

THE SIGNIFICANCE OF METALLURGY AND MINING IN THE ENEOLITHIC AND BRONZE AGES: HISTORICAL ANALYSIS

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Abstract. *When our ancient ancestors began to use copper metallurgy, a new stage in the development of mining production began. It was during this period that people discovered other metals, in particular, tin, silver, and gold, along with copper. This process was an important stage in the development of mining in Central Asia. The article analyzes the history of the emergence of metallurgy and mining in the Eneolithic and Bronze Ages and their significance in social life.*

Key words: *Copper age, Bronze Age, mining, metalworking, tools, social division of labor.*

Introduction. In the region, by the end of the 3rd millennium BC, tools made of a new metal alloy - copper (bronze) - appeared. These new metal tools, which were made of copper and tin or copper and lead (in a ratio of 9:1), led to an expansion of the types of weapons used in hunting and military activities. Analysis. There is information that in the last period of the Kaltaminor culture (4th millennium BC), tribes living in the lower reaches of the Amu Darya began to use copper. It has been found that 13 ancient copper mines of the Early Bronze Age were found in the Central Kyzylkum. Copper workshops have also been found in these areas. Researchers suggest that copper tools were made from raw materials obtained from copper mines in Fergana or lower Zarafshan, depending on the additives in their composition (arsenic, antimony) [5, p. 11].

As a result of archaeological research conducted in Central Asia, in particular in Uzbekistan, it is known that many finds made of copper (knives, spearheads, beads, needles) and various ornaments (rings, beads, etc.) were found in the monuments of the Eneolithic and Bronze Ages [7]. However, since copper is a relatively soft metal due to its chemical properties, it could not completely replace stone tools. For this reason, the period between the Late Stone Age and the Bronze Age is called the Eneolithic, that is, the Copper-Stone Age. According to experts who have studied the monuments of the Copper Age and various finds found in them, the first metal objects were made of pure copper. It was found that the oldest of these objects were not melted in a fire, but were hammered cold, as if processing stone. Only in the 1st century BC. Only in the last centuries of the 4th millennium BC did ancient tribes learn about the valuable property of copper - that it can be melted in a strong fire, taken into various shapes and retained after cooling [6, p. 8].

The transition to the Copper Age led to a further increase in productive forces. Although copper weapons were much more advanced than stone weapons, copper was not very suitable for making durable and heavy weapons (especially tools of labor).

Based on the objects found in the monuments of the Copper Age and Bronze Age, we can conclude that copper was mainly used for jewelry, military weapons, and household items. However, the emergence of copper metallurgy and the appearance of copper tools in primitive households, albeit gradually, began to displace stone tools.

By the beginning of the 3rd millennium BC, tools made of copper had become more advanced. It was during this period that the mining of ore metals, such as copper, tin, silver, and gold, began to develop widely. They were melted, cast into molds, and made into objects of various shapes. The discovery of open-pit mines and metal smelting workshops around them in Central Asia and Kazakhstan [9, p. 16] demonstrates the correctness of our above idea.

In Northern Sogd, that is, in the Southern Kyzylkum region, mining complexes characteristic of the Mesolithic and Neolithic periods have been discovered. Ancient mining deposits have been found on the low-lying Kulzhuktoy, Aumingzatov, Tashditov and Bukantov hills here. As a result of geological exploration work carried out by archaeologists, the presence of a gold deposit has also been discovered. However, the most numerous among them are traces of ancient copper deposits. The Kentov deposit in the Etimtov mountains is considered an ancient deposit, and there are more than 50 mining deposits here. They were mainly mined using an open-pit method. The average copper content in the ore was 10 percent. In Aumingzatov, further west, there are more than 20 mining deposits, the shape and extraction of which are quite similar to those in the first region. Smaller mining deposits have been discovered in Tashditov and Beltov. Ancient miners were mainly interested in copper oxide ores that were rapidly soluble and not very deep [2, p. 40].

Near Koktav, on the site of what is believed to be an ancient river bank, special places were opened for smelting ores. The largest copper processing plant is located west of Boisaganek, where the largest Koktepa ore deposit is located. Here, ore deposits containing copper ore minerals such as malachite, chalcocite, and others were discovered.

In these areas, as a result of investigations conducted by an Uzbek-German archaeological team in 1999, a new, circular-shaped, artificially-ventilated ore-melting cauldron was discovered. The preliminary conclusion based on the study of the finds is that it will allow for a more in-depth study of the areas where these ores were found, and an objective assessment of the place of Sogd in the economy of Central Asia during the Bronze and Early Iron Ages [2, p. 40].

According to researchers, the lowest layers of the Lavlakon and Beshbulak sites in the Bukhara region and the Zamonbaba cemetery date back to the Eneolithic period, and in these sites, along with flint, copper needles and beads were also found [4, p. 41].

Monuments of this period were found in four places around the Kattatuzkan site in Lower Zarafshan, including stone awls, sickles, and knives scattered on the sand and gravel of the area, along with fragments of copper weapons. Archaeological finds (metal and stone weapons, jewelry) by their characteristics belong to the Chalcolithic period. Based on this, it can be assumed that metallurgy was quite developed in the Eneolithic period among the ancient peoples of Central Asia, including Khorezm.

The conditions of Central Asia were not favorable for the development of early agriculture, and the use of metal did not play a significant role in the lives of the population living near the mountains.

In the early metallurgical period, copper was a very valuable raw material, and pure copper (ore) was found only in a few places. The spread of farming tribes to distant territories was associated not only with the development of new lands, but also with the search for mineral resources and deposits of metal ores. The remains of domestic animals, stone awls, and some copper objects found in some places of Central Asia indicate that in the 3rd-2nd millennium BC the first shoots of animal husbandry, agriculture, crafts, and metallurgy appeared.

In very ancient times, metallurgy developed slowly. Therefore, for a long time, weapons made of copper resembled stone weapons.

It is known that although primitive people discovered the excellent property of copper - ductility, this metal could not bring significant changes to the social and economic life of ancient tribes. However, the discovery of bronze (90% copper and 10% tin) was a step forward in socio-economic life. Because bronze is much superior to copper in terms of its properties. It melts faster than copper, is not so brittle, and is much harder than copper. Therefore, weapons made of bronze were stronger and more durable than copper weapons. The Bronze Age in Central Asia covers the period from the 3rd millennium BC to the end of the 2nd millennium BC. During this period, production relations developed rapidly, affecting social and economic processes [9, p. 16].

Bronze Age artifacts were first discovered in Uzbekistan in Khorezm, and later in the Zarafshan, Surkhandarya, and Fergana valleys [11]. In particular, a treasure trove of bronze and silver artifacts was found in the village of Hak in Fergana. The high level of Bronze Age artifacts, tools, vessels, ornaments, weapons, glass, pottery, especially metal objects, razors, and other artifacts, as well as the extraordinary richness of the Tagisken monument found in the Syr Darya delta, dating back to the late 2nd millennium BC and the tomb of a tribal elder or leader of that period (a gold jug, even bronze nails decorated with gold leaf), testify to the high level of development of mining and metallurgy in Uzbekistan [10, p. 233-235].

Furnaces for smelting bronze and brass, dating back to the late 3rd and early 2nd millennium BC, have been found in Bokontag, Central Kyzylkum, and Nurota. The depth of the mines of this period was up to 18 meters. Geologists and archaeologists have also found primitive furnaces for smelting bronze and iron in Kyzylkum. They date back to the 2nd and 1st millennia BC. There is also a lot of information about the fact that people of this period were good metalworkers. They had certain knowledge about the location of underground resources and had the necessary skills in mining. Therefore, having mastered the experience of extracting the metal they needed, they significantly developed the technique of smelting bronze and making various objects from it [9, p. 17].

Tin was also mined in Uzbekistan during the Bronze Age. During the research conducted in 1997-1999 by members of the joint Uzbek-German scientific project ("Tin Mining in Pre-Islamic Central Asia"), ancient tin deposits were discovered in Central Asia, which provided new information clarifying the role of these deposits in the development of metallurgy in the Near and Middle East during the Bronze Age. Within the framework of this project, financed and implemented by the Volkswagen Foundation, it was determined that tin was mined in ancient times from the tin deposits of Karnab, Lapas and Chingali (Uzbekistan), Mushistan and Takfon (Tajikistan). The dating of the found pottery vessels and radiocarbon analysis showed that the tin deposits in all these areas date back to the Andronovo-Tozabogyob culture, that is, to the first half of the 2nd millennium BC. This period, in turn, corresponds to the Middle Bronze Age in Siberia and the Late Bronze Age in Southern Turkmenistan and Bactria. During the research, it was possible to clean and open one ancient mine in Karnab, and its depth was found to be 17.5 meters. In other places, the groundwater level was 9.5 m. A large number of stone axes and their fragments, as well as pottery of the Andronovo-Tozabogyob period, were found in ancient mines and mines. It was determined from numerous mine tailings in Karnab that 500 tons of tin were delivered to this area during the entire period of mining in this area [1].



MODERN EDUCATIONAL SYSTEM AND INNOVATIVE TEACHING SOLUTIONS

Archaeological research indicates that during the Bronze Age, major changes occurred in the cultural development of human society, and bronze played a significant role in these processes.

Over time, the presence of metal ores, including gold, copper, and iron, became of great importance for the development of metallurgy. Ancient copper mines and smelting furnaces have been discovered in ancient sites in Karakalpakstan. Copper and bronze artifacts, such as sickle-knives, spearheads, and jewelry, have been found in the upper layers of the northern and southern hills at the Anov settlement in southern Turkmenistan [8, p. 42].

The economic basis of the ancient statehood and the growth of the population of this region were greatly influenced by the mining and processing of copper, bronze, tin and iron, that is, the development of metallurgy. The territory of ancient Uzbekistan, as praised in the "Avesta", the sacred book of the Zoroastrian religion, was a peaceful, prosperous, rich and strong, that is, a region with strong economic development. Until recently, science believed that metallurgy was not developed in these regions, and the need for metal was satisfied at the expense of Central Kazakhstan, Tuva, the southern regions of Iran, as well as the copper and bronze mining regions of the Middle East. This is because the mineral base between the two rivers of Central Asia at that time was not yet clear. However, research in recent years shows that these ideas are unfounded. In particular, during the extensive research work carried out in the territories of Ancient Sogd in 1997-1999 by the Uzbek-German archaeological expedition of the Institute of Archaeology of the Academy of Sciences of the Republic of Uzbekistan, the German Institute of Archaeology, the Mining Museum in Bochum and the German Mining Academy of Archaeology, new deposits in Central Sogd, large volumes of tools and pottery from ancient mines were discovered. This, in turn, proved that excavations in the mining mines in this region date back to the 2nd millennium BC [3, p. 28].

The area that caused great interest during the joint expeditions was the Central Red Sands. Among the sand dunes, east of Aumingzatov, 8 copper smelting points were identified on an area of 1 km², and 10 smelting points in the area of Lake Lavlakon. Analyses have shown that local ores were smelted at a site in the Lavlakon region, and later raw materials were brought from other regions and smelted. 8 more mining sites were found in the Beshbulak region, and according to studies, chemically pure copper was smelted there.

The largest sites of ancient metallurgists were also discovered in the Chatkal-Kurama mountains west of Yetimtog. In an area 1.5-2 km wide and 10 km long in the southwest direction of this area, it was found that there were alloys separated during the smelting of ores. Mining sites and tools were also found here.

Conclusion. Summarizing the above points, it can be said that:

- Central Asia has been famous for its rare metals, gold, and silver deposits since ancient times.
- The extraction and use of these products began in the Bronze Age, and this process played an important role in the further deepening of the division of labor, the change in social relations, the improvement of labor tools, the development of new lands, and the economic development of the ancient population.
- Based on the above, it can be said that in the III-II millennia BC. the territory of Uzbekistan was one of the regions of Central Asia where copper and bronze metallurgy was developed, and handicrafts were highly developed.



- The use of semi-metallic and non-metallic mineral resources was widely developed in various regions of Uzbekistan. In addition to meeting the needs of local craftsmen, the extracted mineral resources were also exported to foreign countries as important strategic raw materials.

- During this period, various minerals and metals were mined in Uchkurgan, the Chirchik-Akhangaran oasis, the upper reaches of the Ugam River, the Nurota Mountains, and other regions.

References:

1. Alimov K., Bubnova M., Burjakov J., Jakubov J., Pernicka E. and Weisqerber G. Das Zinn der Bronzezeit in Mittelasien I – Berlin. 2003. 306–307 seitens.
2. Буряков Ю.Ф. Из истории горного дела и металлургии древнего Согда // Центральная Азия: источники, история, культура. Тезисы докладов конференции. – М., 2003. –С.40.
3. Буряков Ю.Ф. Металлургическая база древней государственности Согда и Хорезма // Марказий Осиёнинг маданият алоқалар тизимида мавзусидаги конференция тезислари. – Самарканд. 1999. 28-бет.
4. Гулямов Я.Г., Исламов У., Аскарлов А. Первобытная культура и возникновение орошаемого земледелия в низовьях Зарафшана. –Т.: Фан, 1966. С. 41.
5. Лордкипанидзе Л.Н. История геологического изучения Узбекистана. –Т., 2001. С.11.
6. Массон М.Е. К истории горного дела на территории Узбекистана. –Т., 1953. С.8.
7. Массон В.М. Средняя Азия и Древний Восток. –М.-Л.: Наука, 1964; Сарианиди В.И. Энеолитическое поселение Геоксюр. //Тр. ЮТАКЭ. –Т.Х. – Ашхабад: Ёлым. 1960.
8. Средняя Азия в эпоху камня и бронзы. –М.-Л.: Наука, 1966. с. 42.
9. Темиров Г.Т., Одинаев З.Б. ^аадимги давр кончилиги ва металлургияси. – Навоий. 2004. 16-бет.
10. Темиров Г.Т. Средняя Азия в эпоху камня и бронзы. С.233-235.
11. Толстов С.П. Древний Хорезм. –М.: Изд-ва МГУ, 1948; Гулямов Я.Г., Исламов У., Аскарлов А. Первобытная культура..., Аскарлов А.А. Древнеземледельческая культура эпохи бронзы Юга Узбекистана. –Т.: Фан, 1977; Заднепровский Ю.А. Древнеземледельческая культура Ферганы //МИА. –1962. – №118.

