

ЗБОРНИК НАРОДНОГ МУЗЕЈА – БЕОГРАД  
RECUEIL DU MUSÉE NATIONAL A BELGRADE

XXIV/1

АРХЕОЛОГИЈА  
ARCHÉOLOGIE

СЕПАРАТ / SEPARATION

Vera Ž. BOGOSAVLJEVIĆ PETROVIĆ, Kristina Ž. PENEZIĆ,  
Jelena D. JOVANOVIĆ and Sofija M. STEFANOVIĆ

HUMAN JAW FROM THE LATE NEOLITHIC PLOČNIK SITE:  
A MULTIDISCIPLINARY APPROACH

Вера Ж. БОГОСАВЉЕВИЋ ПЕТРОВИЋ, Кристина Ж. ПЕНЕЗИЋ,  
Јелена Д. ЈОВАНОВИЋ и Софија М. СТЕФАНОВИЋ

ЉУДСКА ВИЛИЦА СА ПОЗНОНЕОЛИТСКОГ ЛОКАЛИТЕТА ПЛОЧНИК:  
МУЛТИДИСЦИПЛИНАРНИ ПРИСТУП

НАРОДНИ МУЗЕЈ  
БЕОГРАД



MUSÉE NATIONAL  
A BELGRADE

2019.



Vera Ž. BOGOSAVLJEVIĆ PETROVIĆ

*National Museum in Belgrade*

---

Kristina Ž. PENEZIĆ

*University of Novi Sad, Biosense Institute*

---

Jelena D. JOVANOVIĆ

*University of Belgrade, Faculty of Philosophy – Department of Archaeology*

*University of Novi Sad, Biosense Institute*

---

Sofija M. STEFANOVIĆ

*University of Novi Sad, Biosense Institute*

*University of Belgrade, Faculty of Philosophy – Department of Archaeology*

---

## HUMAN JAW FROM THE LATE NEOLITHIC PLOČNIK SITE: A MULTIDISCIPLINARY APPROACH

**Abstract:** On the Pločnik site in 1978, in Trench VIII A, within an infill with a working title Pit, or Surface 'West', a human jaw was found next to pottery and stone findings. During an examination and the temporary move of the depot of the National Museum in Belgrade in 2016, this jaw was 're-discovered' for the second time, together with a hand-written note on the sex and age of the individual, without any data on the person who gave the interpretation. In this paper, we present further analyses and possibilities of interpreting this mandible, as well as the results of bio-archaeological analyses, AMS dating. These newly obtained results, accompanied by the investigations of the indirect archaeological documentation, have provided us with an interpretation of the fieldwork process, as well as the archaeometallurgical aspects, time-frame, and details about this individual member of the Pločnik Late Neolithic community.

**Key words:** Late Neolithic, Eneolithic, Human remains, Bio-archaeology, AMS, Burial, Pločnik

## INTRODUCTION

The Pločnik site has been known in the archaeological literature ever since the first copper implements were found during the construction work on the railway, connecting Niš to Priština, in the period of the Kingdom of Yugoslavia. The objects were found in a place called Šanac near the village of Pločnik and sent to the National Museum in Belgrade (Grbić 1929).<sup>1</sup> Since 1928 till the present day, there were several publications and dozens of fieldwork reports published on the topic of Pločnik and early metallurgy (Шљивар, Кузмановић–Цветковић и Живковић 2011, with references). On several occasions the Pločnik site was excavated, applying additional prospection methods. Two locations were surveyed by geo-radar and electrical resistivity in 1997 (Vukadinović, Sretenović and Šljivar 1999), as well as a geomagnetic survey during 2007 and 2012/2013<sup>2</sup>. The purpose of these investigations was to obtain more complete data on the size and extent of the site, the organisation of households, or possible enclosure features such as ditches. Despite the fact that this data has not yet been published, the importance of the site in archaeological interpretations is increasing.

When it comes to the archaeometallurgical aspects of the Pločnik site, up to now a trace element analysis was conducted on copper implements such as axes and chisels from contexts that are better known in the literature as ‘hoards’ (Antonović 2014: Table 1, 2, 4, and 5 with references)<sup>3</sup>. The director of the year-long investigations at the Pločnik site, D. Šljivar, is correct when emphasising that the conditions under which the artefacts were found indicate a completely different role than a hiding place, but this inappropriate term was preserved in the literature (Šljivar, Kuzmanović-Cvetković and Jacanović 2006). Samples of copper ore, slag, and metal droplets were subjected to several analyses and studies, investigating the level of knowledge about metallurgical procedures, and the origins of the ores that reached the sites, such as Belovode and Pločnik (Radivojević et al. 2010: Radivojević and Rehren 2015). Currently being undertaken are the functional analyses of the pottery assemblages from Pločnik, as well as the analyses of human remains<sup>4</sup>.

---

1 Gift from the Railway administration on 21.01.1928.

2 Geophysical prospection was conducted in 2012 within the Project “The rise of metallurgy in Eurasia: Evolution, organisation and consumption of early metal in the Balkans” by the Institute of Archaeology, University College London and the National Museum in Belgrade (PIs M. Radivojević and D. Šljivar). Results are pending publication, like the research conducted in 2007, organised by the National Museum in Belgrade supervised by V. Miletić. According to the field diaries for 2007, kept by D. Šljivar, the investigated area was east of the railway, next to the railway station, and covered a surface of 180x30m.

3 The copper implements from the Pločnik site as well as objects originating from different sites throughout Serbia, deposited in the National Museum in Belgrade (NMB), were subjected to element analyses and the determination of the possible origins of the ores. In the documentation department of the Collection of the Late Neolithic and Eneolithic, there are documents signed by S. Jungas and M. Schroder from the Stuttgart Landesmuseum for 158 metal objects from prehistoric collections of the NMB. Members of the so-called “Stuttgart group” research group applied their method of Optical Spectroscopy in the early 1950’s. According to a personal comment from D. Šljivar from April 2019, these analyses were undertaken due to the engagement of D. Garašanin, the years-long director of the Archaeology Department of the NMB.

4 Dušan Borić, Vera Bogosavljević Petrović and Duško Šljivar (forthcoming). Parts of humans: Stray human remains in Late Neolithic Vinča culture sites, where new absolute dates, as well as the absolute date from the human mandible presented here, will be further presented and discussed.

Based on available AMS dates from trenches 14 and 15 that represent archaeological deposits from the whole span of the settlement, the duration of habitation has been confirmed as being from 5200 cal BC to 4650 cal BC (Borić 2009: 212-215). Since 1996 over 20 excavated trenches revealed parts of buildings and structures without clear functions. Due to the excavation system based on trenches, these structures were not investigated in their entirety, and their relationship remains unclear. It is probable that these buildings were a part of residential units with broken walls and household items, and layers of ash and charcoal. Copper chisels originate from partly excavated installations that indicate metallurgical activities but, unfortunately, without details and possible reconstructions of the buildings. A few zones around the site have been documented as possible communal areas, with concentrations of several ovens and rectangular receptacles that served as containers. These zones have not been integrally published up to now.

Despite the focus placed on the Pločnik site as a large settlement, it is still unknown where the Neolithic inhabitants were buried. Bearing in mind the density of the Late Neolithic Vinča settlements on the territory of modern-day Serbia as well as only two detected necropolises – Botoš (Грбић 1934; Маринковић 2010) and Gomolava (Борић 1996; Borić 2009; Borić 2015), it seems that there is a discrepancy between the number of sites and necropolises. Hence, every human remain from the Late Neolithic sites is important, and represents new data, leading to a better understanding of the members of the Vinča community, as well as indications of the existence of different funerary practices and possible social ranking. In this manner, the human mandible ‘found’ during the review of the collection in the National Museum in Belgrade is an important step towards addressing this issue.

## SAMPLE AND METHODS

On the Pločnik site, in Trench VIII A, in an infill with the working name ‘Pit’ in 1978, a human mandible was found next to pottery fragments, chipped stone and bone artefacts, parts of altars, and fragmented anthropomorphic figurines. The box in which the mandible was stored in the depot of the National Museum in Belgrade, containing the mandible and several teeth that were lost post-mortem, had an inscription with the information on the origin of the mandible and a copper finding (Fig. 1). Upon opening the already damaged box during the examination and renovation of the museum building and a temporary move of the depot in 2016, the jaw was found with three quartzite pieces with no traces of an artefact or copper slag. The mandible was not mentioned in the published paper of the material from this trench, or in the context of any copper findings (Šljivar 1996).

In the box numbered 506, besides the human remains, a document was ‘discovered’, handwritten on a piece of paper, without a signature, noting the sex and age of the individual. Taken into consideration that it is the handwriting of B. Stalio, researcher at Pločnik and director of excavations of the Trench A from the year in question, it is probably a record of the person who analysed the anthropological remains, who, for now, remains unknown. In this short report, it was stated that it was ‘most probably female’, aged between 40-60 years ‘most probably around 50’.

The mandible was given for anthropological analyses in June 2016 to the Laboratory for Bio-archaeology, in the Department of Archaeology at the Faculty of Philosophy, University of Belgrade. Another sample of the bone was sent for Accelerator Mass Spectrometry (AMS) dating to the Research Laboratory for Archaeology and the History of Art, University of Oxford. For the purpose of this study, a 3D model of the mandible has been produced and it is available online.<sup>5</sup>

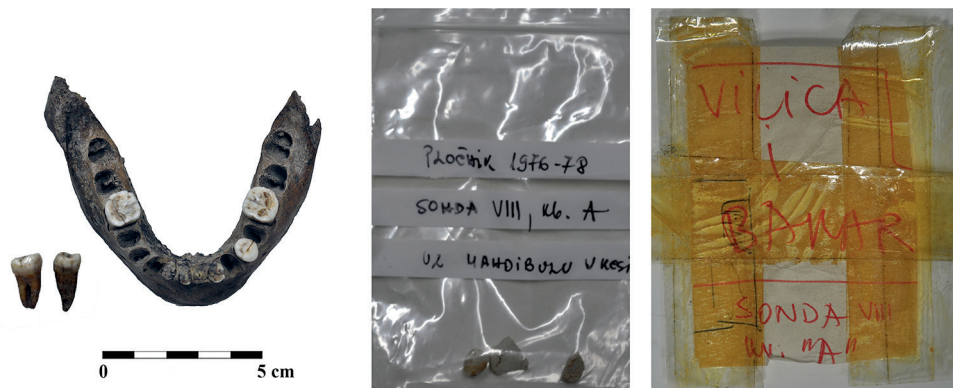


Fig. 1 Pločnik, Trench VIII A. Mandible with information about the copper finding (photo: A. Djorđević and V. Bogosavljević Petrović)

Сл. 1 Плочник, доња вилица с податком о налазу бакра у сонди VIII А (фото: А. Ђорђевић и В. Богосављевић Петровић)

The anthropological analysis showed that only the body of the mandible has been preserved. Tooth 31 (only the root preserved, the crown was post mortally absent), 32 (only root and fragmented left half of tooth crown), 34, 35, 36, 37, 41 (only root, crown was post mortally absent), 42 (only root preserved, the crown was post mortally absent), and 46 were found inside alveolar sockets, while tooth 12 (with a fragmented root) was found outside (Fig. 2). The sex was estimated using standard methods for sex estimation (Ferembach, Schwidetzky and Stloukal 1980). The macroscopic age determination was carried out, based on the degree of tooth wear (Brothwell 1981). Within the dental analysis, the tooth numbering system proposed by the Federation Dentaire Internationale (1971) was used. The presence and degree of dental calculus formation was noted, using the protocol developed by Brothwell (1981), while the timing of hypoplastic events was calculated following the method proposed by Reid and Dean (2006).

Additionally, tooth 12 was used for the Tooth Cementum Annulation (TCA) method. Tooth cementum has the principal function of anchoring the tooth in the jaw. Incremental bands are rhythmic depositions of the tooth cementum, that are seasonal and visible in a broad variety of mammalian species (Lieberman 1994). For adult humans, this age estimation method resulted in more precise age than estimates based on standard macroscopic indicators of age (Wittwer-Backofen et al. 2004). A general protocol for the preparation of samples was based on Wittwer-Backofen (2012). The teeth were embedded into Biodur epoxy resin (Biodur

<sup>5</sup> For the purpose of this study, a 3D model of the mandible has been produced and it is available online <https://skfb.ly/6LtCK>.

E12 resin with hardener E1 in a ratio of 100:28) and the middle third of the tooth was cut cross-sectionally with a slice thickness of 80 $\mu$ m, using a Leica 1600 rotating diamond microtome. Each section was observed, using a transmission light microscope Leica DM RXA 2 with magnifications of 40 $\times$ . Photographs of all regions of interest were taken, using a digital tubus camera Leica DC 250. Age at death was calculated by adding the sex-specific average age of tooth root eruption for the respective tooth type as noted in Adler (1967) to the average number of cementum layers counted.



Fig. 2 Mandible from Pločnik, lateral (a, b) and frontal (c) views (photo: J. Pendić, adapted: Dj. Radonjić)

Сл. 2 Доња вилица са Плочника, латералне (а, б) и предња (с) пројекције (фото: Ј. Пендић, прилагодио: Ђ. Радоњић)

Apart of the bio-archaeological investigations, a thorough analysis was conducted of the archaeological documentation from the excavations. This included the inspection of the field journals from team members excavating Trench VIII A (I. Radovanović, and a joint diary from I. Radovanović and J. Kuzmanović), as well as the sublime field diary kept by B. Stalio, based on individual reports. All three of the field journals are kept as handwritten notebooks. Also examined was the form of field documentation that was designed as a digital version of the field diary, with all basic technical information about the numbering of the sketches, photography, technical plans, coordinates, a separately kept integral diary with coordinates, field sketches, and with a separate place for hand sketches. Apart from the original documentation, also inspected was the final version of the technical appendices for that field season, produced by D. Šljivar over the years.

### **„RECONSTRUCTING’ THE ARCHAEOLOGICAL CONDITIONS BASED ON AVAILABLE DOCUMENTATION**

One of the first questions was whether this was an individual displacement or a devastated layer for whatever reason, or the deliberate deposition within or next to a pit. The fact that the copper findings from the Pločnik site raised a lot of attention from every researcher over the years, starting with M. Grbić, who conducted the first excavations in 1928, had an additional surprise with the ‘discovery’ of human remains. The mandible was stored with separate archaeological material designated for an inventory from several squares from trenches VI, VII, and VIII, investigated over the period 1976-1978, and kept in box 506 together with the information about the copper finding, which is missing today. This jaw was not investigated any further since the excavation.

Carefully going through the notes and other archaeological documentation, it became clear that the jaw was found on October 2, 1978 when team member I. Radovanović noted the content of the base of the Pit 6/7 in the western part of the Trench VIII A. The entry stated: ‘6/7 west. Head of a horse, clay figurine, **human jaw (position taken)**, weight fragment, strainer fragment, fragment of a vessel decorated with incisions, larger amount of bigger fragments of coarse dark-grey vessels (seven bags for reconstruction), some flint, one miniature vessel with incisions on the rim, two protoma, one pottery fragment with incised decoration (small circles), one bone needle (with Seka<sup>6</sup>), one piece of copper slag’. It was clear that the precise position of the mandible was noted on the surface of ash and charcoal, since the information came directly from the primary source – the archaeologist working in that part of the trench, noting his observations. Based on these data, we can assume that the jaw was packed together with a lump of copper slag, where the only information preserved is the tag on the box with the mandible (Fig. 1).

In the joint diary kept by I. Radovanović and J. Kuzmanović there is a sketch where the area covered with charcoal and ash is more clearly defined, and the soil is described as loose and rimmed with occasional daub fragments. A smaller surface

---

6 Here, it is mentioned that the finding was given to the principal investigator, Blaženka Seka Stalio.



of the compact soil, partly burned, was located in the upper two pits. These could have come from a devastated structure, since this oval surface was roughly over 3 meters long, and approximately the same width (Fig. 3).

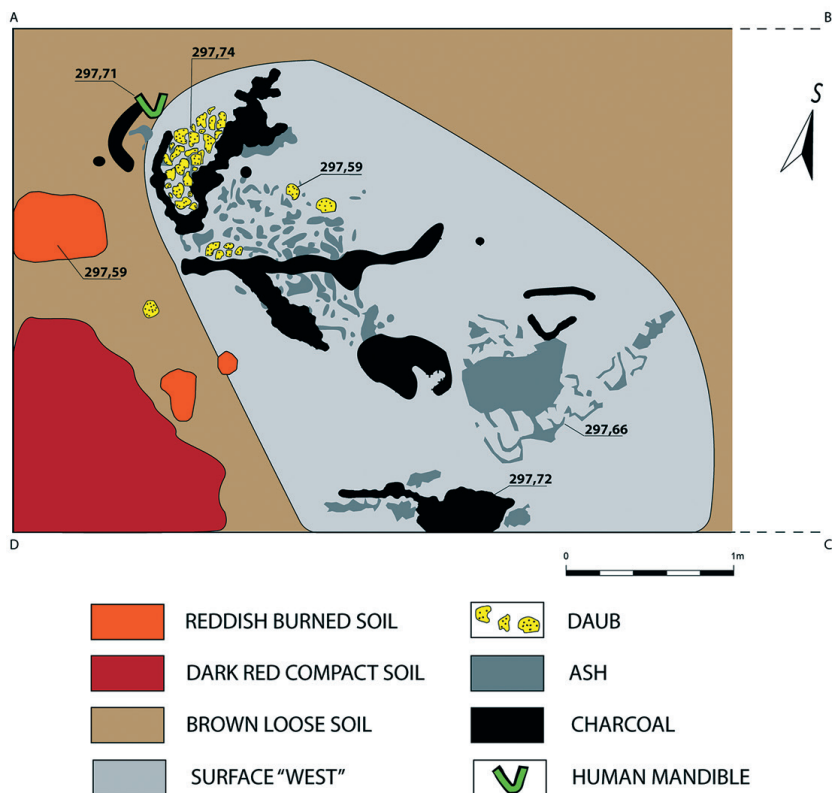


Fig 3 Postion of mandible – surface „West“: Base 5 and Base 6 (Dokumentation of the Collection of Late Neolithic and Eneolithic, adapted by V. Bogosavljević Petrović and Dj. Radonjić)

Сл. 3 Позиција доње вилице – површина „запад“: основе 5 и 6 (документација Збирке за млађи неолит и енеолит, припремили и прилагодили В. Богосављевић Петровић и Ћ. Радоњић)

In the joint field diary, the description of the material found in the area of the trench labelled as ‘West’ is more detailed regarding the pottery assemblage, with a list of small artefacts such as the ‘head of a horse’, male figurine with male anatomical features, except that the copper slag is not mentioned. From this field diary it is clear that at the base of the trench were two structures, labelled from the beginning as ‘East’ and ‘West’. Both of these surfaces were occasionally labelled as pits in different diary entries, and were left without numeration until the end of the excavations.

According to the central diary kept by Blaženka Seka Stalio (handwritten, notebook with filtered texts from individual team members in the period 1976-1978), the finding of the ‘human jaw without accompanying bones’ (underlined) was noted already on September 30, 1978! Since October 2, 1978, this field diary was no longer kept, while in the joint journal kept by I. Radovanović and J. Kuzmanović, the situations in Trench A were described until October 5, 1978. We suppose that

this entry was retroactively written, since all the other documents mention October 2 as the day when the mandible was found.

The surface 'West' was discovered and excavated between September 30, and October 2, 1978 according to the Record form No. 7. In the field inventory notes, on 2.10.1978, the material found at the base 6/7 west was packed into bags 47/a, 47/6, 54, and 55, and labelled with inventory numbers: the male figurine with field inventory number 299 (Fig. 4/1), the head of a 'horse on a rock crystal pedestal' number 300 (Fig. 4/2), pottery assemblages split according to the possibility of reconstruction of the vessel or parts of the same production, special numbers for fragments of a bowl number 346 (Fig. 4/7), fragments of a bowl number 347 (Fig. 4/6), the lower part of a figurine with a skirt number 348 (Fig. 4/3), fragments of an altar, the base of a figurine, and collected pottery fragments from vessels of different types, quality and purposes (Fig. 4/4, 5, 8).



Fig. 4 Surface „West“ - figurines and fragments of vessels (photo: Dj. Radonjić)

Сл. 4 Површина „запад“ - фигурине и уломци посуда (фото: Ђ. Радоњић)

Part of this pottery assemblage from Horizon II was published in a paper by D. Šljivar about the site stratigraphy and positions of the copper implements (Šljivar 1996: Fig. 7). Ten chipped stone artefacts were found in the surface 'West' which, according to structure could be classified as waste, a crested blade, a fragmented blade with the cortex on the right side, several flakes, and a scraper on a short blade. As for a ground stone artefact, the recycled, damaged, and discarded fragment of a polished stone tool was found, transformed in its last phase into a hammer stone, and discarded at the end as raw material not suitable for a blade core.

On the Record form No. 7 from 1978, the situation in the western part of the trench was described as a pit with a depth of 1.60m, with a technical drawing on plan number 5, with listed field inventory findings from the layer of charcoal and ash (Fig. 3). The jaw is part of this context and as for the copper slag, after a detailed analysis which is part of this study, it was most probably a lump of soil with traces of corrosion that originated from another copper object located close by, which was not found in the material. There are no additional data in the documentation. In the field diary, the coordinates of the mandible state an absolute height of 297.71 meters, transforming the object from the depot of the National Museum in Belgrade into a precise finding from the Pločnik settlement site.

## RESULTS OF BIO-ARCHAEOLOGICAL INVESTIGATION AND ABSOLUTE DATING

Since only a fragmented mandible has been preserved, the sex couldn't be estimated. Although the jaw looks very robust due to the thickness of its bones, at the same time it has small dimensions and a medium pronounced dental protuberance. The only macroscopic criteria which could be used for age estimation was dental wear, which points to a young adult, aged between 25-30 years old. Age at death by means of the Tooth Cementum Annulation method showed an approximate age of  $28.81 \pm 2.5$  years (Fig. 5). In this case, the age determination based on dental wear fits very well to the age range obtained through the TCA method.

Dental analysis showed that teeth 33, 38, 43, 44, 45, 47 and 48 were lost post mortem. Abrasion of the 1<sup>st</sup> degree (in the enamel) was noted on teeth 34, 35 and 37, while teeth 12, 36 and 46 have 2<sup>nd</sup> degree (exposed dentin). Although no other part of a maxilla was found, except tooth 12, the same age range and similar degree of abrasion of all teeth found, indicate that tooth 12 and the mandible probably belong to the same individual. Supra-gingival calculus is pronounced in a small amount (degree score 1) on the teeth 12 (buccal side), 36 (buco-lingual side), 37 (buco-lingual side), 46 (bucal side), while teeth 34 and 35 have moderate amounts of calculus on the bucal, mesial and lingual side. Linear enamel hypoplasia was noted on tooth 12.

The sample of the jaw was absolutely dated to 5200–4950 cal BC (OxA-37075), attributing this individual to the Vinča B phase according to the V. Miložić relative chronology (1949), or early phase of Vinča – Tordoš II (according to M. Garašanin 1979). Within the western part of the section CD in Trench VIII A (Fig. 6), the jaw was found in the upper part of the layer that is described as dark brown soil

with an average thickness of 0.40m. This layer is described as the oldest of the three in Trench VIII A, where the total thickness of the anthropological layers is 2.14m (Šljivar 1996: 85).

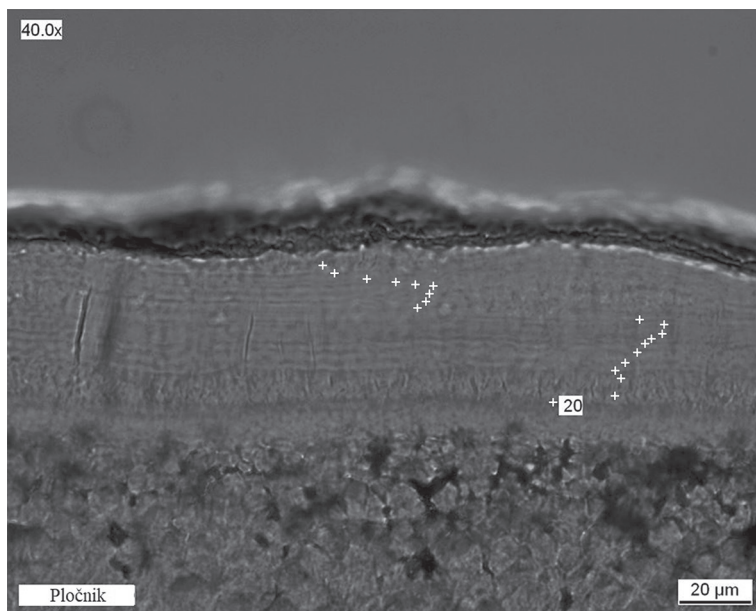


Fig. 5 Section of the tooth 12 with marked counted lines (photo and adaptation: K. Penezić)

Сл. 5 Пресек кроз зуб 12, са обележеним пребројаним линијама  
(фото и припрема: К. Пенезић)

## DISCUSSION

Based on the new results of a human jaw found in the structure labelled Pit or Surface 'West' of the eastern part of the Pločnik settlement, today we are able to produce fresh data and discuss various segments of research, both considering the bio-archaeological results and the archaeological context itself, creating a firm background for future analysis.

The jaw belonged to an individual in his late twenties. The finding provides an insight both into the deposition of dislocated human bones, as well as the possible burial practice. As B. Stalio insists in her field diary, the mandible was found without any additional human bones. This, however, is not strictly true, since tooth 12 originates from a maxilla that was not found. The mandible was found separate from the rest of the skeletal remains and could have been taken to be repositioned to this particular place. The origin of an upper incise in the context still remains in question. On the other hand, the mandible is without traces of burning and it was found in an area of intense firing, together with charcoal and ash. These conditions support the argument that this might be a partial secondary burial.

Taking into account that the jaw with teeth that fell out post mortem were 'discovered' deposited together, as well as having the same approximate age, these re-

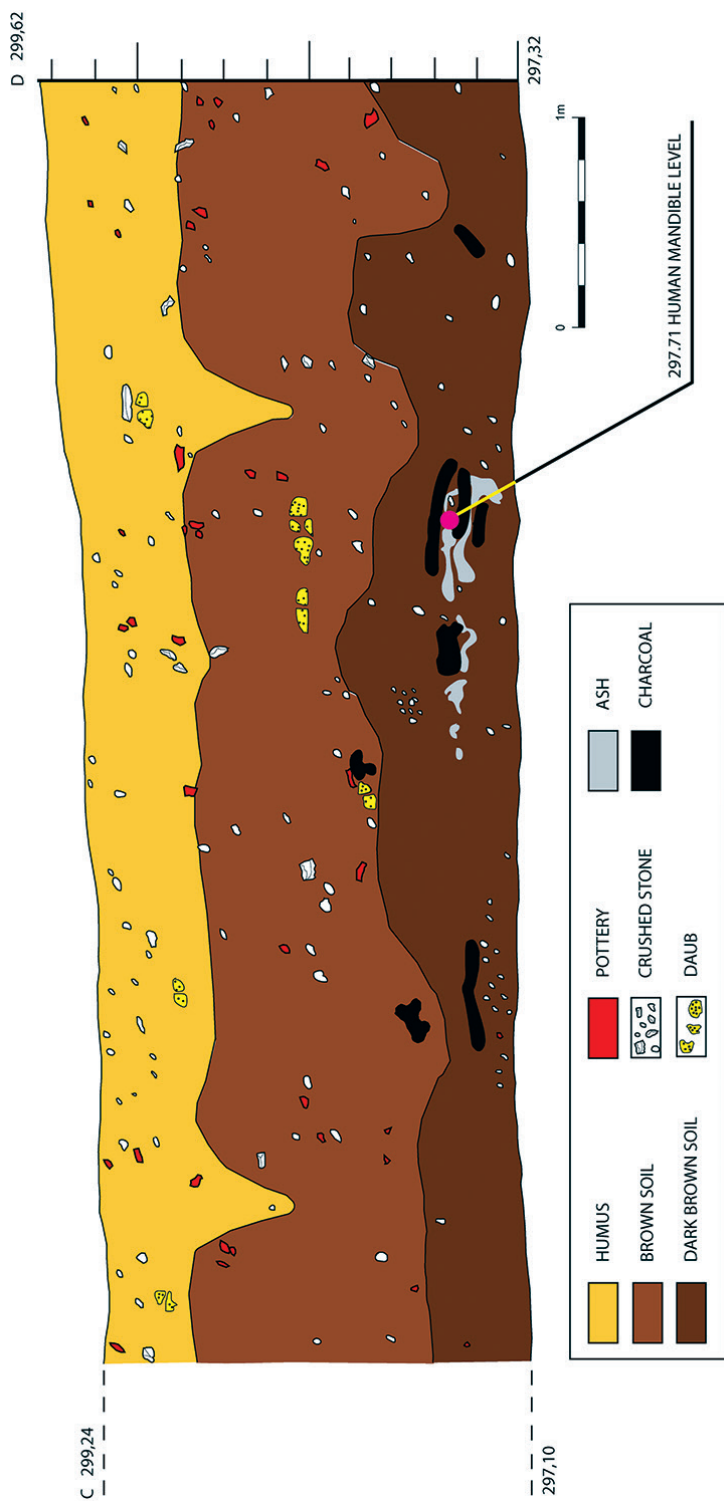


Fig. 6 Pločnik 1978, trench VIII A – part of the section CD (Documentation of the Collection of Late Neolithic and Eneolithic, adapted: V. Bogosavljević Petrović and Dj. Radonjić)

Сл. 6 Плочник 1978, сонда VIII A – део профила ЦД (документација Збирке за млади неолит и енеолит, припремили и прилагодили: В. Богосављевић Петровић и Ђ. Радоњић)

remains are treated as if they belong to the same individual. Even when the human remains found were as scarce as in the case with the jaw, the amount of information that could be retrieved is important. As for the macroscopic analysis of the remains, new knowledge was gained about the health status and possible diet of the Neolithic individual. There are many factors causing the development of calculus in humans, such as alkalinity in the oral cavity, oral hygiene and dietary habits (Lieverse 1999). Some studies suggest that diet rich in proteins contributed to the development of calculus by facilitating the alkalinity in the oral environment (Hillson 1979; Lieverse 1999). The presence and intensity of dental calculus in this young adult indicates probably a diet rich in different nutrients, both proteins and carbohydrates, though not a high level of oral hygiene. The preliminary analysis of plant micro-remains entrapped in the dental calculus showed this individual was eating carbohydrates, which was mainly derived from domestic cereals<sup>7</sup>.

Linear enamel hypoplasia was noted on tooth 12. This non-specific metabolic stress indicator develops during childhood, usually due to poor diet and infectious diseases, as well as hereditary conditions, or localised trauma (Solomonos and Kersch 1981; Goodman and Rose 1991). A line was noted at 3.76 mm from the cemento-enamel junction, which points to a stressful event happening around the age of three. In general, the age between two to four years is a critical period in the growth and development of children. This is the time when most of the stressful events occurred, and they are usually connected to the cessation of breast-feeding and diet completely based on solid food. There is a decline in immunity, which, particularly in combination with poor nutrition, poor vitamins and minerals, can leave traces on bones in the form of dental hypoplasia or some other non-specific stress indicator.

As far as stratigraphic data are concerned, there are three cultural layers in Trench VIII A that were determined by soil colour and concentrations of archaeological material, that belong to certain structures, according to D. Šljivar (1996):

Horizon I as the earliest is characterised by a large amount of charcoal, ash, and daub coming from destructed houses and some broken stones. It should be emphasised that this layer is not clearly separate from the one above. Typological and chronological characteristics of the pottery are based on 'biconical shouldered bowls, as well as the belly-like forms, and shards of plates with a thickened rim' (Šljivar 1996: 86), with ornaments that in comparison with other sites are connected to the phase Vinča – Tordoš I, according to M. Garašanin's chronology by (1979), i.e. the ending of phase A and beginning of phase B, according to V. Miložić (1949). The Base 6 at 297.49 m absolute height belongs to this horizon.

The thickest Horizon II follows with three construction phases (Šljivar 1996:88-90), which, according to the stylistic and typological features of the pottery forms, represent the early phase of the Vinča culture, or Vinča – Tordoš II, according to the chronology of M. Garašanin. Parts of this horizon are Base 4 and Base 5 that have been determined to be at absolute heights of 297.66 m and 298.22 m, respectively.

The latest Horizon III is represented as Surface 1 (at 299.24 m), Base 1 (at 299.07 m), Base 2 (at 298.96 m), and Base 3 (at 298.62 m).

---

<sup>7</sup> Results of ERC BIRTH project - Births, mothers and babies: Prehistoric fertility in the Balkans between 10000-5000 BC (Grant Agreement N°640557).



It is necessary to highlight the situation that was found in the squares of Trench VII from 1977, which were already excavated. For this study, the eastern part of the squares A/1977 is important, where, at the same absolute depth as the human jaw, a pit was located, covered with ash. In the western part of the square A, a dense stone construction was found. In square C/1977, which is located on the south-eastern side of the square A Trench VIII/1978, at the same absolute depth of the jaw, surfaces with ash and charcoal were excavated (Fig. 7). Following the arrangement of the dislocated stone structures, as well as the surfaces covered with ash and charcoal, one gains the impression that this area is modelled under the influence of these destructed buildings. Without a complete analyses of the findings and available documentation, it is not possible to go into detail further about the nature of these structures, beside the preliminary interpretation – in this part of the Pločnik site the density of buildings is great, which, apart from house furniture contained copper objects, as well as human remains such as this mandible without traces of burning. The intensity of the daily routine is quite certain from the published data, as well as from the documentation that was inspected up to now, originating from the excavations conducted by S. Stalio in 1977 and 1978, located closer to the Toplica river (Fig. 7).

Based on the available data from the drawings of the bases and the sections of the aforementioned quadrants, it is possible to detect two levels of intense building debris. The upper one that corresponds to the brown soil with traces of daub and stone fragments, where the lower, earlier one is located between the border between the brown and dark brown soil, and it is represented by the surfaces with ash and charcoal. A potential third layer was never fully defined, due to the fact that the trenches were only partly excavated to greater depths. For now, these are the only indications for the existence of layers that are older than the one with the absolutely dated mandible, at least in this part of the Pločnik site.

The mandible was located on the periphery of a surface covered with ash and charcoal, towards corner A of Trench VIII A (Fig. 3). The content of this unit starting from Base 5 and the location of the jaw at 297.71 m absolute height represents a buried structure that was not fully excavated (Fig. 6). On Base 5 a large number of pottery fragments were found, originating from vessels of different types and techniques of production. We emphasise the fragments of biconical shouldered bowls with black slip that are intensely polished, with spiral motifs (Fig. 4/7), the larger part of a bowl rim with horizontal channels (Fig. 4/8), fragments of polychrome bowls (Fig. 4/5), but also grey vessels with thicker walls and incised white encrusted decoration (Fig. 4/4), as well as shards of plates with a thickened rim. Based on analogies with a large number of other sites, these objects could be attributed to the early phases of the Vinča communities (Garašanin 1979: sl. 12, T. XXV-XXVIII).

A figurine with male characteristics with its pillar form (Fig. 4/1) resembles some of the early forms from the Vinča – Belo brdo site (Бабовић 1984: 121) as well as the Zelenikovo site (Garašanin 1979: Table XXXVII/4). The preserved lower part of an anthropomorphic figurine with an apron (Fig. 4/3) belongs to a known type of standing figurine from Late Neolithic sites such as Vinča – Belo Brdo and Selvac (Тасић 2008: Sl. 60; Tasić 2011; Milojković 1990: Fig. 11.12). These figurines

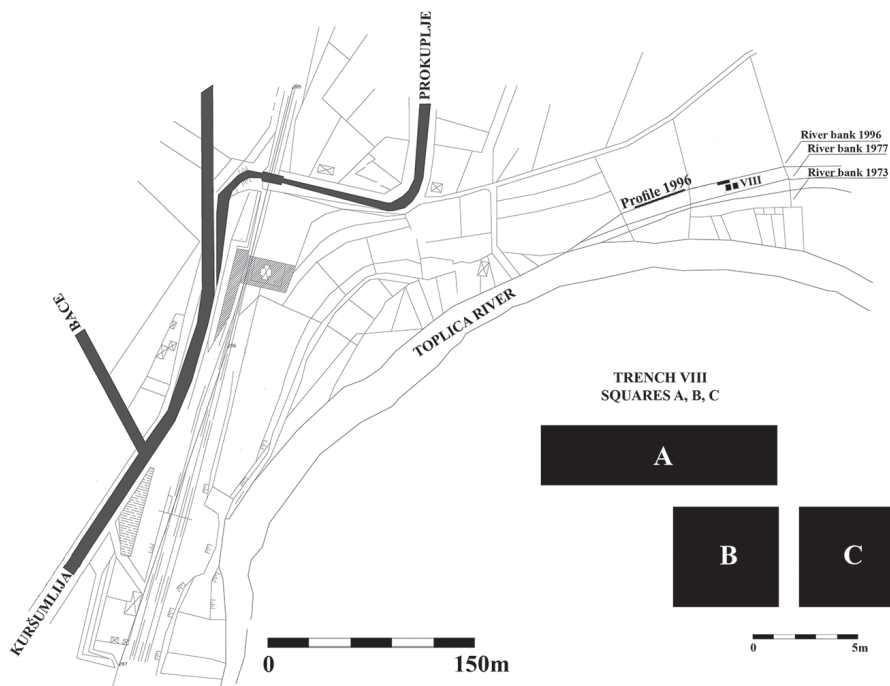


Fig. 7 Pločnik 1976-1978. Position of the Trenches VIII A, B, C (Dokumentation of the Collection of Late Neolithic and Eneolithic, adapted: D. Šljivar, V. Bogosavljević Petrović and Dj. Radonjić)

Сл. 7 Плочник 1976–1978, положај сонди VIII А, Б, Ц (документација Збирке за млађи неолит и енеолит, припремили и прилагодили: В. Богосављевић Петровић и Ђ. Радоњић)

are dated to phases Vinča B to C, at the time of great technological changes associated with stone reduction sequences (Bogosavljević Petrović 2015: 497-501). Ten stone artefacts are typical by-products and discarded tools of the 'industrial' repertoire of the Late Neolithic and Eneolithic communities (Богосављевић Петровић 2011: 236; Bogosavljević Petrović 2018: 109). On the other hand, a perfectly carved animal head in stone (probably marble), the 'rock crystal horse head' is undamaged and does not represent such an inventory. The raw material that was used was wrongly interpreted, as well as the determination of the animal as a 'horse', whereas the species identification remains unknown and requires a separate, complex study. At the Vinča – Belo Brdo site, their occurrence is connected to relative depths between 7.80 m and 2.30 m (Антоновић 1992: 18).

This example of the particularly stored jaw initiated questions about the burial practice in the Late Neolithic on the territory of modern-day Serbia. Known up to now are the necropolis at Botoš where the burials are located outside of the settlement and dated according to the material found to the early phase of the Vinča culture (Маринковић 2010: 27), and 26 graves found on the periphery of the settlement Ib on the Gomolava site, dated to the final phases of the Vinča culture (Borić, 2015: 170). The main question here is whether the jaw was accidentally located next to the edge of a devastated structure that was most probably later turned into a pit,



or whether the position of this mandible at the level of the dark red, compact soil is indicative of a burial practice and spiritual heritage? If it turns out that the deposition was deliberate, then occasional human remains found inside the house present a complex question connected to the rituals and spiritual patterns of the Vinča community. The absolute date of this finding, positioning it in the early phases of the Vinča culture together with the materials found, are dating the contexts Surface 'West' within this trench to the end of the sixth millennium BC (lower part of Horizon II according to D. Šljivar). The structure 'East' has a far more complex composition with a larger amount of house daub and was published in more detail, due to the finding of a copper chisel from Horizon III (Šljivar 1996: 94-97, Fig. 3, 8, 10).

Irrespective of the function of the deposition of this mandible, it is positioned in the stratum that corresponds to the times of great changes. It is the time of major developments, from the founding phase of the Late Neolithic settlements, a time when stone technology was radically changing and being transformed into mass production, recycling, tool repairs, and the introduction of the extensive usage of white chert and a variation of magnesite and light coloured stone of different origins (tuff, porcelanite, etc). All these changes occurred just before the fifth millennium BC, a period when this younger individual lived. It is the period when the number of copper and malachite finds from Pločnik increases, unfortunately often discovered without the presence of an archaeologist. Beyond that, what still remains relatively unknown is information about the settlement size and structure, locations of the necropoles, burial rituals, interaction with other communities, the relationship towards the landscape, as well as the physical characteristics of the people who created this world and lived in it.

## CONCLUSION

The jaw found at the Late Neolithic site Pločnik and stored in the depot of the National Museum in Belgrade belongs to an individual in his late twenties. Based on the results presented here, there is not enough argumentation that this is a case of a specific burial practice. Likewise, the indicators that this is a case of the non-deliberate dislocation of human remains are not convincing enough. The absolute date that was obtained helps determine the archaeological context in which it was found to the end of the sixth millennium BC. The stratigraphic layer is the earliest one in Horizon II, very close to Horizon I according to Šljivar's division. In a relative chronological frame, this represents the early phase B of the Vinča culture. The data obtained from a single human jaw was able to provide us with information about the age at death, dietary habits, as well as indicators of stress at an early age. The time frame, to which this mandible was dated, fits the broader development of the Vinča communities from Vinča-Belo Brdo, along the Great Morava valley and Pločnik. The importance of this finding dated to the early phases of the Pločnik settlement is further emphasised as studies on the chronology of the Late Neolithic in the region advance (Tasić et al. 2015; Whittle et al. 2016; Bánffy et al. 2018).

## ACKNOWLEDGEMENTS

We wish to thank Đorđe Radonjić for his help with the Figures and especially for the adaptation of the original museum documentation, and Jugoslav Pendić for the production of the 3D model of the mandible. Duško Šljivar gave very useful comments and suggestions for an earlier draft of this paper. This work has been done within the project *Pločnik and Belovode - proto urban settlements with a hierarchy of status. Studying the demography of the central Balkans* (PI V. Bogosavljević Petrović). The dental calculus and Tooth Cementum Annulation analyses are part of the ERC BIRTH project - *Births, mothers and babies: prehistoric fertility in the Balkans between 10000-5000 BC* (Grant Agreement N°640557; PI S. Stefanović).

Translated by authors

## REFERENCES / ЛИТЕРАТУРА

Adler, P. 1967

Die Chronologie der Gebissentwicklung, in: E. Harndt and H. Weyers, eds., *Zahn-, Mund- und Kieferheilkunde im Kindesalter*, Berlin: Die Quintessenz, 38-74.

Антоновић, Д. 1992

*Предмети од њачаној камена из Винче*, Београд: Филозофски факултет, Центар за археолошка истраживања.

Antonović, D. 2014

*Kupferzeitliche Äxte und Beile in Serbien*, Prähistorische Bronzefunde Abt. IX, Bd. 27, Mainz: Akademie der Wissenschaften und der Literatur; Stuttgart: Franz Steiner Verlag.

Бабовић, Љ. 1984

Култни предмети и накит, у: *Винча у њаисџорији и средњем веку*, ур. С. Ђелић, Београд: САНУ, 120–128.

Bánffy, E. et al. 2018

Seeking the Holy Grail, *Documenta Praehistorica* 45: 120–137.

Богосављевић Петровић, В. 2011

Редукција камених сировина на локалитету Црквине – сонда 5 са археолошким целинама, *Колубара* 5: 213–238.

Bogosavljević Petrović, V. 2015

*Razvoj industrije okresanog kamena u vinčanskoj kulturi na teritoriji Srbije (Evolution of the Chipped Stone Industry in the Vinča Culture in the Territory of Serbia)*, PhD thesis. University of Belgrade, Faculty of Philosophy, Department of Archaeology.

Bogosavljević Petrović, V. 2018

Standardization of Chipped Stone Artefacts and Patterning of Lithic Raw Material Procurement Strategies in the Late Neolithic and Early Chalcolithic in Serbia: Tradition, Strategy, or Request?, in: *Artisans Rule: Product Standardization and Craft Specialization in Prehistoric Society*, I. Miloglav and J. Vuković, eds., Cambridge: Scholars Publishing, 89–119.

Borić, D. 1996

Social Dimensions of Mortuary Practices in the Neolithic: a Case Study, *Сџаринар* (н.с.) 47: 67–83.

Borić, D. 2009

Absolute dating of metallurgical innovations in the Vinča Culture of the Balkans, in: *Metals and Societies. Studies in honor of Barbara S. Ottaway*, T. Kienlinn and B. Roberts, eds., Universitätsforschungen zur prähistorischen Archäologie, Bonn: Habelt, 191–245.

**Borić, D. 2015**

The End of the Vinča World: Modelling the Neolithic to Copper Age Transition and the Notion of Archaeological Culture, in: *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and Technologies from 6th to 4th millennium BCE*, Archäologie in Eurasien 31, S. Hansen et al., eds., Bonn: Verlag Marie Leidorf, 177–237.

**Brothwell, D. R. 1981**

*Digging up Bones*, third edition, London and Oxford: British Museum and Oxford University Press.

**Buikstra, J. E. and Ubelaker, D. H. 1994**

*Standards for data collection from human skeletal remains*, Arkansas Archeological Survey Research Series No 44, Fayetteville, Arkansas: Arkansas Archeological Survey.

**Federation Dentaire Internationale, 1971**

Two-digits system of designating teeth, *International Dental Journal* 21: 104–106.

**Ferembach, D., Schwidetzky, I. and Stloukal, M. 1980**

Workshop of European Anthropologists, Recommendations for age and sex diagnoses of skeletons, *Journal of Human Evolution* 9: 517–549.

**Garašanin, M. 1979**

Centralnobalkanska zona, u: *Praistorija jugoslavenskih zemalja II*, Sarajevo: Svjetlost i Akademija nauka i umjetnosti Bosne i Hercegovine, 79–212

**Goodman, A. H., Armelagos, G. J. and Rose, J. C. 1980**

Enamel hypoplasias as indicators of stress in three prehistoric populations from Illinois, *Human Biology* 52: 515–528.

**Grbić, M. 1929**

*Pločnik, eine Prähistorische Ansiedlung aus der Kupferzeit*, Belgrade: Nationalmuseum Belgrad.

**Lieberman, D. E. 1994**

The biological basis for seasonal increments in dental cementum and their application to archaeological research, *Journal of Archaeological Science* 21: 525–539.

**Lieverse, A. R. 1999**

Diet and the aetiology of dental calculus, *International Journal Osteoarchaeology* 9: 219–232.

**Маринковић, С. 2010**

Археолошки материјал са налазишта Живанићева доља из збирке Народног музеја у Зрењанину – Винчанска култура, *Раг Музеја Војводине* 52: 21–36.

- Milojčić, V. 1949  
*Chronologie der jüngeren Steinzeit Mittel- und Südosteuropas*, Berlin: Verlag Gebr. Mann.
- Milojković, J. 1990  
 The Anthropomorphic and Zoomorphic Figurines, in: *Selevac: A Neolithic Village*, R. E. Tringham and D. Krstić, eds., Los Angeles: The Institute of Archaeology, University of California, 397–436.
- Radivojević, M. et al. 2010  
 On the origins of extractive metallurgy: New evidence from Europe, *Journal of Archaeological Science* 37 (11): 2775–2787.
- Radivojević, M. and Rehren, T. 2015  
 Paint it black: the rise of metallurgy in the Balkans, *Journal of Archaeological Method and Theory* 23 (1): 200–237.
- Reid, D. J. and Dean, M. C. 2000  
 The timing of linear hypoplasias on human anterior teeth, *American Journal of Physical Anthropology* 113: 135–140.
- Solomons, N. W. and Keusch, G. T. 1981  
 Nutritional implications of parasitic infections, *Nutrition Reviews* 39: 149–160.
- Šljivar, D. 1996  
 The Eastern Settlement of the Vinča Culture at Pločnik: a Relationship of its Startigraphy to the Hoards of Copper Objects, *Сѡаринар* (н.с.) 47: 85–97.
- Šljivar, D. and Jacanović, D. 1996  
 Veliko Laole, Belovode - Vinča culture settlement in Northeastern Serbia, *Préhistoire Européene* 8: 175–188.
- Šljivar, D., Jacanović, D. and Kuzmanović-Cvetković, J. 2006  
 New Contributions Regarding the Copper Metallurgy in the Vinča Culture, in: *Homage to Milutin Garašanin*, N. Tasić and C. Grozdanov, eds., Belgrade, Serbian Academy of Sciences and Arts, 251–266.
- Тасић, Н. Н. 2008  
 Неми сведоци једног времена: фигурална уметност Винче, у: *Винча – ѡраисѡоријска меѡројола*, ур. Д. Николић, Београд: Филозофски факултет, Народни музеј, Музеј града Београда, Галерија САНУ, 139–163.
- Tasić, N. N. 2011  
 Anthropomorphic figurines from Vinča excavations 1998–2009, *Documenta Praehistorica* 38: 149–158.
- Tasić, N. et al. 2015  
 Vinča-Belo Brdo, Serbia: The times of a tell, *Germania* 93:1–77.
- Vukadinović, S., Sretenović, B. and Šljivar, D. 1999  
 Combined Geoelectrical and GPR Investigations of the Neolithic Archaeological Settlement “Pločnik”, Serbia, in: *Extended abstracts* (5 th Meeting of the Environmental and Engineering Geophysical Society, European section.

September 6-9, 1999, Budapest, Hungary), Budapest: Environmental and Engineering Geophysical Society, European section.

**Whittle, A. et al. 2016**

A Vinča potscape: Formal chronological models for the use and development of Vinča ceramics in south-east Europe, *Documenta Praehistorica* 43: 1–60.

**Wittwer-Backofen, U., Gampe, J. and Vaupel, J. W. 2004**

Tooth Cementum Annulation for Age Estimation: Results From a Large Known-Age Validation Study, *American Journal of Physical Anthropology* 123: 119–129.

**Wittwer-Backofen, U. 2012**

Age Estimation Using Tooth Cementum Annulation, in: *Forensic Microscopy for Skeletal Tissues: Methods and Protocols*, L. S. Bell, ed., Methods in Molecular Biology, vol. 915, New York: Humana press, 129–143.

## INTERNET SOURCES / ИНТЕРНЕТ ИЗВОРИ

<https://skfb.ly/6LtCK> (created 17.6.2019)

**Вера Ж. БОГОСАВЉЕВИЋ ПЕТРОВИЋ**

*Народни музеј у Београду*

**Кристина Ж. ПЕНЕЗИЋ**

*Универзитет у Новом Саду, Институт БиоСенс*

**Јелена Д. ЈОВАНОВИЋ**

*Универзитет у Београду, Филозофски факултет – Одељење за археологију*

*Универзитет у Новом Саду, Институт БиоСенс*

**Софија М. СТЕФАНОВИЋ**

*Универзитет у Новом Саду, Институт БиоСенс*

*Универзитет у Београду, Филозофски факултет – Одељење за археологију*

## **ЉУДСКА ВИЛИЦА СА ПОЗНОНЕОЛИТСКОГ ЛОКАЛИТЕТА ПЛОЧНИК: МУЛТИДИСЦИПЛИНАРНИ ПРИСТУП**

### *РЕЗИМЕ*

Током ископавања 1978. године, на локалитету Плочник, у сонди VIII А, у стратиграфској јединици „запад“ (основа 5 под пепелом и гаром) нађена је људска вилица. Без трагова горења, уочена је на ивици површине с пепелом и гаром, поред археолошких артефаката од печене глине (уломци посуда, делови ритуалних сточића и антропоморфних фигурина), животињских костију (игле и шила) и камена (окресани артефакти и зооморфна глава на постољу, највероватније од мермера). Током селидбе депоа Народног музеја у Београду 2016. године, вилица је „откривена“ по други пут, у студијском материјалу, у кутији 506.

Пажљивом анализом археолошке документације, која је вођена у складу с временом ископавања, у одређеној мери било је могуће реконструисати прецизне услове налаза вилице и одредити њен стратиграфски положај. Антрополошка анализа спроведена је у Лабораторији за биоархеологију Филозофског факултета у Београду. Подразумевала је утврђивање пола и индивидуалне старости, степена абразије зуба, присуства каменца и хипоплазије. Узорак вилице узет је и за анализу апсолутне старости индивидуе, путем акцелераторске масене спектрометрије, да би се добио поуздани период за датовање целине „запад“. Анализа је урађена у Истраживачкој лабораторији за археологију и историју уметности Универзитета у Оксфорду.

Добијена старост за вилицу (ОхА-37075) креће се у распону од 5200 до 4950 година пре н.е. и одговара фази Винча Б, по хронологији В. Милојчића (1949), или раној фази Винча–Тордош II, по хронологији М. Гарашанина (1979). Уз помоћ ове процене, археолошка целина „запад“ датована је у крај шестог миленијума пре н.е. Вилица се налазила у доњој зони културног слоја обележеног као хоризонт II, по подели Д. Шљивара (1996), готово у граничном појасу са најранијим хоризонтом I. Резултати антрополошке анализе показали су да вилица припада младој индивидуи, у касним двадесетим (28,81±2,5 година), чија је исхрана била заснована на протеинима, али и угљеним хидратима који потичу од доместикованих житарица. Уочено присуство хипоплазије зубне глеђи указује на то да је ова индивидуа доживела поремећај у развоју или исхрани током најранијег детињства.

Положај вилице на површини интензивног горења, без знакова гари и термичких промена на њој, иде у прилог мишљењу да је остављена после процеса деструкције која се наслађује у тзв. хоризонту I, односно у нивоима који су и у околним истраженим деловима насеља забележени као укупи гари и пепела, поред интензивних струк-

тура од обрнутог камена. У том периоду, у насељу долази до значајних промена, као и на осталим локалитетима позног неолита и енеолита.

На прелазу из VI у V миленијум пре н.е. уочена је „експлозија“ продукције каменог окресаног оруђа, изражене су појаве рециклирања, поправљања алатки, као и доминантна употреба сировина светле боје, од белих рожнаца, варијетета магнетита, до светлих беличастих стена различитог порекла и степена тврдоће. То је на централном Балкану и период када се број налаза од малахита и бакра увећава, поједина насеља су демографски значајнија, организованија у комуналном смислу, а део њих је опасан и рововима. Све ове промене догодиле су се непосредно пре почетка или на почетку V миленијума пре н.е., односно у време када је ова млада индивидуа са Плочника живела.

Подаци о раној металургији бакра на Плочнику, као и у осталим насељима са налазима предмета од малахита и бакра, дужи низ деценија су преокупација истраживача који покушавају да реконструишу процес производње и порекло руда. С друге стране, веома мало се зна о структури и величини насеља у којима су ове промене уочене, о локацији некропола, погребним обичајима, контактима са другим заједницама, њиховој вези са природним окружењем, исхрани, здрављу и физичким карактеристикама људи који су створили тај нови свет метала.

У светлу скромних података о погребној пракси у позном неолиту централног Балкана, као и због положаја вилице у зони густо распоређених објеката у сонди VIII А, разматрани су аргументи како о парцијалном типу сахране тако и о могућности да је вилица доспела сасвим случајно на површину „запад“. Захваљујући мултидисциплинарном приступу добијен је знатан број нових информација које откривају до сада непознате детаље из живота члана плочничке заједнице током периода великих промена, иако је реч о усамљеном налазу људске вилице.