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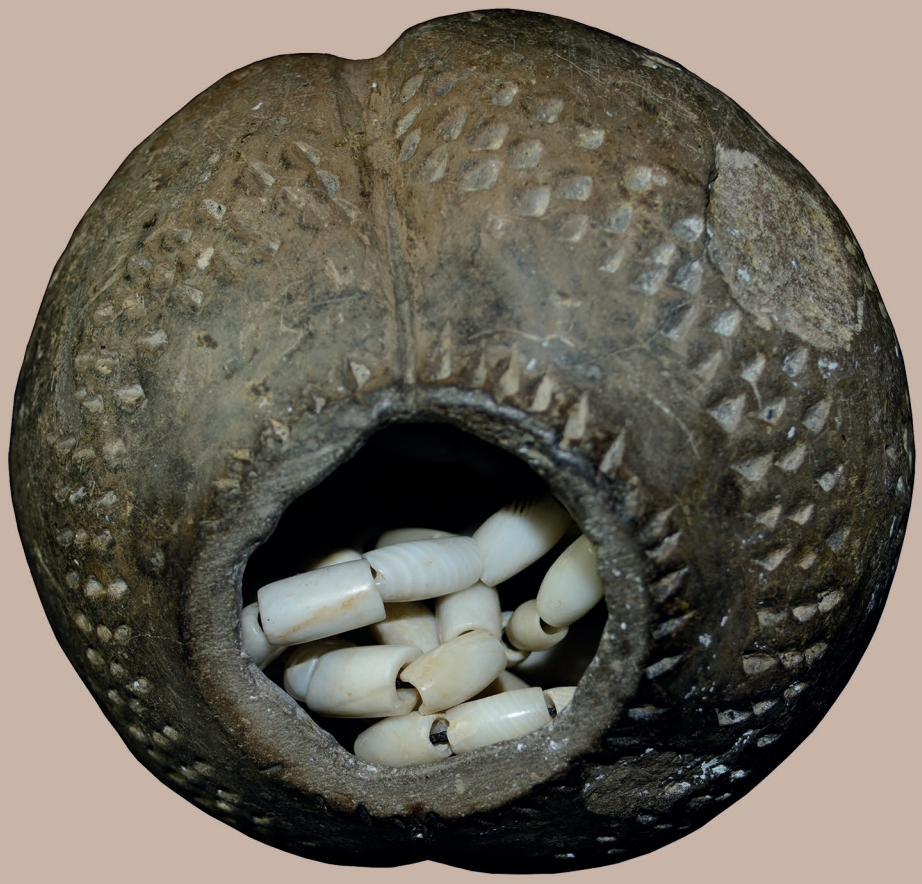

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Le vaisseau anthropomorphe de Vršnik contenant des perles. Crédits photo : Jugoslav Pendić / *The anthropomorphic vessel from Vršnik with beads inside. Photo credits: Jugoslav Pendić.*

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A string of marine shell beads from the Neolithic site of Vršnik (Tarinci, Ovče pole), and other marine shell ornaments in the Neolithic of North Macedonia

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ABSTRACT
The study of ornaments made of marine shells has remarkable importance for understanding prehistoric societies. They tell us about fashion, aesthetic and cultural affinities of the individuals and social groups, as well as ancient networks of communication and exchange. The number of marine shell items known from the Neolithic period of North Macedonia is relatively low. Albeit few, they vary in ornament type, with beads, bangles and pendants represented, and the kind of shell used as raw material, as they are made of shells of bivalves, gastropods, and scaphopods. Of special importance is a find of 157 shell beads, presumably from a single string, discovered in 1958 in an anthropomorphic vessel at the site of Vršnik in Ovče pole. It was the recognition of this find, and the fact that it was originally poorly described, and later almost completely forgotten, that initiated this study. The majority of beads are tubular and made of shells of two mollusks with very different shell morphology (bivalves and scaphopods), yet they are strikingly similar in size, shape, and color. In addition, the collection included white stone tubular beads, a single shell discoid bead, and three perforated snails. This find, as well as others from the region of North Macedonia, enhance our understanding of marine shell items distribution in continental Europe in the Neolithic period. Also, it adds to the visibility of scaphopod items share in exchange networks, which might be underestimated because of the difficulties in their recognition.

KEY WORDS
Personal ornaments,
Spondylus,
Antalis,
scaphopods.

RÉSUMÉ

Un collier de perles de coquillages marins provenant du site néolithique de Vršnik (Tarinci, Ovče pole), et d'autres ornements de coquillages marins du Néolithique de la Macédoine du Nord.

L'étude des ornements faits de coquillages marins a une importance remarquable pour la compréhension des sociétés préhistoriques. Ils nous renseignent sur la mode, les affinités esthétiques et culturelles des individus et des groupes sociaux, ainsi que sur les anciens réseaux de communication et d'échange. Le nombre d'objets en coquillages marins connus de la période néolithique de la Macédoine du Nord est relativement faible. Bien que peu nombreux, ils varient en termes de type d'ornement, avec des perles, des bracelets et des pendentifs représentés, et de type de coquillage utilisé comme matière première, car ils sont constitués de coquilles de bivalves, de gastéropodes et de scaphopodes. La découverte de 157 perles de coquillages, vraisemblablement issues d'un seul fil, est particulièrement importante. Elles ont été découvertes en 1958 dans un vaisseau anthropomorphe sur le site de Vršnik à Ovče pole. C'est la reconnaissance de cette découverte, et le fait qu'elle était à l'origine mal décrite, puis presque complètement oubliée, qui ont lancé cette étude. La majorité des perles sont tubulaires et constituées de coquilles de deux mollusques ayant une morphologie très différente (bivalves et scaphopodes), mais elles sont étonnamment similaires en taille, forme et couleur. En outre, la collection comprenait des perles tubulaires en pierre blanche, une perle discoïde à coquille unique et trois escargots perforés. Cette trouvaille, ainsi que d'autres provenant de la région de Macédoine du Nord, nous permet de mieux comprendre la distribution des objets en coquillages marins en Europe continentale au Néolithique. De plus, elle ajoute à la visibilité des articles de scaphopodes partagés dans les réseaux d'échange, qui pourraient être sous-estimés en raison des difficultés de leur reconnaissance.

MOTS CLÉS
Ornements personnels, *Spondylus*, *Antalis*, scaphopodes.

INTRODUCTION

The man's affinity for personal ornamentation is universal and known since the distant past and from all continents (Cordwell 1979; Bar-Yosef Mayer 2005, 2008; Balme & Morse 2006; Zilhão 2007; Kuhn & Stiner 2007; Álvarez-Fernández & Carvajal-Contretas 2010; Szabó *et al.* 2014). The manner in which people were decorating themselves in prehistory is known mainly on the basis of ornaments made from durable materials. Among those, the most widely distributed and most frequently used in ornament production are items manufactured from shells of marine organisms. In addition to insights into fashion, aesthetic and cultural affinities in prehistory, as well as the social status of individuals, when reliable contextual information is available on shell items as personal belongings, ornaments made of marine shells also tell us about networks of communication and exchange between different prehistoric populations, and distances covered by these networks (Dimitrijević & Tripković 2006; Vanhaeren & d'Errico 2006; Álvarez-Fernández 2011; Rigaud 2011; Micheli 2012; Chapman & Gaydarska 2015).

Distribution maps of items manufactured from marine shells found at prehistoric sites testify to this. The best known is the distribution of personal ornaments made of *Spondylus* shell (Willms 1985; Müller 1997: fig. 1; Schuster 2002: map 1; Borrello & Micheli 2004: fig. 3; Dimitrijević & Tripković 2006: fig. 10; Séfériadés 2009; Rigaud 2011: figs 159, 160; Siklósi & Csengeri 2011: fig. 1). Ornaments made of *Spondylus* get the most attention, due to their relative frequency and shell impressibility. However, these maps usually lack the precision of shell items distribution in a diachronic perspective, since they usually refer to the Neolithic in a broad sense or Neolithic and Eneolithic/Chalcolithic periods (but see Rigaud 2011; Chapman & Gaydarska 2015), if not prehistory as a whole. In addition, maps are mainly too general when the type of ornament is in question (with some exceptions, like Rigaud 2011: annex 2), and also often lack shell taxonomic identification. For example, shell bangles[1], one of the most popular ornament types in the Neolithic, are often automatically ascribed to *Spondylus*, while frequently, the shell of another bivalve, *Glycymeris*, was also used in their production (Dimitrijević & Tripković 2006). Also, scaphopod shells seem to be uncommon in the greater part of Europe in various periods of prehistory, but this may be the consequence of their poor recognition (Dimitrijević 2014; Tripković *et al.* 2016).

The fact that our data are incomplete and sometimes misleading in showing false blank spots on distribution maps, is also manifested by the region of the Republic of North Macedonia. A single site in this region, Amzabegovo, was included in the maps of *Spondylus* distribution in the Neolithic of Europe (e.g., Müller 1997). In this paper, we are going to show that the distribution of marine shell ornaments in North Macedonia is much greater. We will demonstrate that these ornaments vary in ornament type and raw material – shell species used in their production, especially in the case of the assemblage from the site of Govrlevo. In addition, the collection of shell ornaments from the Neolithic of North Macedonia includes some exceptional finds such as beads, probably forming a single string, found in an anthropomorphic vessel at the site of Vršnik in Ovče Pole (Fig. 1), almost forgotten since their brief mention in the original excavation report (Garašanin & Garašanin 1961).

1. In this paper, the term annulet is used for circlets of continuous and homogenous material of any size, bangle for annulet with a diameter that would allow wearing it on the arm, wrist or ankle, while the term ring is reserved for smaller circlets, suitable for wearing on fingers (after Nikolaidou 2003).

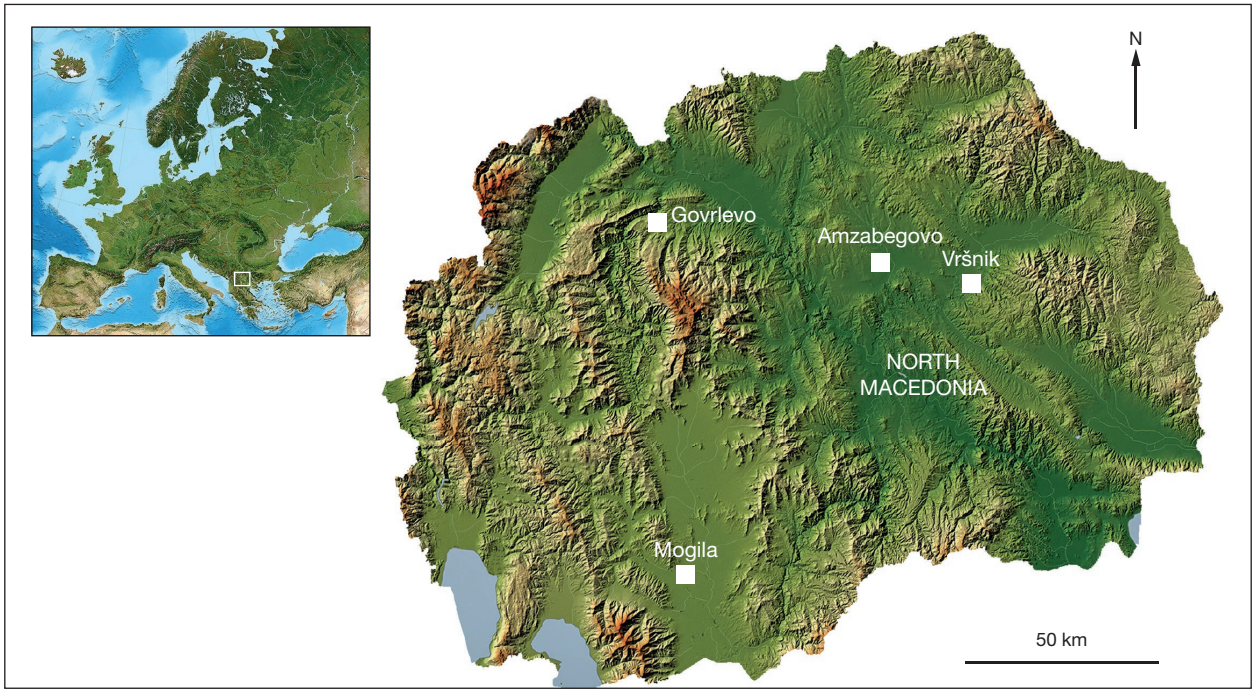


Fig. 1. — The map of North Macedonia with Neolithic sites mentioned in the text.

BACKGROUND – THE NEOLITHIC OF NORTH MACEDONIA

The beginning of the Neolithic in North Macedonia has been often discussed and some major perspectives are presented. The first agricultural societies in the region appeared at the end of the 7th millennium BC as indicated by radiocarbon dates from several sites, such as Amzabegovo (Gimbutas 1976a; Naumov 2016). Although some dates suggest earlier occupation in the middle of the 7th millennium, most evidence at the moment points to 6100 BC as the initial stage of occupation of this site. The Middle Neolithic starts approximately at 5800 BC while its transition to Late Neolithic is dated to 5300-5200 BC (Gimbutas 1976a; Sanev 1995).

Most likely the Neolithic started with the full set of the so-called 'Neolithic package', as no pre-pottery levels are determined so far (Garašanin 1979; Sanev 1994). Thus, since the Early Neolithic, the first agricultural societies produced pottery, figurines, lithic and stone tools, herded domestic animals and cultivated plants. The pottery mostly consists of white-painted vessels with fine fabric in the diversity of shapes, but also coarse pottery mainly used for cooking or as storage containers (Fidanoski 2009). Painted pottery was not only an aesthetical and practical device but also an indicator of the identity of the societies that employed it (Naumov 2015). Consequently, the communities inhabiting a particular region (a valley) had a distinct design of pottery patterns different from those in the other regions. Thus the so-called Amzabegovo – Vršnik and Velušina – Porodin cultural groups were determined, although there is a visual difference of patterns even within them, and particularly within the Amzabegovo – Vršnik group (Garašanin 1979; Sanev 1994).

Apart from these social features, the pottery also had a significant role in symbolic processes and therefore the painted patterns comprised of semiotic components, but some had anthropomorphic features, with the vessel from Vršnik being one of few (Naumov 2008, 2015). In terms of symbolic objects, Neolithic societies modeled a number of anthropomorphic and zoomorphic figurines, but also house models and stamps with human and animal representations (Sanev 2006; Chausidis 2010; Naumov 2010). Regarding rituals, intramural burials were also practiced within the settlements with an apparent preference for infants, children and women buried next to or below the dwellings (Naumov 2014).

A number of axes indicate forestation and provision of trees for constructing the buildings that were mainly rectangular, made of wattle and daub. Daub structures such as ovens, granaries, and bins used for storing and processing of cereals, as well as those for bread production, were often installed within buildings (Stojanova Kanzurova 2008; Tolevski 2009; Fidanoski 2012; Naumov 2013). A large number of seeds found in the vicinity of these structures, as well as a number of flint tools utilized as sickles for agriculture, indicate societies with a distinct focus on cereal-based diet (Hopf 1961; Renfrew 1976; Beneš *et al.* 2018; Naumov *et al.* 2018). In terms of diet, the consumption of cattle, sheep, goat and pig meat is confirmed, as well as the use of various vegetables and fruits in the daily cuisine (Bökönyi 1976; Ivkovska 2009; Naumov *et al.* 2018).

In general, the research of the Neolithic in North Macedonia as an extensive process is still far from sufficient, but current multidisciplinary projects provide new data which will significantly help to understand better the first agricultural societies in the region. Nevertheless, the excavations, cabinet research

TABLE 1. — Shell ornaments found at the Neolithic sites in North Macedonia. Abbreviations: **EN**, Early Neolithic; **MN**, Middle Neolithic; **LN**, Late Neolithic.

	Site						
	Amzabegovo			Govrlevo		Vršnik	Tumba Mogila
Chronology	EN	MN	LN	EN	EN/MN	MN	EN/MN
Ornament type							
Bangle	–	7	9	–	5	3	–
Ring	1	–	–	–	–	–	–
Pendant	–	–	1	1	–	–	–
Perforated ornament	–	–	–	–	1	–	–
Spondylus bead	4	3	–	–	–	29	–
Scaphopod bead	–	6	–	–	–	98	–
Gastropod bead	–	–	–	–	–	3	–
Fragmented ornament	–	–	1	–	–	–	1

and laboratory analyses performed so far indicate dynamic farming communities that were interacting with the natural environment and involved themselves in complex social and symbolic processes. The shell ornaments in general, and the beads deposited within the anthropomorphic vessel from Vršnik in particular, confirm such vibrant engagement of people in aesthetics and ritual practices.

MARINE SHELL ORNAMENTS IN THE NEOLITHIC OF NORTH MACEDONIA

Apart from the exceptional find of beads in an anthropomorphic vessel at the site of Vršnik, marine shell ornaments are reported from the Neolithic sites of Amzabegovo in Ovče pole, Govrlevo in Skopje valley, and Tumba Mogila in Pelagonia (Gimbutas 1976b; Simoska *et al.* 1979: fig. 1; Fidanoski 2009, 2012) (Table 1). In the present section, we shall give an overview of shell items from the collections of the city museums of Štip and Skopje which were available for study (Govrlevo and Vršnik), as well as present the data from the literature for those which were not accessible (Amzabegovo and Tumba Mogila).

The studied shell assemblage from Govrlevo comprises the complete shell material collected in the course of the excavation campaigns 1982-2010 and curated in the City Museum of Skopje. From the site of Vršnik, only the material presented at the exhibition in the History Museum in Štip was accessible and studied.

Magnifying lenses with a magnification × 20 were used for the observation of the details of morphology and manufacture of ornaments, and for measuring a digital caliper with the precision of 0.1 mm. A more detailed analysis of the Vršnik string was conducted on the basis of high-resolution photographs.

Bangles, beads and other types of pierced shell ornaments were recorded in Amzabegovo: seven *Spondylus* tubular and discoid beads[2], six tubular beads made of a fragile white shell, 16 fragmented bangles, one annulet with a possible outer diameter of 3 cm (presumably a ring), one fragmented ornament pierced at one end, and one small bivalve perforated at the hinge (Gimbutas 1976b: figs 203.10-13; 218.2, 3, 5, 7; 215.1-7; pl. 27, 28). These items originate from the phase Anza I, correlated with Early Neolithic (four *Spondylus* beads, one ring), Anza II, Middle Neolithic (seven bangles), and Anza IV, Late Neolithic (three *Spondylus* beads, six tubular beads of a fragile white shell, nine bangles, one fragmented ornament pierced at one end, and one small bivalve perforated at the hinge).

A fragmented shell bangle was published from the site of Govrlevo (Fidanoski 2012: 57, fig. 80). For the purpose of this paper, we analyzed all shell items from this site. The assemblage is rather diverse with respect to the ornament types present and the variability of shell raw material used. There are five fragments of bangles made of a shell of the bivalve genus *Glycymeris*, which is possible to conclude on the basis of morphological traces preserved: a triangular area with tent-shaped grooves (Fig. 2A), multiple transversal hinge teeth diverging outwards (Fig. 2A-C; G), a trace of an adductor muscle scar (Fig. 2E) and traces of marginal crenulations on the inner side of the valve (Fig. 2F), showing at the same time from which part of the valve the fragments come from (cf. Dimitrijević & Tripković 2006).

Three of these five bangle fragments from Govrlevo (Fig. 2E-G) show dark gray – blackish color, created under the influence of heating. One of them (Fig. 2F) shows a nice uniform grayish color which seemingly arose under reducing conditions. It is possible that the bangles were intentionally heated to change their natural whitish color to dark grey or black (cf. annulets at the Late Neolithic settlement of Dimini [Chapman & Gaydarska 2007], or shells of *Tritia neritea* (Linnaeus, 1758) in the Lower Mesolithic of Franchthi cave [Perlès & Vanhaeren 2010]).

There is one complete valve of *Cerastoderma glaucum* (Bruguière, 1789) (Fig. 2H-J), perforated by scraping off the most elevated part of the umbo. On the inner side of the valve, there are distinct ridges that diminish towards the middle of the valve (Fig. 2I). This feature enables differentiation from its close relative, *Cerastoderma edule* (Linnaeus, 1758), previously known as *Cardium edule*. Although the perforation suggests that the item was used as a pendant[3], there are no usage traces on the perforation rims which would be expected if the item was worn on a cord. The usage of this kind of shell in the Neolithic of North Macedonia is also indicated by imprints on ceramic vessel fragments, presumably made by "*Cardium*" valve margins found at the Late Neolithic site of Mogila – Senokos (Temelkoski & Mitkoski 2008: 59).

Another perforated valve fragment (Fig. 2K-M) originates from a shell similar in size to *C. glaucum* or *edule*, but of different appearance, as it is shiny, like the mother of pearl, unlike the opaque, chalky *Cerastoderma* valve. There are

2. A bead is defined as an object perforated along its major rotational axis (after Nikolaidou 2003). A tubular bead is characterized by the length equal to or more than three times their diameter, and a discoid bead has the length equal to or less than one-third of the diameter (after Nikolaidou 2003).

3. A pendant or an amulet is an item perforated at one end, which cannot rotate when suspended (after Nikolaidou 2003).

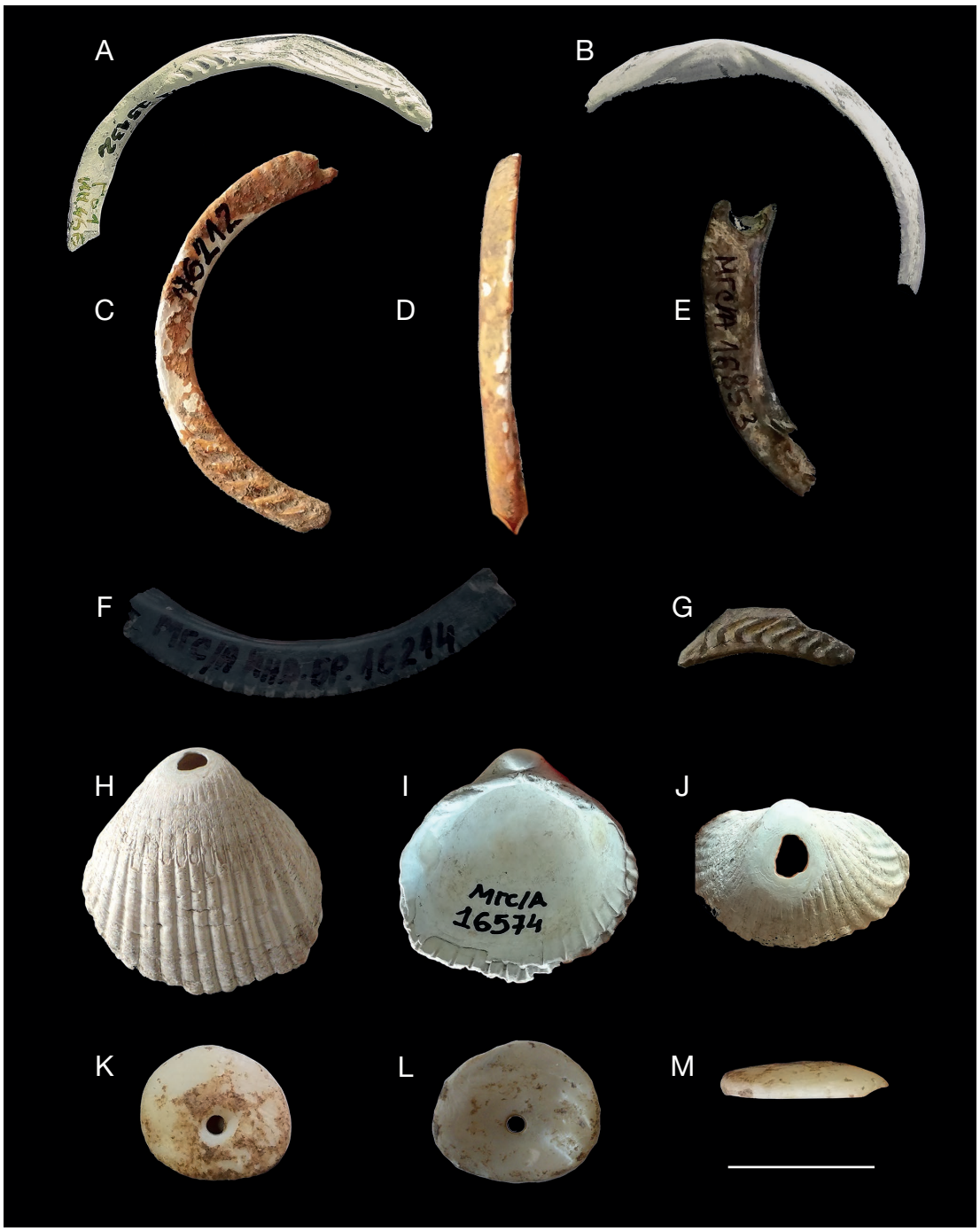


Fig. 2. — Marine shell ornaments from Govrlevo. **A**, one third of the diameter fragment of a shell bangle (inv. nº 15132), made from a *Glycymeris* right valve, with preserved triangular area with tent-shaped grooves and several hinge teeth diverging outwards on both sides of the triangular area; **B**, the opposite side of the same fragment showing the triangular umbonal cavity, i.e. the inner side of the hinge plate; **C**, one third of the diameter fragment of a shell bangle (inv. nº 16212) made from a *Glycymeris* valve, with preserved anterior margin of the valve with a portion of the plate with hinge teeth; **D**, the same fragment showing the uniform bangle depth; **E**, a fragment of a *Glycymeris* bangle (inv. no 16853) with preserved portion of an aductor muscle scar; **F**, a fragment of a *Glycymeris* bangle (inv. nº 16214) with preserved marginal crenulation on the inner side of the valve; **G**, a fragment of a *Glycymeris* bangle (inv. nº 16302) with preserved hinge teeth; **H**, left valve of *Cerastoderma glaucum* (Bruguière, 1789) (inv. nº 16574), outer side; **I**, the same specimen, inner side of the valve; **J**, the same specimen, the umbonal area with a perforation made by scraping; **K**, perforated middle portion of the bivalve (inv. nº 16301), outer side; **L**, the same specimen, inner side; **M**, the same specimen, lateral side, to show the depth of the item and the roundness of the edges. Scale bar: 2 cm. Photos credits: Vesna Dimitrijević (A-G; I-K; M); Ljubo Fidanoski (H, L).

no morphological traits preserved to enable taxonomic identification. It is the middle part of the valve and the perforation is positioned centrally. The rim of the item is well rounded.

All of the bangles from the site of Govrlevo are from the contexts defined as Early-Middle Neolithic, as well as the shell item perforated in its middle, while *C. glaucum* pendant and the fossil come from the more precisely defined, Early Neolithic settings.

Fig. 3. — Marine shell ornaments from Vršnik. **A**, more than half of the diameter fragment of a shell bangle (inv. nº C/110) made from a *Glycymeris* valve, with a preserved part of the triangular umbonal cavity and the hinge plate; **B**, the same specimen, opposite side, showing the marginal crenulation of the inner side of the valve; **C**, one third of the diameter fragment of a shell bangle (inv. nº 0/509) made from a *Glycymeris* valve; **D**, the same specimen, showing the marginal crenulation of the inner valve along its whole length; **E**, outer side of a fragment of a shell bangle made from a *Spondylus* valve (inv.no B&112) with a perforation; **F**, the same specimen, lateral view with a remnant of an adductor muscle scar; **G**, a S*pondylus* bead (inv. nº 0/7), lateral view; **H**, the same specimen, front view. Scale bar: 2 cm. Photos credits: Jugoslav Pendić.

At the site of Vršnik, apart from the beads found in the anthropomorphic vessel which will be described in the next section, three fragmented bangles, and one separate bead were also discovered (Fig. 3). They are previously unpublished and are currently exhibited at the Museum of Štip. The bead and one of these fragmented bangles are made from a *Spondylus* sp. shell (Fig. 3E-H), and two other bangles from *Glycymeris* sp. (Fig. 3A-D).

Both *Glycymeris* bangles were cut out along the margins of valves. One of them had more than half of the valve diameter preserved. A remnant of the triangular hollow below the hinge is visible on one end, while the opposite end shows the marginal ornamentation (Fig. 3A, B). Another fragment bears remnants of the ornamentation from the inner margin of the valve on its whole length (Fig. 3C, D).

Fig. 4. — Bangles made from non-shell materials from Govrlevo. **A**, fragment of a clay bangle; **B**, fragment of a marble bangle; **C**, fragmented fossil – the cast of an uncoiled ammonite. Scale bar: 1 cm. Photos credits: Vesna Dimitrijević (A, C); Ljubo Fidanoski (B).

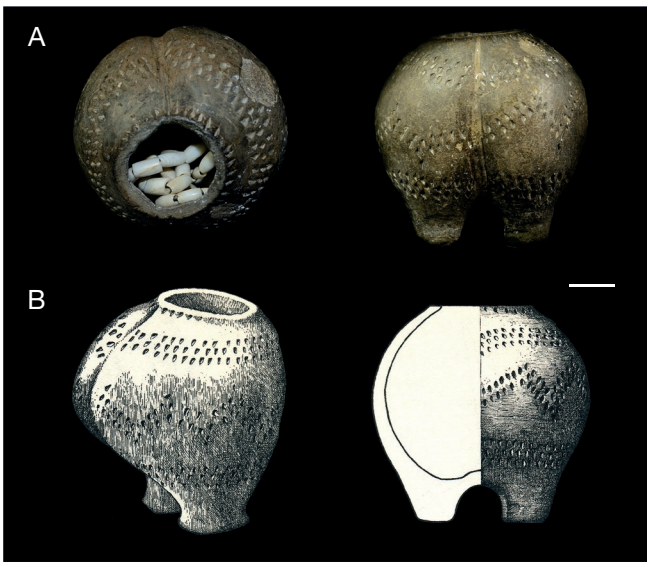


Fig. 5. — The anthropomorphic vessel from Vršnik. **A**, the vessel with beads inside to show their mutual relationship; **B**, drawing of the vessel by Sead Čerkez, *in* Benac 1979: pl. XIV, 1a, b. Scale bar: 2 cm. Photo credits: Jugoslav Pendić.

Spondylus bangle bears a pit at the inner side, which is a remnant of the hollow below the valve hinge. Its color is milky white, while the outer side is coated with carbonates. It is perforated on one end. The perforation was performed in two steps, from the outer, and from the inner side (Fig. 3E, F).

A single fragmented item, probably a pendant made from an unknown mollusk shell, is published from Tumba – Mogila, a tell site in Pelagonia (Simoska *et al.* 1979: 17; Fidanoski 2009).

At Amzabegovo and Govrlevo, there were also bangles made from a material other than shell: fragments of one stone and one clay bangle from Govrlevo (Fig. 4A, B), and nine clay bangles from Amzabegovo (Gimbutas 1976b: 250-252; fig. 216). This is not an unusual find since at a large number of sites where shell bangles were found, they were accompanied with bangles of stone, bone or clay. Usually, they are much fewer than shell bangles, and are often interpreted as their imitations (cf. Dimitrijević & Tripković 2006: 246, fig. 9).

A find from Govrlevo points to an occurrence of fossil collection, presumably in the surroundings (Fig. 4C). It is a small portion of the original form, presumably a cast of the end of a shell of an uncoiled ammonite. As it has natural spiral furrows, it could have been used as a pendant, or simply collected as a curiosity.

VRŠNIK STRING

The context of the discovery of Vršnik beads

Systematic excavations at the site of Vršnik began in 1958. The site is also known as Vršnik – Tarinci, designating a more precise location. Remains of dwellings built in wattle and daub technique were recovered, as well as pits and ovens, a large quantity of pottery, a rather modest amount of stone and bone tools, and few anthropomorphic figurines. An excavation report was published shortly afterward (Garašanin & Garašanin 1961). Four horizons of habitation structures were distinguished (Vršnik I-IV), which were subsequently correlated with the sequence at the site of Amzabegovo, also known as Anzabegovo, and interpreted by Garašanin (1979) as a distinct cultural group (Amzabegovo – Vršnik I-IV), with Amzabegovo – Vršnik I identified as the Early, Amzabegovo – Vršnik II and III as Middle, and Amzabegovo – Vršnik IV as the Late Neolithic. The phasing was based primarily on the pottery features. It has been suggested that Vršnik – Amzabegovo II and III share features and are widely contemporaneous with the Early and Middle Neolithic Starčevo in the Central Balkans, and Vršnik – Amzabegovo IV with the beginning of the Late Neolithic Vinča – Tordoš A (Garašanin 1979; Sanev 1995).

The anthropomorphic vessel has been discovered in block 1, in a layer ascribed to Vršnik II (Garašanin & Garašanin 1961). The vessel is in the form of the lower part of a female body, decorated with rows of incisions (Fig. 5). It is a unique find – there are vessels in the Neolithic of Balkans and Anatolia with similar traits, but none that we could describe as similar in both presenting the lower part of a female body, and in the manner of shaping and ornamentation of the bowl (Naumov 2008).

"A string of 157 clam and snail beads and one small red stone bead" (Garašanin & Garašanin 1961: 24, figs 33; 34) was found in the vessel. While in the reference paper by Garašanin & Garašanin a single sentence was dedicated to the description of the find in the vessel, and one small photo of rather low quality, it appears that it was later completely forgotten, and not further mentioned in subsequent literature. The anthropomorphic vessel was later discussed and illustrated, but the fact that the beads were found in it was omitted (e.g., Garašanin 1979). Given that the original description was scant, mentioning only that the beads were made from "snails and

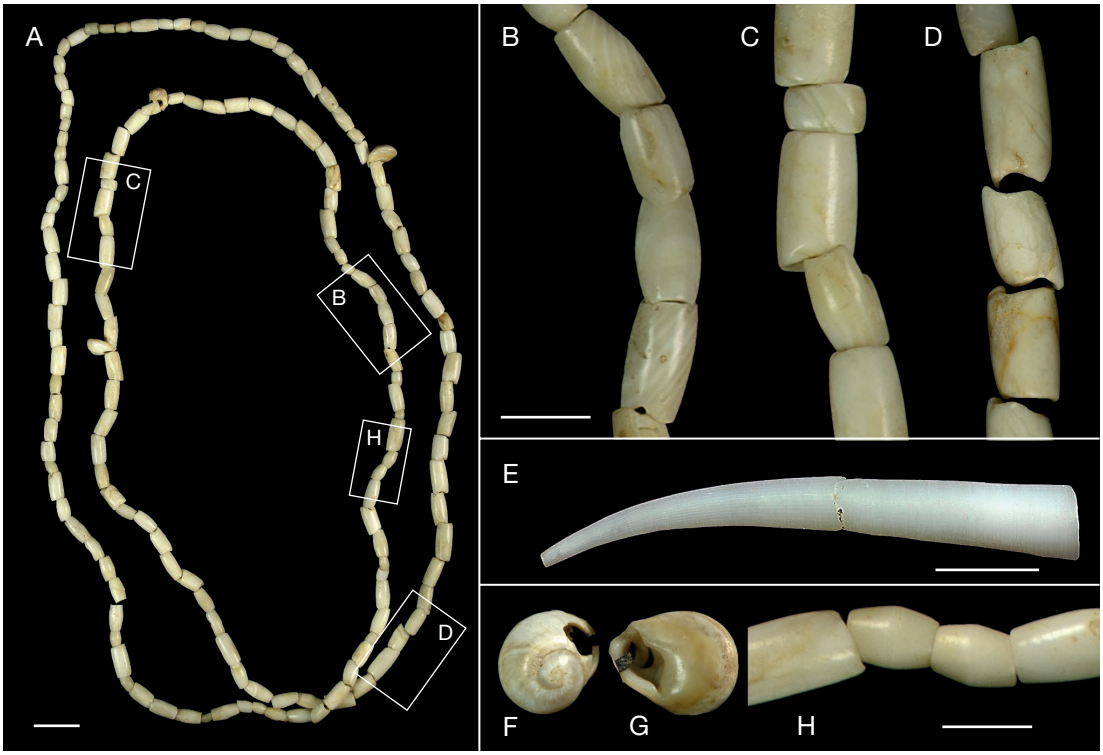


Fig. 6. — **A**, Beads from the Vršnik anthropomorphic vessel in a string, as displayed on the exhibition in the Štip museum. The rectangles designate the magnified details of the string; **B**, detail of the string, showing tubular beads – ovoid (the first on the top, and two on the bottom) and cylindrical (the second from the top); **C**, a detail of the string with a discoid bead; **D**, a detail of the string with cylindrical beads with characteristic sinusoidal ends originating from the lines of growth stagnation in scaphopod shells; **E**, *Antalis vulgaris* (da Costa, 1778), the line of growth stagnation is in the middle of the shell; **F**, **G**, *Tritia neritea* (Linnaeus, 1758) beads; **H**, a detail of the string with two biconical stone/mineral beads between a cylindrical (first on the right) and an ovoid bead. Scale bars: A, 2 cm; B, 1 cm; E, 5 mm; F-H, 1 cm. Photos credits: Jugoslav Pendić (A-D, F-H); Raymond Huet (E; http://www.animalbase.uni-goettingen.de/zooweb/servlet/AnimalBase/home/picture?id=9128, last consultation on 22 February 2021).

clams", and the fact that the report (Garašanin & Garašanin 1961) was published in a local journal, it is not surprising that this find is not represented on the maps of shell items in European prehistory.

Bead description

The beads put together on a string, are currently on display within the permanent exhibition at the Institute for Protection of Cultural Monuments and Museum – Štip (Fig. 6A). We counted 152 pieces, five less than mentioned in the original excavation report (Garašanin & Garašanin 1961). Three beads are *Tritia neritea* snails perforated on the last whorl (Fig. 6F, G). Remaining 149 show regular circular cross-section. The "small red stone bead" was not found in the string at the exhibition.

At first glance, all beads except the perforated snails look like they were made from the same material. Their color is whitish. A single one is discoid (Fig. 6D). Two types of shell tubular beads are present, cylindrical and ovoid (subtypes B21-1 and B.2 in bead typology after Bonnardin 2009; from Rigaud 2011: fig. 6) (Fig. 6B). Their differences can be seen in bead profiles. In the cylindrical subtype, the bead diameter is uniform along the length, whereas ovoid beads have the largest diameter in the middle, slightly and gradually tapering toward the ends. When observed under a light source, the beads are translucent, thus most probably made from a contemporary shell, as fossil shells regularly loose transparency and become opaque through the process of fossilization (cf. Dimitrijević & Tripković 2006).

As usual in beads, their manufacture largely destroys the morphological traits of the original shell, making the taxonomic identification difficult. However, in some beads, the alternation of transparent and opaque lines is observable, identical to the appearance of growth lines in bivalves (Fig. 6B, C, G). The width of these lines is uneven, and they are extending at variable angles in relation to bead axes, similarly to growth lines in sections observable in items made from *Spondylus* shell. Bearing in mind that *Spondylus gaederopus* Linnaeus, 1758 is one of the most common shell raw material in prehistory of Europe and the Middle East (Borrello & Micheli 2004; Dimitrijević & Tripković 2006), and that the production of massive beads of this size demanded massive valves, hardly occurring in any other *Spondylus* species, this leads to the assumption that precisely *S. gaederopus* was used for the manufacture of these beads.

The alternation of growth lines, i.e. the internal shell structure, is regularly visible in ovoid beads. Ovoid beads are also characterized by regular circular ends standing at the right angle in relation to bead axes. On the contrary, no growth lines are visible in cylindrical beads, their surfaces are smooth,

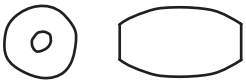
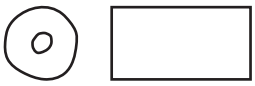
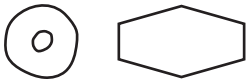
Bead type	Schematic presentation	Raw material
snail perforated at the last whorl		gastropod shell *Tritia neritea*
discoid		bivalve shell cf. *Spondylus gaederopus*
ovoid		bivalve shell cf. *Spondylus gaederopus*
cilindrical		bivalve shell cf. *Antalis vulgaris*
biconical		stone/mineral

Fig. 7. — The typology of beads from the Vršnik string.

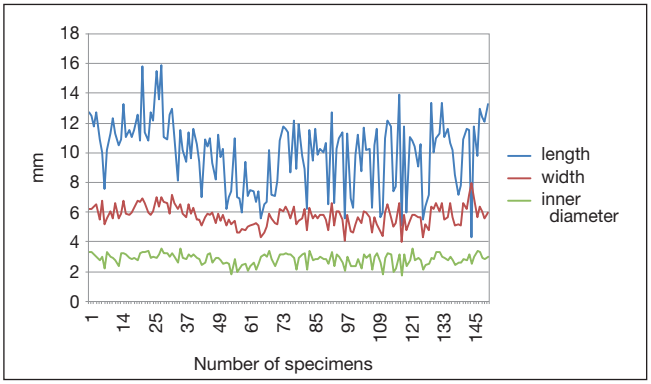


Fig. 8. — The length, width and inner diameter of Vršnik beads.

while their ends are oblique or curved in a sinusoidal line (Fig. 6D). This "sinusoidal" appearance of ends is characteristic for beads originating from the shells of scaphopods. Namely, in scaphopod shells, usually a single or several growth lines are found, most often in the form of sinusoidal curves (Fig. 6E). Scaphopod shells break most easily along these growth lines. Accordingly, scaphopod beads, no matter whether the shells were collected already broken on the beach, or obtained by breaking shell by pressure, very often have this kind of sinusoidal ends (Dimitrijević *et al.* 2010; Dimitrijević 2014; Tripković *et al.* 2016). The surface of cylindrical beads is smooth – it is without longitudinal ribs that characterize the shell of most of the scaphopods. Based on this fact, we could speculate that cylindrical beads might originate from the anterior (wider) end of *Antalis vulgaris* (da Costa, 1778), given that the shell of this species is ornamented with longitudinal ribs in the posterior end, but soon disappearing, thus the anterior end is smooth. *Antalis vulgaris* is one of *c.* ten scaphopod species living in the Mediterranean and the largest among them, with maximal length of 60 mm (Ozturk 2011; Martínez-Ortí & Cádiz 2012; Kurzawska *et al.* 2013: appendix A and references therein). The size of the scaphopod shell used in the production of Vršnik beads had to be quite massive, and maybe even larger then maximal size recorded in recent animals. However, in their study of Natufian scaphopod ornaments, Kurzawska *et al.* (2013) claim that some of the *Antalis vulgaris* shells found at archaeological sites seem to be thicker and larger than recent specimens, which also might be true for the European Neolithic sites. In any case, we leave the question of species attribution of the shell material of cylindrical Vršnik beads open.

To make matters even more complex, a certain number of tubular white beads differ from both types described above (Fig. 6H). They were made of homogenous semitransparent material. They do not have growth lines like the beads made from bivalves, and they differ from scaphopod beads by very regular straight ends. In addition, they are slightly but clearly biconical, thus unlikely made from a scaphopod shell tapering toward one end. Probably, these beads were not made from mollusk shell, but from some sort of whitish, soft, semitransparent stone or mineral. Their number is smaller compared to ovoid beads made from bivalves and cylindrical beads originating from scaphopods.

Accordingly, Vršnik beads are made from shells of three very different marine mollusks – gastropod coiled snails, *Tritia neritea*, bivalves, most probably *Spondylus gaederopus*, scaphopods, possibly *Antalis vulgaris*, and some sort of whitish semitransparent stone. They belong to five different bead types – perforated snails, discoid, ovoid, cylindrical and biconical (Fig. 7).

Bead dimensions and stringing

Tubular beads from shell do not differ significantly, especially if their width and the inner diameter is considered (Fig. 8). Their average length is 10 mm, the average width in the middle is 5.7 mm, and the average depth of the bead wall is 2.8 mm.

The length of the beads ranges from maximal 15.9 mm to minimal 4.3 mm, the latter observed in a single discoid bead. In that range, the length is very variable. The width of the beads shows less variation, from 4.3 to 8 mm, and once again the width of a single discoid bead is exceptional, being the largest. The inner diameter is uniform, with an average of *c.* 3 mm. This uniformity of the inner diameter suggests that all beads most likely originate from the same string. Certainly, this hypothesis is further supported by the fact that all beads were found on a pile and in a vessel, therefore, if not literally strung on a single thread, obviously deposited as a whole. Of course, particular beads could have also been strung on two or more threads, whether in the moment of their deposition in the vessel or during their previous usage.

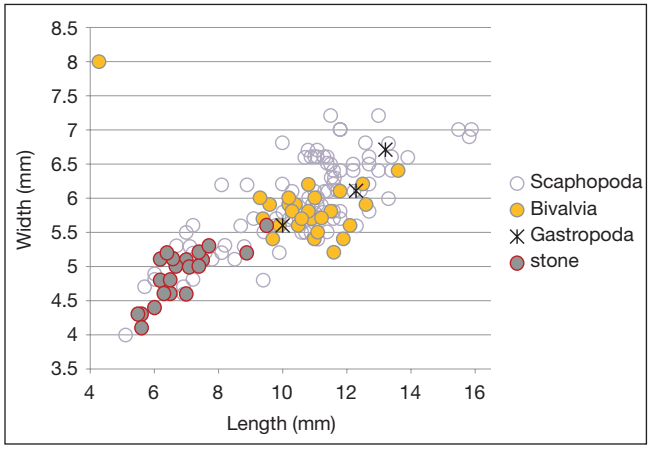


Fig. 9. — The length/width ratio of Vršnik beads.

But, in any case, they were ultimately combined as a whole, which is important for our further discussion.

If we consider the length/breadth proportion (Fig. 9), we observe that the discoid bead is separate, while all the others show a positive correlation. Stone beads tend to be smaller than average, while bivalve beads tend to be larger than average. Scaphopod beads are most numerous and of all sizes.

MARINE SHELL ORNAMENTS FROM THE NEOLITHIC PERIOD IN NORTH MACEDONIA AND COMPARATIVE FINDINGS FROM ADJACENT AREAS

Having in mind that the number of Neolithic settlements discovered in North Macedonia is quite large, with some of them excavated extensively, the number of discovered shell ornaments is rather small. However, it should be borne in mind that the probability of omitting potential finds of shell ornaments would have been very high, for multiple reasons. In the first place, small and fragile shell items are often overlooked if sieving and flotation are not performed, which was largely the case in the excavation strategies of these sites. Even in cases when they were found and curated, mostly shell items were not identified and published, but rather, according to common archaeological practice, they were often lumped together with stone or bone tools or remained unselected from animal bones. Besides the shell ornaments described, there were no other finds of marine shells which would indicate that marine mollusks were used in the diet. Therefore, shells were probably perceived as artefacts and prestige materials, opposite to the shells of mollusks collected for the subsistence (cf. Dupont 2019). They were most probably imported as finished products obtained by exchange with coastal populations.

Somewhat larger assemblages are only known from Amzabegovo in Ovče Pole and Govrlevo in Skopje Valley. From the vast valley of Pelagonia, where many Neolithic tumba (tell) sites are found, there is a single shell find from Tumba Mogila (Simoska *et al.* 1979; Fidanoski 2009). However, if we take a look at figurines from Pelagonia, we may observe that some of them bear representations of ornaments. Judging by their size and shape, it might be assumed that *Spondylus* items (such as pendants, necklaces or belts) were depicted (Todorova & Vajsov 1993: fig. 170), speaking in the favor of *Spondylus* appreciation, and probably its actual presence in the region.

Individual shell finds are mostly attributed to one of the four established Neolithic phases in the region, whereas the chronological attribution of a few specimens is only noted as the Neolithic (Table 1). From the Early Neolithic (Amzabegovo – Vršnik I), four *Spondylus* beads and one ring originate from the site Amzabegovo, and one perforated *Cerastoderma glaucum* was found at Govrlevo. Five *Glycymeris* bangles and one perforated bivalve from Govrlevo and fragmented ornament from Tumba Mogila were attributed to the Early or Middle Neolithic. Seven *Spondylus* and *Glycymeris* bangles, three *Spondylus* and six scaphopod beads from Amzabegovo are dated to the Middle Neolithic (Amzabegovo – Vršnik II), as well as one *Spondylus* and two *Glycymeris* bangles. A find of beads in an anthropomorphic vessel at this site is also related to the Middle Neolithic. From the Late Neolithic (Amzabegovo – Vršnik IV), there are nine bangles, one fragmented ornament pierced on one end, and one small bivalve perforated at the hinge from Amzabegovo.

Consequently, it should be noted that the chronological resolution for this study is fairly low. The Neolithic period is too complex and long, and the shell collection available for study does not allow for a discussion on the diachronic distribution of ornaments, i.e. such questions as: when did the discussed types of ornaments first appear in the region, were there local differences, and how did their value change through time? Instead, we shall point to the appearance of the same or similar types of ornaments in adjacent regions, the Mediterranean and continental parts of the Balkan Peninsula, in order to connect the finds from North Macedonia with regions which yielded much more data on this type of ornaments.

The best-represented ornament class are bangles. As in Greece (Infantidis 2019: xxx), they occur in North Macedonia from the Middle Neolithic and are made from *Spondylus* and *Glycymeris*, more precisely only from *Glycymeris* at Govrlevo. The Amzabegovo collection contains 16 bangles. Although they were originally all identified as *Spondylus* (Gimbutas 1976b), it is very likely that at least one of them is made from *Glycymeris*. Namely, in the published drawing (Gimbutas 1976b: fig. 215.6), a fragment of a hinge is shown, with a series of hinge teeth which are concordant with *Glycymerys* hinge teeth. On the other hand, such teeth are non-existent in *Spondylus*, which is characterized by two large cardinal teeth and two sockets.

Bangles are found throughout the Neolithic Europe (Rigaud 2011: fig. 160; Chapman & Gaydarska 2015). At many sites in Greece (Infantidis 2019) and Balkans (Dimitrijević & Tripković 2006) they represent the dominant class of ornaments. They are often accompanied with bangles made from clay or stone, supposedly imitations of shell bangles, which were also found at Amzabegovo and Govrlevo.

A perforated valve made from *Cerastoderma glaucum* from Govrlevo is a single find of this kind in North Macedonia. In Neolithic Greece, shells of this bivalve species are amongst the most commonly used jewelry raw material (Infantidis 2019: 153). There are a few examples of a direct analogy to the Govrlevo specimen if the location of the perforation and the way it was produced are considered. At the Neolithic site of Dispilio, a necklace was found, consisting of seven valves of this species perforated in the exactly same manner as the Govrlevo specimen – by rubbing the clam beak against a rough surface (Infantidis 2019: fig. 4.43). A possible necklace made from *Cerastoderma glaucum* is also mentioned from Nea Nikomedia (Infantidis 2019: 218).

An item made from the middle part of the valve of an unidentified bivalve from Govrlevo is also a single find of its kind in North Macedonia. It was also most likely an element of a string. However, it was probably suspended differently, since the perforation is positioned in the middle of the item, therefore the bead would not rest comfortably against the body of a wearer, as beads or pendants with a balanced perforation do. One possibility is that it was placed on the separate end of a string with the knot, but even more appealing would be the hypothesis that it represented one of the elements of a string for producing noise, as documented in ethnographic examples (Kolotourou 2007; Rainio & Mannermaa 2014). A similar example could have been pieced which were also perforated in the middle, but made of a different material (marble and *C. glaucum* valve), found in association at Dispilio (Infantidis 2019: fig. 4.62).

When scaphopods used as beads are concerned, they were discovered at Amzabegovo and Govrlevo. Whole shells of scaphopods or segments of variable length were used as beads in the wider area of Europe and were found at a relatively large number of sites, especially in Greece (Karali 1999; Nikolaidou 2003; Infantidis 2019). In Neolithic Greece, they are most often identified as *Dentalium* sp., although probably in the sense of Scaphopoda indet., rather than actually referring to the genus *Dentalium*. They were also found in the Western Mediterranean and Central Europe (Rigaud 2011: 251, 263), where they were mostly identified as *Antalis* sp. or *Antalis vulgaris*. The distance from the Mediterranean coast probably influenced their quantity, therefore, they were rarely found in the hinterlands. Along the Black Sea coast, scaphopods identified as *Antalis* sp. occur in large numbers starting with the fifth millennium, probably due to the maritime trade with the Aegean (Ivanova 2012). Ornaments deposited in graves, especially at the necropolis of Durankulak and Varna (Avramova 2002; Todorova 2002), offered particular insights regarding the manner they were assembled and worn. Apart from contemporary, fossil shells were also used, especially in the middle Danube area and in the Carpathian Basin (Todorova 1995; Sztancs & Beldiman 2010; Dimitrijević *et al.* 2010) sometimes continuously during a considerable period of time (Dimitrijević 2014). In Italy, fossil scaphopods were used in the region of the river Po basin, while contemporary shells were recorded in Liguria and Campaign (Micheli 2004, 2012).

In some instances, scaphopod beads were found in piles, thus probably originally forming necklaces or strings. To mention just a few, six scaphopod beads and one marble pendant were found in Stavroupoli Thessaloniki (Infantidis 2019), and a group of 22 scaphopod beads in Sitagroi Drama (Nikolaidou 2003: 346, 347; pl. 9.13). Analogous to Vršnik, beads deposited in ceramic vessels were found in a vase at Gyalos of Spata, Aticca (Infantidis 2019: 76). Also, the jewelry was placed in a ceramic vessel in the Early Neolithic hoard from Galabnik (Western Bulgaria), with more than 10000 beads made of scaphopods, stone, and bone, along with the annulets manufactured from *Spondylus* and nephrite (Chapman 2000).

Scaphopod beads, jointly with *Spondylus* beads and perforated plates of a belt, were also found at the Late Neolithic site of Čepin in Croatia, in this case, deposited in a large *Spondylus* valve (Tripković *et al.* 2016). The scaphopods were identified as *Antalis vulgaris*, due to the preservation of anterior openings and a larger portion of the shell body in most of the specimens. These were tiny shells, less than 1.5 cm long and very thin. Scaphopod beads from Amzabegovo are very similar, and it is possible that they originate from shells of the same species. On the other hand, beads from Vršnik, although presumed to be *A. vulgaris*, were made from massive and obviously much larger shells. They were made from shell segments where the narrowing of the shell characteristic for scaphopods is not easily observed. One can imagine that this type of bead is not easily identified as a scaphopod bead, and even easily taken for granted as *Spondylus* bead, as our description in the above section has shown. In any case, we failed to find analogies for the Vršnik type of scaphopod beads in literature.

CONCLUSION

Albeit small, the collection of marine shell ornaments from North Macedonia is nevertheless quite diverse in terms of ornament types and raw material – i.e. the shell species used in their production. Bangles made from *Spondylus* and *Glycymeris* valves were found at most sites. In addition, beads made from *Tritia neritea*, *Spondylus* and scaphopod shells occur, as well as a ring and perforated ornaments made from *Cerastoderma glaucum* in one case, and from unknown bivalve species in three more cases.

In the anthropomorphic vessel at the site of Vršnik, more than 150 beads made from shells of gastropods, bivalves, scaphopods, and some sort of whitish semitransparent stone were found. Judging by the size of beads, especially their uniform inner diameter, along with the fact that they were found deposited in a pile in a vessel, it can be assumed that they probably formed a single string. When considering body decorations in the archaeological record, obviously we only have a partial insight into their original appearance, and it is often difficult to reconstruct the manner in which they were worn. This is due to the fact that as a rule, we are missing perishable materials or their traces, by which the preserved ornaments of durable materials were assembled. Moreover,

we usually find elements of composite ornaments separated. A string from Vršnik is a rare exception, as it offers an insight into aesthetic preferences and manufacturing skills that we rarely have the opportunity to discover in the archaeological record. In this case, the skill was manifested by combining materials from very different raw material with a single common feature – their white color, into elements masterfully modified into a similar shape.

Our data also shows that what looked like almost empty space on the maps of the distribution of *Spondylus*/marine shell items in Neolithic Europe, no longer appears to have been excluded from prehistoric exchange networks. The region of North Macedonia communicated with neighboring territories, most likely primarily with Aegean Macedonia, judging by its proximity and convenient communication route through Vardar/Axios valley.

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