of percussion is pronounced (3 pieces), diffused (39 pieces). Scars are centripetal (2 pieces), unidirectional (3 pieces), and orthogonal (3 pieces). Dimensions: length — 1-2.2 cm, width 0.8-1.8 cm, thickness — 0.2-0.5 cm.

Retouched flakes (9 pieces). Retouched on both laterals from the dorsal or ventral, one lateral from the dorsal with short, scaly, semi-abrupt, regular and irregular retouch. One of the flakes retouched on distal and one edge with short, scaly, semi-abrupt, regular from the ventral in such a way that a convergent edge is formed on the flake. Butt — smooth (3 pieces), retouched (2 pieces), punctiform (1 piece). Angle of the butt — 80-90. Butt's width — 0.2-1.1 cm. Bulb of percussion — pronounced (2 pieces), diffused (6 pieces). The presence of a flaw and antennae is recorded in three items. Scars are unidirectional (3 pieces), orthogonal (3 pieces). Dimensions: length — 1.2-4.1 cm, width — 0.8-2.6 cm, thickness — 0.2-1 cm.

Lamellar flakes with a burin chip along the longitudinal axis and a retouched opposite edge (2 pieces). The retouch is short, scaly, semi-abrupt, regular along the dorsal surface and irregular along the ventral surface. The second item has irregular retouch along the dorsal surface, with a serrated edge. The negatives of the removals on the dorsal surface are oppositely directed; the lamellar flakes were obtained by direct, intensive pressure. Dimensions: length — 1.9-3.5 cm, width — 0.9-1.6 cm, thickness — 0.3-0.6 cm.

Fragments of lamellar flakes without retouch made of gray flint (3 pieces): medial (2 pieces), distal (1 piece). The dorsal surface shows orthogonal and unidirectional removals. Dimensions: length — 1.5-2.6 cm, width — 1.3-1.6 cm, thickness — 0.3-0.5 cm.

Whole blade without retouching (1 piece). Knapped by pressure technique. The butt is punctiform, the bulb is diffused, the butt's angle is 85. Dimensions: 1.4 x 0.5 x 0.2 cm.

Proximal parts of retouched blades (7 pieces). Three of them are retouched along one edge from the dorsal with short, scaly, abrupt and flat, regular retouch, the other two are processed along two edges from the dorsal and one distally with short, scaly, abrupt, semi-abrupt and flat, regular retouch. One blade has retouching along two edges from the ventral and a burin chip along the longitudinal edge. Butt is smooth (5 pieces). Angle of butt is 90, width is 0.3-0.6 cm. Bulbs of percussion are diffused (5 pieces). Scars are unidirectional (6 pieces). Dimensions: length — 2.2-2.3 cm, width — 0.8 cm, thickness — 0.3 cm. (Fig. 5, 3, 9)

Medial part of blade with retouching (6 pieces). Four items are treated along one edge dorsally, the fifth — ventrally, and the last of them — with short, scaly, semi-abrupt and flat, regular and irregular retouching. In one case, in addition to the longitudinal edges, the proximal edge is also treated. Scars are unidirectional

(2 pieces). Dimensions: length — 0.7-1.7 cm, width — 0.6-1.5 cm, thickness — 0.2-0.3 cm (Fig. 4, 5, 6, 7, 8, 15).

Distal part of blade without retouching (1 piece). Scars are unidirectional. Dimensions: 1.7 x 0.5 x 0.2 cm.

Retouched blade fragments (19 specimens): medial (8), proximal (8), distal (3), nine of which have transverse fractures. Nine have two edges worked ventrally or dorsally, and five have one edge with short, scaly, abrupt, and flat, regular and irregular retouching. In one case, retouching is recorded on the end. Butt's are smooth (8 pieces) and retouched (1 piece), angle 90-94°, bulb of percussion are diffused, negatives of removals on the dorsal are orthogonal in one case, and unidirectional. Dimensions of the items: length — 1.1-1.6 cm, width — 0.5-1.4 cm, thickness — 0.1-0.3 cm (Fig. 3, 1-31).

Unretouched blade fragments (12 pieces): medial (8), proximal (2), and distal (3) made of gray and pinkish flint, bearing traces of transverse fractures. Three items have smooth talons, an 85-90° angle, and pronounced bulb of percussion. Dimensions: length 0.5-2.3 cm, width 0.6-1.4 cm, thickness 0.1-0.4 cm.

An arrowhead preform is made on the distal part of a retouched blade (1 piece). The distal end of the piece is treated with short, scaly, semi-abrupt, and irregular retouch on the ventral and dorsal surfaces. Scars are unidirectional. Dimensions: 2.5 x 0.9 x 0.4 cm (Fig. 4, 12).

End scrapers (3 pieces). Two items were made on flakes and knapped with a direct blow from a hard hammer. The butt is smooth. The butt's angle is 85°, length is 1.2-1.5 cm. Antennae are present. The bulb of percussion is pronounced. One 1/4 of the perimeter of one item, and three-quarters of the other, are treated with semi-abrupt, short, scaly, and regular retouch on the dorsal side. Dimensions: length — 1.4-3 cm, width — 1.7-4.1 cm, thickness — 0.6 cm (Figs. 5, 4). The third scraper was made on a semi-primary flake. One edge is treated with abrupt, short, scaly, regular retouch on the dorsal side. Dimensions: 2 x 3.3 x 0.6 cm.

Scrapers (2 pieces) One of them was made on a segment of a flint slab, rectangular in cross-section. The working edge is formed by short, semi-abrupt, scaly, regular retouch; the remaining surfaces have a cortical surface. The blade is covered with short, abrupt, scaly, regular retouch. The scraper has longitudinal and transverse fractures. The tool measures 4.3 cm in length, 3.3 cm in width, and 1.3 cm in thickness. The second is a segment of a tall end-scraper on a flake of gray flint, split longitudinally. The blade makes up half the tool's perimeter; its working edge is morphologically formed by a long, scaly, semi-abrupt, and regular retouch. The blade is covered with a short, scaly, abrupt, and regular retouch. Radial deep removals for flattening the tool are recorded on the dorsal surface. The tool measures 2.8 cm in length, 1.3 cm in width, and 0.9 cm in thickness.

Table 1

Typological list of the collection of layer 2 of the Shatyrbulak site

№	Artifact type	total	
		piece	%
	Primary reduction stage		
1	Cores:	9	3,2
	Core-like fragments	7	2,5
	Flat-faced blade cores	2	0,7
2	Core flakes and debitage:	13	4,6
	Core rejuvenation flakes	5	1,8
	Secondary crested blades	8	2,8
	Secondary reduction:		
3	Blades and their fragments without retouching:	36	12,6
	Whole blades	2	0,7
	Fragments of blades	34	11,9
4	Flakes and their fragments without retouching:	99	34,7
	Small flakes	14	4,9
	fragments of flakes	34	11,9
	whole flakes	29	10,2
	Flakes and their chips and chunks without retouching	22	7,7
5	Lamellar flakes	6	2,1
6	Technological debitage:	14	4,9
	chunks	8	2,8

	chips without retouching	1	0,35
	chips with retouching	5	1,75
	Tools on blades:		
7	blades and their fragments with retouching:	58	20,3
	dorsal retouch on one edge	35	12,2
	dorsal retouch on both lateral edges	13	4,6
	ventral retouch on one edge	2	0,7
	ventral retouch on both lateral edges	6	2,1
	alternate retouch	2	0,7
8	Geometric microliths (symmetrical trapezes)	2	0,7
9	Scrapers on blades	1	0,35
	End-scarpers	1	0,35
10	insert	1	0,35
11	Arrowhead preform	1	0,35
	Tools on flakes:		
12	Flakes and their fragments with retouching:	21	7,4
13	Scrapers on flakes:	20	7,05
	end scarpers	19	6,7
	circular scarpers	1	0,35
14	Notched tool	1	0,35
15	denticulate-notched tool	1	0,35
16	shaving tool	1	0,35
17	Fragment of a uniface	1	0,35
GRAND TOTAL:		285	100

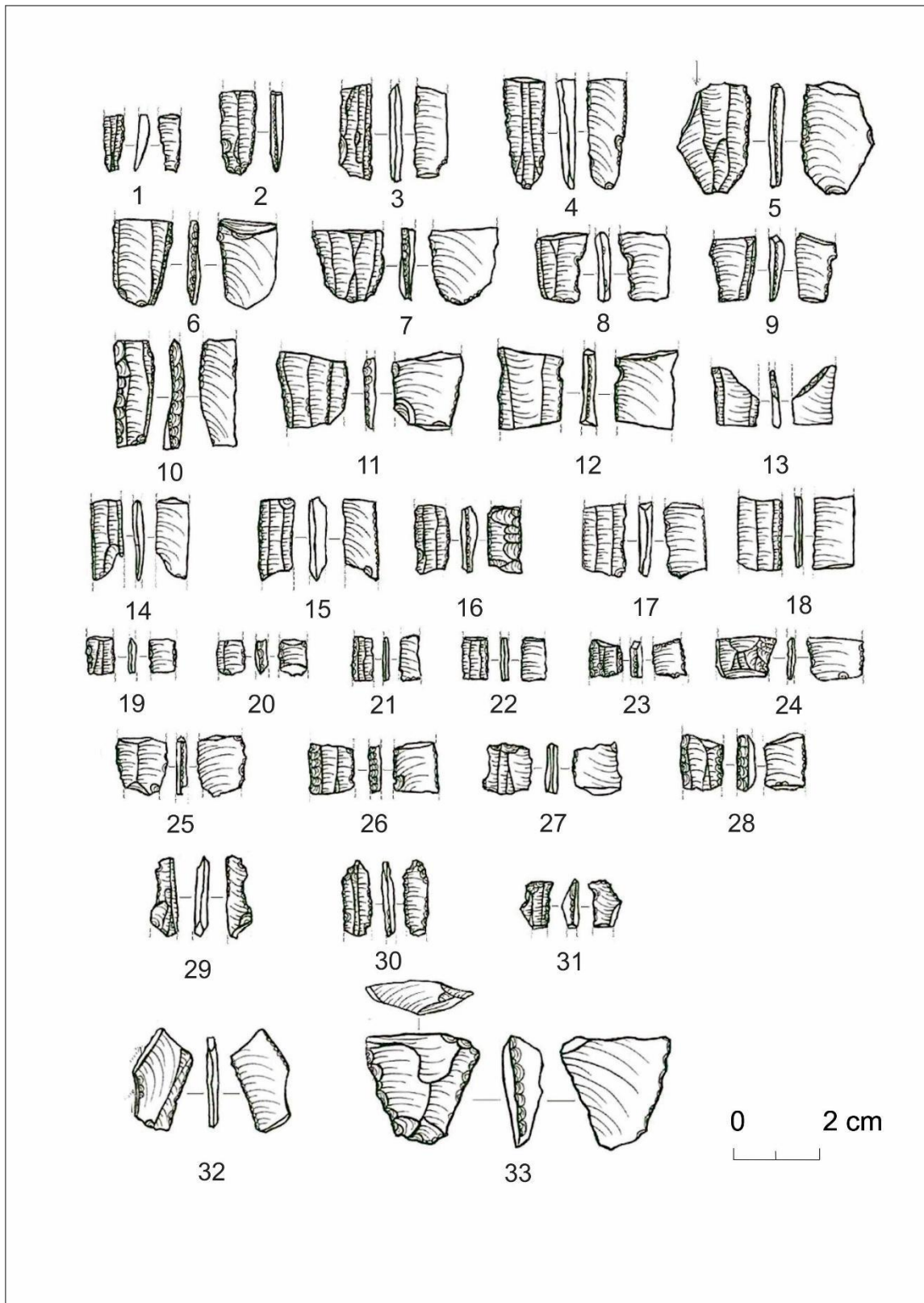


Figure 3. Lithics from the Neolithic layer of the Shatyrbulak site: 1-32 — fragments of secondary blades with retouching; 33 — scraper on a flake

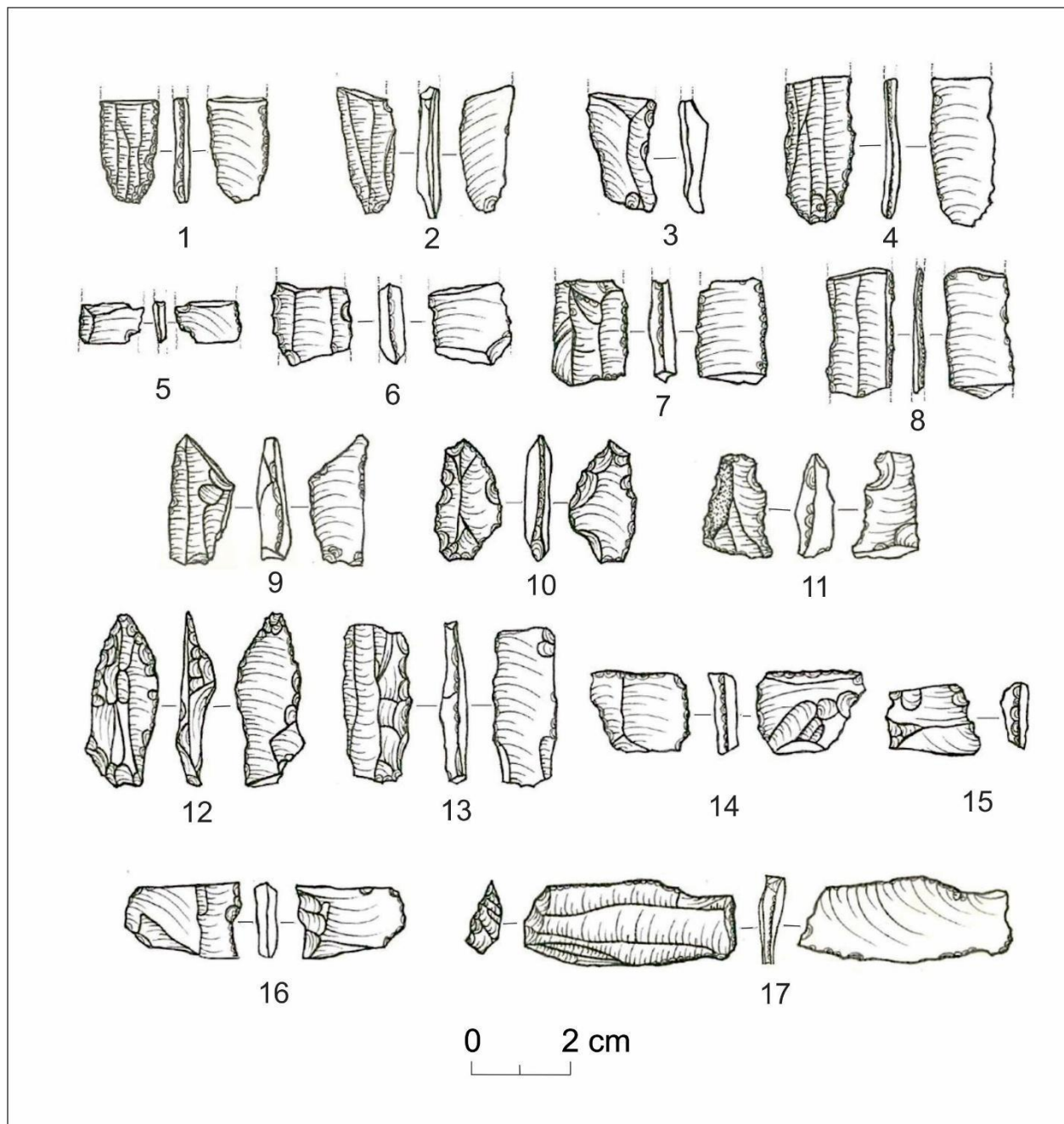


Figure 4. Lithics from the Neolithic layer of the Shatyrbulak site: 1-11, 15, 16 — fragments of secondary blades with retouching, 12 — arrowhead on a blade; 9, 13 — fragments of blades with burin chips; 14 — trapezoid; 17 — insert on a blade.

In square B1, 66 flint artifacts were found at a depth of 27-45 cm, including chips, flakes, blade fragments, a trapezoid, scrapers, a denticulate-notched tool, a notched tool, and a shaving tool (Table 1).

Proximal parts of gray flint blades (2 pieces) and quartzite (1 piece) with retouching along both edges: ventral and dorsal (2 pieces) or dorsal (1 piece). The retouching is short, scaly, semi-abrupt and regular. Unidirectional removals are recorded on the dorsal surface of one artifact, and traces of flattening are present on the proximal part. The blades were produced using pressure technique. Dimensions: length — 0.8-2.3 cm, width — 0.6-1.7 cm, thickness — 0.2 cm (Fig. 3, 32).

Proximal part of a flint blade without retouching (4 pieces). Produced using pressure technique. Smooth butt, angle — 87° , with a lip and a diffused percussion bulb. Dimensions: length — 0.8-1.6 cm, width — 0.4-1.2 cm, thickness — 0.2-0.3 cm.

Medial parts of retouched blades (8 pieces). Made of gray (5 pieces) and green (1 piece) flint and quartzite (2 pieces). The laterals of eight blades and the end of one blade are treated with regular, semi-abrupt, scaly, short retouching. The retouched edge is straight (3 pieces), serrated (1 piece). Scars are unidirectional (2 pieces). Dimensions: length — 1.1-2.4 cm, width — 0.7-1.2 cm, thickness — 0.2-0.4 cm.

Medial parts of blades made of gray and red flint (7 pieces). Dimensions: length — 0.9-2 cm, width — 0.7-1.4 cm, thickness — 0.1-0.3 cm.

Distal part of a retouched blade (1 piece) made of quartzite. Retouch is short, scaly, semi-steep, regular, applied along one edge from the dorsal, along the other from the ventral. Dimensions: length — 1.2 cm, width — 0.5 cm, thickness — 0.2 cm.

Flakes without retouching (18 pieces) Dimensions of whole flakes: 0.5-3.1x1.1-2.6x0.1-0.8 cm. Small secondary flakes and their distal fragments (13 pieces) made of grey flint, without retouching, have two smooth butts, an angle of 97°, a diffused bulb of percussion and a lip, two obtained by pressure, one by direct impact of a soft hammer. The distals were obtained by transverse flakes; Scars are unidirectional (4 specimens) and orthogonal (1 specimen). The dimensions of the pieces are: length — 0.8-1.3 cm, width — 1-1.6 cm, thickness — 0.1-0.4 cm.

Retouched flakes (4 pieces) are made of gray (3 pieces) and reddish (1 piece) flakes; the distals of two items were removed by transverse flakes. Retouching is applied along one edge of the dorsal (3 pieces) and on the distal convex edge (1 piece): short, scaly, semi-abrupt, and regular. One of them was obtained by knapping with a hard hammer. Dimensions: length — 1.6-3.1 cm, width — 1.2-2.7 cm, thickness — 0.5-0.7 cm.

Flake with retouching (1 piece). Made of gray flint. The dorsal distal is treated with regular, semi-abrupt, subparallel, and short retouch. The retouched edge is convex. Scars are unidirectional. The flake was produced with a soft hammer: butt is smooth, with a lip, and the percussion bulb is diffused. Dimensions: length — 1.5 cm, width — 0.8 cm, thickness — 0.5 cm.

Secondary flakes and fragments (4 pieces) of gray and red flint with retouching have longitudinal and transverse flakes. Retouch is short, semi-abrupt, scaly, and regular. It is fixed along one or both edges, forming convex and straight edges. Dimensions: length — 0.9-1.8 cm, width — 0.4-0.9 cm, thickness — 0.2-0.4 cm.

An unretouched flake of gray flint (1 piece) is elongated and irregular in shape with unidirectional negatives of detachments on the dorsal surface. Dimensions: length — 4.8 cm, width — 1.8 cm, thickness — 1.1 cm.

A regular trapezoid (1 piece) is made on the medial part of a knife-shaped gray flint blade. On the dorsal surface, along two lateral surfaces and beveled ends, it is treated with short, scaly, regular retouching: semi-abrupt on the lateral surfaces and abrupt on the ends. Detachments on the dorsal surface are unidirectional. Dimensions: length — 1.7 cm, width — 1 cm, thickness — 0.2 cm.

A notched-denticulated tool made of gray flint (1 piece) is made on a massive, elongated-triangular flake with a triangular cross-section. The working edge is formed on one flatter facet by short, scaly, abrupt, and regular retouching. Dimensions: length — 4.1 cm, width — 2.1 cm, thickness — 1.3 cm.

Notched tool (1 piece). Made on a flake. Two edges and the dorsal and ventral distal are treated with short, scaly, abrupt, and regular retouching. The retouched edge is serrated. Dimensions: 4.1 x 2.9 x 2 cm.

A gray flint shaving tool (1 piece) is made on the medial part of a large flake. The longitudinal edges of the segment, forming the working edge and the part inserted into the split, are treated with retouch. The working edge has short, scaly, semi-abrupt, regular retouch; the lateral edges have abrupt retouch; and the notch for fastening has short, scaly, semi-abrupt, irregular retouch. Dimensions: length — 4.2 cm, width — 2.7 cm, thickness — 1.1 cm (Fig. 5, 13).

End (10 pieces) and circular (1 piece) scrapers. Made on segments and whole flakes (7 pieces), a blade flake (1 piece), and the medial segment of a blade (1 piece) of gray flint. Oval-subtriangular shape. 1/4, 3/4, 4/4 surfaces are treated with short, regular, semi-abrupt, scaly retouch. Dimensions: length — 1.7-2.2 cm, width — 2-3.4 cm, thickness — 0.6-1 cm. Four items have a dorsal working edge formed by long, semi-abrupt, subparallel removals. Two of them also have lateral sides treated by retouch. Retouch is short, scaly, regular, semi-abrupt along the longitudinal edges and abrupt on the blade. The distal end-scrapers on the lamellar flake and the medial part of the blade are treated with short, regular, semi-abrupt, scaly retouch. The shape of the retouched edge is convex. Dimensions: 3.3x1.9x1.7 cm. (Fig. 3, 33). One flake was knapped by a direct blow of a hard hammer. Butt is smooth (1 piece), cortical (1 piece), angle is 85-90°, width is 0.3-1.8

cm. A flaw and tendrils are present. The bulbs of percussion are diffused (1 piece) and pronounced (1 piece). Dimensions: length — 2-3.4 cm, width — 1.4-4 cm, thickness — 0.6-1 cm (Fig. 5, 6, 8, 9).

In square B2, at a depth of 25-46 cm, a core, core-like fragments, core rejuvenation flakes, ribbed blades, flakes, blades, scrapers, a trapezoid, an insert, and a fragment of a uniface were discovered (Table 1). The collection from this square totals 63 items.

Flat-faced blade cores (1 piece). The platform is slightly beveled, the cortical surface is partially preserved, and the width of the negatives is 0.6-1 cm. The dimensions of the artifact are: length — 3.8 cm, width — 2.8 cm, thickness — 1.8 cm.

A flake from the working part of a core for obtaining gray flint blades (1 piece). The flake is from the working part, the width of the removals ranges from 0.3 to 0.4 cm. Dimensions: 1 x 2.1 x 0.8 cm.

Core rejuvenation flakes (3 pieces). Knapped by a soft hammer. Butt is smooth (1 piece), retouched (1 piece), angle is 85-90°, the length is 0.5-2.1 cm. Dimensions: length — 2.6-3.2 cm, width — 2.2-5.4 cm, thickness — 0.5-1.2 cm.

Core-like fragments (4 pieces) of gray flint. One piece has a partially preserved crust. Dimensions: 3.2-5.7 x 2.9-4.5 x 1.7-2.7 cm.

Secondary crested blades without retouching (4 pieces). Obtained by pressure technique. The butt is punctiform. Dimensions: 2.7 x 1.1-1.7 x 0.8 cm (Fig. 4, 13).

Secondary crested blades with retouching (4 pieces). The retouching is short, scaly, semi-abrupt and flat, regular, applied along three faces on the dorsal and ventral sides. Dimensions: 4.4 x 1.3 x 0.9 cm.

A whole blade without retouching (1 piece). Obtained by pressure technique. The negatives of the removals are orthogonal. The butt is smooth — 0.5 cm.

Proximal parts of blades (3 pieces) with retouching, made of flint. On the dorsal or ventral sides there is short, scaly, semi-abrupt and abrupt, regular retouch. Knapped by pressure technique. The bulbs of percussion are diffused, the «lip» is present. The negatives of the removals are unidirectional. Dimensions: length — 1.8-2.4 cm, width — 1.1-1.3 cm, thickness — 0.2-0.4 cm (Fig. 4, 1, 2, 4).

Proximal parts of blades without retouching (3 pieces). Obtained by pressure technique. The butt is retouched. Dimensions: 1-2.1 x 1.2-2.7 x 0.4-0.8 cm.

Medial parts of retouched flakes (11 pieces) are made of flint. The items are treated along one (6 pieces) or both (5 pieces) edges on the dorsal or ventral side with a short, scaly, semi-abrupt, regular retouch. The negatives of the removals are unidirectional. Dimensions: 1.3-3.5 x 0.8-1.6 x 0.2-0.7 cm.

Medial parts of flakes without retouch (3 pieces) are made of flint. The negatives are unidirectional. Dimensions: 1.4-2.2 x 1.6-2 x 0.3-0.8 cm.

Flakes without retouching (9 pieces) are made of flint. They were knapped by a direct blow with a soft hammer. The butts are smooth and bird-shaped. Butt lengths are 0.2-1.2 cm, striking platform angle is 90°. Scars are unidirectional (3 pieces), orthogonal (1 piece). Dimensions: 0.9-3.2 x 1-3 x 0.2-1.3 cm.

Flakes with retouching (8 pieces). Retouch is applied along one edge or distal on the dorsal (5 pieces) and ventral (3 pieces) sides with a short, scaly, semi-abrupt, regular retouch. Knapped by a direct blow of a soft hammer. Butt is smooth, length is 0.4-0.9 cm. The striking platform angle is 85-90°. Negatives of removals are unidirectional. Dimensions: 1.7-2.8 x 0.7-3.2 x 0.3-1.2 cm (Fig. 5, 11).

Insert (1 piece). Made on a blade. One dorsal edge and the ventral end are treated with short, scaly, semi-abrupt, regular retouch. The negatives of the removals are unidirectional. Dimensions: 1.9 x 0.9 x 0.3 cm (Fig. 4, 17).

Trapezoid (1 piece). On the medial section of the blade. Two ventral edges and one dorsal end are treated with short, scaly, semi-abrupt and flat, regular retouch. The shape of the retouched edge is serrated and straight. Dimensions: 1.3 x 1.1 x 0.2 cm (Fig. 4, 14).

Scrapers (5 pieces). Made on flakes. The blade occupies 3/4 (3 pieces) and 1/4 (1 piece) of the perimeter. The working edge is prepared by long subparallel removals. Retouch is short, scaly, semi-abrupt and abrupt, regular and irregular in one item from the ventral side. The shape of the retouched edge is convex. Knapped by a direct blow of a soft hammer. Butt — smooth (1 piece), retouched (2 pieces), linear (1 piece). Talon length — 1.4 cm. Percussion bulb — diffused, «lip» is present. Dimensions: 2-3.6 x 2.1-3 x 0.7-1.1 cm (Fig. 5, 1-3, 5).

Fragment of a uniface (1 piece). Leaf-shaped, semi-lenticular in cross-section. The two dorsal edges are treated with a combination of short and long, scaly and subparallel, semi-abrupt, regular retouching. The retouched edge is straight. Dimensions: 3.4 x 3.4 x 1 cm (Fig. 5, 12).



Figure 5. Tools from the Neolithic layer of the Shatyrbulak site: 1-6, 8-9 — scrapers on flakes; 7 — insert; 11 — flake with retouch; 12 — uniface; 13 — plane

Summarizing the morpho-technological and typological analysis of the collection, it should be noted that the raw material base consists of homogeneous flints of gray, pinkish, and red colors, occasionally with inclusions of fine quartzite in the rock. Light gray flint is the dominant raw material, accounting for 90.88 % (259 pieces). Ten pieces were made from similar red raw material, ten from pink, three from brown, one from yellow and one from green, and one piece from gray homogeneous quartzite.

Of the 285 pieces recorded in the cultural layer, 12.7 % of the collection consists of core-like fragments, cores, platform touch-up flakes, core rejuvenation flakes, and other technological debitage characteristics of the knapping technology. A pair of intact items belong to the group of flat cores used to produce blades. Blade-knapping techniques include rejuvenation flakes from the face and base of cores, as well as platform

touch-up flakes. This fact, along with the small size of the core-like fragments and intact cores, supports the development of blade-knapping techniques.

Most of the objects in the collection are products of secondary reduction, 12 items are semi-primary, and primary ones are completely absent. The presence of a cortical surface is recorded on one core, a core-like fragment, a platform touch-up flake, a secondary crested blade, one retouched flake, two flakes without retouch, a scraper on a flake, a scraper on a flake fragment, a shaving tool, and a denticulate-notched tool.

34.65 % of the collection is represented primarily by fragments of secondary medium-sized blades, tools made from them, and retouched fragments. Whole blades are quite rare (2 pieces); characteristically, they show no traces of secondary modification, compared to 95 fragments and tools made on them (98 %). All blade blanks were obtained by pressure technique and have a feather-shaped tip. Among the groups of tools made on blades, blades retouched on the dorsal side along one edge predominate, slightly fewer have retouching along both longitudinal edges, the ventral side is significantly less processed, and only two items have alternate retouching. The collection includes a pair of symmetrical trapezoids and an insert, and a single example of an end scraper on a blade. Apparently, the medial fragments were used as inserts, as evidenced by the number of blade segments with retouching (20.3 %) and without retouching (12.6 %). However, 52.65 % of the collection consists of medium and small flakes, some of which are debitage products. Whole items of medium-sized flakes were used primarily as tool blanks. Most flake blanks were fragmented transversely during use; in cases where fragmentation was determined to be intentional, knapping was performed longitudinally to separate more suitable parts and create a cutting edge on one side and a more massive edge on the other. Among the tools made on flakes, scrapers predominate (20 pieces), with one each of a notched tool, a denticulate-notched tool, a shaving tool, and a uniface. The collection contains almost equal numbers of retouched and untouched flakes, with secondary modification also recorded on three subtriangular flakes. All of this indicates a significant shortage of suitable raw materials for flake cutting and, consequently, the maximum utilization of existing reserves.

Discussion

The results of the collection's analysis suggest a high level of population mobility during the Middle Neolithic and the development of specific cultural and technological traditions.

The results of the site's analysis reveal a consistent preference for gray flint, which is highly homogeneous. Its density ranges from 2.4 to 2.6 g/cm. No large inclusions are observed in the structure. Apparently, fragments containing voids and inclusions were discarded during the raw material extraction process and were not included in the excavated portion of the site. Near the site to the northwest (100 m) are outcrops of another red-brown veined flint. Artifacts made from this flint are present in layer 1. However, the large number of inclusions significantly complicates its knapping, and pressure technique is practically impossible due to its heterogeneity. According to our hypothesis, similar gray flints are scattered in large quantities in fragments and small pebbles on low hills located in the Ekibastuz and adjacent Bayanaul regions; however, the nearest location of this raw material in the vicinity of the site was discovered by us 35 km to the northeast in the form of characteristic rock ridges and stony placers on hills associated with the fault zones of the anticlinorium, where silica cemented cracked vein rocks and metamorphic schists.

Technologically, the presence of cores for blade production and a sufficient number of blade blanks, their retouched fragments, and artifacts from them confirms a developed technology of pressure technique with a tradition of blade fragmentation. Regarding the stages of lithic raw material knapping, it is important to note that the initial knapping took place at the raw material collection sites, and the population brought fully completed cores to the site, adjusting their shape during the process and using the resulting flakes and chips to make tools. Indirectly, this highly pragmatic use of raw materials, including silicified tiles, supports the raw material shortage experienced by the population at the site.

Flakes are present in greater numbers, but play a significantly lesser role qualitatively. They serve as blanks for more massive tools, designed for processing harder raw materials (wood, bone, stone), which is less suitable for fragile blades, or for economic activities in which the tool is periodically retouched to refresh the working edge, such as scrapers and a shaving tool. Notched-denticulate and notched tools, as well as uniface, were also made on flakes.

Regionally, the materials described are similar to the collection from the Shiderty 3 site from layer 2a, which was made primarily on similar light-gray rock and is distinguished by a large number of blades and tools made from them, combined with «archaic» types of burins featuring regular lateral retouching with

straight and diagonal burin chips. There are 9 similar tools in our collection; they similarly have retouching along the longitudinal edge and in 2 cases along the end of the blade [10; 28], [11].

Comparing this assemblage with materials from Northern Kazakhstan, including the Telman (Telman sites I, VII-X) and Yavlenka (Yavlenka III-VII) types of the Atbasar culture, localized by V.F. Zaibert to the upper reaches of the Ishim and the lower reaches of the Nura, along the Chaglinka River, and in the middle reaches of the Ishim, we note that, in terms of raw materials, they are characterized by the use of a homogeneous raw material — gray or light-brown jasper-like rock or fine-grained quartzite. The blades were knapped and subsequently fragmented, with the medial parts used as inserts. The first type is characterized by lateral burins, symmetrical, high trapezoids, and reamers, which are absent from the Yavlenka variant. End scrapers and arrowheads on blades with a symmetrical blade and a weakly defined tip, as well as blades with an end notch, are presented in series. The presence of an arrowhead blank, a scraper on a blade, and a pair of symmetrical trapezoids in the Shatyrbulak collection brings these assemblages together. The artifacts of Yavlenka are represented by blades with blunted edges, worked ends, and beveled points. Trapezes are rare, fairly large, low, and symmetrical. Judging by the data presented in the monograph's graphs, the assemblage's distinctiveness is due to the high percentage of proximal parts and complete blades and the tools attached to them. Secondary modification becomes more varied, with abrupt retouching almost never occurring, instead featuring flat, marginal, and parallel retouching. A similar predominance of flat, semi-abrupt, scaly retouching is also observed in the Shatyrbulak materials. However, the difficulty in assigning materials to a particular micro-district is significantly complicated by the absence of specific macrolithic tools at the site, which, according to V.F. Zaibert, give them their uniqueness: knives or scrapers with edge retouching or chipping, axes, spearheads with double-sided processing [6; 112-166].

In the Neolithic complexes of Turgay, where the standard sites are the sites of Solenoe Ozero 2 and Ekdirin 24, the finds are represented mainly by siliceous rocks of gray and reddish shades, the predominance of plates is more pronounced: tools made of blades make up 33.2 % of the collection, and plates without secondary modification — 67.5 %, for the Neolithic, symmetrical trapezoids and parallelograms, plates with cutting chips, as well as the presence of polished tools are noted [17; 30, 161]. Researchers unanimously note the presence of fragmented blades with retouching, but since the technological data in the cited publications are not presented in detail, we can only assume that the ratio is close to the data we obtained in the dominance of the medial and proximal parts over the distal ones, which are less suitable for inserts, and retouching as a method of secondary processing is found on all fragments of blades both in the Turgai complexes and at the Shatyrbulak site.

Conclusions

This collection is fully identifiable with the Atbasar-Mahandzhar cultures and has direct parallels with contemporaneous sites in the Shiderty-Olenty interfluvium, both the Telman and Yavlen stages of the Atbasar culture, as well as Neolithic complexes in Turgay. The collection was made from similar raw materials and includes symmetrical trapezoids and an end-scraper on a blade. Characteristic burin techniques and secondary end-working of blades are evident. The increased number of tools on wider blades and flakes is more characteristic of the Middle Neolithic period. However, the absence of bifacial and macrolithic tools, arrowheads, and ceramics significantly complicates a more detailed chronological determination of the obtained material. This discrepancy is planned to be resolved through further exploration of the site over larger areas. Overall, the Shatyrbulak site shifts the distribution area of the Atbasar complexes further to the southwest. Further research at the site will aim to expand our understanding of the planigraphic situation in this layer, as hearths and postholes have already been recorded in the cultural layer of the excavated area of the site. The study of these requires the discovery of dating materials and the use of a range of interdisciplinary methods for a more accurate chronological attribution.

Acknowledgements

The article was prepared within the framework of program-targeted financing of the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan 2024–2026, IRN BR24992916.

References

- 1 Археологическая карта Казахстана. Реестр / составители Е.И. Агеева, К.А. Акишев (отв. редактор), Г.А. Кушаев, А.Г. Максимова, Т.Н. Сенигова. — Алма-Ата: Изд-во АН КазССР, 1960. — 450 с.

- 2 Чалая Л.А. Неолит Северо-Восточного и Центрального Казахстана: автореф. ... канд. ист. наук: спец. 07.00.00. «История» / Л.А. Чалая. — Москва: Московский университет, 1971. — 23 с.
- 3 Чалая Л.А. Озерные стоянки Павлодарской области Пеньки 1, 2 / Л.А. Чалая; под ред. К.А. Акишева // Поиски и раскопки в Казахстане. — Алма-Ата: Наука КазССР, 1972. — С. 163–181.
- 4 Черников С.С. Восточный Казахстан в эпоху неолита и ранней бронзы: автореф. дисс. ... д-ра ист. наук: 07.575 / С.С. Черников. — Москва: Институт археологии АН СССР, 1970. — 60 с.
- 5 Зайберт В.Ф. Неолит Северного Казахстана: автореф. дисс. ... канд. ист. наук: спец. 07.00.06. «История» / В.Ф. Зайберт. — Москва, 1979. — 17 с.
- 6 Зайберт В.Ф. Атбасарская культура / В.Ф. Зайберт. — Екатеринбург: УрО РАН, 1992. — 222 с.
- 7 Зайберт В.Ф. Атбасарская культура: монография: МИАК / В.Ф. Зайберт, А.А. Плешаков, А.Ж. Тюлюбаев; под общ. ред. З. Самашева. — Астана: Издательская группа филиала Института археологии имени А.Х. Маргулана в г. Астана, 2012. — Т. I. — 352 с.
- 8 Логвин В.Н. Каменный век Казахстанского Притоболья. (мезолит- энеолит) / В.Н. Логвин. — Алма-Ата: КазНПУ, 1991. — 64 с.
- 9 Чиндин А.Ю. Каменные индустрии племен Центрального Казахстана эпохи мезолита-энеолита (на основе типологии, трасологии, эксперимента): автореферат дисс. ... канд. ист. наук: спец. 07.00.06. «История» / А.Ю. Чиндин. — Санкт-Петербург: ИИМК, 1992. — 21 с.
- 10 Мерц В.К. К вопросу о происхождении мезо-неолитических комплексов Северной Сары-Арки / В.К. Мерц // Материалы международной научной конференции «Кадырбаевские чтения — 2007» (16-18 мая 2007 года). — Актюбе: Актюбинский государственный педагогический институт, 2007. — С. 27–31.
- 11 Мерц В.К. Периодизация голоценовых комплексов Северного и Центрального Казахстана по материалам многослойной стоянки Шидерты: автореф. дисс. ... канд. ист. наук: спец. 07.00.06. «История» / В.К. Мерц. — Кемерово: издательство Павлодарского государственного университета, 2008. — 26 с.
- 12 Мерц В.К. Новые исследования в горах Калмаккырган (Майский район Павлодарской области) / В.К. Мерц, И.В. Мерц, Е.Д. Демидкова // Материалы международной научно-практической конференции «Маргулановские чтения-2020» (17–18 сентября 2020 года). — Алматы: Институт археологии имени А.Х. Маргулана, 2020. — С. 486–487.
- 13 Inizan M.-L. Technologie de la pierre taillée / M.-L. Inizan, M. Reduron-Ballinger, H. Roche, J. Tixier. — Meudon, 1995. — Vol. 4. C.R.E.P. — 199 p.
- 14 Tixier J. Méthode pour l'étude des outillages lithiques: notice sur les travaux scientifiques de Musée National d'Histoire et d'Art, Centre National de Recherche Archéologique / J. Tixier. — Luxembourg, 2012. — 197 p.
- 15 Кирюшин Ю.Ф. Методика обработки коллекций каменного инвентаря неолитического времени: учеб. пос. / Ю.Ф. Кирюшин, Т.И. Нохрина, В.Т. Петрин. — Барнаул: издательство Алтайского университета, 1993. — 65 с.
- 16 Заитов В.И. Каменная индустрия заключительных этапов каменного века Северного Казахстана / В.И. Заитов. — Петропавловск: ООО «Рифей», 2007. — 256 с.
- 17 Шевнина И.В. Неолит Торгая. Материалы и исследования по археологии Казахстана / И.В. Шевнина, А.В. Логвин; отв. редактор А. Онгар. — Алматы: Институт археологии им. А.Х. Маргулана, 2024. — Том XXII. — 336 с.

References

- 1 Akishev, K.A. (Ed.). (1960). *Arkheologicheskaya karta Kazakhstana. Reestr* [Archaeological Map of Kazakhstan. Registry]. Almaty: Akademii Nauk KazSSR [in Russian].
- 2 Chalaia, L.A. (1971). *Neolit Severo-Vostochnogo i Tsentralnogo Kazakhstana* [Neolithic of North-Eastern and Central Kazakhstan]. *Extended abstract of candidate's thesis*. Moscow: Moskovskii universitet [in Russian].
- 3 Chalaia, L.A. (1972). *Ozernye stoiarki Pavlodarskoi oblasti Penki 1, 2* [Lake sites of Pavlodar region Penki 1,2]. *Poiski i raskopki v Kazakhstane — Excavations and prospecting in Kazakhstan*. K.A. Akisheva (Ed.). Alma-Ata: Nauka KazSSR [in Russian].
- 4 Chernikov, S.S. (1970). *Vostochnyi Kazakhstan v epokhu neolita i rannei bronzy* [Eastern Kazakhstan in the Neolithic and Early Bronze Age]. *Extended abstract of Doctor's thesis*. Moscow: Institut arkheologii Akademii Nauk SSSR [in Russian].
- 5 Zaibert, V.F. (1979). *Neolit Severnogo Kazakhstana* [Neolithic of Northern Kazakhstan]. *Extended abstract of candidate's thesis*. Moscow [in Russian].
- 6 Zaibert, V.F. (1992). *Atbasarskaia kultura* [Atbasar Culture]. Ekaterinburg: Uralskogo Otdelenie RAN [in Russian].
- 7 Zaibert, V.F., Pleshakov, A.A., & Tyulebaev, A.Zh. (2012). *Atbasarskaia kultura* [Atbasar Culture]. Z. Samasheva (Ed.). Astana: Izdatelskaia gruppа filiala Instituta arkheologii imeni A.Kh. Margulana v g. Astana [in Russian].
- 8 Logvin, V.N. (1991). *Kamennyi vek Kazakhstanskogo Pritobolia. (mezolit- eneolit)* [Stone Age of the Kazakh Tobol region (Mesolithic-Eneolithic)]. Alma-Ata: Kazakhskoi Nationalnoi Pedagogicheskoi Universitet [in Russian].
- 9 Chindin, A.Yu. (1992). *Kamennye industrii plemen Tsentralnogo Kazakhstana epokhi mezolita-eneolita (na osnove tipologii, trasologii, eksperimenta)* [Stone industries of Central Kazakhstan tribes from the Mesolithic to Eneolithic]. *Extended abstract of candidate's thesis*. Saint Petersburg: IIMK [in Russian].

- 10 Merts, V.K. (2007). K voprosu o proiskhozhdenii mezo-neoliticheskikh kompleksov Severnoi Sary-Arki [On the origin of the Meso-Neolithic complexes of Northern Sary-Arka]. *Materialy Mezhdunarodnoi nauchnoi konferentsii «Kadyrbaevskie chteniia — 2007» — Proceedings of the international scientific conference «Kadyrbaev Readings — 2007»* (pp.27–31). Aktobe: Aktiubinskii gosudarstvennyi pedagogicheskii institut [in Russian].
- 11 Merts, V.K. (2008). Periodizatsiia golotsenovykh kompleksov Severnogo i Tsentralnogo Kazakhstana po materialam mnogoslonoinei stoianki Shiderty [Periodization of Holocene complexes of Northern and Central Kazakhstan based on materials from the multilayered Shiderty site]. *Extended abstract of candidate's thesis*. Kemerovo: Izdatelstvo Pavlodarskogo gosudarstvennogo universiteta [in Russian].
- 12 Merts, V.K., Merts, I.V., & Demidkova, E.D. (2020). Novye issledovaniia v gorakh Kalmakkyrgan (Maiski raion Pavlodarskoi oblasti) [New research in the Kalmakkyrgan Mountains (Maisky district of Pavlodar region)]. *Materialy mezhdunarodnoi nauchno-prakticheskoi konferentsii «Margulanovskie chteniia-2020» (17-18 sentiabria 2020 goda) — Proceedings of the international scientific and practical conference «Margulan Readings-2020»* (pp. 486-487). Almaty: Institut arkhologii imeni A.Kh. Margulana [in Russian].
- 13 Inizan, M.-L., Reduron-Ballinger, M., Roche, H., & Tixier, J. (1995). *Technologie de la pierre taillée* [Stone knapping Technology]. Vol. 4. C.R.E.P., Meudon [in French].
- 14 Tixier, J. (2012). *Méthode pour l'étude des outillages lithiques: notice sur les travaux scientifiques de Musée National d'Histoire et d'Art, Centre National de Recherche Archéologique* [Method for the study of lithic tools: a report on the scientific work of the National Museum of History and Art, National Center for Archaeological Research]. Luxembourg [in French].
- 15 Kiriushin, Yu.F., Nokhrina, T.I., & Petrin, V.T. (1993). *Metodika obrabotki kolleksii kamennogo inventaria neoliticheskogo vremeni. Uchebnoe posobie* [Methods for processing Neolithic stone tool collections. Textbook] Barnaul: Izdatelstvo Altaiskogo universiteta [in Russian].
- 16 Zaitov, V.I. (2007). *Kamennaia industriia zakliuchitelnykh etapov kamennogo veka Severnogo Kazakhstana* [Stone industry of the final stages of the Stone Age of Northern Kazakhstan]. Petropavlovsk: OOO «Rifei» [in Russian].
- 17 Shevnina, I.V., & Logvin, A.V. (2024). *Neolit Torgaia. Materialy i issledovaniia po arkhologii Kazakhstana* [Neolithic of Torgay. Materials and research on the archeology of Kazakhstan]. Almaty: Institut arkhologii imeni A.Kh. Margulana [in Russian].

Author Information

Saule Zh. Rakhimzhanova (*corresponding author*) — Candidate of Historical Sciences, Leading Researcher of Margulan Institute of Archeology, Almaty, Kazakhstan, e-mail: rakhimzhanova.saule@gmail.com, <mailto:rakhimzhanova.saule@gmail.com> <https://orcid.org/0000-0003-1429-1470>

Yelena K. Tusheva — Master of History, Head of Research Laboratory of Experimental Archaeology, Institute of Archaeological Research at Pavlodar Pedagogical University named after Alkey Margulan, Pavlodar, Kazakhstan, e-mail: tusheva.elena@inbox.ru <mailto:tusheva.elena@inbox.ru>, <https://orcid.org/0000-0003-1866-2574>

Renaud Gosselin — Research Engineer at the National Center for Scientific Research (CNRS), Paris, France, e-mail: renaud.gosselin@cnrs.fr, <https://orcid.org/0000-0001-8176-7366>

Viktor K. Merts — Candidate of Historical Sciences, Director of the Center for Archaeological Research, Toraigyrov University, Pavlodar, Kazakhstan, e-mail: v_merz@mail.ru, <https://orcid.org/0000-0003-3163-1609>

Авторлар туралы мәліметтер

Сауле Ж. Рахимжанова (*хат-хабарға жауапты автор*) — тарих ғылымдарының кандидаты, жетекші ғылыми қызметкер, Ә. Марғұлан атындағы Археология институты, Алматы, Қазақстан, e-mail: rakhimzhanova.saule@gmail.com, <https://orcid.org/0000-0003-1429-1470>

Елена К. Тушева — тарих магистрі, эксперименттік археология зертханасының меңгерушісі, Ә. Марғұлан атындағы Павлодар педагогикалық университеті жанындағы Археологиялық зерттеулер институты, Павлодар, Қазақстан, e-mail: tusheva.elena@inbox.ru, <https://orcid.org/0000-0003-1866-2574>

Рено Госселин — Ұлттық ғылыми зерттеулер орталығының (CNRS) зерттеуші-инженері, Париж, Франция, e-mail: renaud.gosselin@cnrs.fr, <https://orcid.org/0000-0001-8176-7366>

Виктор К. Мерц — тарих ғылымдарының кандидаты, Археологиялық зерттеулер орталығының директоры, Торайғыров университеті, Павлодар, Қазақстан, e-mail: v_merz@mail.ru, <https://orcid.org/0000-0003-3163-1609>

Сведения об авторах

Сауле Ж. Рахимжанова (*автор-корреспондент*) — кандидат исторических наук, ведущий научный сотрудник, Институт археологии имени А. Маргулана, Алматы, Казахстан, e-mail: rakhimzhanova.saule@gmail.com, <https://orcid.org/0000-0003-1429-1470>

Елена К. Тушева — магистр истории, заведующая лабораторией экспериментальной археологии, Институт археологических исследований при Павлодарском педагогическом университете имени А. Маргулана, Павлодар, Казахстан, e-mail: tusheva.elena@inbox.ru, <mailto:tusheva.elena@inbox.ru>, <https://orcid.org/0000-0003-1866-2574>

Рено Госселин — инженер-исследователь, Национальный центр научных исследований (CNRS), Париж, Франция, e-mail: renaud.gosselin@cnrs.fr, <https://orcid.org/0000-0001-8176-7366>

Виктор К. Мерц — кандидат исторических наук, директор Центра археологических исследований, Торайгыров Университет, Павлодар, Казахстан, e-mail: v_merz@mail.ru, <https://orcid.org/0000-0003-3163-1609>

Conflicts of Interest. The authors declare no conflict of interest / **Конфликт интересов.** Авторы заявляют об отсутствии конфликта интересов / **Мүдделер қақтығысы.** Авторлар мүдделер қақтығысының жоқ екенін мәлімдейді.