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MALACHITE FINDS IN VINČA CULTURE: EVIDENCE OF EARLY COPPER METALLURGY IN SERBIA

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ABSTRACT

Large ore deposits in the central Balkans resulted in early discovery of metallurgy by the Neolithic inhabitants. High quantity of malachite at some Vinča culture sites was explained as associated with the beginning of metallurgy. Malachite was found mostly in form of amorphous lumps so it is more likely that it was primarily used in primitive metallurgy and incidentally in production of stone objects for adornment.

Key words: malachite, early copper metallurgy, Vinča culture

Large ore deposits in the central Balkans resulted in early discovery of metallurgy by the Neolithic inhabitants. Finds and situations encountered at some of Vinča sites in Serbia (Vinča, Pločnik, Belovode, Fafos etc.) support that statement [1, 13, 25, 29, 33, 34]. These very finds and situations shift the introduction of metallurgy in the central Balkans to the very beginning of the Vinča culture and also transfer the epicenter of development of early metallurgy from the eastern to the central Serbia.

Objects of malachite, indeed in small quantity, were also in use earlier of the Vinča culture in the territory it later encompassed. One pendant is recorded at Lepenski Vir in settlement IIIa while in pits and pit dwellings of Lepenski Vir IIIb settlement occur the beads of azurite and malachite [21, 22]. At Divostin I dated in Starčevo culture was found one pendant and one conically shaped piece of azurite [11]. At Zmajevac near Smederevska Palanka, also the Starčevo culture site, was recorded the lump of malachite [7]. These isolated cases should not be connected with metallurgy because malachite was used exclusively as decorative stone but this undoubtedly confirms that bearers of Starčevo culture were acquainted with deposits of copper ore. Cases of the use of malachite for production of decorative objects, also entirely exceptional, were recorded in the Early Neolithic of surrounding areas. All these finds, as well as those from the Starčevo culture territory occur in the immediate vicinity of copper bearing regions [8].

The most obvious evidence of the early introduction of copper metallurgy is high quantity of malachite, mostly as amorphous lumps and rather less as beads and pendants, recorded at some Vinča culture sites.

According to the number of finds Belovode, Early Vinča culture site, certainly stands out [31]. Just during one season at this site as much as 0.4 kg of malachite was found in trench 5 within a small area [30]. Thermally treated lumps have been frequently found although it is not precisely stated whether they were found in the layer of conflagration or it was the case of ore processing [27, 30, 32]. As the so called thermally treated malachite lumps are encountered in large amount we can rightfully conclude that Belovode undoubtedly represents a place of copper processing in Vinča culture. At the same site the small amount of objects made of malachite were collected. Many beads 3-8 mm in diameter and one nicely worked pendant were found in all settlement layers [27, 28, 30].

In Vinča malachite was found in all layers and it was evenly represented at all depths. Among the finds predominate amorphous lamps of malachite but certain amount of artefacts is recorded as well. Finds originate from earlier and later Vinča layers respectively. Lumps of malachite or identified by M. M. Vasić, the first investigator of Vinča, as 'small lumps of oxidised metal' were found in the pits excavated in the virgin soil: at the bottom of silo S, and in silos SS II between 9.2-9.8 m and SS III (9.4-9.96 m) situated next to pit dwelling D as well on the bottom of the pit that was at the depth of 10.25 meters under original ground level, all dated to the very beginning of the Vinča culture [14, 16]. Finds of malachite were also encountered on house floors of the houses from depths of 2.5 m, 2.6 to 2.8 m, 3.49 m (Grundris III) investigated in 1912 as well as on the floor of the house from the depth of 6.7 m investigated in 1911 [14, 15]. Comparing the data from Vasić's journals some of them were burnt and were found stuck together in larger lumps mixed with charcoal. According to general estimate of quantity of malachite found in Vinča based on the data from Vasić's journals, find frequency within cultural phases is higher in the later periods of Vinča culture. However, there is no extreme difference in number of finds between cultural phases (Fig. 1; Fig. 2).

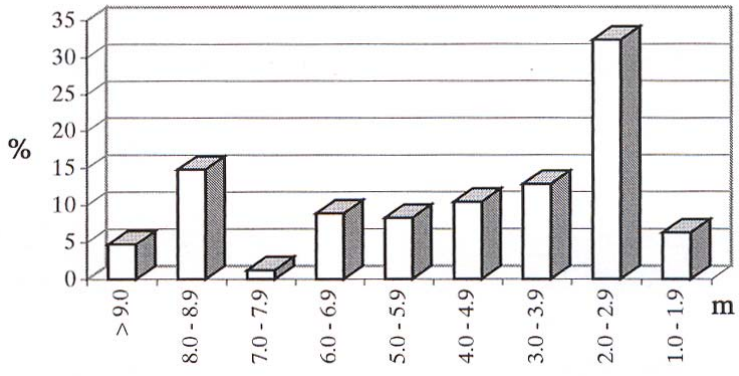

Fig. 1. – Distribution of malachite and azurite in Vinča (according to depth).

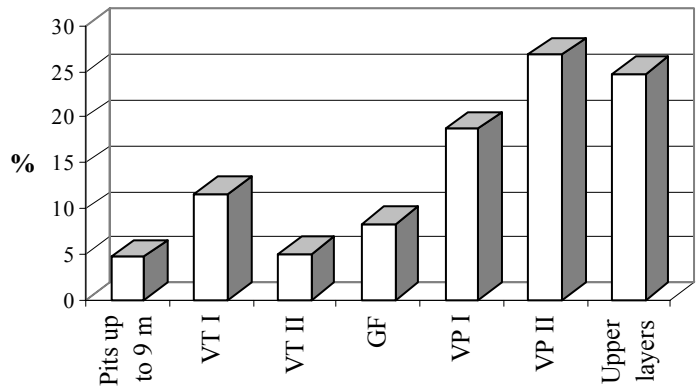

Fig. 2. – Distribution of malachite and azurite in Vinča according to cultural periods: Early Vinča phases (VT – Vinča-Tordoš), transitional Early/Late Vinča phase (GF – Gradac phase), Late Vinča phases (VP – Vinča-Pločnik).

The following find from Vinča from the depth of 4.2 m could be directly related with smelting activity. It is fragmented bottom of crude vessel, which was half full of green pigment as Vasić said [37] that is with pulverised malachite as was established after much later analyses [8]. Such pulverised ore was used in the primitive technology of copper producing. Experiments carried out with ore from Rudna Glava required ore to be crushed in granules up to 100μm [36]. This information could be linked with above-mentioned fragmented bottom of crude vessel from Vinča containing pulverised malachite and explained as the initial stage in the process of copper ore smelting.

There is one more case of large amount of malachite that could be according to the opinion of investigator related to the copper processing in the settlement. At the site Fafos I near Kosovska Mitrovica, settlement dating from late phase of the Vinča culture, in the pits 16 and 38 were recorded intensive remains of native copper mineral defined by petrologic analysis as malachite with cuprite and azurite [13].

At Selevac, Late Vinča culture settlement, all in all 209 malachite lumps were collected, 87% of which were smaller than 5cu mm. Unambiguous find of slag with copper beads within is also recorded. There in the trenches 12 and 15 was found metallurgical slag and analyses revealed that it originated from copper ore and investigators of this site relates it with certainty to copper processing at the site. In addition, the investigators linked striking concentration of malachite in houses 1-4 investigated in 1977-78 and even more striking absence of this mineral in other stratigraphic units with organized copper processing just in the distinct section of the settlement [12].

In the Late Vinča horizons at Divostin slightly less than 100 lumps of malachite were found within entire excavated area and 75% of them are smaller than 1cm. A few perforated pendants and many discoid beads the largest being 7

mm in diameter, 4mm high and with 2mm perforation were found as well. There was discovered the complete workshop for manufacturing malachite beads [11].

We would also like to mention two lumps of copper oxide at Late Vinča site in Opovo [35]. This find could not be related so far to copper processing at this site.

At Tisza culture site Kremenjak near Čoka, in pit 2 were found 14 beads of malachite in a vessel containing also other types of decorative objects assumed to be Vinča culture import [3, 10].

At Pločnik near Prokuplje large amount of malachite lumps was recorded in Early Vinča horizons [26].

Facts that certainly confirm the knowledge of copper processing are the finds of copper objects registered at Vinča culture. Most cooper objects have been found at Pločnik in 4 hoards. They were considered so far to be Eneolithic hoards buried into earlier Vinča culture layer. More prevailing opinion after recent investigations at Pločnik is that mentioned hoards could be attributed to the transitional Gradac phase of Vinča culture and subsequently that they are not buried later but that they are closed associations from the last phase of the life at Pločnik [34]. Three massive copper chisels stratified and dated with certainty were recorded at Pločnik. They were found in the intact layer attributed to the end of early Vinča culture phase [25]. In the light of this new discovery the Pločnik hoards appear to be the most significant find of copper products in the Vinča culture: in all four hoards 45 massive copper tools – axe-hammers and chisels were found [23, 24]. At other sites copper in the form of completed artefacts or lumps is recorded in very few instances. From Early Vinča layers in the trench I at Belovode originate few finds of small copper lumps. According to the opinion of investigators of this site it is most probably native copper [27]. This is for the time being the earliest find of copper in Vinča culture. From Divostin originate few small copper beads, one pendant and bracelet all found in undisturbed Late Vinča horizon [11]. One rather small copper bead along with few rather corroded small granules was found at Selevac [12]. At Grivac, in the block Barice IA, in the Late Vinča horizon was found one copper bead almost completely crumbled [9]. At Ratina near Kraljevo presence of copper jewellery is confirmed in the shape of one loop of copper wire. This is confirmed by green remains of copper oxide on fragments of anthropomorphic figurines [18]. At Gomolava were found 3 small metal beads in exclusively Late Vinča horizon [19] as well as 7 beads and a bracelet in the burials of the Vinča-Pločnik I cemetery [6]. At Velika Gradina in Stapari near Užice in the II cultural layer dating from the Late Vinča phase period was found a bracelet of copper wire of square section [17].

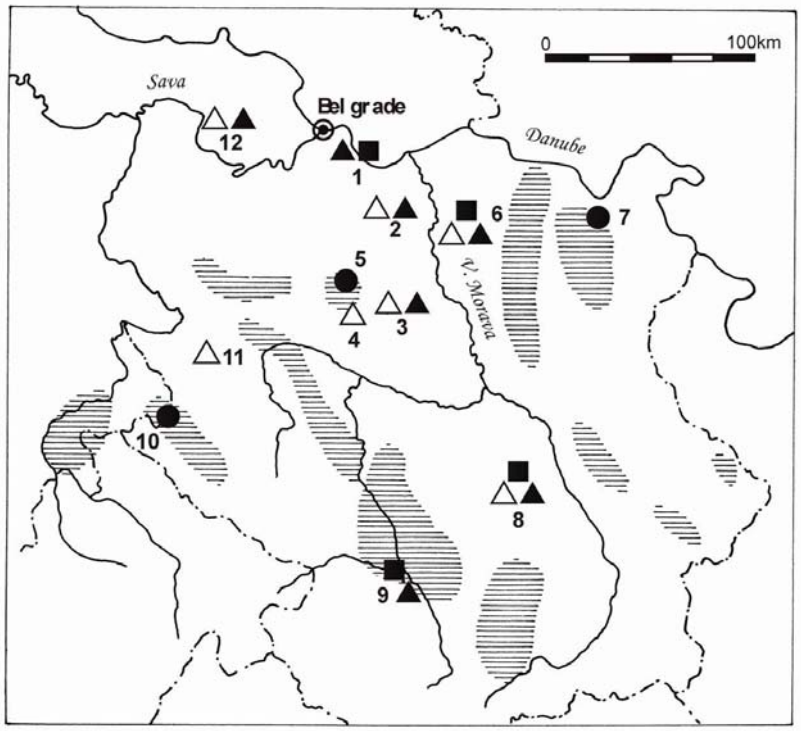

Fig. 3 – Malachite, copper finds and metallurgical features in Vinča culture, prehistoric mines and copper deposits in Serbia. ▲Malachite finds, Δ copper finds, ■ metallurgical features, ● prehistoric mines, ≡ copper deposits. Early Vinča sites: 1. Vinča, 6. Belovode, 8. Pločnik, 9. Fafos. Late Vinča sites: 1. Vinča, 2. Selevac, 3. Divostin, 4. Grivac, 7. Rudna Glava, 11. Velika Gradina – Stapari, 12. Gomolava.Chronologicaly undefined sites: 5. Mali Šturac, 10. Jarmovac.

In favour of early introduction of copper processing speaks the fact that bearers of Vinča culture were by all accounts well acquainted with ore deposits in their territory. This is confirmed also by good knowledge about high quality stone raw material used for production of stone tools in the Vinča culture [2, 4]. Some of this raw material was certainly acquired in organised way possibly even by quarrying [5]. At Vinča lumps of galena and cinnabar were also collected. In the monograph on Vinča we find detailed description of the procedure of mercury processing in this settlement. Such activity is confirmed by numerous finds of cinnabar lumps found in all site layers, the construction of the furnaces in Vinča houses as well as exploitation of cinnabar mines on the Avala Mountain [37]. As the territory of Vinča culture was and remained exceptionally rich in copper ore deposits it is beyond doubt that bearers of Vinča culture got acquainted rather early with those deposits and commenced their exploitation. Already mentioned malachite and azurite, basic carbonates of copper, resulting from decomposition and transformation of all copper ores and frequently present

at Vinča culture sites are very widely distributed in the Central Balkans. Their occurrence in prehistory could be related to present occurrence of copper ores deposits (Fig. 3). According to the latest and most advanced investigations of samples of malachite, ore, slag and metal objects from some of Vinča culture sites (Selevac, Pločnik, Gomolava, Rudna Glava) the only definite conclusion reached was that for the time being we can not identify the source of ore used during the earliest metallurgic period in our territory [20].

Malachite and azurite are today almost impossible to find in the nature but it does not necessarily means that it was the case in the Neolithic. It is absolutely certain that they were much more abundant in the past but their exhaustion is undoubtedly in relation with primitive prehistoric metallurgy but also with the fact that malachite was in all epochs, like it is today, appreciated as ornamental stone. For the time being we can not say anything more concrete about origin of copper ore used for primitive metallurgy on the Vinča culture sites because of exceptionally small number of precise analyses of copper minerals from archaeological excavations, ore samples from all known prehistoric mines and prehistoric metal objects. It is immediately clear that the next step in the field of archaeometallurgical investigations concerning the early copper metallurgy has to be undertaking of more analyses in purpose to detect the ore deposits exploited in prehistory and to reconstruct technology used in metal processing by the Vinča culture population.

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