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OPAL RING FROM NOVO BRDO  
AND GEMSTONE RINGS IN THE LATE MIDDLE AGES

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ПРСТЕН ОД ОПАЛА ИЗ НОВОГ БРДА И ПРСТЕЊЕ ОД ЈУВЕЛИРСКОГ КАМЕЊА  
У ПОЗНОМ СРЕДЊЕМ ВЕКУ

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## MEMORIAE DICATUM

МАРКО ПОПОВИЋ  
(1944–2020)



Марко Поповић, доајен наше археологије, припада плејади научника који су дали немерљив допринос познавању средњовековне историје српских земаља и материјалне културе током тог периода. Рођен у Ужицу 1944, он је 1966. године завршио студије археологије на Филозофском факултету Универзитета у Београду, где је магистрирао 1971, а докторирао 1980. године. Свој научни рад Марко Поповић је започео истраживањем Београдске тврђаве, и то од 1968. године као сарадник Завода за заштиту споменика културе града Београда, да би 1976. постао члан, а затим и дугогодишњи руководилац новоустановљеног научноистраживачког пројекта за Београдску тврђаву при Археолошком институту у Београду. Оформио је тим сарадника с којима је, увек уз несебично лично залагање, утемељио путеве интердисциплинарних истраживања средњовековног Београда.

Међутим, осим Београдске тврђаве, централно место његових истраживања заузимала су и друга средњовековна утврђења. Без доприноса Марка Поповића, разумевање збивања на нашим просторима у средњовековном периоду не може се ни претпоставити. Мислимо притом на више аспеката његовог деловања. Био је оштар противник псеудонаучних теорија о пореклу Срба и досељавању Словена на Балкан, за чије су ширење деведесете године прошлог века пружиле погодан терен, а њихов уплив је, нажалост, и данас уочљив. Затим, као врхунски теренски археолог, он је руководио истраживањима највећих и најзначајнијих средњовековних локалитета у Србији, као и публикавањима резултата тих комплексних радова (М. Поповић, *Београдска тврђава*, Београд: Археолошки институт, 1982; М. Поповић и В. Бикић, *Комплекс средњовековне митрополије у Београду: истраживања у Доњем граду Београдске тврђаве*, Београд: Археолошки институт, 2004; М. Поповић, *Ужички град*, Београд: Археолошки институт; Ужице: Историјски архив, 1995; М. Popović i V. Bikić, *Vrsenice: kasnoantičko i srpsko ranosrednjovekovno utvrđenje = Late Roman and Serbian early medieval fortress*, Београд: Археолошки институт, 2009; М. Поповић, *Смеђевски град*, Београд: Републички завод за заштиту споменика културе, 2013; М. Поповић, *Манасијин Свјуденица: археолошка открића*, Београд: Републички завод за заштиту споменика културе, Археолошки институт, 2015).

Марко Поповић се прихватао и незахвалног и деликатног задатка објављивања и ревизије резултата ранијих археолошких ископавања, често оних с непотпуном теренском документацијом. Монографија о властеој задужбини у околини Пирота, коју одликује више етапа градње, представља изузетну књигу у којој су сублимирана дугогодишња истраживања и нови резултати анализа фаза њене изградње и стварања откривеног живописа (М. Поповић, С. Габелић, Б. Цветковић и Б. Поповић, *Црква Свјетог Николе у Стјаничењу*, Београд: Археолошки институт, 2005). Проучавајући настанак и развој урбаних и сакралних центара на тлу средњовековне Србије, Марко Поповић је посебну пажњу, осим на споменике с подручја града Раса, усмерио и на остатке Новог Брда на данашњем Косову, што је најпре резултовало публикавањем монографије о цркви Светог Николе у том граду (М. Поповић и И. Бијелић, *Црква Свјетог Николе: катедрала града Новог Брда = M. Popović and I. Bijelić, St Nicholas Church: The Orthodox Cathedral of the Town of Novo Brdo*, Београд: Ре-

публички завод за заштиту споменика културе, 2018), а затим и постхумно објављеном књигом о заштитним археолошким ископавањима на том локалитету, којима је руководио (М. Поповић и Г. Симић, *Утврђења средњовековној гради Новој Брди* = М. Popović and G. Simić, *Fortification of medieval town of Novo Brdo*, Београд: Републички завод за заштиту споменика културе, 2020).

Захтеван, пре свега, према самом себи, али и према члановима археолошких и конзерваторских екипа с којима је сарађивао, резултате својих истраживања публиковао је у оквиру студија у научним часописима и монографија, које одликују апотекарска прецизност у изношењу података и закључци базирани на чињеницама, обимној литератури и његовој ерудицији.

Осврнућемо се и на једну донекле скривену, али за археолошку науку драгоцену делатност Марка Поповића. Као врхунски познавалац домаће, европске и светске стручне литературе, он је уложио свој ентузијазам и знање да домаће научне публикације постану међународно релевантне како својим садржајем тако и техничком опремењеношћу. Будући да је био дугогодишњи руководилац *Пројекта Београдска утврђења*, 1997. године је покренуо издавање едиције *Singidunum*, чији је био уредник, а у којој су до сада изашле четири свеске. На његовим млађим сарадницима је да продуже тај рад. У традицији Археолошког института је да се материјал с великих античких локалитета периодично објављује у оквиру тематских публикација, што је започето 1971. године серијом *Sirmium*, а настављено 1984. године серијом *Caričin Grad*. Едицијом *Singidunum* су представљени резултати археолошких истраживања римских остатака у нашој престоници, у оквиру већих студија о некрополама Сингидунума, керамичком материјалу пронађеном током ископавања, о изузетним предметима из епохе Сеобе народа откривеним у Улици Тадеуша Кошћушка, али и краћих прилога о појединим споменицима или историјским проблемима. Све радове одликују научна прецизност и веома добар квалитет илустративних и документарних прилога, о чему је уредник едиције, Марко Поповић, помно водио рачуна. Студиозан приступ издавачкој делатности наших научних и културних институција пружио је и као члан уређивачког одбора Археолошког института и дугогодишњи уредник часописа *Наслеђе*, који издаје Завод за заштиту споменика културе града Београда. Његова сарадња с Народним музејом у Београду сведочи о вишедеценијском пријатељству и професионалној посвећености, из којих су произашли важни пројекти и значајна археолошка открића. Готово две деценије био је члан редакцијског одбора *Зборника Народног музеја*, свеске за археологију, а од 2013. године био је уредник тог часописа. Улагао је неизмерно знање, труд и искуство у стално одржавање највишег научног и стручног нивоа те публикације, која је 2013. године, према одлуци Министарства за науку, просвету и технолошки развој Републике Србије, у оквиру Листе домаћих часописа за друштвено-хуманистичке науке, унапређена у категорију часописа од националног значаја. Лично сам, као члан редакције *Зборника*, имала прилику да се уверим у његова залагања да се у часопису, увек водећи рачуна о квалитету прилога, нађу саопштења како сарадника Народног музеја у Београду тако и оних из других музејских и научних институција. Стога,



с великим поштовањем и захвалношћу, Марку Поповићу посвећујемо ову археолошку свеску *Зборника Народног музеја*.

Овај кратки увид у научну делатност Марка Поповића ни у ком случају не пружа комплетну слику о његовом доприносу нашој археологији. Бескомпромисни борац за очување нашег културног наслеђа, чијем је разарању неретко био сведок, залагао се за његову конзервацију и презентацију, не презајући да се супротстави решењима која је сматрао неодговарајућим. Своје ставове износио је храбро и аргументовано, што га је понекад лишавало официјелних признања, али не и уважавања колега. Поштовали су га и млађи сарадници којима је, можда, својим захтевима у погледу одговорности у раду, најпре уливао страх, али који би убрзо схватили да се иза маске строгог шефа крије велики стручњак који благоданно гледа на њихову будућност и који, с дозом доброћудне ироније, дели паметне савете. Један од видова исказивања тог поштовања је и зборник радова у част Марка Поповића, који је Археолошки институт у Београду недавно публиковао (*Свети средњовековних утврђења, градова и манастира. Омаж Марку Поповићу*, ур. В. Иванишевић, В. Бикић, И. Бугарски = *The Medieval World of Fortresses, Towns and Monasteries. Homage to Marko Popović*, ed. V. Ivanišević, V. Bikić, I. Bugarski, Београд: Археолошки институт, 2021).

Резултати научног рада Марка Поповића присутни су свуда око нас, а најбољих ћемо се увек сећати или, како би то рекли стари Латини, *Optimos semper meminimus*.

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## OPAL RING FROM NOVO BRDO AND GEMSTONE RINGS IN THE LATE MIDDLE AGES

**Abstract:** Rings made entirely of one piece of gemstone are a rarity in medieval jewellery. One such ring, made of opal, was discovered during the most recent archaeological excavations in Novo Brdo, in a layer above the floor in a house near the north-eastern ramparts of the lower town, which was formed during the second half of the 14<sup>th</sup> century. This paper will examine the circumstances of the finding of the ring, the technical details of its production and the marks that appeared during use, i.e. wearing. Another ring of the same type, but made of carnelian, had been previously discovered in the area of the Novo Brdo Cathedral. In addition to the two mentioned, more specimens are known, among them several from archaeological contexts. This interesting group of rings raises questions about possible models, sources of raw materials, method of production, symbolism, as well as about the skill of the master jeweller and the requirements of the customers. In addition, special attention will be paid to the technical aspects of the production, as one of the possible ways to establish a more precise chronological framework for jewellery rings, as well as to better understand the social and cultural contexts in the Middle Ages.

**Keywords:** hololith rings, archaeological contexts, chronology, manufacturing techniques, origin, gemstone symbolism, ring wearers

*...Hence very many people find that a single gemstone alone is enough to provide them with a supreme and perfect aesthetic experience of the wonders of Nature.*

Pliny, the Elder, *Natural History*

From the very beginning, the history of jewellery has been characterised by an extraordinary variety of rings, which is reflected in design, shape and material, as well as in the function and symbolism. It is therefore not surprising that wearing rings has been viewed as a phenomenon worthy of attention among chroniclers of all eras (e.g. Pliny, 33: iv–viii; King 1872: 329; Kunz 1917). In the medieval societies of Byzantium and Serbia, precious jewellery, especially rings, was highly valued, and was even considered property (cf. Radojković 1969; Oikonomides 1990; Parani 2010). In this regard, it is interesting to mention that most "middle class" households owned more than one precious ring, often two or three, and with them a few pieces of lesser value, which, however, are mentioned exceptionally, in cases of inheritance litigation (Oikonomides 1990: 210; Parani 2010: 187).

At the same time, data on stone rings is almost completely absent, although the value, symbolism and protective role of precious stones exist in many civilizations, cultures and religious contexts. Let us recall the XXXVII book of Pliny's *Natural History* (Pliny, 37: ix.24–lxxviii.204), written around the year 75, which contains a valuable abundance of information about gemstones, including their medical and magical properties, but also the convenience of processing, making engraved gems (intaglios and cameos) and pieces of jewellery. Twelve precious stones are in the holy breastplate (Choshen Mishpat) worn by the high priest of the Israelites, as well as in the foundations of Jerusalem: ruby, topaz, carbuncle/red garnet; emerald, sapphire, diamond; hyacinth, agate, amethyst; beryl, onyx and jasper<sup>1</sup>, while ruby, coral and pearl are especially mentioned in the verses of the Qur'an (Patrizi 2018: 107–117). Arab sources of the Middle Ages mention corundum, emerald, diamond and pearl as the most valuable (first group), followed by less expensive turquoise, carnelian, garnet, onyx, lazurite and malachite (Amar and Lev 2017: 377–379). Sapphires, emeralds and pearls were considered a symbol of imperial power in Byzantium, and they were procured and chosen exclusively for the most precious jewellery (Spier 2012: 18–19), including imperial gifts (cf. Горянова и Грозданова 2019). The Western clergy associated the colour of the blue sapphire with chastity, the Virgin and heaven, meaning it was most often chosen for Episcopal rings (Dalton 1912: xxxiv–xl). Pliny's heritage was experienced through multiple readings in the Christian West – with supplemented compilations of Roman and Arabic texts; "princes and peasants, learned people and ignorants" believed in the medical and protective power of precious stones (cf. Kunz 1938<sup>7</sup>: 23–24).

The tendency to own and wear rings during the Middle Ages has been confirmed by specimens discovered at a number of archaeological sites and, perhaps even more, by museum collections and private jewellery collections, in which there are a significantly larger number of luxury specimens.<sup>2</sup> All the collections known so

1 In the square field the stones are placed in four rows, see <https://www.jewishencyclopedia.com/articles/3668-breastplate-of-the-high-priest>.

2 Literature on jewellery of the late Middle Ages, especially rings, is numerous and diverse, so only some of the most important publications will be referred to here: King 1872; Dalton 1912; Kunz 1917; Battke 1953; Ross, M. C. 1965; Рadojković 1969; Накит на тлу Србије 1982; Бајаловић–Хаџи-Пешић 1984; Trésors 1988; Милошевић 1990; Вузанс 1992; Манева 1992; Курраиу 1997; Зечевић 2006; Bikić 2010; Bosselman-Ruickbie 2011; 2019; Spier 2012; 2013; Гајић 2018.

far contain rings made of metal, mostly silver and bronze, while specimens made of other materials are very rarely present. This is especially true in the case of rings made entirely of a single precious stone (hololith rings), which occur sporadically and in a small number of specimens. However, the findings discovered in recent times, which will be discussed in more detail below, somewhat change this impression, given that they are rings that represent a unique group in terms of shape.<sup>3</sup> The uniqueness is reflected in the shape of the ring, i.e. the common details, which are a massive ring with epaulette shoulders and button-shaped protrusions on the bottom, as well as a bezel with a wide surface, round, oval or elliptical, sometimes with pointed lateral edges. In the previously published papers that were available to us, data on individual findings was offered, which, observed separately from one another, provide only a partial insight into certain aspects of the problem of hololith rings. Encouraged by the discovery of such a ring during new archaeological excavations in Novo Brdo, as well as recent findings, our intention in this paper is to analyze certain issues that could contribute to a broader debate on the rings made of gemstones in the Middle Ages.

### OPAL RING FROM NOVO BRDO AND THE ISSUE OF THE CONTEXTUALISATION OF HOLOLITH RINGS

The ring made of opal was discovered during archaeological excavations of the fortifications of Novo Brdo, which were carried out in 2016 (Fig. 1).<sup>4</sup> The find originates from a house (house 2) which, during the second half of the 14<sup>th</sup> century, was leaning against the inner face of the north-eastern ramparts of the Lower town (Поповић и Симић 2020: 201, сл. 76, 77, 92). The house had a simple internal layout – the entrance in the form of a vestibule on the west side, while opposite there was a fireplace, cut into the rock. Judging by the findings of cooking pots in and around the fireplace along the east wall, a kitchen was organised in this part of the house. The ring was discovered on the floor in the central part (Поповић и Симић 2020: 201, сл. 29/7), a space which, bearing in mind the ground plan of the building, can be interpreted as a passage in the direction that connected the entrance with the zones of activity. The stratigraphy of the layers in the building indicates that the objects on the floor belong to the last phase of the "life cycle" of the house. A more precise time of the cessation of life in the house was determined indirectly, by following later stratigraphic sequences (Поповић и Симић 2020: 207–211, 241). The house was abandoned, presumably, just before the Turkish siege of the city in 1412, when works to strengthen the fortifications, which needed to be adapted to warfare

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3 There are other types of hololith rings, e.g. simple round rings, followed by banded rings, which are assumed to belong to the group of archery (thumb) rings, as well as rings with relief figures. However, they were not considered here, since the issues regarding those are different.

4 The analysis of the ring was made possible thanks to the head of archaeological research in Novo Brdo, Dr Marko Popović, and the support of the company "KOTO d.o.o." from Belgrade. cf. Popović and Simić 2020: 55–63.

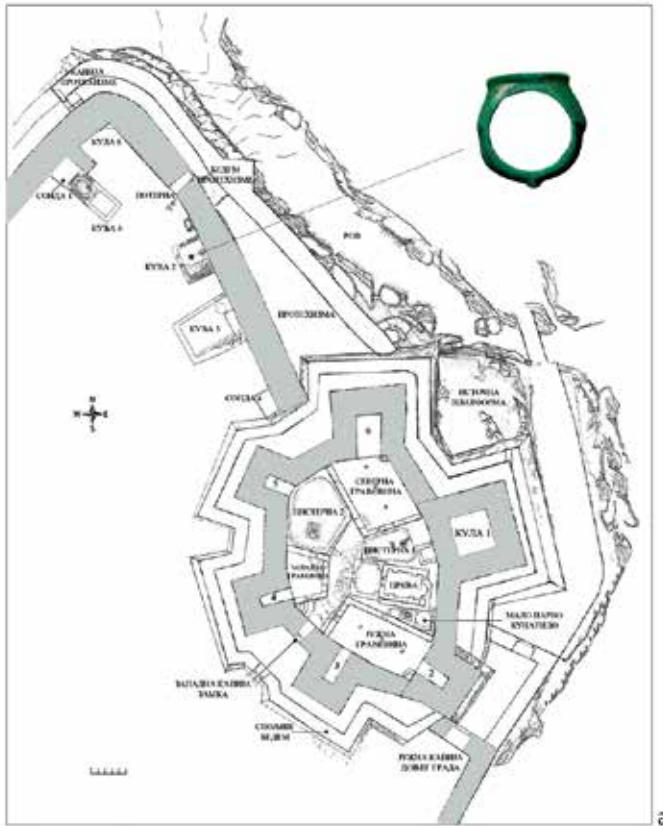


Fig. 1 The opal ring and the place of its find: a) plan of Novi Brdo (after: Popović and Simić 2020: fig. 20); b) North-East rampart of Lower town, with position of house 2 after archaeological excavations in 2016 (after: Поповић и Симић 2020: fig. 77)

Сл. 1 Прстен од опала и место његовог налаза: а) план Новог Брда (према: Поповић и Симић 2020: сл. 20); б) североисточни бедем Доњег града и кућа 2, након ископавања 2016. године (према: Поповић и Симић 2020: сл. 77)

with firearms, were being carried out (Поповић и Симић 2020: 235–239). In addition, the distribution of the findings suggests that the house was abandoned in a hurry – the owner left behind several ceramic vessels, while the ring, we assume, was dropped during the relocation of the possessions

As suggested, the opal ring is one of the known examples of hololith rings. Among them, those discovered during archaeological research deserve special attention, precisely because of the question of the archaeological context and, consequently, the chronology. In this regard, we should first mention another, previously known similar ring from Novo Brdo, which is made of carnelian (Fig. 2/7; Зеचेвић 2006: кат. бр. 72).<sup>5</sup> The ring was discovered in the southern part of the yard of the Church of St. Nicholas (Cathedral), in a layer of rubble formed by the devastation of the graves (Зечевић 2006: 196–197; Поповић и Симић 2020: 83). During the archaeological excavations, two main levels of burial were determined, the older one next to the cathedral church and the younger one, with a much smaller number of burials, next to the adapted mosque (Зечевић 2006: plans 2 and 3). Unfortunately, the approximate position, in the south-eastern part of the yard, is the only piece of data that speaks to the location of this find. However, based on the interpretation of the stratigraphy of the cultural layers from the excavation documentation, a dating to the end of the 14<sup>th</sup> or 15<sup>th</sup> century was suggested for the carnelian ring (Зечевић 2006: 15–21; Поповић и Бјелић 2018: 185–193). A similar ring to the one from the yard of the Cathedral was discovered in the necropolis researched at the Thermi site, east of Thessaloniki (Fig. 2/8; Pappa et al. 2011: 344–345).<sup>6</sup> The ring and the bead, both made of carnelian, are practically the only finds in that necropolis, where burials were performed according to the Muslim rite. The dating of the carnelian jewellery to the late 14<sup>th</sup> century was carried out indirectly, by analogy with the Novo Brdo ring (Pappa et al. 2011: 345; Antonaras 2019: 77–78, fig. 8).

Slightly more data exist on carnelian rings from Hungary.<sup>7</sup> Two rings were discovered during protective archaeological explorations in the necropolises next to the Turkish palisade fortification at the Fonyód-Bézsénypuszta site on the southern shore of Lake Balaton (Németh et al. 2010: 58). Participants in the battles around the fortification were buried in two investigated necropolises. The deceased were laid (thrown) in common graves, and severe injuries from cold weapons and firearms speak in favour of the researchers' opinion that these were war funerals (Németh et al. 2010: 58). The situation at the site in Pest, where a part of the 17<sup>th</sup> century necropolis was explored in 2016 (Tóth 2017: 121–126), is especially interesting. Namely, out of 1,058 burials there were offerings in only five graves. Of these, four graves contained the same finds – a carnelian ring: one was found in three graves, on the finger of the right hand, and in one grave two rings of different sizes, on the little

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5 The ring is kept in the Archaeological Collection of the Middle Ages of the National Museum in Belgrade (inv. no.24\_4966). We would like to thank Dr Emina Zečević, museum advisor of the National Museum in Belgrade, for provided the photos of the ring.

6 We thank Dr Anastasios Antonaras from the Museum of Byzantine Culture in Thessaloniki for provided the photos for research and publication of the ring.

7 The circumstances of the findings and the examination of the technical properties of individual specimens of rings from the Pest site were made possible by the kindness of Dr Anikó Tóth from the Historical Museum in Budapest, for which we are again wholeheartedly grateful.



Fig. 2 Hololith rings: 1) Novo Brdo (photo: Z. Miladinović); 2, 3) Corinth (ASCSA Digital Collections MF9402, MF717); 4) Sremska Mitrovica (photo: S. Maksić); 5, 6) Belgrade surroundings? (Belgrade City Museum, inv. nos. AS 1996, AS 759, AS 760; photo: Z. Miladinović); 7) Novo Brdo – Cathedral (National Museum in Belgrade, inv. no. 24\_4966); 8) Thermi, Thessaloniki surroundings (photo: A. Antonaras); 9) Museum of Applied Art (inv. no. 485) (photo editing: I. Kajtez)

Сл. 2 Хололитно прстење: 1) Ново Брдо (фото: З. Миладиновић); 2, 3) Коринт (ASCSA Digital Collections MF9402, MF717); 4) Сремска Митровица (фото: С. Максић); 5, 6) околина Београда ? (Музеј града Београда, инв. бр. АС 1996, АС 759, АС 760; фото: З. Миладиновић); 7) Ново Брдо – Катедра (Народни музеј у Београду, инв. бр. 24\_4966); 8) Терми, околина Солуна (фото: А. Антонарас); 9) Музеј примењене уметности (инв. бр. 485) (обрада фотографија: И. Кајтез)

finger also of the right hand (Tóth 2017: 126–127, fig. 5). Another specimen accidentally found in the area of the necropolis was added to the mentioned findings.

In the considerations of the archaeological context, the specimens found on the famous ancient sites, above all in Corinth and Lindos, deserve special attention. Two carnelian rings, found in the early years of research on the Acropolis of Corinth, were once published with the determinant *Roman*, with the assumption of

later authors that these finds are from the cultural strata of that time. However, this is not the case. According to the data from the documentation of small finds, for one ring there is no record of the place and conditions of the find,<sup>8</sup> while the other was found on the "finger of a skeleton" – an individual buried according to Muslim rites along the south wall of the mosque of Sultan Mehmed the Conqueror, orientation northeast-southwest (Fig. 2/2, 3).<sup>9</sup> Considering the stratigraphic picture of the castle of Acrocorinth, the smaller necropolis to which this burial belongs was formed after the Ottoman conquest of the city in the middle of the 15<sup>th</sup> century (Blegen et al. 1930: 29–30; Kiel 2016: 49–50). A similar thing can be said for the ring from Lindos (Blinkenberg 1931: Pl. 152/3241). The ring is presented at the end of the review of objects from excavations carried out in the campaigns of 1902–1914, in the category *various objects* that are without origin, in terms of location and archaeological context. This group of finds originates from mixed layers of earth and ruins, gravel and waste areas, which belong not only to the ancient but also to the medieval phase of life on the Lindos Acropolis (Blinkenberg et Kinch 1931: 5–6), which further warrants caution in determining the origin and chronology of the hololith ring. In addition to the above, one of the rare, if not the only specimen of a ring made of metal – bronze, whose shape is the most similar to the Novo Brdo ring, can be found in the catalogue of the ancient gems and rings collection of the Paul Getty Museum (Spier 1992: Cat. No. 82, Type VIII). At the same time, it is the only metal ring of the given profile with a protrusion, in this case quadrangular, not only in this collection but also among Antique rings from the publications that were available to us. It is marked as Greek from the 4<sup>th</sup> century BC, originating from Asia Minor, but, like other specimens from private collections, unfortunately, it cannot be considered reliable in chronological terms. Due to all of this, a reconsideration of the previously proposed dating seems justified, and a re-examination of the context and chronology of the findings dated in the period of Antiquity significantly affects the questions of origin, which will be discussed in the next section of this paper.

In addition to the findings from the residential building in Novo Brdo, whose dating is undeniable, for the considerations of the archaeological context, it seems important to underline the findings of the ring from the necropolis and, in connection with that, the similarities of the funeral rite. Namely, in the case of the Thermi and Pest sites, the orientation of the graves and the features of the burial – directly in the grave facing east, i.e. Mecca, without coffins or cover boards – they speak in favour of Muslim funeral customs (Pappa et al. 2011: 344–345; Tóth 2017: 125–126).<sup>10</sup> A similar model is observed in Corinth, although the details regarding the manner of burial are unknown. In the area of Pest, burials with some kind of "roof" were encountered sporadically, which was practiced in situations when the burial was carried out in sandy soil or the groundwater level was high, and in these cases the boards were placed above the burial, obliquely in relation to the position of the body (Tóth 2017: 123–124), to protect the face from earth/sand (Petersen 2020: 50–

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8 The documentation is available at <http://corinth.ascsa.net/id/corinth/object/mf%209042?q=9042&t=&v=icons&sort=&s=1>

9 <http://corinth.ascsa.net/id/corinth/object/mf%20717?q=717&t=&v=icons&sort=&s=7>

10 On the funeral practice of Muslims see, for example, Kia 2011: 266–267.



51). Along with the typical rings, the funeral rite was a key point for the ethnic attribution of the population buried in those areas. While the area around Thessaloniki was found to be a Muslim cemetery from the early Ottoman era, most likely from the first century of the Ottoman occupation of the region (Pappa et al. 2011: 345), burials from the 17<sup>th</sup> century at the sites of Fonyód-Bézsénypuszta and Pest were attributed to the local Muslim population originating from the Balkans (Németh et al. 2010: 58; Tóth 2017: 122).

In addition to the above, another ring cut from carnelian was found during archaeological excavations. It was discovered in the eastern part of the complex of the imperial palace in Sirmium (Sremska Mitrovica), where in the phases of the utilisation of the space, the terrain was filled in and the layers disturbed, which led to the mixing of the ancient, medieval and later material (Popović 2013: 157–159). We would like to remind you that the mentioned specimen was published in one of the earlier issues of this journal. Then, it was identified as Roman and was considered together with two other rings from the *Roman Imperial Period Collection* of the National Museum in Belgrade, for which the locations and conditions of the finds are unknown, so the chronological framework 2<sup>nd</sup> – 3<sup>rd</sup> century was determined by analogies with some previously published specimens (Popović 2013: 160–161, figs. 3–5; Поповић 1992: кат. бр. 126, 127). That notwithstanding, the proposed dating of the ring from Sirmium/Sremska Mitrovica remained questionable, not only due to the circumstances of its finding, but also due to its shape and production features, which will be discussed in more detail below.

A set of contextual data is missing for several specimens of hololith rings dating to the late Middle Ages i.e. early modern times, which are kept in museum jewellery collections. Nevertheless, they remain important for understanding the distribution of findings, as well as the typological and technological features of jewellery of this type. Three rings are kept in the Belgrade City Museum, one made of opal (inv. no. AS 759) and two made of carnelian (inv. no. AS 1996 and 760),<sup>11</sup> and one carnelian specimen is kept in the Collection of Metals and Jewellery of the Museum of Applied Arts (inv. no. 485).<sup>12</sup> In addition to the above, an agate ring is also known, which was found under a tombstone in Gornje Turbe near Travnik (National Museum in Sarajevo, inv. no. 2846), and two more specimens are mentioned, from the Skopje Fortress and the so-called Trajković collection in Janjevo, which is kept in Pristina (Радојковић 1969, 178, fn. 504). Probably, the most numerous group of carnelian hololith rings is an integral part of the famous Nasser D. Khalili Collection of Islamic art (Wenzel 2005: 314–315), while some pieces occasionally turn up at jewellery auctions, where they are almost always presented with very scarce information regarding their origin.<sup>13</sup>

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11 We thank our colleague Nika Strugar Bevc, senior curator of the Museum of the City of Belgrade, for the provided data and the opportunity to perform and publish ring analyses.

12 We thank our colleague Mila Gajić, senior curator of the Museum of Applied Arts, for the provided photographs and literature.

13 See for example <https://www.christies.com/lot/lot-a-roman-carnelian-magic-finger-ring-circa-5004617/?from=salesummary&intObjectID=5004617&lid=1>; <https://www.lot-art.com/auctions/Auction-66-Part-II-Glyptic/137841?page=2>

## THE ISSUE OF ORIGIN

A ring made of gemstone is a very old product, even when observed from the point of view of artistic craft. Earlier researchers of jewellery agree that hololith rings originated in the cultures of the ancient world.<sup>14</sup> A writer and collector of gems, Charles William King (1872: 372), states that *stone* rings, especially those made of carnelian, were quite fashionable among the Romans and that they were worn as a kind of an amulet, as protection against diseases. In his opinion, the idea for the "construction" was borrowed from the hemispherical stone seal, made of chalcedony, which was in use in Sassanid Persia; by expanding the perforation in the centre and carving the lateral sides, jewellery that could be worn on the little finger was made (King 1872: 372–373). Of particular interest is his observation that the "Mohammedans retain the ancient Oriental inclination towards the seal ring" which was commonly made from agate, chalcedony and carnelian and is, for the most part, unique in shape with a long oval bezel with a pointed edge, sloping shoulders and a small protrusion at the highest part of the ring (King 1872: 374), since in that description we recognise the ring which is the subject of our examination. Somewhat later, Frederick Henry Marshall (1907: xxxvi) reminds of Mycenaean and Greek hololith rings, noting that they appear occasionally but are very rare. Varieties with an elliptical bezel, made of gold, lead and glass (Marshall 1907: Nos. 66, 1512, 1561, 1562, Pls. III, XXXIV), which can be seen as the beginning of the development line of this type of ring, are also attributed to the same period. His contemporary, Ormonde Maddock Dalton (1912: xviii, xxvii), included two specimens made from gemstones in his catalogue of early Christian and later rings: one was made of carnelian, with a flat bezel depicting a dove with an olive branch in its beak, while the other, made of chalcedony, according to its appearance, primarily of an oblong bezel and protrusions on the shoulders and bottom of the ring, was identified as Persian from the 16<sup>th</sup> century (Dalton, 1912: cat. no. 20, 2344). In addition to the fact that hololith rings made of jasper and rock crystal (quartz) with engraved representations were found in Mycenae, George Frederick Kunz (1917: 99–100) also recalls a specimen of a late Roman ring with an inscription indicating that the owner was a member of the Gnostic sect (Marshall 1907: No. 654). Unfortunately, except for the latter, none of the mentioned specimens were illustrated, and most of them were not even described in detail, which is why modern researchers are left with very little space to re-evaluate the credibility of the presented assessments.

Similar claims can be made by examining famous specimens of rings. Sophisticated design is noticeable on the Egyptian rings made of carnelian from the time of the New Empire (around 1539–1075 BC), although they are relatively rare in relation to beads and amulets (Petrie 1909: 79–80; Quibell 1907: 31, Pl. XXXVI/1).<sup>15</sup> Among the specimens, the carnelian hololith ring with engraved names of Pharaoh Ramses II (1279–1212) and his wife, Queen Nefertari, kept in the Louvre Museum in Par-

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14 The mentioned authors concurrently mention archery rings (thumb rings), thus clearly emphasising the difference in the typology and function of the hololith ring.

15 Cf. data at: <https://petriecat.museums.ucl.ac.uk/brief.aspx?gotopage=1>

is, deserves special attention.<sup>16</sup> Regarding its general appearance, it can be associated with Greek and Roman metal rings with a monolithically connected ring and bezel, which, we conclude from the representations, in some cases served as a seal (Battke 1953: 11–12, No. 4; Spier 1992: Type XI, cat. nos. 51, 56, 79, 83–86, 218, 221, 416, 421, 429; Поповић 1992: тип I, кат. бр. 97). In the following, the development of the design is not clear and cannot be monitored continuously, primarily due to the lack of contextualised archaeological findings. Its appearance in the early Middle Ages is also questionable, as this dating has been suggested for rare specimens for which data on the conditions of the finds are lacking, such as the carnelian seal ring with the name *Muhammad Ali Ibn Muhammed Ali* retrogradely engraved on it.<sup>17</sup>

We recognise variants basically of the monolithic shape among the metal rings dated to 11<sup>th</sup>–12<sup>th</sup> century. In one, similar to ancient rings, a massive square bezel (square/rectangular, hexagonal or octagonal in shape) is the same width as the hoop, like in the case of gold rings made in the filigree technique from the collections of the Metropolitan Museum of Art (Jenkins and Keen 1982: Cat. No. 49b; Jenkins 1988: 41, fig. 10) and the Aga Khan Museum (No. ACM948.2)<sup>18</sup>, as well as specimens made of gold with niello decoration from the so-called Thessaloniki hoard, dating to the 12<sup>th</sup> and early 13<sup>th</sup> century (Bosselmann-Ruickbie 2010: 221–228, Cat. Nos. 4–8, 13; Bosselmann-Ruickbie 2011: 52–54; Kat. Nr. 192–196, 202). Among the jewellery from the same hoard, we find a close variant solution to this one, although it is, tentatively speaking, more graceful, in so far as the hoop is thin, and above the extended shoulders is a bezel that suggests, due to its shape, the separation of the neck (Bosselmann-Ruickbie 2010: 221–228, Cat. Nos. 14, 15; Bosselmann-Ruickbie 2011: 52–54; Kat. Nr. 199, 200). However, the hoop from the mentioned hoard represent a unique group in Byzantine jewellery and, in all likelihood, are the product of one workshop (Bosselmann-Ruickbie 2010: 223), created at one time, i.e. procured in the form of a special order. In addition, it can be assumed that this jewellery was inspired by Islamic design (Bosselmann-Ruickbie 2010: 221–222).

Unlike the monolithic rings, the question of origin and, possibly, the model for the variant with a wide oval bezel, epaulette shoulders and a button-shaped protrusion on the bottom of the ring has remained largely unknown. In addition to the basic data on the appearance, the analyses of individual specimens have been kept narrow, with the repetition of data taken from only a few sources that need to be commented on here as well. As far as we know, the most concrete opinion on the origin of the ring with a wide oval bezel and widenings on the ring was given by Heinz Battke in his book *Geschichte des Ringes* (Battke 1953). Since the data published with this specimen of the ring has been cited as a chronological marker in all later works,

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16 The ring (inv. no. E 31890) was procured in 1948, without data on the origin: [http://cartelen.louvre.fr/cartelen/visite?srv=car\\_not\\_frame&idNotice=17642](http://cartelen.louvre.fr/cartelen/visite?srv=car_not_frame&idNotice=17642). We thank Ms Aminata Sackho-Autissier, of the Documentation Department of the Louvre Museum, for the information. The reign of Pharaoh Ramses II according to: Dodson and Hilton 2004.

17 The ring is accessible at [https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1\\_1567657771\\_7688+sxsrf](https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1_1567657771_7688+sxsrf). We thank Prof. Dr Mirjana Marinković from the Department of Oriental Studies at the Faculty of Philology in Belgrade for her help reading the inscription on the ring.

18 The ring is accessible at <https://www.agakhanmuseum.org/collection/artifact/ring-akm948.2>

we consider it necessary at this point to pay special attention to Battke's assertions. In the observations that follow the description of the carnelian hoop, the only one of its kind in the mentioned publication, he states that the appearance of such rings is so numerous and temporally and geographically wide, that one should not even try to determine the time of their appearance, but that all certainly dated specimens belong to a small group of mutually similar works dating from the late imperial Roman period and the early Middle Ages (Battke 1953: 99, No. 148). He goes on to list those findings, together with the data on the place of storage, i.e. references. In his opinion, the oldest is the Egyptian-Roman carnelian ring with an octagonal bezel from the necropolis in Antinoopolis, whose chronology is determined in relation to the construction of the city in the time of Hadrian, which is around 130 AD.<sup>19</sup> Similar to it is a massive ring with less accentuated shoulders from the Guilhou collection, with an engraved representation of a carriage, whose style, being similar to a late Roman gem from Adolf Furtwängler's catalogue (Furtwängler 1900: 359, Pl. XLVI/10), points Battke to the 3<sup>rd</sup> century. However, he adds that he knows that "the plates were later engraved in the antique style" on some specimens, as well as that this piece seems "old-fashioned" to him, although he only saw it in a picture (Battke 1953: 100). According to him, the third specimen is kept in the Berlin Antiquities Collection (Altes Museum), which was excavated in southern Russia together with a late antique necklace; it is much smaller and more rounded, although it also has a prominent widening in the middle (Battke 1953:100). In connection with this, Battke cites the opinion of Prof. Robert Zahn, then director of the Berlin Antiquities Collection, that the chronology of the ring of this type should be extended to the early medieval period. At the end is the most recent ring from this group, from the British Museum in London, published by Dalton (1912: Cat. No. 2344) as Persian from the 16<sup>th</sup> century (?).

From the text that accompanied the description of the carnelian ring it is clear that Battke was cautious in dating both individual pieces and the entire hololith group. However, in the specific case of the carnelian ring, we believe that he decided to date it later. Therefore, he placed it at the back of the review, directly in front of a (basically similar) silver ring from Bukhara (?), which he assumed was from the time of the rule of the Timurids (1369–1468) (Battke 1953: 100, No. 149). Moreover, in the discussion, he again emphasised the similarity and connection between this and the carnelian ring from Antinoopolis, as well as with another piece from the British Museum, which Dalton (1912: Cat. No. 2362) identified as possibly Persian from the 18<sup>th</sup> century. Although she accepts the ancient origin of the hololith ring type, a similar question about the chronology of the ring is expressed by Marianne Maaskant-Klainbrick (1972: 140–141, Fig. 8), who adds rings from Lindos and Sotheby's 1937 sales catalogue to previously known pieces. In recent times, the same examples and data related to chronology were repeated in the article by Ivana Popović (2013: 161–162), where their determinant *Roman* is supported by parallels from contemporaneous metal rings. Here, we would like to remind that the *Collection of the Roman Imperial Period* of the National Museum in Belgrade preserves

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19 The ring was in the collection of the Musée Guimet in Paris, but is now listed as missing.

two carnelian rings of different shapes, but information is missing regarding the places of the finds for both rings (Поповић 1992: кат. бр. 126, 127).

From all the above, early dating of hololith rings from ancient sites remains questionable. Archaeological finds that served as a chronological stronghold turned out not to be reliable, certainly not to the necessary extent. This primarily refers to the findings from Acrocorinth and Lindos, which, as we have seen, in addition to the archaeological context, also problematised the issues of chronology. All previous studies suggested that the origin of this type of ring should first be sought in the Middle East. However, the establishment of a reliable chronology of the ring design is still an assumption, since contextualised archaeological findings from the beginning of the development line are missing. It would be interesting to recall that the earliest information about a ring of this shape from the Middle Ages can be found on another *medium*, on a sgraffito plate made in a Corinthian workshop during the first half of the 12<sup>th</sup> century – in the depicted scene a bird holds a ring facing a horseman (Fig. 3; Papanikola Bakirtzi 1990: Cat. No. 3; Bosselmann-Ruickbie 2010: 221, Pl. 36). Although it does not bring a resolution, the representation on Byzantine pottery in its own way contributes to the considerations about the origin and chronology of monolithic rings at this time when the amount of stratified finds is quite modest.



Fig. 3 Byzantine sgraffito plate with a representation of a ring from Corinth (ASCSA Digital Collections C 1966 43)

Сл. 3 Византијски зграфито тањир с представом прстена из Коринта (ASCSA Digital Collections C 1966 43)

<http://corinth.ascsa.net/id/corinth/image/digital%202019%201470?q=1966%2043&t=&v=list&sort=&s=4>

In the late Middle Ages, hololith rings were typologically and stylistically completed. Basically, these are more or less close variants of one type of ring, made of metal and stone. Common to all variants (specimens) are epaulette shoulders and a button-shaped protrusion on the bottom of the ring, while the upper part is solved in several ways that affect the shape and size (width) of the bezel and (non) existence of the neck (Fig. 4). The intention to separate the neck is visible to a greater or lesser extent on all

specimens, especially those from 16<sup>th</sup>–17<sup>th</sup> century (Figs. 4/11, 15, 16). In most cases, the bezel is massive, oval or elliptical in shape, while other shapes, such as hexagonal or circular (Figs. 2/2, 4/16, 17), occur less frequently. Although there are not enough stratified findings from the late Middle Ages and the ancient times for a reference study, the data at our disposal speak in favour of different interpretations of the basic form, artisan's skill and personal aesthetic experience, rather than a developmental line in the true sense of the word. The grouping of rings of similar variants – on the one hand Novo Brdo from opal, Corinthian, and carnelian from Sremska Mitrovica, and, on the other hand, Novo Brdo from carnelian, Thessaloniki and Hungarian – led to a clearer differentiation of specimens from Hungary, which are, due to the greater thickness of the ring, different from pieces from earlier centuries. Arguably, there are also variants from a later time with a small round bezel with a granule on top (Fig. 4/18) and with a triangular bezel (Fig. 4/19).

In the Middle Ages, the hololith rings considered here have parallels among gold, filigree ornate jewellery from the time of the Fatimids (909–1171; Jiwa 2018: 32 et seq). However, for specific varieties, rings of the Timurid age (14<sup>th</sup>–15<sup>th</sup> century) are most often mentioned, which are at the top of the line of that design, as a completely shaped product (Brosh 1987: 55, fig. 39; Wenzel 2005: No. 317). Several illustrative specimens from that and somewhat later times (15<sup>th</sup>–17<sup>th</sup> century) are in private collections (Chadour 1994: Nos. 550–552; Wenzel 2005: 320–325). The shape of the ring follows the early Islamic tradition, and the new design, embodied in an oval-shaped bezel protruding from the shoulder line, as well as floral and zoomorphic style decorations, was shaped in Central Asia during the time of Seljuks and Timurids (Brosh 1987: 55, Fig. 39; Гајић 2018: 43). The richness of the Timurid heritage in the culture of the Islamic world is well known, as is its strong connection with Persian artistic and craft roots, in addition to Turkish and Mongolian elements (Jackson and Lockhart 1986: 97–98; Subtelny 1997). In this context, let us mention that an exceptional specimen of a monolithic type jade-nephrite seal ring from the Khalili collection has been attributed to the Mongols (Chaldecott 2007).

Metal rings, primarily silver, were made during the second half of the 14<sup>th</sup> and in the 15<sup>th</sup> century, both in Central Asia and in the Balkans. Specimens from the area of the Central Balkans are especially numerous, which are also characterised by diversity in both shape and decoration. However, all of them are characterised by an ellipsoidal bezel, a "warped" hoop and a relief surface at the bottom, while the droplet-shaped ornaments on some pieces are missing, as is the case with the rings from Novo Brdo (Zečević 2006: cat. Nos. 68–71). Most of them are richly decorated – vegetal and geometric motifs extend along the widened part of the hoop, while on the bezel there are matching motifs of the same style, but also heraldic motifs, representations of animals or birds, as well as inscriptions, although much less often (Brosh 1987: Fig. 39; Радојковић 1969: 177–180, Т. 104–107; Премовић-Алексић 1988: 33, Т. II/7; Милошевић 1990: кат. бр. 58, 112, 113, 115–123; Друмев 1976, 471, Обр. 511; Манева, Е. 1992: 90–93, Т. 87: 24/2, 88: II/12, 93: 31/80, 31/132, 62/24, 31/86, 31/88, 62/22, 67/9, 31/19, 31/85, 65/18, 69/1, 94: 63/15, 65/7, 93/21, 62/4, 63/17, 96: C/7, 26/3, 26/5). Зечевић 2006: 94–99, кат. бр. 67–71; Гајић 2018: кат. бр. 53–56).

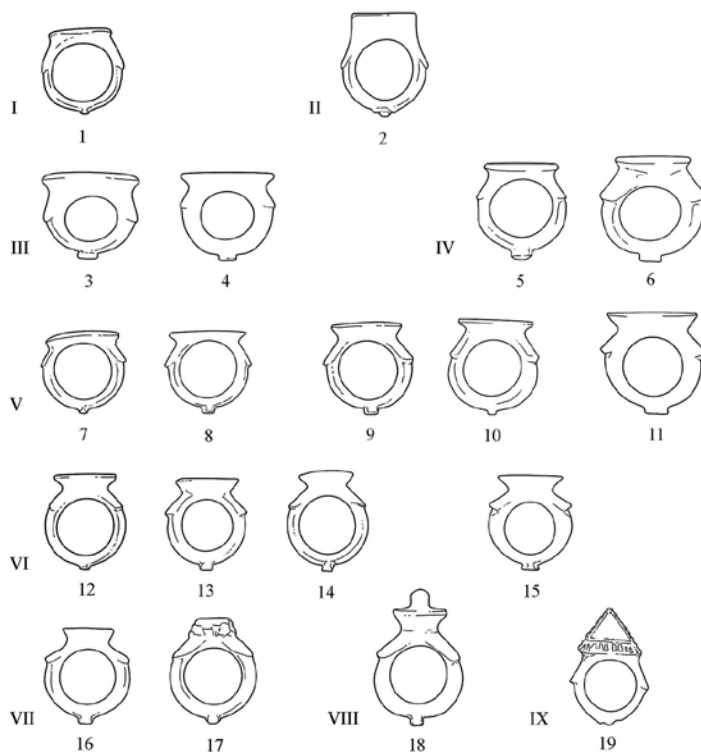


Fig. 4 An overview of hololite ring varieties from the late Middle Ages and early modern period (I – IX) mentioned in this paper: 1) Novo Brdo, house 2; 2) Khalili collection (after: Chaldecott 2007); 3) signet ring Muhammed Ali Ibn Muhammed Ali (after: [https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1\\_1567657771\\_7688+sxsrf](https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1_1567657771_7688+sxsrf)); 4) Khalili Collection (after: Wenzel 2005: No. 323); 5) Corinth (no. MF9402); 6) Timurid ring (after: Chadour 1994: no. 551); 7) Sremska Mitrovica (after: Popović 2013: fig. 3); 8) Corinth (no. MF717); 9) Belgrade City Museum (inv. No. AS 1996); 10) Timurid ring (after: Chadour 1994: no. 550); 11) Pest (not published); 12) Novo Brdo - Cathedral (National museum in Belgrade, inv. no 24\_4966); 13) Belgrade City Museum (inv. no. AS 759); 14) Thermi, Thessaloniki surroundings (after: Pappa et al. 2011); 15) Pest (not published); 16) Khalili Collection (after: Wenzel 2005: no. 325); 17) Museum of Applied Art (inv. no. 485); 18) Khalili Collection (after: Wenzel 2005: no. 322); 19) Belgrade City Museum (inv. no. AS 760) (drawings: I. Kajtez)

Сл. 4 Преглед варијетета хололитног прстења из раздобља касног средњег века и раног новог доба (I–IX) који се помињу у овом раду: 1) Ново Брдо, кућа 2; 2) Калили колекција (према: Chaldecott 2007); 3) печатни прстен Muhammed Ali Ibn Muhammed Ali (према: [https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1\\_1567657771\\_7688+sxsrf](https://www.google.com/search?q=Early-medieval-Carnelian-Islamic-Ring-with-calligraphy-rare-1_1567657771_7688+sxsrf)); 4) Калили колекција (према: Wenzel 2005: No. 323); 5) Коринт (Corinth, No. MF9402); 6) тимуридски прстен (према: Chadour 1994: No. 551); 7) Сремска Митровица (према: Роровић 2013: fig. 3); 8) Коринт (Corinth, No. MF717); 9) Музеј града Београда (инв. бр. АС 1996); 10) тимуридски прстен (према: Chadour 1994: No. 550); 11) Пешта (није објављено); 12) Ново Брдо, Катедра (Народни музеј у Београду, инв. бр. 24\_4966); 13) Музеј града Београда (инв. бр. АС 759); 14) Терми, околина Солуна (према: Pappa et al. 2011); 15) Пешта (није објављено); 16) Калили колекција (према: Wenzel 2005: No. 325); 17) Музеј примењене уметности у Београду (инв. бр. 485); 18) Калили колекција (према: Wenzel 2005: No. 322); 19) Музеј града Београда (инв. бр. АС 760) (цртежи: И. Кајтез)

In the considerations of the style of jewellery from the second half of the 14<sup>th</sup> and early 15<sup>th</sup> century, B. Radojković (1969: 177–179) paid special attention to the ring with a “more prominent oval bezel, on a slightly profiled neck”. Referring to the previously mentioned Battke’s assumptions about the origin, she states that the role of Serbian jewellery in these early considerations was unjustly neglected and that this type of ring originated on our soil, indisputably under the influence of Antiquity and the East, since rings in medieval Serbia already at the end of the 14<sup>th</sup> century and especially in the 15<sup>th</sup> century “easily absorbed Islamic decorative motifs” (Радојковић 1969: 178). The number and variety of specimens speak in favour of the opinion that this type of ring was widely accepted in the Balkans, perhaps precisely because of the spacious surface of the bezel that could accommodate various representations, heraldic motifs, but also serve as a personal seal. The results of the studies conducted so far speak quite convincingly in favour of the production in domestic workshops, primarily mentioning those in Novo Brdo, Prizren, then in Janjevo, Skopje, Prilep, as well as in Bosnia (Радојковић 1969: 178; Милошевић 1990: 19; Гајић 2018: 43). However, given the almost simultaneous appearance of the same type of ring at several points, it is rather a trend in jewellery, and in part fashion, which had come from the East and which, apparently, found its full expression in the Balkans.

From all the above, it is certain that there is a strong connection of long duration between metal and stone rings. However, this connection is not limited only to the previously considered variants. Primarily, we mean that which rises in height above the line of the hoop, by adding a high conical neck and a granule that is added to the round, flat surface of the bezel – a hololith variant which is assumed to be from a later time, 17<sup>th</sup>–18<sup>th</sup> century (Wenzel 2005: Nos. 320–322, 324; сл.4/18). The connection we see with the late medieval silver rings, such as the one from the area of Novo Brdo and from the area of today’s North Macedonia (Радојковић 1969: Т. 49, 94, 95, 117, 119; Милошевић 1990: кат. бр. 132, 137; Манева 2002: Т. 92: 54/27, 60/5. 57/7, Т. 96: П/6, П/10), is merely theorising about the possible development of this line of the ring, including its origin in Late Antiquity, i.e. the early Byzantine period (Battke 1953: Nr. 49, 51, 52; Spier 2012: 74–78, Fig. 10.1, 80–81, Fig. 11.1). Further studies, which will undoubtedly follow with the discoveries of stratified specimens, will, among other things, better explain the place on the chronological scale of similar carnelian rings from the *Collection of the Roman Imperial Period* of the National Museum in Belgrade (Popović 2013: figs. 4 and 5).

## THE ISSUE OF TECHNOLOGY

In the considerations of hololith rings, the question of technology, choice of stone and applied processing techniques, can provide valuable information about the craft itself, the degree of skill of the artisan, tools and methods of work, and thus indirectly about the chronology of jewellery. Due to a number of limiting factors, three hololith rings were subjected to direct tests, from house 2 in Novo Brdo (HLP-1, Fig. 5a) and from the collection of the Belgrade City Museum (HLP-2 – Fig. 5b and HLP-3 – Fig. 5v). ). Unfortunately, the green stone ring from Novo Brdo was avail-



able for an extremely short period of time, which significantly affected the scope of the examination. In order to reliably identify the mineral raw material from which the rings were made, non-destructive (classical gemmological) methods were applied: refractometry, a hydrostatic method for determining specific gravity/density and optical microscopy. Refractometry, i.e. the determination of the refractive index of light, was performed using a classical optical refractometer with a contact fluid of refractive index of 1.79. The determination of the specific gravity/density of the samples by the hydrostatic method was performed using distilled water and a digital scale with a precision of 0.001 g. The measurement methodology for both methods is described in Matlins and Bonanno (2007: 330).

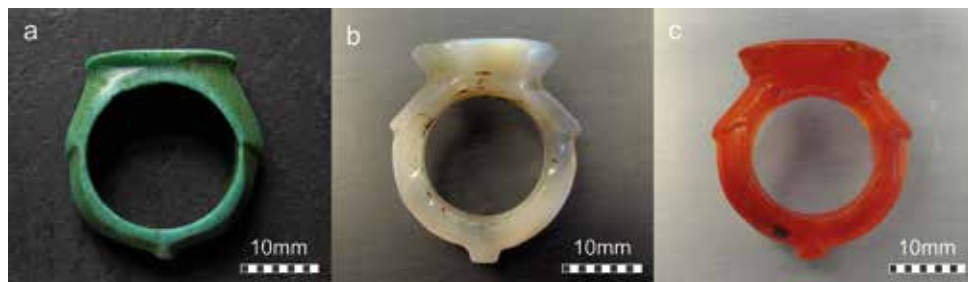


Fig. 5 Investigated rings: a) HLP-1, 28,5 × 27,5 mm; b) HLP-2/AS 759, 29 × 25,5 mm; c) HLP-3/AS 1996, 29 × 27,5 mm

Сл. 5 Прстење подвргнуто испитивањима: а) ХЛП-1, 28,5 × 27,5 мм; б) ХЛП-2/АС 759, 29 × 25,5 мм; в) ХЛП-3/АС 1996, 29 × 27,5 мм

On the other hand, macroscopic observations were made to detect traces left by the tools during the processing of the gemstone, and optical binocular microscopy up to a magnification of 100X in reflected light as well as in a dark field was used. Also, in addition to the original illumination of the microscope, additional lamps were used that directed light at different angles for better visibility of processing traces.

In the short time available for analysis, the green stone ring (HLP-1) was tested only by the method of hydrostatic determination of specific gravity/density. Therefore, its identification cannot be considered absolutely reliable. Based on the obtained lower value of specific gravity, as well as on the basis of the observed pronounced hydrophilicity (water absorption), it was concluded to be an opal. The other two rings (HLP-2 and HLP-3) were reliably identified by laboratory methods as chalcedonies. The obtained values of refractive index and specific gravity, shown in Table 1, are in the domain of standard values for chalcedony. More precisely, these are varieties of chalcedony – agate (HLP-2) and carnelian (HLP-3). The HLP-2 ring was defined as opal in the collection of the Belgrade City Museum. However, the refractive index values of 1.37–1.52 and the specific gravity values of 1.88–2.50 for opal are lower than those measured for the HLP-2 ring. Also, opal is isotropic, while the HLP-2 ring doubly refracts light.

	HLP-2/AS 759	HLP-3/AS 1996
Refractive index	1,530-1,539	2,63
Specific gravity	1,530-1,539	2,61

Table 1 Results of refractometry (refractive index) and hydrostatic weighing (specific gravity)  
Табела 1 Резултати рефрактометрије и хидростатичке методе одређивања специфичне тежине

Opal and chalcedony are chemically silica ( $\text{SiO}_2$ ). Opal is a mineraloid, made of an amorphous substance (without a crystalline structure), which, in addition to silica, also contains free water ( $\text{SiO}_2 \cdot x\text{H}_2\text{O}$ ). On the Mohs scale, the hardness of opal is 5½-6. Chalcedony is a cryptocrystalline variety of quartz whose hardness is 6½-7. Chalcedony is characterised by numerous sub varieties by colour and texture, including: carnelian (red to orange-red), chrysoprase (green), sard (brown to brown-red), onyx (striped - horizontal stripes), agate (concentric-striped) and others (Schumann 2011). In terms of hardness, opal and chalcedony do not differ too much at first glance. Although on the Mohs scale they are quite close, 5½-6 (opal) and 6½-7 (chalcedony), the difference is still significant. It should be borne in mind that the Mohs scale is not linear and that the values of adjacent levels differ significantly. In short, opal is brittle and, therefore, less suitable for fine lapidary processing, while chalcedony is much better able to withstand the requirements of carving and during processing allows for more complex and finer details to be produced. It is also very resistant to wear when wearing jewellery made of it. Chalcedony owes such a quality to its structure, which gives it a pronounced resilient property. It is, therefore, not surprising that chalcedony was used much more for carving than opal. In fact, immediately after jade, it is the most used mineral in gem carving. Therefore, the properties listed above make it a good raw material for making hololith rings.

Bearing in mind the listed properties, the comparative analysis of traces on the ring led to additional conclusions about the types of minerals. Namely, deep traces of drilling in the form of concentric grooves (Fig. 6a) remained on the inner wall of the ring from Novo Brdo, which could not be removed by subsequent finer grinding and sending. Such deep traces of tools are not noticeable in the other two rings. On the agate ring, these traces are barely noticeable macroscopically (Fig. 6b), while on the carnelian ring (HLP-3) they cannot be seen without magnification. The fact that a tool leaves deeper traces on a softer material supports the opinion that the hololith ring from house 2 in Novo Brdo (HLP-1) is made of opal.

The selection of an appropriate stone, which is at the beginning of the operational sequence, begins at the source of the raw material, at the mine.<sup>20</sup> The origin of the raw material used to make hololith rings is very difficult to determine. The most commonly used is chalcedony, a precious stone with perhaps the longest tradition. There are numerous archaeological artefacts made from this cryptocrystalline variety of quartz. The oldest chalcedony finds have been dated to the Neolithic (Groman-Yaroslavski and Bar-Yosef Mayer 2015). In the time of ancient Rome, one of

20 In the mine itself, the stone could be evaluated and sorted by value, while the on-site craftsmen could cut into larger pieces and roughly process the raw stone (cf. Wulf 1966: 38-39).

the main sources of chalcedony, or *sard*, was India (Pliny, 37: xxxi.105). This stone has always been traded intensively. Therefore, it is safest to assume that the raw material from which hololith rings were made is not from local deposits. However, bearing in mind the highly developed mining in medieval Serbia, the assumption of the use of nearby chalcedony deposits cannot be completely rejected, especially for the rings found in Novo Brdo. This famous medieval mining town is located approximately 15 km from the Lece Tertiary andesitic volcanic complex, which represents a promising environment for deposits of silica gemstones. Today, we know of primary and secondary chalcedony occurrences in it (Miladinović et al. 2016). Due to the easier availability of raw materials in secondary deposits, as a potential source of raw materials for the production of hololith rings, alluvial deposits, such as those in the valley of Velika Kosanica and Kosanica, are particularly interesting.

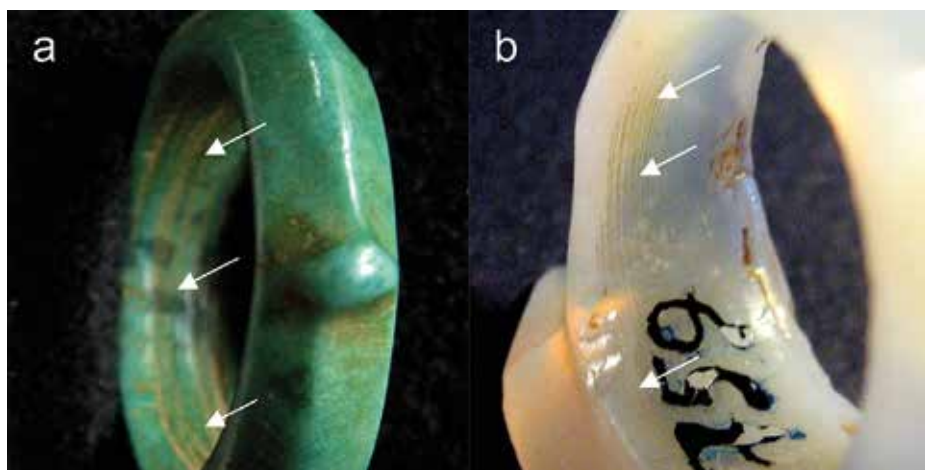


Fig. 6 Drill marks are more evident in opal ring (a) than drill marks in agate ring (b)

Сл. 6 Трагови бушења, много јаче изражени код прстена од опала (а) него код прстена од ахата (b)

Apart from the Lece volcanic complex, there are several chalcedony deposits on the territory of Serbia, which were formed as a consequence of Tertiary volcanic activity (e.g. Boblija and Kremenac near Gornji Milanovac, and Kremenjača near Gornja Trepča). Sometimes, in addition to chalcedony, other silica gemstone varieties (quartz rock crystal, jasper or amethyst) appear at the same occurrences, among which there is also opal. In ultramafic complexes, deposits of green opal are frequent, such as in serpentinites in the vicinity of Kragujevac (deposits Ramaća, Gaj-Lazine), Mataruška Banja (Lojanik) and Trstenik (Veluće,) but also in harzburgites and serpentinites of Kosovo (deposits Goleš near Pristina, Kuna Ljuget near Podujevo, Čikatovo and BaKS in Drenica).

The developed mining activity in the Middle Ages certainly implied a good knowledge of the geology of the terrain on which the mines were opened. Deposits of opal, chalcedony and other silica minerals often occur in the same area or in the immediate vicinity of metallic ore deposits (lead, zinc, silver and gold), as is the case in the Lece volcanic complex (chalcedony, amethyst and jasper) or Rudnik (quartz

and rock crystal). It is not too bold to assume that the metal ore prospectors of that time were also acquainted with the gemstone occurrences. Whether these deposits were used at the time of the making of the examined hololith rings, without reliable evidence, of course, remains an open question.

With the exception of the green opal ring from Novo Brdo, the examined hololith rings were made of chalcedony. Among them, only the ring from the collection of the Belgrade City Museum (HLP-2 / AS 759) is made of agate, while the others are red chalcedony, carnelian. The great symbolic significance of the red colour of carnelian is obvious. In this regard, it should be borne in mind that the whitish agate ring could also turn red. Heat treatment of lighter varieties of chalcedony in order to obtain a beautiful red-orange carnelian was being applied in the third millennium BC in Gujarat in northern India (Rapp 2009).

Traces of tools used in the processing of gemstones, clearly visible on the material, i.e. the final products, reveal the method of processing the examined hololith rings. In this regard, the morphology of the treated surfaces, the shape of the traces, their dimensions and orientation were analysed macroscopically, using a 10X magnification magnifying glass and a binocular microscope with a magnification of up to 100X. As a reminder, the processing of gemstones is based on three basic procedures, the so-called *simple processing*, i.e. processing by rounding, most often represented by rounded or flat cabochons (Ilić 2006: 152), *faceting* (processing of transparent stones by placing numerous small flats – facets, e.g. brilliant cut) and *carving*. Hololith rings were made by carving techniques, i.e. glyptography. The very principles of processing gemstones have been known for a very long time, since the Late Palaeolithic, as well as in the cultures of Mesopotamia, Egypt, ancient Greece and Rome. Over time, the technique did not change much, and the stone was carved with simple hand tools – chisels and files. These tools were made of obsidian, chert, chalcedony or metal, primarily copper and bronze, and later iron, to which natural abrasives, quartz sand, garnet or sandpaper were added (Семенов: 96–104, рис. 23–25; Šarić 2009: Pls. IV/3–4, V/5–13; Šarić 2014: 162–163, Pls. 16/5, 52/7, 8, 9, 57/3, 87/3; Sax et al. 1998; Rosenfeld and Dvorachek 2003; Anselmus Boetius de Boot 1636: 74–85). Another method of processing involved the use of rotary tools. Initially, such tools were driven by hand, using a type of bow whose bowstring was wrapped around a shaft at the end of which a cutting tool was attached (Gwinnett and Gorelick 1979). Later, a drive wheel was moved by foot, and the rotation system of a belt was transmitted to the shaft with cutting tools of various shapes and sizes attached. (Fig. 7a; Anselmus de Boodt 1609). Compared to bow-driven tools, this method of processing was faster, with a higher tool speed. The work of the processors at that time was, therefore, very similar to the work in modern lapidary workshops (Fig. 7b).

Based on the analysed marks of the tools with which the stones were processed (Fig. 8), it can be assumed that the following carving techniques were used: *drilling* (circular features), *filig* (linear features) and *rotational grinding* (linear and slightly curved features and flat surfaces). Traces of sawing could not be noticed because, if any, they were eliminated by later stages of stone processing, grinding, fine grinding and polishing. Due to the resilience and hardness of chalcedony, the sawing phase

would be very useful, because it reduced the total processing time. In modern carving of gemstones, sawing is most often used, in spite of the fact that today grinding is much faster and more efficient. Despite the fact that the sawing process of the three examined rings is not supported with tool marks, the existence of this phase of work remains questionable, since in order to reduce the total processing time a raw material of suitable shape and size could have been selected, or the size of the raw material could have been reduced by knapping, with the use of various tools.

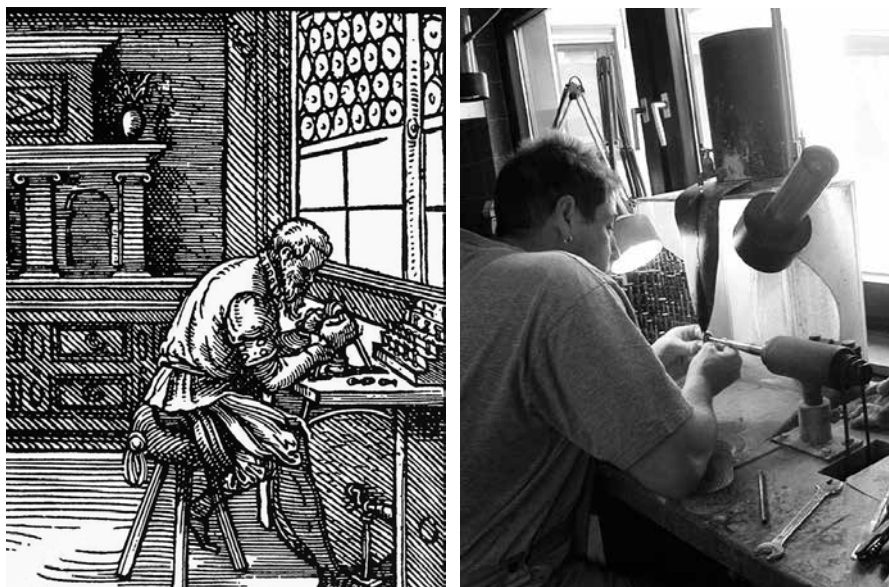


Fig. 7 Gemstone carving: 16th century glyptic workshop, xylography Jost Amman, *Caelator gemmarum*, 1568 (a); Contemporary lapidary workshop in Idar-Oberstein modern glyptic workshop (<http://www.free-form.ch/minereports/e12.jpg>) (b)

Сл. 7 Приказ резбарења јувелирског камења: глиптографска радионица у XVI веку, ксилографија Jost Amman, *Caelator gemmarum*, 1568 (a); савремена глиптографска радионица у Идар-Оберштајну у Немачкој (b)

Of all the traces of lapidary processing, the drilling traces are the most striking on all three rings (Figs. 6, 8a and 8b). For drilling, hand drills with a bow and bowstring could be used, in which the rotation of the tool is oscillatory, i.e. with changeable direction (back and forth). However, drilling could also be performed on a foot-operated "machine" (Fig. 7), in which the rotation of the tool was one-way, i.e. continuous. In both cases, a tool most likely used was a kind of a drill, in the shape of a hollow cylinder, to which a paste obtained by mixing abrasives and lubricants, oil or water, was added. Such a tool eventually becomes "impregnated" with an abrasive that is pressed into the metal. Even today, copper cutting tools of various shapes are used in the carving of gemstones. Because copper is soft, much harder abrasives are easily imprinted (impregnated). A drill in the shape of a hollow cylinder removes the stone with only its outer diameter, and leaves the core intact, and in that way significantly reduces the abrasive surface. The mass of the removed stone is much smaller.

Pronounced traces of drilling on all three hololith stones could have arisen for a number of reasons. In order to shorten the working time, an abrasive of a larger size and, thus, of higher abrasive power could have been used. Later, finer grinding made it harder to remove these rough marks. Also, it is logical to assume that the artisans paid less attention to the inside of the ring, because it is not visible when worn (used). However, traces of manual finer grinding have been noticed on the agate and carnelian rings, which partially removed the drilling marks. Traces of manual processing are perpendicular to the drilling traces and can be seen on both rings (Figs. 8a and 8b). Most likely, the files used were made of metal or wood with added abrasive, while in the final phase, leather could have been used on which polishing powder was applied.

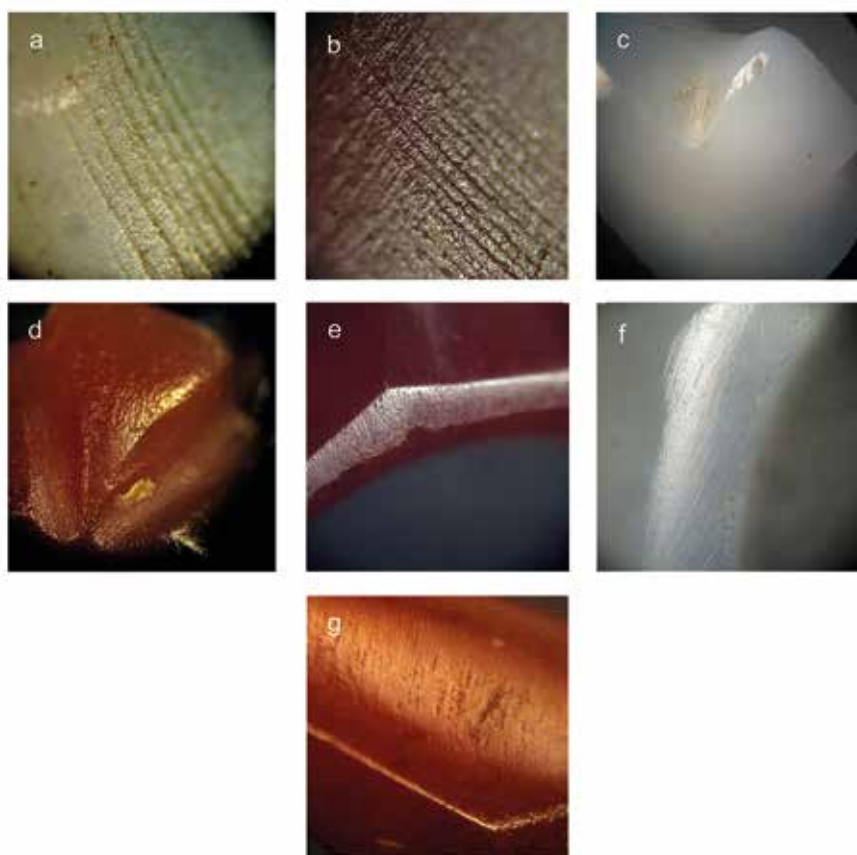


Fig. 8 Photomicrographs of carving tool marks on hololith rings: HLP-2/AS 759 (a, c, f) and HLP-3/AS 1996 (b, d, e, g); rotary drill marks and perpendicular linear hand filing tool marks (a, b); deep linear rotating disc tool marks (c, d); flat surfaces with tool marks caused by flat upper part of rotating disc or wheel (e, f, g); magnifications: a and b – 100 $\times$ , c, d, e, f, and g – 50 $\times$

Сл. 8 Фотомикрографије трагова обраде/резбарења хололитног прстења: ХЛП-2/АС 759 (а, с, ф) и ХЛП-3/АС 1996 (б, д, е, г); трагови ротационог бушења и управни линеарни трагови ручне обраде (а, б); дубоки линијски трагови ободног дела ротационог диска (с, д); равне површине са траговима обраде добијене коришћењем равног дела ротационог диска или точка (е, ф, г); увећања: а и б – 100 $\times$ , с, д, е, ф и г – 50 $\times$

Narrow and relatively deep traces formed during the formation of wart-shaped protrusions on the lateral and especially lower parts of the ring indicate the use of a rotating disc/rotating blade (Figs. 8c and 8d). The width of the blade used was less than 1 mm. The disc was probably made of metal, copper, bronze or iron, to which an abrasive was added, most likely natural sandpaper. The disc used to incise the groove was probably small in diameter. In addition to thin rotating discs, rotating wheels of various thicknesses were also used to create all the rounded surfaces on the stone, as well as to round off the edges.

For flat surfaces, of which there are many on all three rings, rotary discs or larger diameter wheels were probably used. For this purpose, the entire (available) surface of the disc would be enriched with abrasive. Flat surfaces could also have been created with a hand tool, however, traces of flat grinding and polishing have a uniform direction, and therefore correspond more to the traces left by rotary discs (Figs. 8d, 4e and 8f).

## THE ISSUE OF SOCIAL AND CULTURAL IDENTITY

We consider it appropriate to begin our considerations of the meaning of hololith rings by stating that the stratification of society, among other things, has influenced the stratification of jewellery, both in terms of form and material. It is not necessary to emphasise the fact that the making of stone jewellery is one of the oldest and most permanent human activities. However, in its obvious abundance and variety, the rings made entirely of gemstone represent a small group, so far, unfortunately, poorly noted and out of the field of interest not only of earlier chroniclers but also of modern researchers, we have to say, somewhat unfairly. The material itself certainly contributed to the value of the individual pieces. But not only that – the shape of the ring and the type of stone, in correlation with the archaeological context, reveal certain aspects of demand, i.e. consumption of this type of ring in medieval society.

Previous studies, as well as ours, stand quite firmly by the view that the origin of stone rings is in the East, the Middle East and the Mediterranean. Not only were these sources of quality, highly prized gemstones, among them opal and chalcedony, above all carnelians and agates (Pliny, 37: xxvi.83, xlvi.129; Fernie 1973: 138), to mention only those from which the rings discussed in this paper were made, but these areas are also associated with changes regarding ring design. In addition, for those who believe in the magical properties of precious stones, hololith rings *work* more successfully than metal ones with an inlaid stone, since the stone is in its entirety in contact with the skin of the wearer. A system of medical-magical properties of stones was developed among the peoples of the East, which, in almost the same form, has lasted for centuries, practically to this day in all parts of the world. According to this system, opal helps with vision problems, that is, sharpens and strengthens vision, and is also valued as a medicine that stimulates the heart and protects against infectious diseases (Albertus Magnus: 110; Fernie 1973: 248; Bliss 1936: 550). In the late Middle Ages, it was even believed that the one who wore opal could be made invisible, which is why it was called the patron of thieves (Kunz

1938<sup>7</sup>:150). This stone of exceptional beauty and purity, which often appears under its Greek name *paederos* – favourite (Pliny, 37: xxii.84; Anselmus Boetius de Boot 1636: 190–195), is considered a talisman of faith, hope, good luck and love (Kunz 1938<sup>7</sup>: 359). On the other hand, chalcedony worn around the neck helps against illusions arising from melancholy, and also preserves physical strength (Albertus Magnus: 78). Carnelian was believed, due to its red colour, to have a great influence on solving the issues of bleeding, especially from the nose, as well as inflammatory processes (Albertus Magnus: 81–82; Anselmus Boetius de Boot 1636: 230–233; Bliss 1936: 548; Kunz 1938<sup>7</sup>: 6). It can save individuals from the dangers of plague, but also from injuries that could result from the collapse of walls (Ferne 1973: 138). In addition to the fact that its cooling effect leads to calming anger, in the Arab world carnelian is a powerful stone against envy, both one's own and other people's (Kunz 1938<sup>7</sup>: 6, 63). Due to all these properties, it is not surprising that this stone was most often used to make seal rings (Amar and Lev 2017: 380). Among gemstones, agate stands out as a powerful antidote. The Romans were already making a tincture from agate powder mixed with water, which was known as a powerful remedy against snake bites and scorpion stings (Ferne 1973: 168),<sup>21</sup> while in the Middle Ages in the eastern Mediterranean it was used for dental diseases, primarily for the treatment of caries, teeth whitening, as a prevention of bleeding gums and their strengthening, but also as a powerful amulet to dispel fears (Lev and Zohar: 329).

From all the above, it follows that for the hololith ring the type of stone was crucial, while its shape rather used to be a reflection of the fashion of the time. The records at our disposal speak in favour of the dominance of carnelian over other gemstones, but also the consistent choice of one type of stone – chalcedony, which is characterised by a unique hardness (6½-7), and, thus, the convenience of processing. Carnelian was not one of the most expensive gemstones, unless it was unique in some way, so during the Middle Ages the variant from Yemen was especially highly prized (Amar and Lev 2017: 383). Apart from its value, in the Middle Ages, the stone was valued according to the degree of processing in several categories, from "raw", washed and cleaned, which was the cheapest, through semi-processed and polished to processed stone that was ready to be set in a metal frame and was, therefore, the most expensive (Amar and Lev 2017: 383). At that time, the first half of the 13<sup>th</sup> century, polishing gemstones, which was done with abrasive stone and water, was a well-paid and respected job (Amar and Lev 2017: 383). The presented data on the categories of gemstones, as well as the evaluation of the work of a master-cutter who prepared precious stones for sale, reveals a complex division of work based on the specialisation within the jewellery craft.<sup>22</sup>

On the other hand, traces of lapidary processing provide key information about the practice that the jeweller carried out in the process of making the ring. Already at first glance, a great similarity can be noticed among the specimens of hololith

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21 In the late Middle Ages, two other methods of protection against poison were known: cups and other drinking vessels were made, or the servants touched food and drink with pieces of stone before serving, cf. Ferne 1973: 168, 310.

22 The beginning of an organised association of craftsmen in groups – guilds, belongs to a much later time, cf. Rafeq 1991; Feroqhi and Deguilhem 2005; Feroqhi 2009.



rings found at different locations (Figs. 2 and 4). It is practically a single model with minor variations in shape and proportions. The most noticeable difference is in the ring bezel. There are two basic shapes: elongated oval and octagonal, with more numerous rings with an oval bezel. The octagonal shape characterises the rings from the Museum of Applied Arts and one ring from Pest. Furthermore, only the Corinthian ring (Fig. 2/2) has a round bezel shape. Regardless of the shape, they were all processed as flat polished surfaces, most likely on a flat rotating disc.

Small differences in shape are also noticeable on side protrusions that are in accordance with the shape of the bezel. When they are octagonal in shape, the side protrusions on the hoop have flat facets – three on each side. The facets were created by flat grinding on flat rotating discs. In the case of rings with an oval shaped bezel, the side protrusions do not have facets and follow the shape of the lower part of the ring. There is also a very clear manner in the processing of the opposite sides (front and rear) of the hoop, in the form of flat surfaces of the facet that follow the shape of the ring. They were most likely created by grinding on flat rotating discs whose diameter was larger than the diameter of the ring.

Minor variations in the shape and proportions, such as the emphasis on the neck of the ring, can be a consequence of the quality (presence of cracks, cavities and other irregularities) and the size of the mineral raw material. The rings were made by carving techniques in a very similar way. In addition, some specimens appear to have been made in the same workshop, which is best illustrated by carnelian hololith rings from Novo Brdo and Thessaloniki (Figs. 2/7 and 2/8).

On all the specimens we had the opportunity to study, traces of wear, in the form of minor or major mechanical damage, are also visible. Shallow incisions and scratches, which appear on the flat surface of the bezel (Fig. 9a), could be a consequence of exposure to abrasive materials, such as contact of the ring with a harder surface, but also the effect of natural abrasive processes whose traces remained on the ring due to insufficient polishing. On the other hand, on the most exposed parts of the ring, which are the edges of the bezel and shoulders, a series of small areas of damage in the form of impacted parts were noticed (Fig. 9b, c, d), which occur when the ring hits a hard surface. Regardless of the type, the listed traces of wear and tear assure us that the rings were worn for a longer or shorter period of time.



Fig. 9 Traces of mechanical damage on the hololith rings: a) Novo Brdo; b) Sremska Mitrovica; c) Belgrade City Museum, AS 759; d) Museum of Applied Art in Belgrade

Сл. 9 Трагови механичких оштећења на хололитном прстењу: а) Ново Брдо; б) Сремска Митровица; с) Музеј града Београда, АС 759; д) Музеј примењене уметности у Београду

The manner in which the ring wore in the past depended on its shape, the reason for which it was worn and the social position of the person wearing it (cf. Kunz 1917: 10–17, 35–41). In Pliny's repeatedly mentioned *Natural History* (Pliny, 33: iv – viii), we find comments on aspects of ring-wearing, including the origins of that fashion (from the Greeks, through the Etruscans to the Romans), the meaning of the gold ring in high social circles, the manner of wearing one (on the ring finger) or more pieces (sometimes only on one, the little finger), with reference to the seal ring and that with set gems, as well as regulations regarding the wearing of this type of jewellery in certain social groups, or the ban for enslaved people. A remark of the Christian theologian Clement of Alexandria (c. 150–210) is well known, that men should not wear a ring on the upper finger joint, because it is suitable only for women, but on the little finger, so that they can do other jobs with their hand, without the danger of the seal ring falling off (King 1872: 329).

Similar to previous epochs, in the society of medieval Serbia, the ring was a status symbol, and through its value, embodied in both material and decoration, one could follow the economic prosperity and culture of the environment (Радојковић 1969: 43–44, 103). Archaeological records provide data on the fact that rings were worn by everyone, men, women, and children, most commonly one ring on the right hand (Bikić 2010: 89–90). By wearing more (precious) pieces arranged on both hands, a high social position was emphasised. Among the depictions of this practice, the founder's portraits in the Church of St. Nikola in Staničenje, where the noblewomen wear three rings on both hands, and the founder Konstantin also wears two rings on each hand, in all cases on the upper joint of the ring finger (Поповић и др. 2005: 86–92, сл. 33–39)r. In Ottoman society, men and women were allowed to wear a ring as an ornament, talisman and seal, provided that the ring, according to the instructions issued by the Prophet, was made of any material other than gold (Brosch 1987: 55).

Wearing a hololith ring fits into the presented practice. From the data we have, which concerns the customs of persons of the Islamic faith, the hololith ring was worn on a finger of the right hand, and in one case two different sizes on the little finger of the right hand, the place where the seal ring was usually worn. As we have seen, only individual specimens of hololith rings with an oval bezel and epaulette shoulders served as a seal. However, all the finds of rings from archaeological contexts considered in this paper have a smooth surface of the bezel, without engraved or any other motifs, because of which we are convinced that they were worn as an ornament and an amulet. Their role was to help solve medical problems or to protect from harmful effects of certain substances or intentions.

The role of a hololith ring in funeral practice is a separate issue, considering that these finds are of the same type and that they exclusively accompany the burials of Muslims. Although there is a set of practices regulated by the Islamic legal system (*fiqh*), such as burial in the first 24 hours after death, body washing, covering and laying in the grave, orientation with the head facing Mecca and others, local customs and the ethnic origin of the deceased often have precedence over religious laws (Biçer 2009: 24–25, 34–35; Petersen 2020: 49). These rules are deviated from in the case of the burial of a *martyr*, the one who was killed in the fight between

Muslims and "infidels", i.e. in the fight for the state, when the body is not bathed, but the person is buried in the same clothes in which they were found after they had passed (Biçer 2009: 25). In religious literature, objects in the grave are not mentioned or are explicitly forbidden (Petersen 2020: 51). Although the observance of this ban has been largely confirmed by archaeological research, there are cases that strongly deny this practice. For example, in the Middle East, funerals with small pieces of jewellery, mirrors and coins are quite common, and in some cases quite numerous, up to 40% of the total number of funerals (Petersen 2020: 51).

Nevertheless, caution should be maintained when considering the issue of admirers of the custom of wearing an amulet ring. On the one hand, burials with hololith rings from the Ottoman era represent a special phenomenon, judging at least by, for now, the rare archaeological examples. The contextualised findings from Pest differ from the usual practice, in that the rings accompanied the funerals that were performed *according to the law* (Tóth 2017: 126–127). Therefore, we conclude that it was considered a strong protection in the other life (afterlife). The belief in the power of a certain jewel is characteristic of the peoples of the East, in this case the Ottomans, who applied their customs, including the burial rite, throughout the Balkans in the time following the conquests. On the other hand, the opal ring from the Novo Brdo house, which was abandoned at the end of the 14<sup>th</sup> or at the very beginning of the 15<sup>th</sup> century, belongs to the time when Novo Brdo was a large, populous cosmopolitan city (Поповић и Симић 2020: 31–33). Given the widespread fashion of wearing rings with an oval/elliptical bezel, made of silver, the presence of a hololith ring of the same type in the late medieval societies of Serbia and Bosnia can be assumed, although material evidence of this is lacking for now. The long duration of that custom, up to the 16<sup>th</sup>–17<sup>th</sup> century, was confirmed by findings in necropolises in Hungary, one being civil (Tóth 2017), and the other military (Németh et al. 2010). While the necropolis in Pest was found to belong to the local Muslim community, burials in cemeteries next to the earthen fortification on the Fonyód-Bézsénypuszta stretch were attributed to the Balkan, partly already Islamized, population. It is known that as part of the army stationed in the area of the so-called Ottoman Hungary there were also non-Muslims, primarily the Slavic population from the Balkans, Serbia and Bosnia, then Greeks and Hungarians, i.e. the Islamized Balkan population (Hegyí 2018: 31–40, 235–267). Moreover, the number of defenders of Ottoman fortresses in Hungary who were of Balkan origin ranged from 30% to as much as 90% (Hegyí 2018: 40), which further problematizes the issue of ethnicity in the context of the custom of wearing a hololith ring.

## CONCLUDING THESESES

A ring as an object that is chosen, made or ordered to be made in a certain way, has a special meaning for the wearer. Fully visible in the place where it is worn on the finger, it "reveals" the owner, his aesthetics, beliefs and material conditions, that is, his social position and cultural background. All of the above also applies to hololith rings. In their long duration, the rings carved from one piece of gemstone remained recognisable and, it can be stated, did not suffer significant typological

changes. This has greatly contributed to various aspects of these rings remaining largely unexplained.

The study, focused on specimens from the late Middle Ages and early modern period from the Balkans, i.e. the European part of the Ottoman Empire, has brought, we believe, a new and somewhat different view of hololith rings, especially in the sphere of chronology, technology and use, i.e. wearing. The presented results can be summarised in several points:

- Contextual analysis of archaeological findings has shown the need to re-examine the previously set chronology, especially in the periods of Antiquity. According to our results, hololith rings appear in greater numbers in the period from the late 14<sup>th</sup> century to the 17<sup>th</sup> century. In other words, they appeared during the Ottoman conquests of the Balkans and lasted, practically, until the Austro-Turkish wars.
- The rings, in all likelihood, reached the mentioned parts of the Balkans and southern (Ottoman) Hungary as a finished product. However, given the availability of varieties of precious stones, including chalcedony and opal, in the mines of medieval Serbia, and especially in the area of the Lece volcanic complex, the local production of hololith rings cannot be completely ruled out.
- Uniformity, similarity of materials and consistency of applied techniques and procedures reveal the unity of the craft and the cultural circle in which the production of the hololith rings considered here took place. The vast majority of specimens are made of chalcedony, a precious stone very suitable for processing. All of them were made in the same way, with the same tools and techniques, which left identical traces: concentric grooves from drilling on the inside of the hoop, grinding with files and abrasives in the opposite direction from drilling, shaping the protrusions on the hoop by grinding using rotary discs and, in particular, grinding of the front and the back in the form of a flat surface of the facet around the inner edge of the hoop.
- Judging by the available data, a ring with all the main elements – an elongated shape of the bezel and solutions for the hoop, epaulette shoulders and a button-shaped protrusion on the bottom, are recognisable features of the Ottoman and Timurid cultural-craft circle. In the same circle, the belief in the magical and medical power of precious stones is widespread.
- The unusual appearance of hololith rings with burials according to the Muslim rite has problematized the issue of admirers of the custom of wearing such protection, not only in the earthly life but also in the other life, the afterlife. Although previous research took the view that this is an Islamized population from the Balkans, caution should be maintained in the ethnic interpretation of these findings, due, among other things, to the fact that religious prohibitions regarding burial in some cases were not respected in practice.

In addition to all the above, the study of phenomena related to hololith rings, in a way, complements the previous knowledge about Muslim-Christian cultural exchange and syncretism in the Balkans in the centuries following the Ottoman conquests (Vryonis 1975; Norris 1993: 263–268; Lowry 2003: 95–96).

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## ПРСТЕН ОД ОПАЛА ИЗ НОВОГ БРДА И ПРСТЕЊЕ ОД ЈУВЕЛИРСКОГ КАМЕЊА У ПОЗНОМ СРЕДЊЕМ ВЕКУ

### РЕЗИМЕ

Прстен резбарен из једног комада јувелирског камења (хололитно прстење, hololith rings) представља појаву дугог трајања. Због препознатљивог облика у протеклим епохама, различити аспекти његовог присуства у накиту остали су у већој мери неразјашњени. Анализа најскоријег налаза прстена, у кући 2 на Новом Брду, и студија усредсређена на примерке из раздобља касног средњег века и раног новог века са Балкана, односно из европског дела Османског царства, донеле су унеколико другачији поглед на хололитно прстење, нарочито у сегментима хронологије, технологије и употребе, тј. ношења. Контекстуална анализа археолошких налаза показала је неопходност преиспитивања раније постављене хронологије, нарочито у раздобља антике.

Према нашим резултатима, хололитно прстење се у већем броју јавља у време османских освајања у позном XIV веку, све до XVII века. У крајеве Балкана доспело је као готов производ. Међутим, с обзиром на расположивост варијетета драгог камења у рудницима средњовековне Србије, пре свега на простору Лецког вулканског комплекса, локална израда хололитног прстења не може се у потпуности искључити. Велика већина овде разматраних примерака израђена је од калцедона, сви су рађени на исти начин, истим алатом и техникама, који су оставили идентичне трагове, због чега је претпостављено јединство занатског и културног круга у којем се одвијала израда хололитног прстења.

Судећи према расположивим подацима, прстен са свим главним елементима препознатљиво је обележје османског и тимуридског културно-занатског круга. У истом кругу раширено је и веровање у магијску и медицинску моћ драгог камења, међу њима опала и карнеола (калцедона). Неуобичајена појава хололитног прстења уз сахране по муслиманском обреду проблематизовала је питање ко су били поштоваоци обичаја ношења такве заштите. Иако претходна истраживања стоје на становишту да је реч о исламизованом становништву са Балкана, у етничкој интерпретацији ових налаза потребно је задржати опрез, поред осталог и због чињенице да се религијске забране у вези с полагањем предмета у гроб, у појединим случајевима у пракси не поштују. Уз све поменуто, изучавање појава у вези с хололитним прстењем на своје-врстан начин употпуњава досадашња сазнања о муслиманско-хришћанској културној размени и синкретизму на Балкану у столећима након османских освајања.