

## **FERROUS METALLURGY CENTER OF THE BRNJICA CULTURAL GROUP (14<sup>th</sup>–13<sup>th</sup> CENTURIES BC) AT THE HISAR SITE IN LESKOVAC**

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### **ABSTRACT**

The remains of the ferrous metallurgy and handicrafts center based on iron from the oldest Brnjica cultural group stage (the 14<sup>th</sup>–13<sup>th</sup> centuries BC) were discovered in one part of the archaeological Hisar site in Leskovac; found are: millstones (several hundreds), smelting furnaces (dozens), charcoal pits, air blowing ceramic pipes, slag, amorphous iron, bloom and other ferrous artefacts.

**Key words:** iron, furnaces, slag, ferrous artifacts, Brnjica culture

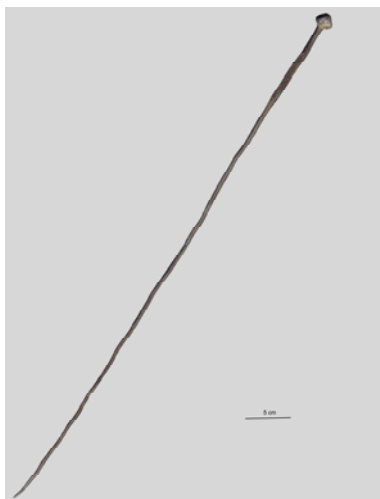
The experts in archaeometallurgy deny existence of iron production in Europe prior to the first millennium BC maintaining that the ferrous artefacts from the last centuries of the second millennium BC, found within the territory of the continent, were made of raw material imported from the Middle East (by “alloy circulation”) or that they stem from meteoric iron [1]. The archaeological research, however, proved the existence of the ferrous metallurgy center at the Brnjica site Hisar in Leskovac dating the 14<sup>th</sup>–13<sup>th</sup> centuries BC (Figure 1) [2].

Given the fact that several ferrous artefacts from the period of 14<sup>th</sup>–13<sup>th</sup> (12<sup>th</sup>) centuries BC were discovered within the central Balkan territory prior to 2005, until that year there were no proofs of existence of possible local metallurgy of iron [3]. The discovery of a big iron needle at the Hisar site in Leskovac stimulated even more the archaeological research of metallurgy of iron.



*Fig 1*

Namely, several months after the trial archaeological excavations in 2000 at the Hisar site in Leskovac, which served to substantiate the complete development of the Brnjica cultural group (the 14<sup>th</sup>–10<sup>th</sup> centuries BC) in the South Morava river basin, an associate from the Leskovac Museum, who had taken part in the excavations, found at the bottom of the excavation profile from the mentioned year, a 0.645 m long ferrous artefact in a form of a needle, (Figure 2) [4]. “The needle” has irregular biconical head with largest width of 0.021 m, mildly bent neck of ca. 0.006 m in diameter connected to a part of 0.007 m wide square cross section, while the remaining part, in direction of the point, has a diameter between 0.005 and 0.002 m. The head is wrought crudely and is of irregular form. The swelling of the “needle”, of square cross section, has a very symmetrical form. There are no visible traces of corrosion on this artefact. By a method of energetic dispersion X-fluorescent spectroscopy it is established that the needle was made of iron with no traces of any other metals. The X-ray shows the needle to be made of very compact iron. In short, this artefact was made of very compact iron with no traces of other metals and has not shown any signs of corrosion both during the period of burial in the ground and later on.



*Fig. 2*

The archaeological excavations carried out in 2003 showed that the iron needle (Turović's needle) found in 2000, comes from a large architectural structure from the 14<sup>th</sup> or 13<sup>th</sup> centuries BC in the center of which was a large furnace and a great number of millstones with traces of ore grinding (iron?) [5]. The analyses showed that the furnace was not used for food preparation, but most likely for iron smelting, because no animal bones or fruits remnants were found, but for amorphous iron pieces, slag and air blowing ceramic pipes [6].

During the archaeological excavations in 2005 at the same Hisar site in Leskovac, five other ferrous artefacts were found: three (of which two were chisels and a needle fragment with an oval head) in an architectural structure from the oldest stage of the Brnjica cultural group (the middle of the 14<sup>th</sup> century BC) –

(Figures 3–5), one (iron–bronze combination) under a furnace calotte and a 3340 g. cast in a Brnjica cultural group layer, characterized specially by the Mycenaean style painted ceramics (Figure 6). In 2005, several kilometers to the southwest from the Brnjica metallurgic center, at the Hisar site in Leskovac, another needle was found, same by type, but somewhat shorter than the 2000 find (Figure 7). In the close vicinity of the slag filled structure (where the three ferrous artefacts were found) were found remains of dozens of furnaces (Figures 8–9) among which is the furnace under calotte of which was found the artefact made in the iron–bronze combination.



Fig. 3



Fig. 4



Fig. 5



Fig. 5a



Fig. 6



Fig. 7



Fig. 8



Fig. 9

*Fig 10*

In short, during the archaeological excavations in the part of the Hisar site in Leskovac, in the oldest stratum of the Brnjica cultural group (the middle of the 14<sup>th</sup> century BC) were found: ferrous cast of several kilograms, amorphous iron, ferrous artefacts, slag, remains of numerous smelting furnaces, charcoal pits, ceramic air blowing pipes (Figure 10), millstones with traces of ore grinding; consequently, all the finds confirm the existence of a ferrous metallurgy and handicrafts center at the Hisar site, based on iron.

The ferrous artefacts in a form of “shafts” or “spits”, similar to the “needles” from the Hisar site in Leskovac, found in larger numbers at one spot (the Lower Danube, Peloponnesus, Middle East) are considered to represent the (pre-monetary) payment means, expensive presents or, possibly, votive presents [7]. The oldest ferrous artefacts in the Middle East very often are in a form of a chisel, similar to the chisel from the Hisar slag structure [8]. The iron production in the Middle East during the second half of the second millennium BC, as well as the distribution thereof, particularly of finished artefacts, was under the strict control of rulers, as confirmed in the written documents of the time [9]. It may be assumed that there was no kept evidence of the “royal metal” expenditures at the Hisar settlement in Leskovac, that there was no iron inventory as had been kept by the Hittites or the Assyrians, but it is quite certain that the leading personality of the South Morava river basin society living in the settlement, had taken care of the production and distribution of iron and ferrous artefacts as well as that he had seen to it that the metallurgic secret of production of the “metal, more expensive than gold” remained under his monopoly, the same as had done the powerful Hittite and Mesopotamian rulers.

The Rajkinac axe, ferrous artefacts traces from Stari Kostolac, the iron fibula from the Gornja Stražava urn and the ferrous artefacts from Leskovac are the oldest ferrous artefacts in the central Balkan region, pointing to the fact that iron was utilized by all the communities from the area during the 14<sup>th</sup>–13<sup>th</sup> (12<sup>th</sup>) centuries BC [10]. All the ferrous artefacts have cultural and chronologic context. The Rajkinac axe belongs to the Paraćin cultural group, Leskovac and Gornja Stražava artefacts – to the Brnjica cultural group, while the Stari Kostolac artefacts – belong to the Belegiš II cultural group, that is, most probably to the cultural manifestation characterized by a mixture of yellow hill ceramics and cannellured ceramics of Belegiš II type – Gava. In short, these artefacts prove the use of ferrous artefacts of all the central Balkan communities during the period of 14<sup>th</sup>–13<sup>th</sup> (12<sup>th</sup>) centuries BC.

The context (grave finds) of individual artefacts point out that the ferrous products were exceptionally appreciated during the 14<sup>th</sup>–13<sup>th</sup> centuries BC in the Pomoravlje region (along the Morava rivers), not only as expensive products but as objects of definite symbolic meaning.

Hisar in Leskovac was the only settlement within the central Balkan region from the period of the 14<sup>th</sup>–13<sup>th</sup> centuries BC with a fortification – an acropolis of several hectares of land. Its location (at the crossing points of roads leading along the Jablanica and Veternica rivers' valleys and along the Morava river valley), its size (of several hectares), its continuity (14<sup>th</sup>–13<sup>th</sup> centuries BC), permanent development, specialized features of individual parts of the settlement (acropolis, metallurgic center, bone processing center, representative architecture (habitations decorated in Mycenaean style plastics), variety of ceramics (diverse forms, extraordinary quality, richness of decoration, Mycenaean style imitations), – all of these confirm that the settlement at the Hisar location in Leskovac was the most representative one and undoubtedly the main settlement of the Brnjica community, the largest and the only one artificially fortified settlement within the whole central Balkan region during the last centuries of the second millennium BC.

The settlement, being the largest within the whole central Balkan region, as already emphasized, distinguishes itself by two characteristics. It has its fortification – acropolis, protected by a moat and a rampart, its bronze and iron metallurgic and handicrafts centers and a separate bone processing center. In all cultures and periods of time, metallurgic centers, particularly the iron ones, were under the protection of fortified palaces i.e. of fortifications.

The earliest iron metallurgy (in the second half of the second millennium BC) in the Middle East was carried out explicitly under the auspices of the capital of the state and the ruling palace [11]. The Hisar settlement in Leskovac from the second half of the second millennium BC reproduces the same pattern.

It might be supposed that knowledge of iron metallurgy arrived to Pomoravlje from the Mycenaean area, the same as the influences manifested in the architectural plastics (to be found at Hisar) as well as in painted ceramics. The Mycenaean civilization reached its culmination in the 14<sup>th</sup>–13<sup>th</sup> centuries BC, greatly because of the monopoly both of production and distribution of bronze artefacts across the significant part of the Mediterranean. On Mycenaean territory were found ferrous artefacts, but there is no proof of local metallurgy of the metal, which makes it certain that these ferrous artefacts were imported from the Middle East (the same as in Egypt) [12]. It seems, however, that the ferrous artefacts stemming from the Mycenaean soil are younger as compared to the ferrous artefacts belonging to the Brnjica cultural group from Pomoravlje. Moreover, it seems that the Mycenaean interest for some communities in Pomoravlje, such as the one belonging to the settlement in Leskovac, proved by architectural plastics and painted ceramics – was at least partly motivated by possibility to acquire iron. Even if the Mycenaean community had the knowledge to produce iron, it was much easier for them to get it through barter from outside than to produce it on its own soil because of the energetic shortage (lack of wood) of the civilization from the south of the Balkan Peninsula.

There are reliable proofs of iron utilization by all the central Balkan communities as well as that the Brnjica community, as already mentioned, mastered the iron metallurgy and handicrafts based on this metal in its early stage (ca. 1350 BC) [13]. Moreover, all ferrous artefacts found in the central Balkan region come

from enclosed entities – graves and depositories or from layers, the relative chronology of which is determined precisely [14].

The Rajkinac axe, ferrous artefacts traces from Stari Kostolac and the ferrous artefacts from Leskovac and Gornja Stražava are the oldest ferrous artefacts in the central Balkan region. All the artefacts have their cultural and chronological context. The Rajkinac axe belongs to the Paraćin cultural group, Leskovac and Gornja Stražava to the Brnjica cultural group; the Stari Kostolac artefacts belong to the Belegiš II cultural group – Gava.

The ferrous artefacts from Pomoravlje from the period of the 14<sup>th</sup>–13<sup>th</sup> centuries BC and particularly, the existence of the ferrous metallurgy center from the 14<sup>th</sup> century BC within the framework of the sole artificially fortified settlement in the central Balkan region – on the Hisar site in Leskovac, point to the region which had a definite, and possibly the crucial part in the far-reaching events designated as the Aegean migration.

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