Ancient Metallurgical Center in Georgia

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Abstract. *Georgia is situated in Caucasia, between the Black Sea and the Caspian Sea. Its terrain is created by the Greater and the Lesser Caucasus, rivers with great volume of water flowing between them and coastal plains. The territory of the whole Caucasus and, specifically, Georgia, is one of the main communication areas linking ancient Steppe empires with Near Eastern civilizations (pl. 1), which, alongside rich natural conditions, significantly determined formation of human society from ancient times and proved favourable to its development.*

Formation and evolution of the human society in any corner of the earth, from the earliest times to ancient civilizations, largely depends on the geographic environment and reasonable exploitation of natural resources by humans.

With its mild climate, fertile lands, flora, fauna, alpine pastures and low-lying fields, diverse natural resources, extensive river network, etc. Georgia has always provided convenient conditions for human habitation and development of economic activities.

Southern slopes of the Caucasus Mountain Range and the highlands of the Lesser Caucasus are especially rich in metallogenic provinces.

The present article deals with when production of different metals started here and whether it became one of the main bases for development of the society.

Key words: *metallurgy, Caucasus, Bronze Age.*

Introduction. In Georgia they started processing various metals in the VI millennium BC, which eventually turned into the main factors for development of the society.

Georgia has the following types of metal ores necessary for producing bronze: copper-pyrite, colchedan-gold-barite-polymetallic, copper-porphyrin and related vein-type gold-polymetallic deposit and vein-type lead-zinc deposit.

In Near East metal mining and metalworking begins in the non-ceramic Neolithic epoch in the IX-VIII millennia BC. These activities are known both in the form of finished products and metal pools which points to presence of pyrotechnological processes in this epoch.

In Georgia very small objects made of virgin copper through hammering first appeared in the sites of Shulaveri-Shomutepe culture, Marneuli District (pl. 2). The earliest are the artifacts discovered at Khramis Didi Gora that were dated by 5568 and 5350±210 through radiocarbon (C¹⁴) method. There are also references to discovering copper pools at this site; however, the artifacts known from Khramis Didi Gora are made only of virgin copper by means of hammering.

In Caucasia the earliest metal artifacts have been discovered in Armenia, Artashen and Aknashen. They are also made of virgin copper. Using the radiocarbon (C¹⁴) dating techniques, Artashen is dated by 5878 and 5775 BC, and Aknashen – by 6000-5500 BC.

In Caucasia the earliest workshop producing metal has been evidenced at Leilatepe settlement site, but at the settlement sites of Shulaveri-Shomutepe culture it dates from the Late Eneolithic epoch and belongs to the culture represented by the materials that are alien to Caucasia.

As it has already been proved, in the late V millennium – Early IV millennium BC, a huge mass of advanced Uruks arrived in Caucasia from Mesopotamia along the valleys of the Mtkvari and the Chorokhi. They actually covered the whole Caucasia - the Greater Caucasus with the territories south and north of it. It is thought that they reached Caucasia in their search for raw material necessary for bronze metallurgy, got close to the local community through their activities, merged with them and eventually settled in this country. Apparently, they shared their advanced experience with the local inhabitants in many branches of economy, including all the spheres of bronze metallurgy.

It cannot be excluded that this proximity had crucial influence on local society's social-economic advancement and, probably, it laid the foundation for formation of the strongest, particularly advanced Early Bronze Age Kura-Araxes and Maykop cultures in Caucasia.

As is known, from this time metal production became one of the leading powers of Caucasian cultures throughout the Bronze-Iron Age. There are many indications of particularly advanced bronze metallurgy and metalworking in the period of Kura-Araxes culture of the Early Bronze Age. Vast scale of bronze mining and processing is expressed through comprehensive laboratory investigation of finished products of this epoch on the territory around the Black Sea. Research showed that the bronze artifacts of archaeological cultures existing within these frames were largely made of Caucasian metal -arsenical copper (pl. 3). Accordingly, it was logical to presume presence of such a number of ancient exhausted ores in Caucasia. Regrettably, no site of this function and this period has been revealed and studied throughout Caucasia so far.

By now, there is only Sakdrisi hill (pl. 4) in Bolnisi Municipality, Kvemo Kartli, where ancient exhausted ores have been identified. It is presumed that it belongs to the Early Bronze Age, is attributed to the Kura-Araxes culture and is considered to be a gold-mining site. However, these deductions do not sound convincing to a big group of specialists of different fields. As far as the radiocarbon (C^{14}) dating carried out to provide the date is concerned, there arise many questions here too. For instance, many scholars presume that the coal sample(s) received from the so-called 'mine' cannot be considered to be authentic evidence, because its provenance is unverifiable, is not documented in situ and it could have ended up in the mine from the surface. Given this and some other facts, opinions about Sakdrisi being the 'ancient gold mine', unfortunately, sound unconvincing.

Starting from the Early Bronze Age – beginning of the IV millennium BC and throughout the III millennium BC – 'leaping', 'explosive' development of bronze metallurgy in the South Caucasus is indicated by presence of melting furnaces and colossal, high- quality products discovered in Caucasia (pl. 5,6,7,8). They occupy a prominent place among the artifacts of the whole Near East. From this time particular advance of metallurgical industry is reflected in discovery of a large number of metal objects and moulds for casting them at Pichori settlement site on the black Sea coast (pl. 8).

In the Early Bronze Age, the reason for the 'explosive' nature of development of the Kura-Araxes culture could not have been based on the impressive progress of just one of its internal dives- metal production. In my opinion, this process was also influenced by emergence of the so-called Alazani-Bedeni culture in the central part of South Caucasus during the heyday of the Kura-Araxes culture. It looked different from the Kura-Araxes culture and its level of social-economic development was much higher than that of the Kura-Araxes culture. Origin of the so-called Alazani-Bedeni culture has not been estimated so far and it attracts attention by many peculiar features. It should be mentioned that distribution of this culture does not coincide with the borders of distribution of the Kura-Araxes one and is limited to only a specific small part of the central area of South Caucasus. It is a significant fact because it is these borders that the further, Middle Bronze Age Trialeti culture of the central part of South Caucasus and the following early stage of the Late Bronze Age fall in. Based on present data, it

is impossible to explain the fact of this extremely significant coincidence, but it should definitely be considered and it is necessary to conduct further research to analyse it.

Despite the fact that the Alazani-Bedeni culture, which dates to the second half of the III millennium BC, is represented only by burial sites, it still offers basis for general characterization and identification of the social-economic level of development of the society bearing this culture, which, as it seems, was more developed than its contemporaneous Kura-Araxes culture.

Settlements of the time have not been discovered and studied yet and we can discuss the society's social-economic system only according to mortuary material. Nevertheless, using new technologies allows us to create a certain impression about the Alazani-Bedeni culture.

Specifically, there are many indications that the society bearing the Alazani-Bedeni culture must have followed a settled lifestyle, as it is characterized by highly developed fields of agriculture. Humans of this epoch grew five sorts of wheat and other crops. They were intensively involved in horticulture and beekeeping, were occupied with weaving, pottery making, medicine, metalworking, carpentry and so on. There is another small, but extremely important detail: the wooden burial chamber of one of the rich, particularly large burial mounds in the Alazani Valley yielded an exquisite large wooden armchair executed with high artistic skills which provides another indication of settled lifestyle of the Alazani-Bedeni society, presence of well-built settlements and comfortable structures (pl. 10).

Presumably, the solid large wooden burial chambers belonging to the Alazani Bedeni culture are the product of the tradition strongly formed during construction of residential structures (pl. 11).

High level of pottery production is testified by ceramic vessels made with refined taste and on a high technological level. Many of them are particularly big which also points to the sedentary lifestyle of the community that produced them.

Archaeological record for metal production of this period comes from only mortuary goods (pl. 12). It differs from the artifacts of the Kura-Araxes culture not only in terms of shape, but composition of metal as well, part of it is made not of arsenical bronze which is typical of the Kura-Araxes culture, but of tin-bearing metal too.

It should be mentioned that at the time the number of ornaments produced of gold and silver, statues (pl. 13) and high-quality artifacts of different functions grows, which is novelty for the Early Bronze Age Caucasus.

Emergence of huge elite burial mounds with wealthy inventory and the tradition of human sacrifice both on the roof of burial chambers and inside graves must be pointing to high social stratification of the society of the time.

It is significant that the Alazani-Bedeni culture caused the final phase of the Kura-Araxes culture to change substantially. It was reflected in the social sphere of the society of this period as well as in different aspects of its material culture.

Only at the end of the Kura-Araxes culture emerge grandiose tumuli with burial chambers built of logs and containing rich inventory (pl. 14), and human sacrifice which should be ascribed to the impact of Alazani-Bedeni culture. Metal weapons of the time still maintain the forms typical of the Kura-Araxes culture, but, unlike arsenical bronze products characteristic to the Kura-Araxes culture, they often use tin-bearing bronze common to the Alazani-Bedeni culture.

Existing artifacts do not provide more detailed information about metallurgy and metalworking of this period. Nowadays it is also difficult to speak about the traditions of bronze metallurgy and metalworking of the archaeological cultures of the central and western parts of South Caucasus of the first half of the II millennium BC, following the Early Bronze Age, because no manufacturing unit of this time has been revealed so far. Metal products of the time are known only through mortuary goods and

their appearance does not allow us to associate them with local materials. The most significant metal artifacts of the central part of South Caucasus resemble more to southern civilizations (pl. 15, 16, 17). While those from western part of South Caucasus find more in common with the artifacts typical of northern-steppe and eastern European cultures, which is most vivid in pottery. In the central and western parts of South Caucasus both cultures are distinguished by local features expressed in many ways.

It is almost excluded to speak about mining, metallurgic and metalworking processes of these periods, as science does not possess any tangible material. In this respect, drawing general conclusions based solely on finished products could contain certain errors.

Thus, due to complete lack of proper data, it is extremely difficult to discuss mining, metallurgical industry and metalworking of the Early Bronze Age Alazani-Bedeni and Middle Bronze Age cultures in the central part of South Caucasus. For the same reason, it is impossible to draw conclusions about any genetic links between these cultures. This problem should become subject of special research, otherwise we should seek intermediary linking cultures between them or search for strong impacts of regions situated outside Caucasia on every stage of development in order to explain differences between them. Therefore, we can only discuss their interrelations according to the level of social development which, as it is thought today, must have had the form of an early class society.

It has already been convincingly documented that by the end of the Middle Bronze Age, in the mid-II millennium BC impacts of northern-steppe cultures in central Transcaucasia increase, which had considerable influence on the development of local cultures. During this section of development of South Caucasian cultures genetic link between the Middle and Late Bronze Ages has been reliably estimated. It has also been estimated that from this epoch a society is formed which is based on strong irrigation farming and particularly developed metallurgy and which had quite definitely created state structures equal to Near Eastern civilizations.

Especially noteworthy is that one of the principal aspects of development of this society is metallurgy. The first indication of this is particular multitude of high-quality metal products throughout South Caucasus from the early stages of the Late Bronze Age – the 14th century BC. These products occupy a prominent place throughout Near East (pl. 18-26). A series of exhausted ores of copper mines of the second half of the II millennium BC has been investigated only on the southern slope of the Greater Caucasus in western Georgia (pl. 27-28). As for the metal workshops of the time, only one workshop has been studied in the mountains of the Lesser Caucasus, on the territory of present Armenia and two – on the Lori Plateau, which is indeed insufficient for comprehensive research of manufacturing of a colossal number of finished products.

There was an attempt to suggest a very early 14th century BC as the date of transition to iron production in South Caucasus, but it was not shared from the very beginning. Currently there are findings that point to the necessity of intensifying research in this direction. Discovery of a large number of finished iron products in the central part of South Caucasus from the late II millennium BC provides good grounds to confirm this necessity.

Thus, as a consequence of the above mentioned, bronze and iron production must have been one of the principal bases for social-economic development of the society in South Caucasus, which obliges us to intensify further work in this very direction because, as shown above, present condition of research in this field is not satisfactory.

PL. 1 Georgia and the outside world. Physical map

PL. 2 Neolithic artifacts from the territory of Georgia

PL. 3 Areas of distribution of Caucasian metal in Circumpontic zone in the Early and Middle Bronze Age

PL. 4 Sakdrisi hill. Ancient exhausted ore

PL. 5 Melting furnaces and moulds for casting metal weapons of the Kura-Araxes culture

PL. 6 Metal workshop of the Kura-Araxes culture of the Early Bronze Age. Amiranis Gora settlement site

PL. 7 Metal products of the Kura-Araxes culture

PL. 8 Bronze axes of the Kura-Araxes culture found in South Caucasus

PL. 9 Western Georgian Early Bronze Age moulds for casting axes from Pichori settlement site

PL. 10 A wooden armchair discovered in the tumulus of Alazani-Bedeni culture. Reconstruction

PL.11 Burial chamber of the tumulus of Alazani-Bedeni culture with a wooden chariot

PL. 12 Metal artifacts discovered in the tumuli of Alazani-Bedeni culture

PL. 13 Gold sculpture of a lion discovered in a tumulus of Alazani-Bedeni culture in the Alazani Valley

PL. 14 Final phase of Kura-Araxes culture – gold and silver ornaments of a tumulus

PL.15 Artifacts of the central part of South Caucasus dating to the first half of the II millennium BC

PL. 16 Artifacts of the central part of South Caucasus dated to the first half of the II millennium BC

PL.17 Silver and gold vessels of the Middle Bronze Age tumulus of Trialeti culture

PL. 18 Military axes typical of central Transcaucasian cultures of the second half of the II millennium BC

PL. 19 Bronze axes typical of central Transcaucasia in the second half of the II millennium BC.
Moulds for casting them and flat axes

PL. 20 Bronze horse-bits typical of central Transcaucasian cultures in the II and I millennia BC

PL. 21 Central Transcaucasian bronze daggers and their typology

PL. 22 Bronze spearheads typical of the cultures of the central part of Transcaucasia in the 14th -13th cc BC

PL. 23 Bronze spearheads typical of the cultures of the central part of South Caucasus in the 12th -7th cc BC

PL. 24 Bronze weapons typical of the cultures of the central part of South Caucasus in the second half of the II millennium BC

PL. 25 Bronze axes with engraved ornament from western Georgia. Second half of the II millennium – first half of the I millennium BC

PL. 26 Bronze axes with engraved ornament from western Georgia. Second half of the II millennium – first half of the I millennium BC

PL. 27 Southern slope of the Greater Caucasus, Mountainous Racha. Copper mine. Second half of the II millennium BC

PL. 28 Southern slope of the Greater Caucasus. Ancient exhausted copper ore of Bashkatsari. Second half of the II millennium BC