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### THE USE OF ANIMAL JAWS IN BRONZE AGE CENTRAL KAZAKHSTAN

**Abstract:** This article considers the types of tools made from livestock mandibles that have been found in Bronze Age settlements in Central Kazakhstan. In this article, we consider the study of bone artifacts in the Atasu micro district (Atasu, Myrzhyk, Akmaya, Akmustafa) and the Taldysai settlement, a feature of the settlements that existed in the second half of the 2nd - early 1st millennium BC.

**Keywords:** *Central Kazakhstan, settlement, Late Bronze Age, bone tools, tanning, mandibles.*

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#### INTRODUCTION

The Kazakh people have been herding hooved livestock from ancient times and call them “tort tulik mal” (in English: “tort” – “four”, “tulik mal” – “livestock”; types of livestock – horse, camel, cow, sheep). Kazakhs used livestock for transport and for obtaining meat, milk and dairy products (e.g., koumiss, shubat). In particular, horses, bred from ancient times, are the most sacred and precious animals to the Kazakh people. In prehistoric times, and particularly the Bronze Age, the bones of livestock also served non-utilitarian, cultural and ritual roles. In this article, tool types manufactured from mandibles will be considered. Such artifacts have been found in Bronze Age settlements of Central Kazakhstan, such as Taldysai, Atasu, Myrzhyk, Ak Mustafa and Akmaya.

Until today, the study of bone and antler tools in the archeology of Kazakhstan has been largely limited to typological descriptions. A.Kh. Margulan emphasizes the importance of bone processing in the history of Kazakhstan. He wrote that the processing of horse bones is especially common on many sites and noted that bone-processing industries were widespread in Central Kazakhstan in the Late Bronze Age<sup>1</sup>.

#### MATERIALS AND METHODS.

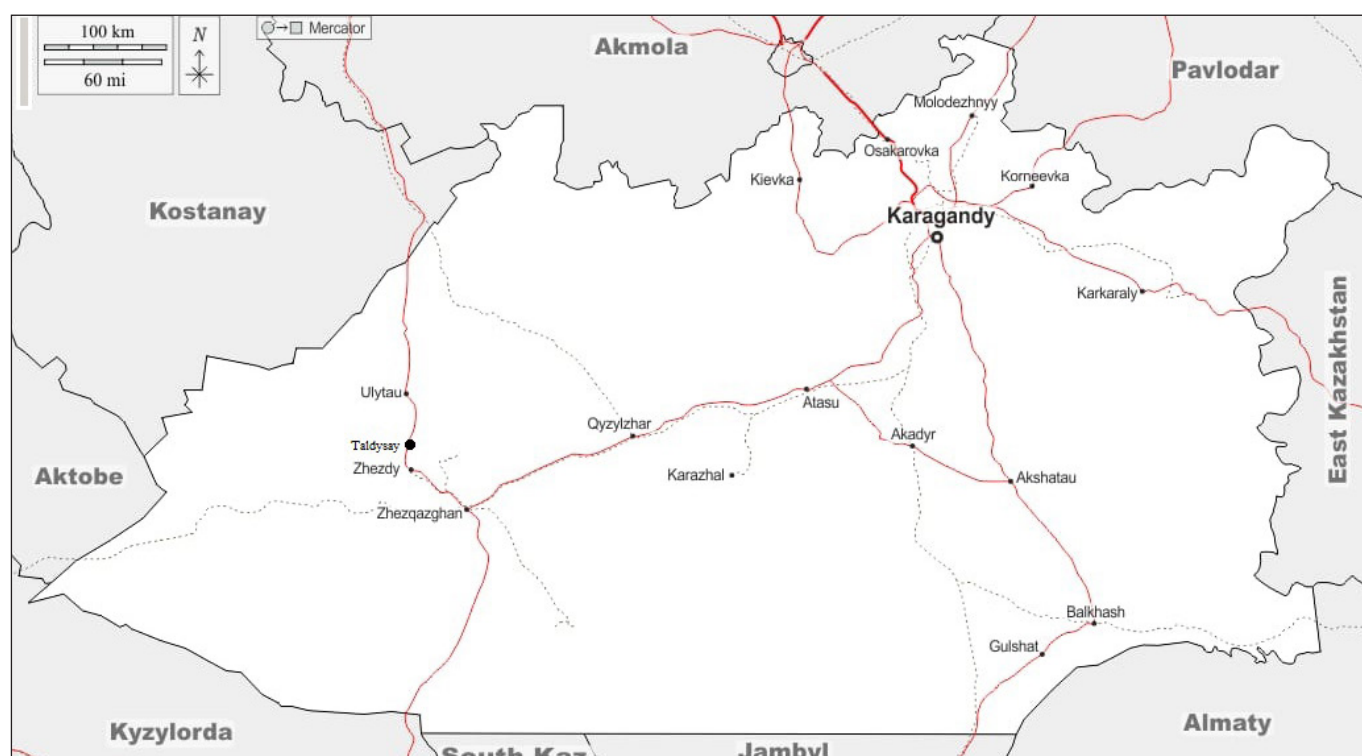
The purpose of this work is to determine the economic orientation of the settlements complex of Central Kazakhstan based on the study of bone materials. In this article, we consider the study of bone artifacts in the Atasu micro district (Atasu, Myrzhyk, Akmaya, Akmustafa) and the Taldysai settlement. A feature of the settlements that existed in the second half of the 2nd - early 1st millennium BC is the discovery on their territory of

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<sup>1</sup> MARGULAN 1998, 288.



**Fig. 1.** Map of Karagandy region (Central Kazakhstan).

complex copper-smelting units that have no analogs outside of Kazakhstan<sup>2</sup>.

The settlements of the Atasu micro district (Atasu, Myrzhyk, Akmustafa, Akmaya) are located in Central Kazakhstan, which is a powerful center of non-ferrous metallurgy, the discovery of which belongs to A. Kh. Margulan<sup>3</sup>. Atasu I settlement is located on the Mynbaisai River, one kilometer from its confluence with the Atasu River. The settlement, surrounded on three sides by mountains, was located 35 km southwest of the village of Kzyltau, in the Agadyr district (now Shet) of the Karagandy region. The dating of the early Atasu horizon is determined at the end of the third quarter of the 2nd millennium BC<sup>4</sup>.

The Myrzhyk settlement, one of the largest in Central Kazakhstan, was discovered in 1977 by the Central Kazakhstan archaeological expedition. The settlement is located on the right bank of the Atasu River, 10 km southwest of the Atasu I settlement. Excavations of the Myrzhyk settlement yielded material synchronous with the third group of Atasu pottery. The settlement is dated at the beginning of the 1st millennium BC<sup>5</sup>.

The settlement of Akmustafa (Atasu II) is located on the right bank of the river Atasu, 5 km south of the settlement of Atasu I, next to the old winter quarters with the same name<sup>6</sup>.

The Akmaya settlement is located 25 km southwest of the Kzyltau settlement and 20 km northwest of the Atasu settlement.

In general, judging by the number and variety of products in the Atasu world region, bone carving at the final stage of the Bronze Age reached a high level<sup>7</sup>. According to typological descriptions, tools from the mandibles were used mainly in leather production and for harvesting<sup>8</sup>.

Taldysai is a settlement of the Bronze Age in Central Kazakhstan, with consistent evidence of mining and metallurgical industry, as well as other crafts. It is the largest economic and industrial center of its period, possessing shaft furnaces, metal products and foundry tools, which have been widely studied<sup>9</sup>. The settlement is located in the eponymous tract at the confluence of the rivers Ulken Zhezdy and Bala Zhezdy, in the Ulytau administrative district of Ulytau (Karagandy) area, 80 km from the city of Zhezkazgan on the side of the mountain Ulytau (**Fig. 1**). Archaeological excavations in Taldysai have been conducted for several years under the supervision of A.S. Ermolaeva. The transition to a more complex settlement involving metallurgical and housing-industrial took place during the second half of the 2nd millennium BC - the beginning of the first half of the 1st millennium BC. The nature of the furnaces and ceramics found is often associated with the culture of Petrov<sup>10</sup>.

The study of bone and antler tools is important in establishing the farming practices and lifeways of the ancient inhabitants of the settlement. Archaeozoologist L. Gayduchenko analyzed the bone and horn artifacts collected from Taldysai settlement<sup>11</sup>. Later, in 2019, our study of

<sup>2</sup> ARTUHOVA *et alii* 2020, 127.

<sup>3</sup> MARGULAN 1956, 18.

<sup>4</sup> ARTUHOVA *et alii* 2020, 127.

<sup>5</sup> ARTUHOVA *et alii* 2020, 133.

<sup>6</sup> KADYRBAYEV/KURMANKULOV 1992, 63.

<sup>7</sup> KADYRBAYEV/KURMANKULOV 1992, 238.

<sup>8</sup> KADYRBAYEV/KURMANKULOV 1992, 154.

<sup>9</sup> ERMOLAYEVA 2016, 127; KURMANKULOV/ERMOLAYEVA/ERZHANOVA 2012, 8.

<sup>10</sup> KURMANKULOV/ERMOLAYEVA/ERZHANOVA 2012, 5.

<sup>11</sup> GAYDUCHENKO 2013, 353.

the bone and antler industry from Taldysai began. The first characterization was carried out on the osteological materials from the excavations in 1994-2019 at Taldysai<sup>12</sup>. The surface of the artifacts from Taldysai was studied using a Levenhuk DTX 700 LCD digital microscope. As a result of the analysis, the presence of use wear traces on individual tools was revealed, and their characteristic features were determined.

### THE RESULTS OF THE STUDY.

Tools made of horse jaw bones have been used in the region of Kazakhstan since the Eneolithic period. For instance, many examples are seen in materials from the Botay Culture settlements of Botay<sup>13</sup> and Krasniy Yar<sup>14</sup> in North Kazakhstan. The role of thong-smoothers at Botay in the control of tame or domestic horses is worth examining. It is recognized that thongs are multi-purpose materials, but the abundance of tools specifically designed for the manufacture of thongs indicates their importance at Botay<sup>15</sup>.

According to A. Choyke, the Early Bronze Age in Europe and Eurasia is characterized by the appearance of mandible-based thong-smoothers from Kazakhstan. However, a century or so later, these tools appear on Early Bronze Ages sites in Slovenia, Hungary and the Czech Republic. These tools were made from the mandibles of cattle, horses and red deer, depending on availability. The mandibles are modified distal to and around the third molar. The appearance of these thong-smoothers may be connected to a need to produce quantities of straps associated with the control of domestic horses. This was also a period where people were on the move through actual population movements and trade<sup>16</sup>.

The thong-smoother can serve to straighten, stretch, de-hair, or soften (break) the thong, depending on when in the process of preparing the implement it is employed. Regardless of the roles this tool plays, the motion is basically the same. The thong is run back and forth across a crisp (but not sharp) edge of a rigid tool. Bone or antler is often the material of choice for this tool because of the ease with which a smooth edge that does not cut the hide can be produced<sup>17</sup>.

It is believed that the tools from mandibles found in the Atasu micro district were used both for tanning processes and agricultural purposes according to their typological characteristics. These agricultural implements are bone sickles, of which 38 have been found (in the settlement Atasu – 10, Myrzhik – 24, Ak-Mustafa – 4)<sup>18</sup>. The bone sickles were made from horse mandibles and in several cases from caprines (sheep). First, all the teeth were removed, and their sockets were smoothed to form the handle. The working part was a jaw cut half in width and an additionally sharpened ascending branch.

Tools for the processing of skins from the Atasu district amount to about 118 samples (whole and fragments)<sup>19</sup>. They were prepared from the mandibles of ungulates (mainly horses) and rarely from caprines. Scrapers were made in the following way: at first, the teeth were removed from the jaw and the holes were smoothed, then the front (sharp) part of the jaw was cut and carefully polished. Usually, one side was trampled, the top or one half was removed completely, and then the high part became sharp. Such scrapers are polished to shine.

Also in the descriptions of the guns there is another group for mash of raw belts made from the mandibles of cows or horses. General descriptions are similar to scrapers for tanning. A characteristic feature of these tools is a special triangular notch in the corner of the jaw, behind the alveolar row<sup>20</sup> (**Fig. 2**). Usachuk and Bakhshiev believe in their paper that such holes were intended for attaching a handle or a belt to the scrapers, or for attaching dead ends to each other in pairs<sup>21</sup>. Such scrapers with holes are also found in the settlement of Kent, a site also located in Central Kazakhstan<sup>22</sup>.

In the Taldysai settlement, many scrapers were made from animal jaws. The total number is more than 150, including both whole and fragmented examples. The raw



**Fig. 2.** Mandibles with hole from settlements Atasu district (after KADYRBAYEV/KURMANKULOV 1992, 166).

<sup>12</sup> PANKOWSKI/SARGIZOVA 2020, 163.

<sup>13</sup> ZAIBERT 2011, 97; OLSEN 2001, 197.

<sup>14</sup> ZAIBERT 1993, 128.

<sup>15</sup> OLSEN 2001, 201.

<sup>16</sup> CHOYKE 2013, 7.

<sup>17</sup> OLSEN 2001, 201.

<sup>18</sup> KADYRBAYEV/KURMANKULOV 1992, 166.

<sup>19</sup> KADYRBAYEV/KURMANKULOV 1992, 165.

<sup>20</sup> KADYRBAYEV/KURMANKULOV 1992, 165.

<sup>21</sup> USACHUK/BAKHSHIEV 2020, 61.

<sup>22</sup> USACHUK/VARFOLOMEYEV 2013, 219.





**Fig. 3.** Taldysai settlement. Fragments of mandibles of ungulates.

materials used for scrapers were the mandibles of ungulates (mainly horses) and very occasionally caprines. 44 scrapers are made from the left half mandible and 39 from the right half mandible, with 60 examples being indeterminate by side. Thus, little preference is evidenced in relation to the side used. Scrapers for tanning processes belong to the class of industrial equipment in the classification matrix of bone and antler equipment from Taldysai settlement<sup>23</sup>. Bone scrapers were more likely to result from the imprecise manner in which the mandibles were struck with the hammer. This type is narrower and follows the contours of the posterior and inferior margins of the mandible, giving it a shape similar to a boomerang or sickle. After the general shape was achieved, one of the notches resulting from knapping away part of the jaw was selected. This notch was then either abraded or scraped with a stone tool to smoothen its working edge.

For the mandibles, the preparation of tools is often done in one process. The main processes occur in the following cases: 1) the condylar and coronoid processes are removed; 2) the jaw angle and the entire end part are cut off and leveled with a knife; 3) the incisal edge is cut off; 4) the toothless edge is trimmed at the bottom to form the “handle”; 5) teeth are extracted and the alveolar margin is cut off; 6) the resulting working edge is sharpened with a

es. Such traces are clearly visible on complete scrapers, and if used for a long time, then the working area gradually wore out and decreased (**Fig. 3; 4**). One of the fragments of mandible has a special hole and is linear with metal tools, there are signs of processing (**Fig. 5**). The working edge is worn and polished. This feature may be designed to be attached or tied in one place. It should be noted that such aspects are very rare and vague on Taldysai mandible tools.

Such tools were involved in the experiment of tanning processing<sup>24</sup>. The processing of the skin took place on a wooden base, and tools were used in the process of softening and fleshing. The working part of the blade is somewhat flattened towards the back or abdomen, depending on



**Fig. 4.** Scrapers from mandible. Taldysai settlement.

<sup>23</sup> PANKOWSKI/SARGIZOVA 2020, 165.

<sup>24</sup> SEMENOV/KOROBKOVA 1983, 172.





**Fig. 5.** Taldysai. A - scraper from mandibles; B - traces on working place; C- noched hole; D - traces of processing

which side the tool was facing the object being processed. Such tools turned out to be convenient for working on wide surfaces and required the skins of both hands in the process of tanning<sup>25</sup>.

The bone tools found in the Taldysai settlement are similar to the tanning processing tools found in the neighboring Kent settlement. The technology of production and the use purpose are the same<sup>26</sup>. Taldysai's scrapers were very similar to the tools of the Kent settlement; that is, the left and the right bones were both used. Interestingly, the peculiarity of these scrapers is that at Taldysai they were often found near the hearth, and some of them were burned. Such scrapers are very shiny, from being used for a long time, and they were found in a semi-broken, fragmented state (**Fig. 6**).

<sup>25</sup> SEMENOV/KOROBKOVA 1983, 181.

<sup>26</sup> USACHUK/VARFOLOMEYEV 2013, 219; VARFOLOMEYEV/LOMAN/EVDOKIMOV 2017, 64.

These tools have similar external characteristics to finds from the settlements of the Bronze Age on the territory of Kazakhstan and the Late Bronze Age settlement of Ustye I<sup>27</sup> in the Chelyabinsk State, and the Zharkovo-3 settlement in the central part of the Kulunda Steppe<sup>28</sup>. A fragment of a burnt mandible was found in the medieval Kultobe settlement, in a part of the old city of Turkestan (Eski Türkistan), located in Southern Kazakhstan<sup>29</sup>.

Some literature<sup>30</sup> suggests that the ancients processed the skin by burning it at the hearth to obtain a quality leather product. The burnt bones found in the Taldysai settlement may have been involved in such processes, or they may have been used as fuel in the case of equipment breakdowns, work

<sup>27</sup> USACHUK 2013, 482.

<sup>28</sup> FEDORUK/VALKOV 2015, 230.

<sup>29</sup> SARGIZOVA 2021, 142.

<sup>30</sup> BEYRI *et alii* 2002, 83; SEMENOV/KOROBKOVA 1983, 174.



**Fig. 6.** Taldysai settlement. A - Fragment of burnt mandible; B - traces on the surface of the mandible; C – traces on the working place.

areas and failures. Because they are heavily worn and occur in fragments.

## CONCLUSION

Numerous and typological use wear analyses allow the reconstruction of the technological process of production. The sources available today indicate that during the Bronze Age and the transition to the Early Iron Age, jaw scrapers were the most effective and common tools. Owing to their availability and ease of manufacture, they successfully competed with metal tools for a long time.

The general characteristics and purpose of the tools made of jawbones found on the sites of Central Kazakhstan are similar. They are often used in tanning processes. It can be concluded that, in the Late Bronze Age, the people of Central Kazakhstan, along with animal husbandry, metalworking, and ceramic manufacture, mastered the leather industries. They knew how to use the available raw materials efficiently. They were able to eat the meat of slaughtered animals, utilize their secondary products, and fashion their bones into tools of everyday life.

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