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Editorial

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Prva številka revije SUH v letu 2022 je posvečena antičnemu steklu. Nabor člankov ni naključen, saj v letu 2022 praznujemo mednarodno leto stekla, ki ga je 18. maja 2021, na pobudo Mednarodne komisije za steklo (ICG), ICOM-Glass in Community of Glass Associations (CGA), razglasila Generalna skupščina Združenih narodov. Med več kot 1100 podporniki iz 74 držav je bila, na pobudo Fakultete za humanistične študije Univerze na Primorskem, tudi Slovenija.

Leto poudarja pomembno vlogo stekla v našem življenju in posebej izpostavlja tehnološki, znanstveni in gospodarski pomen tega pogosto spregledanega prosojnega materiala (https://iyog2022.org/). Steklo je prav tako izjemno pomemben medij v umetnosti in njegov zgodovinski razvoj je nedeljiv del tisočletnega razvoja in napredka človeštva.

Vizija mednarodnega leta stekla 2022 je praznovati preteklost, sedanjost in bodočnost tega izjemnega materiala ter slediti ciljem Agende 2030 Združenih narodov. Posebej so izpostavljeni vloga stekla v razvoju človeštva, organizacija mednarodnih znanstvenih in umetniških dogodkov, spodbujanje in širitev védenja o pomenu bogate zgodovine stekla, poudarjanje povezave med steklom, umetnostjo in kulturo, spodbujanje raziskav o steklu v izobraževalnih in raziskovalnih institucijah, industriji in širši javnosti ter seveda izgradnja in spodbujanje mednarodnih povezav.

Na pobudo slovenskih raziskovalcev antičnega in novoveškega stekla s Fakultete za humanistične študije Univerze na Primorskem, Narodnega muzeja Slovenije, Pokrajinskega muzeja Maribor in Pokrajinskega muzeja Celje, je v Sloveniji nastal projekt »Po stekleni poti/*Upon the Glass Trail*«, s katerim se je Slovenija vključila v praznovanje mednarodnega leta stekla (https://www.nms.si/si/razstave/e-razstave/11049-Po-stekleni-poti).

Trinajst slovenskih muzejev že od februarja dalje pripravlja vitrine meseca, v katerih predstavljajo izbrane steklene predmete iz svojih zbirk in depojev. Vitrine in razstave dopolnjujejo raznolika predavanja strokovnjakov in raziskovalcev stekla iz različnih muzejskih in raziskovalnih ustanov.

Fakulteta za humanistične študije se kot izobraževalna in raziskovalna institucija v ta program vključuje s konferenco, potekala bo 5. in 6. oktobra 2022 v Kopru in Ljubljani, ter s tematsko številko revije *Studia Univerzitatis Hereditati*, ki je pred nami in prinaša nabor znanstvenih prispevkov na temo raziskav antičnega stekla. V njej svoje rezultate predstavljajo mednarodno uveljavljeni raziskovalci stekla iz Bolgarije, Hrvaške, Slovenije, Velike Britanije in Severne Makedonije.

Sklop znanstvenih prispevkov obsega sedem člankov, ki prinašajo razprave na temo materialne kulture stekla v arheoloških kontekstih od prazgodovine do srednjega veka, številko pa

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zaključuje še recenzija monografije Muzeja antičnega stekla iz Zadra.

Prvi članek, ki ga je prispeval Boris Kavur, analizira steklene jagode v obliki amforiskov iz različnih arheoloških kontekstov in jih uporabi za interpretacijo širših kulturnih procesov. Odražajo namreč kompleksne družbene mreže, ki so povezovale različne svetove – od antične Makedonije do Baltika, od osrednjega Balkana do osrčja Panonske nižine. Odsevajo svojevrsten prestiž v materialni kulturi prazgodovinskih elit in dokazujejo obstoj trgovske mreže na dolge razdalje.

Naslednji članek, ki so ga pripravili Ana Franjić, Ian Freestone, Borut Križ in Petra Stipančić, prinaša pomembne novosti s področja raziskav in arheometričnih analiz prazgodovinskega stekla Dolenjske. Analizirano gradivo je obsegalo 48 poznobronastodobnih in železnodobnih jagod s prazgodovinskih grobišč Kapiteljska njiva in Mestne njive. Rezultati analiz kažejo, da je bilo steklo, uporabljeno za izdelavo jagod, uvoženo. Elementi v sledovih kažejo analogije z že opredeljenimi tipi stekla, ki izvirajo iz vzhodnega Sredozemlja. Rezultati tako dokazujejo obstoj organizirane in dobro vzdrževane trgovine na dolge razdalje med Dolenjsko in vzhodnim Sredozemljem v času železne dobe.

Tretji prispevek, izpod peresa podpisane, predstavlja izjemno najdbo v kalup pihane steklene čaše steklarja *Enniona* z območja Slovenije; gre za izdelek antičnega mojstra, ki je na svoje steklene posode, pretežno izdelane v prvi polovici 1. stoletja, napisal *Ennion me je izdelal*. Najdba izvira iz naselbinskega konteksta rimske naselbine *Romula* (Ribnica pri Brežicah), carinske in obcestne postaje, kamor so, sodeč po številnih izjemnih najdbah, prihajali tudi po naročilu narejeni stekleni izdelki z vseh strani imperija. V svetovnem merilu pomembna najdba širi poznano mrežo izdelkov sidonskega mojstra z najdišč zahodne Evrope na območje JV Alp in rimske province Panonije.

Naslednji prispevek, ki ga objavlja Zrinka Buljević, predstavlja rimski grob 6 iz Trogirja na Hrvaškem. V poznorimskem grobu, datiranem na konec 4. in v prvo polovico 5. stoletja, posebej izstopa skodelica z graviranim geometrijskim okrasom, tako zaradi okrasa kot majhnih dimenzij. Skodela, ki je okrašena po vsej površini, ima primerjave v izdelkih, ki so nastajali v steklarskih centrih Dura-Europos, Intercisa, Tanais in Köln. Avtorica članka meni, da je skodela iz Trogirja uvožena iz ene od galsko-renskih delavnic, ki so bile aktivne v 4. stoletju.

Kristina Koseva, doktorska študentka iz Bolgarije, objavlja razpravo o sklopu steklenega gradiva, ki je bilo odkrito med raziskavami leta 2012 v opuščenem vodnjaku rimskega mesta *Serdica* (Sofija) v Bolgariji. Opredeliti je bilo mogoče oblike, kot so konične čaše, svetilke, steklenič-ke in vrči, posode so bile obdelane in okrašene v toplem in ohlajenem stanju. Glede na stratigrafijo in odkrito gradivo je bil vodnjak najverjetneje opuščen in napolnjen z odpadom v teku 5. stoletja, v 6. stoletju je bil nad njim že pozidan nov objekt. Na osnovi primerjav je stekleno gradivo datirano v čas med 4. in 6. stoletjem.

Posebej zanimivo gradivo objavlja Dimitar Nikolovski, ki predstavlja majhne steklene uteži (*exagia*), katerih posamična teža ne presega 4,5 g, odkrite v antičnem mestu *Stobi* (današnja Severna Makedonija). Najdbe steklenih uteži za zlate kovance (solidi) so tesno povezane s fiskalnimi in administrativnimi reformami cesarja Anastazija, ki jih je nadaljeval Justinijan I. Uteži so bile v uporabi relativno kratek čas, približno 150 let, in sicer v 6. in prvi polovici 7. stoletja na območju Bizantinskega cesarstva. Najdbe uteži dokazujejo trgovsko in gospodarsko aktivnost mesta *Stobi* še na koncu 6. in v prvi polovici 7. stoletja.

Zadnji prispevek se posveča slikanemu steklu oziroma vitražem. Nikolina Topić predstavlja ostanke slikanega stekla in oken (kosi obarvanega stekla vseh vrst, svinčeni okvirji, mreža za okna) iz katedrale v Dubrovniku iz obdobja od sredine 14. do prve polovice 15. stoletja. Gradivo predstavlja redkost med steklenimi najdbami na Balkanu. Vitraži iz dubrovniške katedrale so bili morda delno izdelani v Dubrovniku pod zahodnoevropskim vplivom ali pa uvoženi iz zahodne Evrope. Nastali so verjetno med sredino 14.

stoletja in letom 1440 (Philip de Diversis v svoji knjigi omenja steklena okna katedrale s podobami svetnikov). Okna so bila poškodovana leta 1573, dokončno uničenje pa je povzročil potres leta 1667.

Številko zaključuje recenzija Irene Lazar, ki je vzela pod drobnogled katalog stalne postavitve Muzeja antičnega stekla v Zadru, objavljen leta 2021 (*Antičko staklo. Katalog stalnog postava Muzeja antičkog stakla u Zadru*), ki sta ga pripravila Anamarija Eterović Borzić in Berislav Štefanac.

Želimo vam prijetno branje!

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We're same colours, and we're different breeds ...
Smo iste barve in smo različnih vrst ...

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Abstract
The paper analyses amphoriskos-shaped glass beads from different archaeological contexts. As they reflect the complex social networks that connected different worlds, they can be used to interpret broader cultural processes – from ancient Macedonia to the Baltic, from the central Balkans to the heart of the Pannonian plain. Most importantly, we can use the finds to explain the concept of prestige in the analysis of material culture and to reconstruct the intercultural character of social elites, which created and sustained long-distance trade networks.
Key words: amphoriskos-shaped glass beads, long-distance trade, Early Iron Age, Late Iron Age

Izvleček
Prispevek analizira steklene jagode v obliki amforiskov iz različnih arheoloških kontekstov. Uporabljajo se za interpretacijo širših kulturnih procesov, saj odsevajo kompleksne družbene mreže, ki so povezovale različne svetove – od antične Makedonije do Baltika, od osrednjega Balkana do osrčja Panonske nižine. Najpomembneje pa je, da se najdbe lahko uporabijo za razlago koncepta prestiža v analizah materialne kulture in za rekonstrukcijo medkulturnega značaja družbenih elit, ki so ustvarile in vzdrževale trgovske mreže na dolge razdalje.
Ključne besede: steklene jagode v obliki amforiska, trgovina na dolge razdalje, starejša železna doba, mlajša železna doba

Introduction

Europe presently is, and was in the past, a continent with many interacting regions. While some aspects, such as the relationship between Mediterranean cultures and Early and Late Iron Age cultural regions, for example, have been addressed many times, other inter-regional relationships have been neglected – especially those transgressing the Early/Late Iron Age cultural and chronological borders. Particularly since numerous authors claimed that the Balkans and the Eastern Adriatic coast were just the periphery of the more developed and wealthy Greek world (especially in the 5th and 4th century BCE these were Archaea Macedonia and Syracuse on Sicily) and the contacts of these regions with their hinterlands were based on purely economic relations.

A mosaic of different prehistoric communities surrounded the Adriatic in the 4th century BCE. Each one of them possessed a limited territory and several fortified proto-urban centres controlled secondary urban agglomerations and spoke most probably a distinct language. While in the southeastern Alps and along the river Sava there were the last communities persisting in the last cultural manifestations of the Early Iron

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Age, further to the north, in the Pannonian Basin, there were the communities we describe today as the Celts. Carriers of technological and stylistic innovations broadly described as the Late Iron Age – and despite their cultural variability, they unified in numerous stylistic and technological aspects a large part of central, eastern and western Europe. The writers of antiquity, referring to these communities, used different ethnonyms in describing them. They were subtly imposing that the lack of urbanization and political organization witnessed that they still did not reach the level of civilization of the people surrounding the Mediterranean. Not reducing the arguments to the dichotomy and divisions between the civilized in the barbarians, the authors used an array of subtle gradients to introduce them into the world of antiquity. These communities entered the Mediterranean world and made their debut in history especially at the end of the 5th and beginning of 4th century BCE during the great shifts of power when ancient Macedonia and Sicilian Syracuse included them into their economic networks and colonial ambitions – in the Greek narratives they were transformed from mythological into historical neighbours. As a result, their relationships shifted from being mythological to being economic and military, especially the last narrative dominated by Celtic migrations and invasions as well as the inclusion of Celtic mercenaries in power struggles among Mediterranean centres of power.

In the last century archaeology was desperate to provide the material evidence for several processes known form history on one and to synchronize the existing archaeological data with historical sources on the other side. Of course, the tracing of prehistoric weaponry in the Mediterranean (Kavur and Blečić Kavur 2014) and of luxury bronze vessels in central and eastern Europe (Blečić Kavur and Kavur 2010) seemed the easiest solution since it was interpreted as the mobility of warriors and as flow of diplomatic gifts connecting social elites on both sides. It was a major departure from the decades-old fascination with the historical events such as the Celtic raid towards Delphi, which dominated the narrative (Schönfelder 2007; cf. Szabó 1991). Slowly the focus started to move to processes predating the historical events, economic, cultural and religious contacts linking the Mediterranean and central Europe before the age of Celtic military invasions (Verger 2003). Beside the focus on massive imports such as pottery and amphorae, as well as important items, such a bronze vessel, clearly illustrating the networks of contacts between social elites, the focus shifted towards the circulation of assumable less practical and ideologically invested items – jewellery, trinkets produced in workshops of ancient Macedonia and Great Greece. Among them the most prominent, basically due to their large numbers, wide distribution and numerous culturally different contexts of discovery, role is played by simple amphoriskos-shaped glass pendants (Rustoiu 2015; Blečić Kavur and Kavur 2016; Kavur 2019).

Perhaps the oldest known archaeological discovery, chronologically and from the literature, predating the arrival of the Eastern Celts to the southern part of the Pannonian Basin, but clearly indicating the circulation of prestigious items of material culture was unfortunately also mostly ignored. Already in 1902 published assemblage from Sremska Mitrovica, most probably the remains of a single burial, included three fibulae and two bracelets made from silver, 74 amber beads, 61 coral beads, 262 amphoriskos-shaped glass pendants, a single melon-shaped glass bead, two elongated black glass beads and, most importantly, the remains of a bronze cup (Brunšmid 1902, 80). Although fragmented, the remains could be reconstructed as a cup with everted rim, low foot and two handles. Similar finds were in the assemblages from the Athenian Agora dated to the end of the 5th century BCE (Vocotopoulou 1975, 761–764). Today, among the most important finds from this context are the amphoriskos-shaped glass beads, numerous times discussed in the scientific literature. They were discovered in numerous different cultural contexts demonstrating the en-

Figure 1: Necklace composed from glass beads from Sremska Mitrovica (photo: Boris Kavur).

tanglement of past societies today interpreted in different cultural and chronological contexts and systems.

During the last few decades, new interpretations, based on concepts of entanglement, acceptance, and rejection, have enabled modern understanding of specific items of Mediterranean material culture in prehistoric Iron Age contexts. They contributed to our understanding of the intercultural nature of the world but focused predominantly on valuables such as vessels displaying the prestigious economic status of exclu-

sively symbolic significance, such as situlae, cups, and rhyta. They were discussed presenting their typological and stylistic determination and proposing their most probable place of production – illustrating the processes of their distributions as indicators of mostly political ambitions. On the other hand, they were also describing the acculturations of indigenous elites accepting and manipulating these items.

By studying the material culture, new archaeological interpretations have altered the discourse on Mediterranean (cultural) colonialism by promoting concepts of identity and entanglement, acceptance and rejection, acquiescence, and resistance. This process significantly enriched our understanding of the intercultural character of the world in the 5th and 4th centuries BCE. Thus archaeology, for decades embedded in the historical narratives, became an even more culturally sensitive and anthropologically relevant endeavour. Modern studies focusing on culture contact (and culture redistribution) studies have transformed the archaeology of Mediterranean trade into a discipline with transdisciplinary relevance. A widespread critical consciousness about indigenous cultural practices (and material culture production and consumption) surfaced during this (fashionable) rise of multiculturalism. A leap was made from just talking about things and their physical properties to dealing with societies in terms of abstract processes of ideological manipulation with material culture.

Discussion

Many papers and authors have discussed amphoriskos-shaped glass beads in the past two decades from a variety of perspectives, but it was only recently that chemical analyses of the glass contributed to the understanding of their production and origins.

Petar Popović presented the first major publication of them, focusing on finds from the Adriatic and particularly the Central Balkan region. He identified the workshops in ancient Macedonia as the most probable places of their production and noted that despite the presence of multiple finds in Celtic graves, their production and circulation ceased with the Celtic invasion to the south (Popović 1997; Popović 2000, 274–275). On the other side, Stefania Vellani presented an overview of their presence on the western Adriatic coast and its hinterland. Demonstrating that a modest amount of such finds was known in the 4th century BCE generally in northern Italy, the most southern find came from a female burial in the hypogeum in Via Molise in Canosa di Puglia where, amongst others, 99 beads were discovered (Vellani 2000, 42–45, Fig. 1).

A few years later, Martin Schönfelder included them into a broader historical picture illuminating their distribution because of the Celtic unsuccessful raid towards Delphi. He assumed that their distribution could explain their origins in mainly Greece but perhaps even Italy (Schönfelder 2007, 308–309). Building upon the critique of his approach and new data presented, Aurel Rustoiu demonstrated a much more complex situation with numerous previously uncharted finds (Rustoiu 2008, 52–57). Later he elaborated his position by dividing their distribution into western and eastern areas, where the western one was further sub-divided into four zones (Rustoiu 2015, 367, Fig. 3). His innovative interpretation proposed that the distribution of amphoriskos-shaped glass beads should be viewed in the context of economic and intercommunity connections across wide areas and since most of them were discovered in female burials, he assumed that exogamy played an important role in their circulation (Rustoiu 2015, 370–373). Vera Bitrakova Grozdanova focusing on their southern distribution presented that Macedonian workshops developed the art of production of light transparent glass in the 4th century BCE and concluded that they were their producer (Bitrakova Grozdanova 2011, 171).

In the latest publications on the distribution of amphoriskos-shaped glass beads, Martina Blečić Kavur and Boris Kavur acknowledged the previous discussions about the Danubian

Figure 2: Necklace with two amphoriskos-shaped glass beads and a golden lion-shaped pendant from grave 150 at the necropolis Golem Grad on Lake Prespa (Bitrakova Grozdanova 2011, 168).

corridor but focused on the importance of eastern Adriatic trade routes and regional distribution centres. Based on the association between Macedonian production, the dissemination of such finds in Slovenia, and the large concentration found in central Transdanubia, they concluded that amphoriskos-shaped glass beads were the most numerous, but not the only element found along these pathways (Blečić Kavur and Kavur 2017; Kavur 2019). Such a position was accepted by Attila Horváth, who discovered more than 500 examples on the Celtic cemetery at Csepel Island in Budapest, where beside different forms of glass beads, also corals and finger rings coming from the Mediterranean were discovered in female graves (Horváth 2017).

According to the widespread distribution of amphoriskos-shaped glass beads along the Adriatic coast and southeastern Europe, we can conclude that most of them were discovered in regional settlement centres, which served as important links in chains of long-distance trade and cultural connections, acting as distribution and redistribution centres for prestige items. They were points in a network of interlinked centres of power and trade, in which the redistribution and circulation of exotic prestigious goods created individuals accentuating their status and position with the creation of a cosmopolitan fashion in which the Macedonian products played an important role.

In the necropolis of the Celtic World, those beads were discovered in female graves demonstrating a higher status of the deceased. Such assemblages were created to clearly exhibit the economic abilities of their owners to enter and perform a crucial role in the long-distance trade with prestigious items. In grave context, from Slovenia to Hungary and beyond, glass amphoriskos-shaped glass beads were discovered in graves not only displaying opulent grave inventories, such as grave number 247 from Csepel Island (Horváth 2017), but graves which displayed multiple cultural origins of the grave goods such as the grave number 37 from tumulus VII on Kapiteljska njiva in Novo mesto where in a modestly equipped female grave an amphoriskos-shaped glass bead was discovered together with a fibula of Eastern Celtic origin, regional bracelets and ankle ring as well as glass beads (Križ, Stipančić and Škedelj Petrič 2009, 318, 8.5.5, 320, 8.5.27). By creating such inventories, they substituted their expressions of identity with symbols of their status, with prestigious items acting as an intercultural composition of their attire. These burials included items originating from different sources and cultural backgrounds, indicating that these glass beads were one of the important el-

ements of "cosmopolitan fashion" consumed by individuals desiring to accentuate their social status.

A diffused distribution pattern was most probably the result of a system of gift exchanges that accelerated the flow between the vaguely geographically defined areas from which one was considered a source of prestige and power. Peer-polity interaction and competition stimulated the elites to emulate the consumption and display creating several archaeological records. Although trinkets – are hardly recognizable outside of close personal interactions, with their visual idioms, they were perceived as exotic, and their iconography and raw materials were dramatically different. Small and worn on the body they were not as dramatically exotic as bronze vessels – their semantic message was not directed to a broad audience present on feasting and/or burial rites but limited, individual and

Figure 3: Necklace composed from glass beads from Přítluky, Moravia (photo B. Kavur).

personal. They were prestigious, although they were not on public display – their recognition required personal closeness and admittance into a restricted social circle. Only members of social elites were able to understand activities involving the procurement and redistribution of them as well as the symbolically codified identity of the possessor and his or her role within the society. They mediated this information through culturally constructed activities that included the formation of obligational relations between participants in the long-distance trade networks (Blečić Kavur and Kavur 2016, 250–252). These beads were holders of information about the social connections of the owner, their relational identities and their social status or statuses in the region. Moreover, it is through the known biography of the artefacts owned, and their history of circulation that they became links between people, objects and places creating the enchainment between them (Tilley 1999; Knappett 2011). Elevated into cultural icons, enabling people to identify strongly with them and to rely on these symbols as carriers of information in their everyday lives.

Conclusion

Cosmopolitanism commenced its life as a project of participation in which commons exceeded the boundaries of their communal specificity and were aspiring to embrace the world as a shared sphere. They were not only replicating their cultural and aesthetic uniformity but organized diversity, the latter being the reflection of an increasing interconnectedness of varied local cultures. Ad it was the long-distance trade and interconnectedness of regional communities that developed cultural characteristics without a clear anchorage in any one territory, without a clear pattern of consumption. Amphoriskos-shaped glass beads were trinkets transgressing cultural boundaries, interpreted, and reinterpreted in different contexts, creating a diversity of practices of their manipulations, and a multitude of appropriations by local communities. Flowing across the cultural borders and linking central and southeastern Europe into a network connected with similar symbolic perceptions and desires for translucent prestigious jewellery. Trinkets were defined as small objects of clearly foreign origin produced from relatively inexpensive materials. They were not locally produced, and not even imitated, small enough to be worn around the neck but their details were only discernible from up close. Its' form and the material used reinforced its otherness and rendered it manifestly non-local – the object's distant origin was essential to its ontological status and meaning within the society. It was minor exotica somewhat wondrous and unusual but somewhat cheap, small but still considered prestigious (Arrington 2016, 2–3).

Despite their small size, they were considered items of prestige due to their materiality and distant origin. And prestige was the main asset in the premodern world of the 5th and 4th century BCE – not only reduced to the material manifestation in terms of artefacts but also, and even more intensively in the terms of symbolic capital which could have been converted easily in other forms of capital. The great imperial superpowers of that period, the Macedonian state on one and the Sicilian Syracuse on the other side, were increasing their prestige on the peripheries through direct and indirect promotion. A constant flow of artefacts, interpreted as symbolic, has crossed the economic and political boundaries of empires connected to world economies defined by market trade and their marginal regions where redistribution took place linked to territories embedded in subsistence economies lacking the mechanisms of wider integration.

The reception of the Mediterranean imports in prehistoric contexts remains substantially incomplete without an understanding of these prehistoric communities. The presence of imports, impeded considerations of the sites in their regional contexts as loci of cultural interactions. The places and mechanisms of origin of these items remain in the narrative as cultural fantasies, and the hinterland of the Northern Adriatic acts as an interstitial location, a "non-

place" between the Mediterranean and prehistoric times.

Within all these relations, amphoriskos-shaped glass beads served as society's foundational compass points – as anchors of meaning continually referenced in the reproduction of social relations and social roles. In addition, it was the similarity of social relations and social roles that connected different communities, basically different only due to their material culture. They were representative symbols considered worthy admirations that people accept as a shorthand to represent important ideas that were otherwise gradually diffused through oral storytelling traditions, common rituals and other means of ideological reproduction. The crux of their iconicity was that they were widely regarded as the most compelling symbol of a set of ideas or values that the societies deemed important (Holt 2004, 1–20). Ideas that actually changed along the long way of the distribution of the amphoriskos-shaped beads, demonstrating the cosmopolitanism of the prehistoric communities from the Aegean and Adriatic all the way to central-eastern Europe.

Summary

For most of the twentieth century, historiography and archaeology justified the great divide between the ancient civilizations of the Mediterranean and the cultures of prehistoric Europe. Traditionally, the contacts were interpreted as military conflicts and the archaeological finds that crossed the borders on one side, and the other, were interpreted as objects related to these rare contacts of social elites - as military booty or as diplomatic gifts.

In recent decades, especially the archaeological interpretation of the processes of cultural and economic flows and social dynamics at the places of contact has begun to change radically. Analyses of the finds and the contexts of their discoveries on both sides showed that the contacts between the Mediterranean and Europe, based primarily on economic, as well as entirely on religious processes, were a historical constant and not an exception. Above all, it was shown that the flows of individual objects passed between centres of the redistribution for which we assumed culturally completely different contexts in our archaeological constructions. Long-distance trade with objects originating from the workshops of Great Greece and Ancient Macedonia connected communities on the periphery of the Mediterranean world, and the shores of the Adriatic with communities in their hinterland and further on the continent – communities that experienced the end of the Early, or they already formed, culturally, technologically and aesthetically the beginning of the Late Iron Age. There are a number of items that mark long-distance trade, including glass pendants in the form of amphoriskos-shaped glass beads – jewellery trinkets made of monochrome blue glass and especially transparent glass, which represented the latest technological innovations of Macedonian workshops. The distribution of these objects along the Adriatic shore, through the central Balkans, and beyond the Black Sea to Pannonia enables reconstruction of the networks of contacts and, above all, the interpretations, and reinterpretations of the fashion of wearing them in different prehistoric communities. They show us the cosmopolitan spirit of the prehistoric communities of Europe – the economic relations of individuals and communities to exotic imports, their inclusion in local aesthetics and, above all, the interpretation and reinterpretation of exotic objects from the Mediterranean workshops that connected prehistoric Europe.

Povzetek

Večji del dvajsetega stoletja sta zgodovinopisje in arheologija utemeljevala veliki razkol med antičnimi civilizacijami Sredozemlja ter kulturami prazgodovinske Evrope. Tradicionalno so bili stiki interpretirani kot vojaški konflikti. Arheološke najdbe, ki pa so prehajale meje na eni in drugi strani pa so bile interpretirane kot predmeti povezanimi s temi redkimi stiki družbenih elit – kot vojaški plen oziroma kot diplomatska darila.

V zadnjih desetletjih se je predvsem arheološka interpretacija procesov kulturnih in ekonomskih tokov ter družbenih dinamik na prostorih stikov začela radikalno spreminjati. Analize najdb in kontekstov njihovih odkritij na obeh straneh so pokazale, da so predvsem ekonomski, kot tudi na popolnoma religioznih procesih utemeljeni stiki med Sredozemljem in Evropo, bili zgodovinska stalnica ter ne izjema. Predvsem pa se je poka-

zalo, da so tokovi posameznih predmetov prehajali med centri redistribucije za katere smo v naših arheoloških konstrukcijah predvidevali kulturno povsem drugačne kontekste. Pokazalo se je, da je trgovina na dolge razdalje s predmeti, ki so izvirali iz delavnic Velike Grčije in Antične Makedonije povezovala skupnosti na obrobju sredozemskega sveta in na obalah Jadrana s skupnostmi v njihovem zaledju ter dalje na celini – skupnostmi, ki so preživljale konec starejše oziroma so že kulturno, tehnološko in estetsko tvorile začetek mlajše železne dobe. Med predmeti, ki so zaznamovali trgovino na dolge razdalje moramo vsekakor izpostaviti male steklene obeske v obliki amforiskov – nakitne drobnarije iz enobarvnega modrega, predvsem pa prosojnega stekla, ki so predstavljale zadnje tehnološke inovacije makedonskih delavnic na področju steklarstva. Opazujoč njihovo distribucijo po obalah Jadrana, preko centralnega Balkana in onkraj obal Črnega morja na prostor Panonije ter dalje, lahko rekonstruiramo omrežja stikov predvsem pa interpretacije in reinterpretacije mode njihovega nošenja v različnih skupnostih prazgodovinske Evrope. Prikazujejo nam kozmopolitski duh prazgodovinskih skupnosti – ekonomske odnose posameznikov in skupnosti do eksotičnih importov, njihovo vključitev v lokalno estetiko ter predvsem interpretacijo in reinterpretacijo eksotičnih predmetov iz sredozemskih delavnic, ki so povezovali prazgodovinsko Evropo.

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The spectrometric analysis of Iron Age glass beads from Novo Mesto, Slovenia

Spektrometrične analize železnodobnih steklenih jagod iz Novega mesta, Slovenija

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Abstract
This paper presents the results of spectrometric analysis of Iron Age glass from Novo Mesto, Lower Carniola, Slovenia. Several different glass types were detected in the assemblage. The results indicate that raw glass was imported to Novo Mesto from eastern Mediterranean centres and corroborate the existence of long-distance trade during the first millennium BCE.
Key words: glass, chemical composition, provenance, Iron Age, Novo Mesto

Izvleček
Članek predstavlja rezultate spektrometričnih analiz stekla z najdišč starejše železne dobe v Novem mestu, Dolenjska, Slovenija. V izbrani skupini je bilo mogoče opredeliti več različnih tipov stekla. Rezultati kažejo, da je bilo surovo steklo v Novo mesto uvoženo iz središč vzhodnega Sredozemlja in dokazuje obstoj trgovine na dolge razdalje v času 1. tisočletja pr. n. št.
Ključne besede: steklo, kemijska sestava, izvor, železna doba, Novo mesto

Introduction

With its abundant glass bead assemblage, Novo Mesto is one of the key sites for prehistoric glass studies in Europe. No remains of glass production workshops have yet been archaeologically confirmed. However, the myriad of glass items, colour and bead type combinations, attested sand sources suitable for glassworking, and documented knowledge of pyrotechnology during the Early Iron Age (cf. Gabrovec 1987, 93, 95; Haevernick 1974, 65; Križ 2009, 103; Križ and Guštin 2015, 49-50) have suggested that local glassmaking workshops existed in Novo Mesto.

In this short paper, we present the first quantitative trace element data on the Novo Mesto glass assemblage that offers a fresh perspective on the region's prehistoric glass use and production. The project set out to define the compositional types in Novo Mesto and test the local provenance hypothesis through archaeometry.

Analysis

The analysed material consists of forty-eight Late Bronze Age to Late Iron Age (ninth– to second–century BCE) glass beads and one Late Iron Age glass bracelet from the Kapiteljska Njiva and Mestne Njive cemeteries (Figure 1). The analysis was organized by Dr Milko Novič and performed by Professor Detlef Günther at ETH Zurich, using Laser Ablation Inductively Coupled Mass Spectrometry (LA-ICP-MS).

Several compositional glass groups of different origins have been discerned (Figure 2). Only two samples are characterised by elevated magnesia and potash concentrations, which indicate plant ash was used as a flux for low-

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Figure 1: Samples of Novo Mesto glass included in this study.

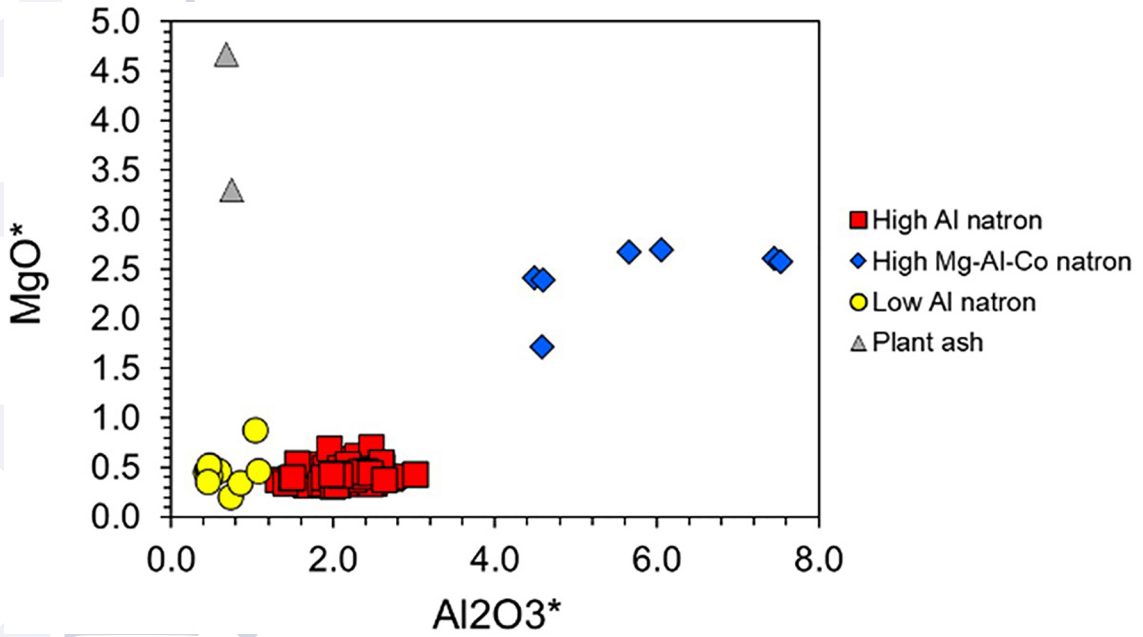

Figure 2: Main compositional types discerned in the Novo Mesto assemblage.

ering the high melting temperature of quartz (c.1710°C). The trace elements of these beads resemble those of Late Bronze Age Mesopotamian glasses from Nuzi and Tell Brak (Shortland *et al*. 2007). As this glass type is not frequent in the assemblage, it is likely an heirloom, presumably of Mesopotamian provenance, which remained in circulation.

The rest of the assemblage is characterised by low potash and magnesia concentrations, indicating that mineral natron was used as a flux. This sodium bicarbonate mineral was the prevailing flux in glasses found in the Mediterranean and Europe from the first millennium BCE well into the ninth century CE (Phelps et al. 2016; Schlick-Nolte and Werthmann 2003, 29; Shortland *et al*. 2005, 522).

These natron glasses can be further subdivided according to their alumina concentrations. As alumina enters the glass batch as an accompanying element in the silica minerals present in the sand impurities – feldspar and clay – it indicates sand origins. The occurrence of glasses with higher and lower alumina concentrations suggests at least two different sources of sand in this compositional glass type. Moreover, the differences in the amounts of zirconium and strontium further corroborate different provenance of the sands used. Zirconium is usually more abundant in inland sands, and strontium is more abundant in marine sands (Degryse *et al*. 2006, 497; Wedepohl and Baumann 2000, 129).

Glasses with lower alumina concentrations have lower strontium and higher zirconium, and most glasses with higher alumina concentrations, except for a few outliers, have lower zirconium and higher strontium concentrations. The sands used in natron glasses with higher alumina have a very similar chemical composition to Levantine sands, which were extensively used in the later, Hellenistic, and Roman glass production, and are mentioned by Pliny as a good source for glassmaking (NH 36; Eichholz 1962, 151). It appears Levantine glass was traded and produced on a larger scale before the Hellenistic period. A smaller subset of this group with elevated zirconium is possibly Egyptian in origin.

The origin of the glass with lower alumina concentrations is ambiguous. According to their trace element pattern, the earliest examples are

likely of Mesopotamian origin, while the Early and Late Iron Age low alumina glasses share similarities with Egyptian sands. Another exciting possibility is that the latter could be local Italian production: a recent study of West Mediterranean sand deposits has shown that beach sands from the northeast part of the Salentina peninsula in southern Italy would produce a glass similar to standard natron glass but with lower alumina, which corresponds with these studied examples (Brems *et al*. 2012, 2902; Brems and Degryse 2014, 117). However, there is no archaeological evidence of the glass industry in the region at this time, and more research is needed before any conclusion can be reached.

Finally, four cobalt-blue glass samples, the earliest dated beads in the studied assemblage, contain high alumina and magnesia, indicating the use of a specific colourant which is attributed to cobalt-bearing alums from the western desert of Egypt. This source was first defined by Kaczmarczyk in 1986. The trace elements of these alum-coloured glasses are affected by the contamination of the strong colourant. However, the sediment-related elements somewhat resemble Mesopotamian raw materials, which can be taken as a suggestion of their origin. This type of cobalt blue glass appears to occur widely in the tenth-eight centuries BC and has been reported from Iraq (Reade *et al*. 2005) to France (Gratuze 2009).

Regarding the colouration of the beads, opaque colours are more common than translucent ones. The most common bead colour is blue, followed by yellow, white, colourless, green, and turquoise, and the most common decoration colours are white and yellow.

Cobalt, from at least three different sources, was used as the colourant for the blue glasses. Alongside the already mentioned cobalt alum, a second cobalt source is characterised by elevated arsenic and nickel concentrations. Its signature is comparable to the European Erzgebirge Mountain range cobalt ores, as well as some Iranian cobalt sources; both were actively exploited during this period of prehistory (Gratuze 2013, 323; Walton *et al*. 2012). The third cobalt source, defined by elevated copper concentrations, is analogous to the later Roman cobalt sources (Gratuze *et al*. 2018, 5). One bead was coloured very dark blue/black with the addition of iron.

Yellow glass is coloured and opacified with lead antimonate, and white glass with calcium antimonate; these compounds are typical opacifiers and colourants of the period (Shortland 2002, 519). Only a few samples are colourless. Most of these are intentionally decolourised with antimony, and one sample is naturally translucent and contains slightly elevated Cu concentrations that suggest recycling. The turquoise glass was made by adding copper to calcium antimonate white glass, and green glass was made by adding copper to lead antimonate yellow glass. In one of the samples, cobalt is present alongside copper, indicating a possibility that a yet undocumented practice of mixing cobalt blue glass with the lead antimonate yellow glasses to achieve the desired colour. Furthermore, another distinct practice – often seen in later workshops producing Roman mosaic vessels (Freestone and Stapleton 2015, 70) – of overlaying translucent copper-blue or turquoise glass over the opaque yellow glass to achieve a green hue – was detected in two samples. This suggests that the workshop that produced the beads was not colouring the raw glass but just used the available imported materials to produce various colours.

Conclusion

In conclusion, the presented Novo Mesto data indicates that glass used for bead production was imported. The trace elements of Novo Mesto glasses show analogies to the already defined glass types provenanced to the eastern Mediterranean, and natron, a geographically restricted ingredient, is the source of soda for the most significant part of the assemblage. At present, there is not much archaeological evidence of natron being traded as a raw ingredient. The results, however, reveal the existence of organised and well-supplied long-distance glass trade between

the eastern Mediterranean and Lower Carniola during the Iron Age, asserting the strategic geographical position of the Novo Mesto settlement and its active participation in the prehistoric trade networks. Local glassworking workshops remain to be archaeologically confirmed, but the possibility that the glass was imported as ingots and worked locally is likely.

The reasons why glass was imported can only be hypothesized. It is likely due to the restricted sources of natron, suitable sand of a complimentary composition, as well as possibly the lack of specific know-how, but perhaps the intentional exclusivity and symbolic significance of the far-derived material was a choice employed to maintain the construction and display of local elite identities. Hopefully, future research will be able to provide new insights on glass use in Lower Carniola.

Summary

With its abundant glass bead assemblage, Novo Mesto is one of the key sites for prehistoric glass studies in Europe. No remains of glass production workshops have yet been archaeologically confirmed, but the myriad of glass items has suggested that local glassmaking workshops existed in Novo Mesto. This report presents the first quantitative trace element data on the Novo Mesto glass assemblage that offers a fresh perspective on prehistoric glass use and production. The analysed material consists of forty-eight Late Bronze Age to Late Iron Age glass beads and one Late Iron Age glass bracelet from the Kapiteljska Njiva and Mestne Njive cemeteries. Several compositional glass groups of different origins have been discerned. Only two samples are characterised by elevated magnesia and potash concentrations, which indicate plant ash was used as a flux, and the trace elements of these beads resemble those of Late Bronze Age Mesopotamian glasses. The rest of the assemblage is characterised by low potash and magnesia concentrations, indicating that mineral natron was used as a flux.

These natron glasses can be further subdivided according to their alumina concentrations. Cobalt, from at least three different sources, was used as the colourant for the blue glasses. The presented Novo Mesto data indicates that glass used for bead production was imported. The trace elements of Novo Mesto glasses show analogies to the already defined glass types provenanced to the eastern Mediterranean, and natron, a geographically restricted ingredient, is the source of soda for the most significant part of the assemblage. The results reveal the existence of organised and well-supplied long-distance glass trade between the eastern Mediterranean and Lower Carniola during the Iron Age, asserting the strategic geographical position of the Novo Mesto settlement and its active participation in the prehistoric trade networks.

Povzetek

Novo mesto je s svojimi bogatimi najdbami steklenih jagod eno najpomembnejših najdišč za študij prazgodovinskega stekla v Evropi. Dokazi o lokalni proizvodnji stekla še niso bili arheološko potrjeni, toda izjemna količina steklenega gradiva je spodbudila hipotezo o obstoju lokalnih steklarskih delavnic v Novem mestu. V tem članku predstavljamo prve podatke in rezultate naravoslovnih analiz stekla iz Novega mesta, ki nudijo svež pogled na uporabo in proizvodnjo prazgodovinskega stekla. Analizirano gradivo je obsegalo 48 pozno bronastodobnih in pozno železnodobnih jagod ter odlomek latenske zapestnice s prazgodovinskih grobišč Kapiteljska njiva in Mestne njive. Razločiti je bilo mogoče več skupin glede na sestavo stekla. Samo dva vzorca sta imela značilno povečano koncentracijo magnezija in sode, kar pomeni, da so kot topilo uporabili pepel morskih rastlin; elementi v sledovih pri teh jagodah so podobni kot pri steklo pozne bronaste dobe v Mezopotamiji. Ostali vzorci imajo značilno nizko koncentracijo magnezija in sode, kar kaže, da je bil za topilo uporabljen natron.

To skupino stekla je mogoče deliti dalje v podskupine glede na koncentracijo aluminija. Kot barvilo za temno modro steklo so uporabljali kobalt, ki kaže na tri različne izvore. Rezultati analiz gradiva iz Novega mesta tako kažejo, da je bilo steklo, uporabljeno za izdelavo jagod, uvoženo. Elementi v sledovih pri steklu iz Novega mesta kažejo analogije z že opredeljenimi tipi stekla, ki izvirajo iz vzhodnega Sredozemlja, natron, geografsko ozko omejena sestavina, pa je bil vir sode v pretežnem delu analiziranih vzorcev. Rezultati tako kažejo na obstoj organizirane in dobro vzdrževane trgovine na dolge raz-

dalje med Dolenjsko in vzhodnim Sredozemljem v času železne dobe; hkrati dokazujejo strateško geografsko lego Novega mesta in njegovo aktivno vlogo v širši trgovski mreži železne dobe.

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hereditati

Rimska čaša s podpisom mojstra Enniona – prva najdba, odkrita v Sloveniji

Roman beaker signed by Ennion – the first find discovered in Slovenia

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Izvleček

Na steklenih posodah lahko prepoznamo različne vrste napisov. Imena mojstrov ali lastnikov delavnic so najbolj znana na v kalup pihanih izdelkih, različne znake in okrajšave imen pa najdemo tudi na prostopihanem posodju. Vsi ti podatki nam omogočajo zbrati številne podatke o imenih mojstrov in njihovem izvoru, lokalnih delavnicah, razprostranjenosti njihovih izdelkov itd. Članek predstavlja novo najdbo enoročajne čaše, pihane v kalup, ki nosi podpis mojstra Enniona. Gre za prvo tovrstno najdbo v Sloveniji (*Romula, Pannonia*). Enoročajna čaša iz rumenkastega stekla ima ohranjen napis v kvadratnem okvirju, izpisan v grščini. Primerjamo jo lahko s sorodnimi najdbami iz Italije in nedavno odkritimi najdbami iz Dalmacije na Hrvaškem.

Ključne besede: rimsko steklo, pihanje v kalup, napisi na steklu, *Ennion, Romula*

Abstract

Glass vessels constitute a source of inscriptions of various types and groups. The names of artisans or workshop owners, for example, are known from mould-blown vessels and even more so from the base marks on free-blown vessels that appear in great numbers. They allow us to gain important information on the local workshops and the distribution of their products, on the names of the glass-blowers and their social or national origin. The article presents the first find of a mould-blown beaker signed by Ennion from Slovenia (*Romula*, *Pannonia*). On the one-handled beaker is preserved an inscription in a square frame in Greek. The find can be compared with similar finds from Italy and the latest finds discovered in Dalmatia in Croatia.

Key words: Roman glass, mould-blowing, inscriptions, *Ennion, Romula*

Uvod

Na steklenih posodah lahko med analizo zasledimo, ne glede na tehniko ali čas izdelave, tudi različne vrste napisov. Izdelke z napisi lahko delimo v dve večji skupini, vezani na način njihove izdelave. V prvo skupino sodi posodje, izdelano s pihanjem v kalup, v drugo pa prosto pihani izdelki, ki imajo na dnu odtise, nastale v enodelnih odprtih kalupih (Nenna, Foy, 2006; Lazar 2006, 245). Naš interes bo tokrat usmerjen predvsem k prvi skupini.

Med izkopavanji rimske naselbine *Romula* (Ribnica pri Brežicah), ki je ležala ob glavni rimski cesti *Emona–Neviodunum–Siscia* v Panoniji (Lazar 2020, 387), je bila v skupini kakovostnega uvoženega posodja odkrita tudi čaša iz rumenkasto obarvanega stekla, pihana v kalup. Delno ohranjena čaša z rastlinskim okrasom ima na ostenju kvadraten napis v grščini, na osnovi katerega smo jo lahko opredelili kot izdelek rimskega steklarskega mojstra Enniona (Lazar 2004; 2021, 150). Gre za prvo najdbo iz te skupine iz-

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delkov v Sloveniji in na širšem območju JV Alp, zato si zasluži nekaj več pozornosti.

Razprava

Na številnih izdelkih 1. stoletja, ki so nastali s pihanjem v večdelne kalupe, zasledimo imena mojstrov ali morda lastnikov delavnic, ki z napisom neposredno sporočajo, kdo je posodo izdelal. V tej skupini najdemo najzgodnejše izdelke, ki so nastali s tehniko pihanja v kalup in jih časovno lahko umestimo od začetka do druge tretjine 1. stoletja. Pihanje v kalup se je razvilo šele po odkritju prostega pihanja stekla, saj rokovanje s steklarsko pipo ob pihanju v kalup zahteva posebno spretnost in izkušnje steklopihača.

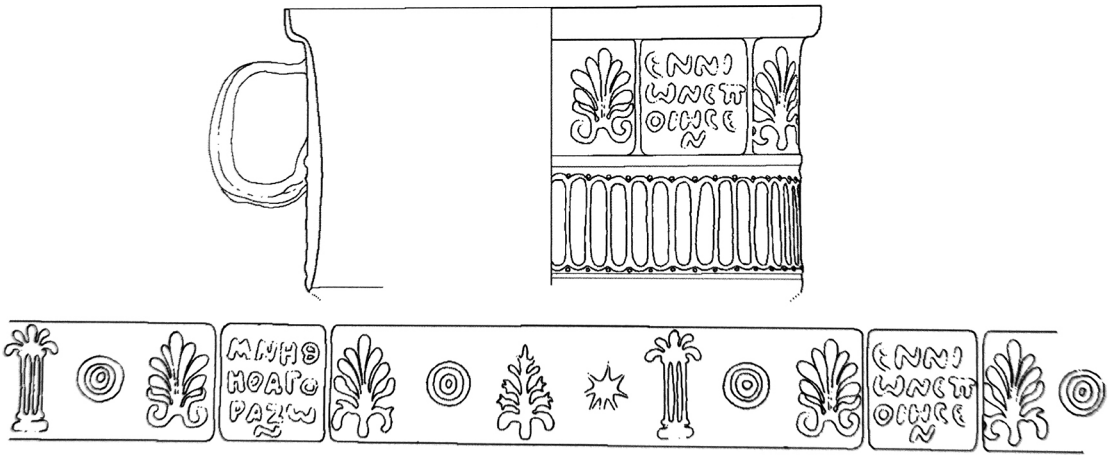
Napisi na izdelkih, pihanih v kalup, govorijo o mojstrih in spretnih rokodelcih, ki so izdelovali te bogato okrašene in odlično narejene izdelke in so z zapisom svojega imena želeli izpostaviti svoje mojstrstvo v steklarski obrti, kakovost natančno izdelanih okrasov in kalupov ter s tem posredno tudi svoj umetniški talent (Stern 2010, 25). Razprostranjenost teh skupin izdelkov ali tudi posamičnih najdb nam omogoča slediti trgovske povezave in mreže posameznih delavnic in njihovih mojstrov, obsežne trgovske poti v steklarski obrti, ki so vodile z vzhoda na zahod in z juga na sever, in s tem tudi izjemno hiter razvoj in širitev novo odkritih steklarskih tehnik v teku 1. stoletja.

Po drugi strani tudi vemo, da je proizvodni proces pihanja v kalup nekoliko zahtevnejši, zato ti izdelki niso najcenejši in tako na voljo povsod in na vsakem tržišču; gre za posodje višjega kakovostnega razreda, ki je bilo lahko tudi delano po naročilu in željah posameznega odjemalca. Najdbe teh posod v grobnih ali naselbinskih kontekstih tako govore tudi o družbenem statusu njihovega lastnika oz. kupca in posredno sporočajo o obstoju bogatejšega sloja posameznikov v mestu ali naselju, ki si je lahko privoščil izdelke višjega kakovostnega razreda. Večinoma je šlo za namizno posodje, s katerim so želeli narediti vtis na svoje goste, včasih pa tudi za spominke, s katerimi so privrženci ali podporniki spodbujali svoje izbrance na javnih prireditvah v areni, cirkusu ali še kje (Foy, Fontaine 2010, 87).

Primer slednjega je npr. najdba iz Emone, odlomek cirkuške čaše z upodobitvijo kvadrige (Petru 1980, 445, sl. 1). Čaše z imeni zmagovalcev ali tekmovalcev na različnih športnih dogodkih so navadno imenovane cirkuške čaše ali gladiatorske čaše. Z njimi so npr. spodbujali udeležence gladiatorskih bojev v arenah ali tekmovalce v dirkah z vozovi v cirkusu, najdemo jih razprostranjene po vsem zahodnem delu imperija. Najdba čaše iz naravno obarvanega stekla iz emonske insule je žal preveč skromno ohranjena, zato na njej ne moremo prebrati napisa na frizu, kot jih npr. poznamo s podobnih čaš (*Vale Cresces* ali *Vale Pinius* = Naj živi *Cresces* oz. Naj živi *Pinius*). Žal tudi ne vemo, ali je bila ta čaša namenjena tekmovalcu iz Emone ali pa je bila sem prinesena kot spominek. Vemo pa, da so imena nekaterih tekmovalcev, ki se pojavljajo na teh čašah, ohranjena tudi v antičnih virih (npr. Svetonij, Kasij Dion; Stern 1995, 60) in nam tako na neposreden način povezujejo arheološke najdbe z rimskim vsakdanom.

Med imeni mojstrov, ki jih lahko preberemo na izdelkih 1. stoletja, brez dvoma najbolj izstopa ime steklarja oz. mojstra Enniona, ki je na svoje izdelke v grščini zapisal, kdo jih je izdelal. V široki skupini v kalup pihanih izdelkov njegovo delo izstopa zaradi natančnosti, jasnega oblikovanja in kakovostnega okrasa, ki je iskalo vzore v istočasnih izdelkih rimske torevtike. Njegovo delo je bilo inovativno in tehnično dovršeno (Stern 1995, 69; Lehrer 1979; Harden 1935). Zadnji pregled njegovih do sedaj poznanih oz. odkritih izdelkov (v celoti in delno ohranjene posode) z območja rimskega imperija, med katerimi najdemo čaše, vrče, amfore in stekleničke, se je ustavil pri številki 55 (Lightfoot 2015, 39). Zato ne presenča, da je vsaka nova najdba z njegovim podpisom vredna dodatne pozornosti; še posebej pa, če gre za območje imperija, kjer njegovi izdelki še niso bili odkriti, kot je npr. najdba iz Ribnice na Dolenjskem (*Romula,* Panonija).

Še vedno pa kljub pozornosti, ki so je deležni ti izdelki rimskega steklarstva, ostaja od-



Slika 1: Risba plašča čaše iz Narone (Vid pri Metkoviću, Hrvaška) z ohranjenima napisoma v kvadratnem okvirju (po Buljević 2012).

prto vprašanje o identiteti, vlogi in aktivnostih tega antičnega umetnika, ki se je na svoje izdelke podpisal, da bi zbudil pozornost svojega časa in se nam hkrati zapisal v zgodovino. Razen imena vemo o njem zelo malo. Njegovo ime ni grško ali rimsko in ga redko srečamo na ohranjenih napisih (Lightfoot 2015, 17). Najprej so raziskovalci menili, da gre za Egipčana iz Aleksandrije, že dolgo pa je uveljavljeno mnenje, da naj bi izviral iz Fenicije oz. natančneje iz mesta Sidon (Lehrer 1979, 5; Stern 1995, 69).

Drugo pomembno vprašanje je, kaj točno je Ennion delal. Njegovo ime, ki se pojavlja na izdelkih v kvadratnem okvirju ali tabuli ansati, spremlja grški glagol izdelal, naredil, oblikoval (sl. 1; Buljević 2012, 18; 2015, 62). Bil je torej neposredno povezan s proizvodnjo, vprašanje pa je, ali je bil lastnik delavnice, mojster ali le eden od steklopihačev. Če sklepamo po analogijah v proizvodnji fine namizne keramike oz. tere sigilate, je bil lahko eno in drugo (Lightfoot 2015, 18; Hayes 1997, 41, 52).

Bolj zahtevno pa je vprašanje, kje točno je Ennion delal oz. osnoval svojo delavnico. Glede na najdbe in tradicijo razvoja novih steklarskih tehnik je bilo dolgo uveljavljeno mnenje, da je bila njegova delavnica na začetku oz. v prvih desetletjih 1. stoletja osnovana v Sidonu. Številne nove najdbe, posebej v zahodnih provincah imperija in v Italiji, pa so spodbudile nadaljnje hipoteze, in sicer da je svojo delavnico iz Sidona preselil v Italijo oz. natančneje v Adrio (De Bellis 2004; 2010, 44). Številni to idejo zavračajo in opozarjajo, da so ta vprašanja veliko bolj kompleksna; lahko bi npr. v Italijo pošiljali le kalupe, razmišljamo lahko tudi o potujočih mojstrih; sicer pa zaenkrat ni arheoloških dokazov oz. delavnic za proizvodnjo stekla ne v Sidonu ne v Adrii (Lightfoot 2015, 20).

Tudi razprostranjenost njegovih izdelkov ne pomaga najti odgovora glede lokacije njegove proizvodnje. Res je, da je s številom najdenih čaš dolgo prevladovala severna Italija, vendar so se nove najdbe nato pojavile še v Španiji, Grčiji in Franciji (McClellan 1983, 76; Lightfoot 2015, 19, Fig. 4). Novejša odkritja z območja sosednje Hrvaške (najmanj 11 odlomkov čaš, najdenih v Dalmaciji – Narona, Tilurij in Burnum; Buljević 2015, 61), in ne nazadnje tudi najdba iz Slovenije, pa so pozornost spet preusmerila drugam in odprla so se nova vprašanja.

Odlomek ostenja čaše iz Ribnice (sl. 2; pr. ostenja 12,5 cm, PN 4596, S 889) je pripadal enoročajni čaši in je bil izdelan iz prosojnega, nežno rumeno obarvanega stekla (Lazar 2004, 53, fig. 17; 2005b, 40). Na ostenju so ohranjeni ostanki pritrditve ročaja. Rastlinski okras na posodi sestavljajo stebri, palmete, koncentrični krogi in del

Slika 2: Odlomek enoročajne čaše mojstra Enniona, *Romula* (risba Anđelka Fortuna Saje).

zvezde. Po primerjavah ga lahko opredelimo kot bližnjevzhodni slog okrasa, kot sta ga je opredelila Lehrer in Lightfoot (Lightfoot 2015, 36, fig. 26; Lehrer 1979, Pl. VI: 2). V osrednjem delu je v kvadratnem okvirju ohranjen napis v grščini ΜΝΗΘΗ ΟΑΓΟ ΡΑΖΩΝ (*mnesthe ho agorazon* – Naj se ohrani ime kupca). Drugi napis, ki je bil na teh čašah postavljen na drugi strani ostenja ΕΝΝΙ / ΩΝΕΠ / ΟΙΗCΕ Ν (Ennion me je izdelal) in ga smemo predvideti na osnovi primerjav s podobnimi izdelki, v našem primeru žal ni ohranjen.

Ohranjeni napis raziskovalci interpretirajo na več načinov; vsekakor pa pomen, naj ime kupca tega izdelka ostane v spominu oz. se ohrani, daje blagoslov kupcu oz. uporabniku posode in ga lahko razumemo tudi kot neke vrste napitnico pri uporabi te čaše. Na drugi strani pa je mogoče tudi povezati oba napisa v celoto in ju razložiti nekoliko drugače, kot sporočilo »Naj si kupec zapomni, da me je izdelal Ennion!« (Lightfoot 2015, 29).

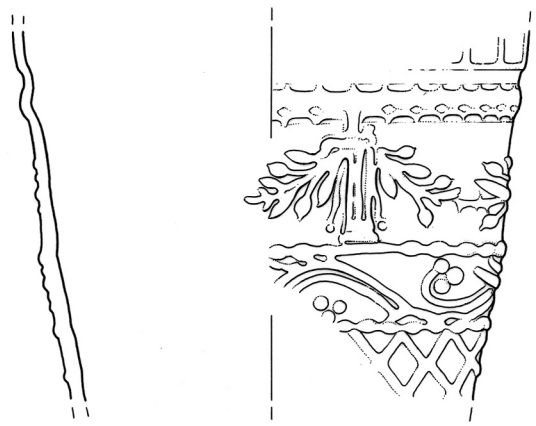
Na čaši iz Romule ohranjeni napis lahko skupaj z okrasom opredelimo kot tip J glede na izdelano tipologijo poznanih napisov (Lightfoot 2015, 28). Primerjave najdbi iz Ribnice, glede na napis in okras, najdemo na odlomku čaše iz zelenkastega stekla, ki je bil najden v Soluntu (*Soluntum* / Solanto) v Italiji (hrani jo Regionalni arheološki muzej A. Sallinas v Palermu na Siciliji; De Bellis 2004, 129–133, figs. 6, 8), in tudi v dvoročajni čaši iz zbirke The Shlomo Moussaieff Collection (Lightfoot 2015, 92). Obe omenjeni čaši sta bili pihani v kalup z enakim vzorcem oz. okrasom kot čaša iz Romule, kajti okras, napis v okvirju in ostali detajli so popolnoma enaki (De Bellis 2004, 134).

To lahko potrdimo še posebej s primerjavo položaja črk in napisa v okvirju ΜΝΕ… / ΟΑΓΟΡ / ΑΖΩΝ; opazimo lahko, da je črka ‚N' postavljena nad črko ‹Ω› (ω) v tretji vrstici in ne v četrti (sl. 2), kakor npr. pri ostalih čašah iz te skupine, na primer na čaši iz Narone na Hrvaškem (Buljević 2015, 61, fig. 50: 1). To kaže, da je

obstajala razlika v posamičnih kalupih za isti tip čaše in da je seveda obstajalo več kalupov. Do teh malih razlik je lahko prišlo pri obnovi oz. izdelavi novih kalupov.

Časovno so enoročajne Ennionove čaše umeščene v drugo četrtino 1. stoletja. Redke najdbe iz datiranih kontekstov se pojavljajo v poznotiberijskih in klavdijskih plasteh (Lightfoot 2015, 26; Price 1991, 65). Najdba iz Romule sodi v kontekst bogatega sklopa steklenih najdb od druge četrtine do konca 1. stoletja (Lazar 2021, 50).

Novejše najdbe dokazujejo, da so bili Ennionovi izdelki široko zastopani po vsem zahodnem delu imperija, razen v Italiji jih najdemo še v Španiji, Grčiji in Franciji (McClellan 1983, 76; Lihgtfoot 2015, 12-13; Buljević 2015). Široko razprostranjenosti njegovih izdelkov po evropskih provincah imperija pa sedaj dopolnjujejo tudi številne najdbe s Hrvaške (Buljević 2004, 188; 2012; 2015, 61, figs. 50, 51) in opisana najdba iz Slovenije.



Slika 3: Odlomek v kalup pihane čaše z rastlinskim okrasom, Romula (risba Anđelka Fortuna Saje).

Za konec velja omeniti še en odlomek v kalup pihane čaše z istega najdišča, ki ima soroden rastlinski okras kot Ennionovi izdelki (sl. 3). Gre za del ostenja konične čaše, izdelane iz rahlo modrikastega, naravno obarvanega stekla visoke kakovosti. Na ostenju ni sledov napisa, okras pa kaže številne sorodnosti z izdelki, ki jih je podpisal *Ennion* in tudi ostali po imenu znani rimski mojstri. Vidni so štirje pasovi okrasa, ki so ločeni s horizontalnimi linijami biserov oz. majhnih pik. Dva pasova z rastlinskim okrasom kažeta v spodnjem delu elemente dionizičnega sloga okrasa, ki ga prepoznamo tudi na dvoročajnih Ennionovih čašah (Lightfoot 2015, 36, Fig. 27). Zgornji pas okrasa je sestavljen iz stebrov z girlandami. Odlomek zaključujejo pokončne kanelure na zgornjem delu in mrežast vzorec na spodnjem delu čaše, okras, ki ga prepoznamo na izdelkih, ki sta jih lahko podpisala tako Ennion kot Aristeas.

Sklep

Vsaka nova najdba s podpisom Enniona je vredna dodatne pozornosti; še posebej, če gre za območje imperija, kjer njegovi izdelki še niso bili odkriti. Razprostranjenost njegovih izdelkov, poleg najdišč zahodne Evrope s poudarkom na severni Italiji, so v zadnjih nekaj letih dopolnile nove najdbe

Slika 4: Ennionova čaša iz Ribnice pri Brežicah (*Romula*), Slovenija (foto Tomaž Lauko).

iz Dalmacije v sosednji Hrvaški (Buljević 2012; 2015) in predstavljena čaša iz Slovenije.

Skupino obravnavanih izdelkov, ki so zaradi svoje priljubljenosti postali nadregionalni in prisotni v številnih delih rimskega imperija, druži še ena podrobnost; v skoraj vseh primerih gre za namizno posodje visoke kakovosti, ki je bilo izjemno cenjeno in je že samo po sebi lahko predstavljalo statusni simbol (Stern 1995, 94). Sodeč po najdbah in priljubljenosti v kalup pihanih izdelkov s podpisi rimskih mojstrov lah-

ko zaključimo, da je bil njihov namen ne le praktičen, ampak so z njimi želeli tudi poudariti vtis izobraženosti in kulture lastnika, ki je posodo postavil na mizo.

Summary

Glass vessels, in addition to other sources, provide various sorts of inscriptions. The various types of mould-blown vessels from the 1st century AD give the names of the artisans or workshop owners, expressly stating and proving the maker of the object. This group is formed by early products, predominantly from the 1st century, that were made by mould-blowing.

The names of Roman glass masters are preserved on their products, including one indeed known best, ENNION. He worked in the Near East, with his workshops probably operating in Sidon. His products include jugs, amphoras, small angular bottles and several types of beakers. Within the group of mould-blown products, his work stands out due to its precision and clear design, modelled on the contemporary products of Roman toreutics. It was innovative and technically refined.

Recent finds in Europe prove that, apart from Italy, his products were also distributed in Spain, Greece, France, Croatia and Slovenia. As for the latter, the site of Ribnica near Brežice yielded new finds of imported mould-blown beakers.

A partly preserved one-handled beaker signed by Ennion discovered in 2003was made from yellowish glass. The decoration consists of pillars, palmettos, concentric circles and a part of a star (?) and can be defined as a Near Eastern style of decoration. In the centre, inside a square frame, there is the inscription in Greek MNHΘH OAΓO PAZΩN (mnesthe ho agorazon – Let the buyer be remembered!). The second inscription panel ENNI / ΩNEΠ / OIHCE N (Ennion made me), which we can presuppose based on the analogies, is not preserved.

The preserved inscription allows comparing this beaker with a beaker found in Soluntum (Solanto), Italy and with a beaker from The Shlomo Moussaieff Collection. These one-handled beakers were blown into a mould with the same pattern as the one from Ribnica since the decoration, the inscription within the square frame, and other details are identical.

Chronologically, one-handled beakers belong to the second quarter of the 1st century. The rare finds from dated contexts occur in late Tiberian or Claudian strata.

Povzetek

Na steklenih posodah lahko v teku analize zasledimo, ne glede na tehniko ali čas izdelave, tudi različne vrste napisov. Na številnih izdelkih 1. stoletja, ki so nastali s pihanjem v večdelne kalupe, beremo imena mojstrov ali morda lastnikov delavnic, ki z napisom neposredno sporočajo, kdo je posodo izdelal.

Med imeni rimskih mojstrov, ki so se ohranila na njihovih izdelkih, najdemo tudi ime Enniona, ki je brez dvoma najbolj poznan med vsemi. Deloval je na Bližnjem vzhodu, njegova delavnica je bila najverjetneje locirana v Sidonu. Med njegovimi izdelki najdemo vrče, amfore, majhne stekleničke in več vrst čaš. V skupini v kalup pihanih izdelkov njegovo delo posebej izstopa zaradi natančnosti in jasnega dizajna, ki se je vzoroval pri sočasnih izdelkih rimske torevtike. Bil je inovativen in tehnično dovršen.

Novejše najdbe širom Evrope kažejo, da so bili njegovi izdelki razširjeni ne samo v Italiji, ampak tudi v Španiji, Grčiji, Franciji, na Hrvaškem in v Sloveniji. Članek se posveča prav najdbi iz Slovenije, iz Ribnice pri Brežicah, kjer je bila odkrita prva najdbe te vrste.

Deloma ohranjena enoročajna čaša iz rumenkasto obarvanega stekla s podpisom Enniona je bila odkrita leta 2003. Okras sestavljajo stebri, palmete, koncentrični krogi in del zvezde ter ga lahko opredelimo kot bližnjevzhodni slog okrasa. V osrednjem delu je znotraj kvadratnega okvirja napis v grščini MNHΘH OAΓO PAZΩN (*mnesthe ho agorazon* – Naj se ohrani ime kupca). Napis na drugi strani, kot ga poznamo iz primerjav (ENNI / ΩNEΠ / OIHCE N (Ennion me je izdelal), pa ni ohranjen. Na osnovi ohranjenega napisa lahko čašo primerjamo z najdbo iz Solunta v Italiji in čašo iz zbirke The Shlomo Moussaieff Collection. Vse tri enoročajne čaše so bile pihane v enak kalup, saj so okras, napis in razporeditev črk v okvirju ter druge podrobnosti povsem enaki.

Kronološko lahko enoročajne čaše umestimo v drugo četrtino 1. stoletja. Redke najdbe iz datiranih kontekstov se pojavljajo v plasteh poznotiberijskega in klavdijskega obdobja.

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Grave 6 from Trogir's Dobrić necropolis
Grob 6 z nekropole Dobrić v Trogirju

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Abstract
This paper covers the finds dated to Late Antiquity from grave 6 in the Roman necropolis in Trogir's Dobrić section, which was partially excavated in the 1980s. A portion of the goods from this sporadically excavated necropolis are held in the Archaeological Museum in Split. Documentation is lacking. However, in the case of three items, there is confirmation that they are from grave 6, and they have been dated to the period from the latter half of the 4th to the first half of the 5th century: a ceramic oil-lamp, a glass bottle, and a glass bowl. The small glass bowl with engraved decoration is particularly interesting. It stands out among similar bowls in terms of its decoration and small dimensions.
Key words: Roman grave, Trogir, Dobrić, glass, bottle, small bowl, oil-lamp

Izvleček
Članek predstavlja poznoantične najdbe iz groba 6 z rimske nekropole Trogir-Dobrić, ki je bila deloma raziskana v osemdesetih letih. Del najdb te sporadično raziskane nekropole hrani Arheološki muzej v Splitu. Kljub pomanjkljivi dokumentaciji je mogoče opredeliti najdbe iz groba 6, ki so datirane na konec 4. in v prvo polovico 5. stoletja: oljenka, steklena skodelica in steklenička. Posebej zanimiva je skodelica z graviranim okrasom, saj izstopa tako zaradi okrasa kot majhnih dimenzij.
Ključne besede: rimski grob, Trogir, Dobrić, steklo, steklenica, skodelica, oljenka

Introduction

Several Roman graves with goods in urns and under tegulae were found in the Dobrić section of Trogir in 1948. Trogir's honorary conservator, Mirko Slade-Šilović sent written notification thereof to the Archaeological Museum in Split (AMS). AMS staff examined several more excavated graves at the same site in 1980 and then 1982 (Duplančić 2017, 217, note 42). Some of the goods from this sporadically excavated necropolis are held in the AMS, although documentation is lacking. However, in the case of three items, there is confirmation that they are from grave 6, examined in 1982: a ceramic oil-lamp, a glass bottle and a glass bowl.

The finds

The small glass bowl with engraved decoration is particularly interesting. The bowl (cat. no. 1, figs. 1 and 2) belongs to a type of hemispherical bowl with a convex, truncated rim, made of free-blown glass with a complex, engraved geometric decoration.

Their rims may be convexly everted, sometimes flat, with a flat or gently rounded base. The engraving of geometric designs in compositions arranged along horizontal bands cover the entire surface of the bowls, leaving little empty space.

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Figure 1: Hemispherical bowl (Archaeological Museum in Split, inv. no. AMS-4 1272, photo: Tonći Seser).

Such bowls with facets in bands, made of colourless, sometimes green-tinted glass, were frequent in the north-western provinces (Foy *et al*. 2018, 109, IN 107), but they were found throughout the Roman Empire. Among similar bowls, the Trogir example further stands out due to its small dimensions[1] and lack of faceted circular or oval patterns, which distinguishes it from most similar examples, even those with more intricate geometric decorations (Foy *et al*. 2018, 109, IN 107). An analogy to the cross-hatched decoration in the band can be seen on a shard from Saalburg (Fremersdorf 1967, 85, P. 8. 3) and the shards from Dura-Europos (Clairmont 1963, 72-73, III B 2 g, cat. no. 273, 274, P. VII. 273, XXVII. 273) which are comparable to the Trier deep hemispherical bowl on which there is a cross-hatched decoration in arcades (Goethert-Polaschek 1977, form 49a, cat. no. 182, P. 38. 182; Clairmont 1963, 72-73, III B 2 g, P. XXXVIII. 5208). Such a decoration in the band can also be observed on three bowls from the Corning Museum (Whitehouse 1997, cat. no. 448, 449, 460), on shards from Milan (Uboldi 2017, 185-186, fig. 2. 4, 5) and on a shard from Genoa (Paolucci 1997, 142). The cross-hatched decoration is generaly composed into bands of rhombuses and so forth (Sánchez de Prado 2018, 264, fig. 172. 9; Foy *et al*. 2018, 109, IN 107, no. 1, 2, 5, 6; Uboldi 2017, fig. 2. 2; Smith 2014, cat. no. 67, fig. 173f; Arveiller-Dulong and Nenna 2005, 321, cat. no. 932; Price and Cottam 1998, 116, fig. 47b; Whitehouse 1997, cat. no. 447, 451; Rütti 1991, P. 59. 1322, 1323, 1324, P. 61. 1338, 1339; Goethert-Polaschek 1977, form 49a, fig. 19. 207; Fremersdorf 1967, 81, 83-87, 95, P. 57, 60, 61, 62, 63, 65, 66, 85; Elbern 1966, fig. 1-4).

The closest analogy to the radially engraved bottom of the Trogir bowl can be seen on the bowl from Mainz, dated to the 4th century (Caron 1997, 28-30, cat. no. 6, fig. 28-32). I have not found a decoration analogous to the arcaded, triangular composition on the central band of the Trogir bowl.

Bowls with simple faceted band decorations, generally circular or oval, were produced in a minimum of four workshop centres. However, prevailing circumstances compelled the halt of their production in Dura-Europos, Inter-

1 Foy *et al*. 2018, 109, IN 107: the small Gallic bowls are 5.5 to 10 cm high with mouth diameters ranging from 8 to 13 cm; Price and Cottam 1998, 115-117; Cool and Price 1995, 76-79, 218-220, Facet-cut cups and other facet-cut fragments, cat. no. 412-425, fig. 13.5, 13.6: the British examples are 7 to 12 cm high, with mouth diameters of 8 to 12 cm.

Figure 2: Hemispherical bowl, detail of the decoration (Archaeological Museum in Split, inv. no. AMS-4 1272, photo: Tonći Seser).

cisa and Tanais in roughly the mid-3rd century, but not in Cologne, where it continued during the 4th century with more intricate decorative designs (Foy *et al*. 2018, 107-108, IN 106; Antonaras 2017, 61, 174-175, type 12.ii.a.2.; Weinberg and Stern 2009, 94-96, Zone Facet Cutting; Stern 2001, 137). I believe that the Trogir bowl is a western import, probably from one of the Gallic Rhineland workshops of the 4th century, with the caveat that recent analysis indicates Rome as one of the primary production centres (Uboldi 2017, 185). In the Roman province of Dalmatia, few vessels were found with engraved facets and intricate geometric decorations; similar examples are known from Komini, near Pljevlja (Cermanović-Kuzmanović 1971, 297, P. I. 3), Stolac (Paškvalin 1976, 118, grave good, 4th c., cat. no. 37, P. VIII. 3), Narona (Buljević 2004, cat. no. 24), Salona (Kirigin 1984, 127-128, form VIII. 2, cat. no. 46),[2] Asseria (Kirigin 1984, 127, form VIII. 2, cat. no. 43, 2nd c.), from an unknown Dalmatian site (Kirigin 1984, 127-128, form VIII. 2, cat. no. 47, 4th c.), and a possible shard from Polače on the island of Mljet (Kovačić 2017, 16, fig. 4).

The bottle (cat. no. 2, fig. 3) belongs to a type with a gently concave bottom, ribbed spherical body, cylindrical neck with funnel-shaped mouth and no handles, in use throughout the Roman Empire from the late 3rd to the first half of the 5th century AD (Antonaras 2017, 99-100, type 51b; Gallo et al. 2012, 356, P. 1. 11; Arveiller-Dulong and Nenna 2005, 359, cat. no. 1056; Mandruzzato and Marcante 2005, cat. no. 128; Israeli 2003, 164, cat. no. 177; Sternini 2001, 30, cat. no. 156; Barkóczi 1996, 91-92, cat. no. 285, 286, P. XXIV, LXIII. 285, 286; Kunina 1997, cat. no. 173, 174; Auth 1976, cat. no. 152; Baluta 1978, 103, fig. 2. 13).

They were made by pattern blowing, but there are some in a smooth variant, free-blown (Antonaras 2017, 99-100, tip 51a; Dalmatia: unknown site: Buljević 1994, 259, cat. no. 4; Solin: Bralić and Šuta 2018, 33-34, Grave 4, inv. no. 4960, 4970; Perović 2015, 322, fig. 2; Buljević 1994, 259, cat. no. 3; Kaštel Sućurac: Kamenjarin 2014, 13, 56-58, 64, Grave 28.7-12, Grave 32.1c; Fadić 1994b, 2, fig. 1; Kijevo: Fadić and Babić 2011, cat. no. 30; Split: Zglav-Martinac 2010, 184,

2 A decoration similar to this one was observed on a Salonitan shard: Buljević 2019, 92, cat. no. 58.

Figure 3: Spherical bottle (Archaeological Museum in Split, inv. no. AMS-4130-1, photo: Tonći Seser).

fig. 6, 8; Buljević 2010, 178, Grave 23, P. 18, fig. 69; DeMaine 1979, P. 7. A. R 22; Resnik: Fadić 1994a, 159, fig. 3; Trogir – Dobrić: Donelli 1992.). The Cypriot bottles with pinched ribs (Lightfoot 2017, cat. no. 204; Vessberg 1952, 133, AIIα, P. VII. 16) are similar. Such smooth bottles are the most numerous vessel type of Late Antiquity in the Archaeological Museum in Split, mostly from Solin (Salona) and adjacent areas.[3] Their number and lower-quality craftsmanship indicate the possibility that they were made in Salona, all the more so since they have been dated to the period when a glass-making workshop was operating there (Auth 1975, 147). Pattern blowing is a technique for decorating and shaping an item by first blowing the glass into a patterned mould (Rumyantseva and Belikov 2017, 258, fig. 3), in which the decoration is formed, and then, once the final shape is obtained, it is largely finished by free blowing, which modifies the decoration (Stern 2001, 27). The ribbed pattern is vertical or curved. In Dalmatia, there are four such bottles from Solin (Damevski 1976, 66, P. XIII. 4; Buljević 1994, 259, cat. no. 5, 6; Perović 2015, 322, fig. 2, first on lower left, Smiljanovac site), one Salonitan (Buljević 2019, 94, cat. no.

3 Besides published examples (Buljević 2010, 178, Grave 23, P. 18, fig. 69; Buljević 1994, 259, cat. no. 3 and 4), the Archaeological Museum in Split also holds thirty-six more such bottles: one from Lokva Rogoznica (inv. no. AMS-41479), one from Kamen (inv. no. AMS-42589), nineteen from Solin (inv. no. AMS-G-67, AMS-G-69; AMS-G-70, AMS-G-78, AMS-G-382, AMS-G-383, AMS-G-384, AMS-G-385, AMS-G-389, AMS-G-808, AMS-G-843, AMS-G-921, AMS-G-931, AMS-G-982, AMS-G-1093, AMS-G-1244, AMS-G-1304 (Rižinice), AMS-G-1315, AMS-G-1345), two from Mravinci (inv. no. AMS-G-1786, AMS-G-1787), one from Klis (AMS-G-1346), one from Stobreč (Epetium) (AMS-G-936), three from Muć (Andetrium) (inv. no. AMS-G-1075, AMS-G-1788, AMS-G-1909), two from Žrnovnica (inv. no. AMS-G-1031, AMS-G-1029), two from an unknown Dalmatian site (inv. no. AMS-42586, AMS-64603); and four more of these bottles that thus far do not have invoice numbers: one from Kamen and three from an unknown Dalmatian site, of which two may correspond to the Salonitan bottles inventoried under numbers AMS-G-68 and AMS-G-1182.

Figure 4: African oil-lamp (Archaeological Museum in Split, inv. no. AMS-4 1230, photo: Tonći Seser).

95), one shard from Split (DeMaine 1979, Diocletian's Palace, P. 7. A. R 23), seven bottles from Kaštel Sućurac (Bralić and Šuta 2018, 38, 40-41, Grave 7, inv. no. 4966, inv. no. 4963, Grave 9, inv. no. 4962, 4961; Kamenjarin 2014, 36-37, 82, Krtine site, Grave 14.10, Grave 47.2; Fadić 1994b, 2, Gojača site, fig. 2), one from Kaštel Lukšić (Žaja 2020, 186, Grave 4, P. 8. 1), one bottle from an unknown site (Buljević 1994, 259, cat. no. 7), possible bottles from Bakar (Volcera), Zadar (Iader), Makarska (Muccrum) (Damevski 1976, 66), a possible shard from Srima (Fadić 2005, cat. no. 9), and others.[4]

The oil-lamp (cat. no. 3, figs. 4 and 5) belongs among the African oil-lamps of Late Antiquity. Their name indicates their workshop origin: the main centre for oil-lamp production in the northern African provinces in the Roman era and later, in the area of what is today Tunisia (Hayes 1980, 63).

These are oil-lamps with an oblong or oval body and discus, with a nozzle and channel that extend from the fuel chamber, without any clear division between them. The handles, generally unpierced, are vertical and vertically grooved. The bottoms are gently concave and bordered by grooves, which extend in a decorative pattern toward the handle. The discus is smooth or adorned with a motif, generally a Christogram, seashell, rosette or geometric design. The decorative repertoire of the shoulder was similarly limited to plant or purely ornamental motifs. The division into four sub-types, A, B, C and D, is based on the shape of the shoulder: the shoulder of types A and B is convex, but the type A shoulder is decorated with stylized palm fronds, while type B features tendrils in relief; the handle on type B is pierced as a rule; the shoulder on type C is flat, while on type D it is not separated from the discus (Anselmino and Pavolini 1981, 192-198). The Trogir oil-lamp belongs to Atlante form VIII, type A1c, with convex shoulder adorned with stylized palm fronds, an open channel, a central rosette around the pouring and air hole (Anselmino and Pavolini 1981, 194, CLVII. 2).

This type was produced in Tunisia (Bussière 2007, 30, type 10 – 4.1.1.1.2.3; Bonifay 2004, 359, type 44), distributed throughout the Mediterranean and up to the Rhine/Danube border zone and to Portugal, and dated from the latter half of the 4th through the entire 5th century (Anselmino and Pavolini 1981, 195, 196), the latter of the 4th to the early 5th century (Hayes 1972, 310-313, 313, type IB; Hayes 1980, 63, 66, cat. no. 281, North African lamps, Hayes type

4 Six more unpublished bottles are held in the Archaeological Museum in Split: five with vertical ribs, of which three are from Solin (inv. no. AMS-G-72, AMS-G-380, AMS-G-1896), and two from an unidentified Dalmatian site (inv. no. AMS-42525, one without inv. no.) and one, thus far without an inv. no., with notably curved ribs, from an unidentified Dalmatian site; the neck has not been preserved, so it may belong to a similar type with a funnel-shaped neck.

Figure 5: African oil-lamp, bottom (Archaeological Museum in Split, inv. no. AMS-4 1230, photo: Tonći Seser).

I, Pohl type 2, P. 34. 281) and the latter half of the 4th to the first half of the 5th century (Bussière 2007, 30, type 10 – 4.1.1.1.2.3; Bonifay 2004, 359, type 44); due to this wide distribution, they are also called Mediterranean oil-lamps, and also Early Christian due to the Christian motifs on them (Vučić 2009, 10, 13, note 23-24, 37; Bubić 2012, 119, note 2, 3).

Such Dalmatian oil-lamps with six-petal rosettes are known from Šolta (Bubić 2012, 120, cat. no. 34, 35, P. IV. 34, 35), from Diocletian's Palace in Split (Dvoržak Schrunk 1979, 92-94, cat. no. 12) and, with an eight-petal rosette, from Dračevac near Zadar (Vučić 2009, 17, cat. no. 1; Vučić and Giunio, 2009, 9, 11, cat. no. 105).

Catalogue

1. Hemispheric bowl, inv. no. AMS-41272

Material: transparent greenish-tinted glass, shaped by free blowing and decorated by shallow engraving; tiny air bubbles are visible; shattered when photographed, reassembled with adhesive.

Description: The rim of the deep hemispherical bowl is slightly convexly everted and truncated straight; the unworked, small bottom is gently concave. It is decorated with imprecisely engraved lines in three horizontal bands: intermittent horizontal lines are etched along the rim, below which there is a band with a cross-hatched engraved decoration; below another band with horizontally etched lines there is a band with irregular, asymmetric arcades and a triangular decoration that form multiple short horizontal and diagonal lines, or rice-like facets; below engraved irregular horizontal lines there is a band with an engraved cross-hatched decoration which is separated by a shallow horizontal line from the bottom with engraved radial lines.

Dimensions: ht. 3.2 cm, dia. 5.5 cm, wall thickness 0.2 cm.

Dating of type: 3rd-4th c.

Typology: Foy *et al*. 2018, 109, IN 107; Antonaras 2017, 60-62, type 12.ii.a.3; Lazar 2003, 83-84, 2.6.2., fig. 30; Harter 1999, 70-72, form B15b, cat. no. 320-361; Price, Cottam 1998, 115-117, Hemispherical/deep convex bowl with facet-cutting, fig. 47; Whitehouse 1997, 223, 6. Third-Century and Later Objects with Geometric Decoration; Rütti 1991, AR 60.1B; Goethert-Polaschek 1977, form 49a, P. 38. 182; Clairmont 1963, 72-73, III B 2 g, cat. no. 273, 274, P. VII. 273, XXVII. 273; Isings 1957, 114-116, form 96b1.

2. Spherical bottle, inv. no. AMS-41301

Material: transparent light green glass shaped by pattern blowing into a mould; many air bubbles in the walls.

Description: bottle preserved in several pieces: a part of the mouth to the shoulder has been assembled from several shards. Body is partly preserved in two pieces assembled from two or more shards and two unconnected shards, bottom partially preserved in three reassembled shards. Cylindrical neck narrows toward the funnel-shaped mouth with a rounded edge. Spherical body is decorated with curved ribs from the articulated shoulder probably to the bottom. Bottom is gently concave.

Dimensions: ht. of upper section 10.05 cm, dia. of mouth 7.5 cm.

Dating of type: late 3rd c. – first half of 5th c. AD

Typology: Antonaras 2017, 99-100, type 51b; Dévai 2016, 263, fig. 4, Pa1.2b; Lazar 2003, 141-142, 6.2.3., fig. 41; Harter 1999, 147-148, form G27b, cat. no. 1050-1051; Ružić 1994, 14-15, I/4b, cat. no. 54, 61, 63, P. V. 2, 6; Rütti 1991, AR 148; Šaranović-Svetek 1986, 23, VI.3, cat. no. 91, 92, P. X. 5; Isings 1957, 119-120, form 101.

3. African oil-lamp, inv. no. AMS-41230

Material: ceramic without preserved slip, colour: 2.5 YR 7/8 reddish orange.

Description: entirely preserved oil-lamp with open channel. Traces of charring on nozzle, channel and part of shoulder. Discus oval, concave with pouring and air hole in middle, separated from shoulder with bent articulation that continues to end of channel. Discus and shoulder decorated in relief. Discus has six-petal rosette around pouring and air hole. Stylized palm frond motif on shoulder. Handle full (unpierced), flat with vertical groove. Bottom gently concave. Central vertical incision from edge of bottom toward handle, which on both sides has two short vertical and two opposing diagonal incisions with rounded ends along edge of bottom.

Dimensions: ht. 5.3 cm, lng. 11.86 cm, wid. 7.8 cm.

Dating of type: latter half of 4th c. – first half of 5th c.

Typology: Bussière 10 – 4.1.1.1.2.3: Bussière 2007, 30; Bonifay 44: Bonifay 2004, 359; Atlante form VIII, A1c: Anselmino, Pavolini 1981, 192-198; Hayes IB: Hayes 1972, 310-313: Pohl 2d: Pohl 1962; Broneer type XXXI: Broneer 1930, 118-119.

Conclusion

Several Roman graves with goods in urns and under tegulae were found in the Dobrić section of Trogir in 1948. AMS staff examined several more excavated graves at the same site in 1980 and then 1982. Some of the goods are held in the AMS, although documentation is lacking. However, in the case of three items, there is confirmation that they are from grave 6, examined in 1982: a ceramic oil-lamp, a glass bottle and a glass bowl.

The small glass bowl with convex, truncated rim made of free-blown greenish glass and featuring engraved geometric decorations arranged in horizontal bands over the vessel's entire surface is particularly interesting (cat. no. 1, fig. 1, 2). It stands out among similar bowls in terms of its decoration and small dimensions. An analogous example could not be found. There are analogies to the cross-hatched decoration on bowls from Dura-Europos (Clairmont 1963, 72-73, III B 2 g, cat. no. 273, 274, P. VII. 273, XXVII. 273), in the Corning Museum (Whitehouse 1997, cat. no. 448, 449, 460) in Milan (Uboldi 2017, 185-186, fig. 2. 4, 5) and Genoa (Paolucci 1997, 142). The closest analogy to the radially engraved bottom of the Trogir bowl can be seen on the bottom of the bowl from Mainz (Caron 1997, 28-30, cat. no. 6, fig. 28-32). Bowls with simple faceted band decorations, generally circular or oval, were produced in a minimum of four workshop centres. Prevailing circumstances compelled the halt of

their production in Dura-Europos, Intercisa and Tanais in roughly the mid-3rd century, but not in Cologne, where it continued during the 4th century with more intricate decorative designs (Weinberg and Stern 2009, 94-96). I believe that the Trogir bowl is a western import, probably from one of the Gallic Rhineland workshops of the 4th century.

The bottle (cat. no. 2, fig. 3) belongs to a type with a gently concave bottom, ribbed spherical body, cylindrical neck with funnel-shaped mouth and no handles, in use throughout the Roman Empire from the late 3rd to the first half of the 5th century AD, a well-represented type in Dalmatia, mostly in Salona and adjacent areas.

The oil-lamp (cat. no. 3, fig. 4, 5) belongs among the African oil-lamps of Late Antiquity with an oval body and discus, a nozzle and channel that extend from the fuel chamber, without any clear division between them. Their name indicates their workshop origin. More narrowly, it belongs to a widely distributed type having a convex shoulder decorated with a stylized palmette frond motif, an open channel, a central rosette around the pouring and air hole, dated from the latter half of the 4th through the first half of the 5th century. Given this, Grave 6 at the Dobrić necropolis in Trogir has been dated from the latter half of the 4th through the first half of the 5th century.

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Summary

Several Roman graves were found in the Dobrić section of Trogir in 1948. AMS staff examined several more excavated graves at the same site in 1980 and then 1982. Some of the goods are held in the AMS. The documentation is lacking but in the case of three items, there is confirmation that they are from grave 6, excavated in 1982: a ceramic oil-lamp, a glass bottle and a glass bowl. The bowl with convex, truncated rim made of free-blown greenish glass and featuring engraved geometric decorations arranged in horizontal bands over the vessel's entire surface is particularly interesting. There are analogies to the cross-hatched decoration on bowls from Dura-Europos, in the Corning Museum and Genoa. The closest analogy to the radially engraved bottom of the Trogir bowl can be seen on the bottom of the bowl from Mainz. Bowls with simple faceted band decorations were produced in a minimum of four workshop centres, in Dura-Europos, Intercisa, Tanais and Cologne. The author believes that the Trogir bowl is a western import, probably from one of the Gallic Rhineland workshops of the 4th century. The bottle belongs to a type with a gently concave bottom, ribbed spherical body, cylindrical neck with funnel-shaped mouth, in use throughout the Roman Empire from the late 3rd to the first half of the 5th century AD. The oil-lamp belongs among the African oil-lamps dated from the latter half of the 4th through the first half of the 5th century. The grave 6 at the Dobrić necropolis in Trogir can be dated from the latter half of the 4th through the first half of the 5th century.

Povzetek

Leta 1948 so na območju Dobrića v Trogirju odkrili več rimskih grobov. Ekipa Arheološkega muzeja Split je na istem najdišču leta 1980 in nato leta 1982 raziskala še več grobov. Del gradiva hrani Arheološki muzej Split. Dokumentacija je pomanjkljiva, a vseeno je bilo mogoče potrditi, da keramična oljenka, steklenička in steklena skodelica pripadajo grobu 6, odkritem leta 1982. Posebej zanimiva je pihana skodela iz zelenkastega stekla, z ravno odrezanim in rahlo navzven nagnjenim ustjem in graviranim geometrijskim okrasom, ki je v vodoravnih trakovih razporejen po vsej površini ostenja. Primerjave za soroden okras najdemo na skodelah z najdišč Dura-Europos, Genova in v Muzeju stekla Corning. Najbližjo primerjavo za radialno gravirano dno skodele iz Trogirja pa najdemo na dnu skodele iz Mainza. Skodele s preprostim okrasom v trakovih so izdelovali v delavnicah najmanj štirih centrov, Dura-Europos, Intercisa, Tanais in Köln. Avtorica članka meni, da je skodela iz Trogirja uvožena iz ene od galsko-renskih delavnic, ki so delovale v 4. stoletju. Steklenička z rahlo vboklim dnom, narebrenim kroglastim ostenjem, cilindričnim vratom in lijakasto oblikovanim ustjem sodi med obli-

ke, ki so bile razširjene po vsem rimskem imperiju od poznega 3 do prve polovice 5 stoletja. Afriški tip oljenke iz groba pa je opredeljen na konec druge polovice 4. stoletja in prvo polovico 5 stoletja. Grob 6 iz nekropole Dobrić v Trogirju lahko na osnovi tega časovno umestimo konec druge polovice 4. stoletja in v prvo polovico 5 stoletja.

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Late antique glass assemblage from *Serdica*
Poznoantično stekleno gradivo iz Serdike

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Abstract
An assemblage of more than thirty individual glass vessels was found inside a water well during the 2012 archaeological research of the Western Gate of Serdica site in present day Sofia, Bulgaria. Conical and hemispherical vessels, lamps and jugs/flasks are among the identified shapes. The finds illustrate different finishing and decorating (both hot- and cold-working) techniques. The well went out of use and was filled with debris in the course of the 5th century. Based on the listed parallels, the glass finds could be dated between the 4th and the 6th centuries. Such relatively long time span could owe to the not entirely certain initial period of using the facility as a dump site and also to the attested building activities in the area during the 6th century, which might have disrupted the deposit's stratigraphy.
Keywords: Serdica, Late Antiquity, glass assemblage, lamps, hemispherical bowls

Izvleček
Skupina več kot trideset posamičnih steklenih posod je bila odkrita v vodnjaku, ki je bil raziskan leta 2012 ob zahodnih vratih rimskega mesta *Serdica,* današnja Sofija v Bolgariji. Med gradivom so bile prepoznane oblike kot so konične in polkroglaste posode, svetilke in stekleničke oz. vrči, ki so bile obdelane in okrašene v toplem in ohlajenem stanju. Vodnjak je bil opuščen in zapolnjen z odpadom v teku 5. stoletja. Na osnovi primerjav lahko stekleno posodje datiramo v čas med 4. in 6. stoletjem. Relativno širok časovni razpon je posledica nepoznavanja začetnega datuma odlaganja odpadkov in tudi dokumentirane gradbene aktivnosti v 6. stoletju, ki je morda poškodovala stratigrafijo najdišča.
Ključne besede: *Serdica,* pozna antika, stekleno gradivo, svetilke, polkroglaste skodele

Introduction

The archaeological research at the Western Gate of Serdica, present-day Sofia, Bulgaria, was carried out in two separate campaigns, the first between 1974 and 1980 and the second in 2011 – 2014 (Borisova-Katsarova and Barfonchovska 2018). As a result, a significant amount of new archaeological data regarding the town's Roman and Early Byzantine fortifications and urban structure has been acquired.

A considerable number of glass fragments were discovered in an abandoned well, more than 3 m deep, excavated during the 2012 archaeological campaign within the studied area (Fig. 1). According to the stratigraphic situation, it is assumed that it went out of use and was filled with debris most likely in the 5th century. Fragments of more than thirty individual glass vessels were identified, along with window glass, two entirely preserved ceramic jugs, pottery sherds and animal bones (Dr Borisova-Katsarova, pers. comm.). This contribution aims to pres-

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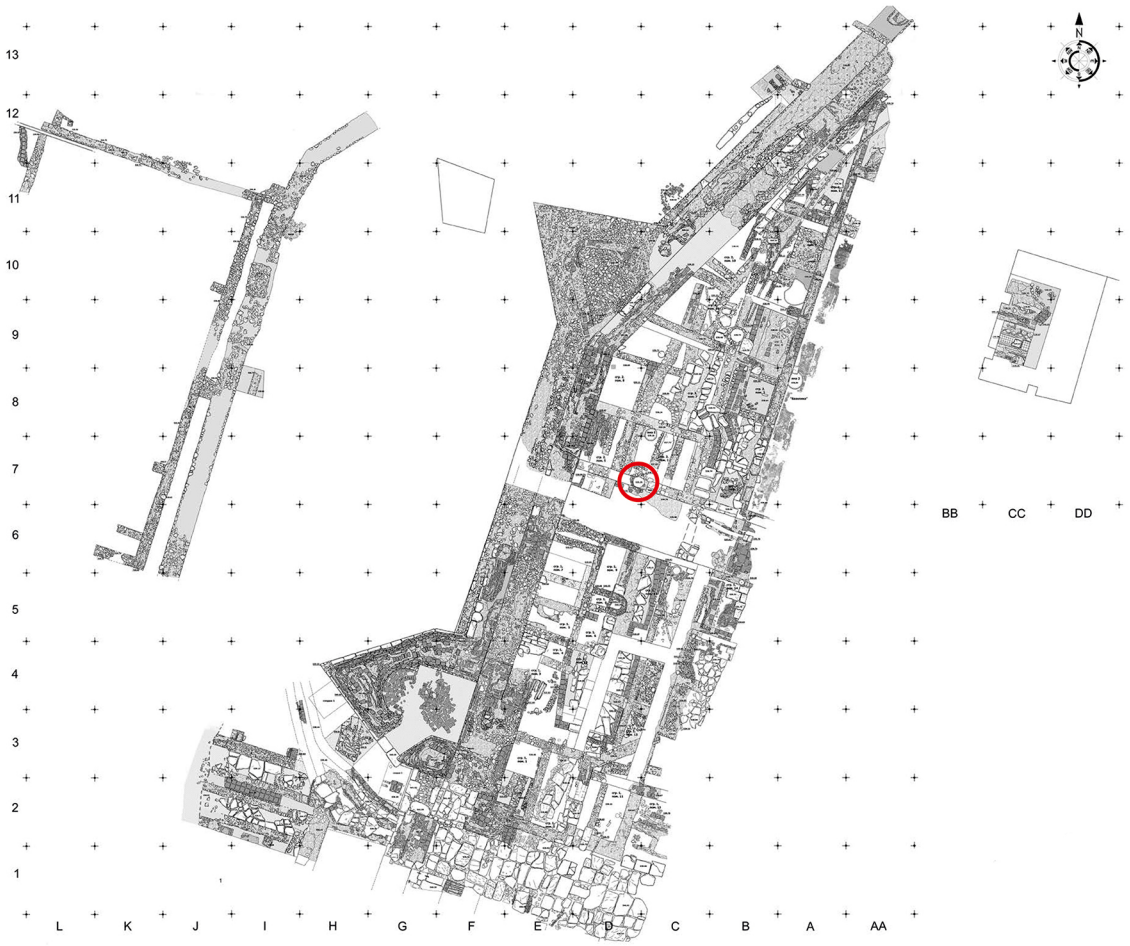

Figure 1: General plan of "The Western Gate of Serdica" site with the exact location of the well highlighted in red (after Borisova-Katsarova and Barfonchovska 2018, modified by the author).

ent the assemblage and, at the same time, illustrate some of the commonly used glass vessel shapes during the late antique period in Serdica.

The glass assemblage

All of the vessels are free-blown. The material's quality varies from clear gas bubbles and impurities with a shiny surface to bubbly, with rough surface and weathering. The range of colours is typical for the period - light blue, light green, yellow-green and nearly colourless with slight yellow or green tint (Table I). The decoration is rarely attested, but when present, it is made using both techniques: hot-working – in the form of applied self-coloured, dark blue or dark green glass trails, and on one occasion, cold-working – abraded/engraved geometric motifs. The finds will be presented in several groups, according to their morphology and, when possible to be determined, their function.

Conical vessels

Most of the finds are included in this group (Fig. 2; Table I.1-32). The reconstruction of three vessel profiles (Fig. 2.1-3) made it easier for the rest of the fragments (both rims and bases) to be more surely assigned to it (Fig. 2; Table I.1-32). Although morphologically, these glass finds are comparable to Isings form 106b1 (Isings 1957,

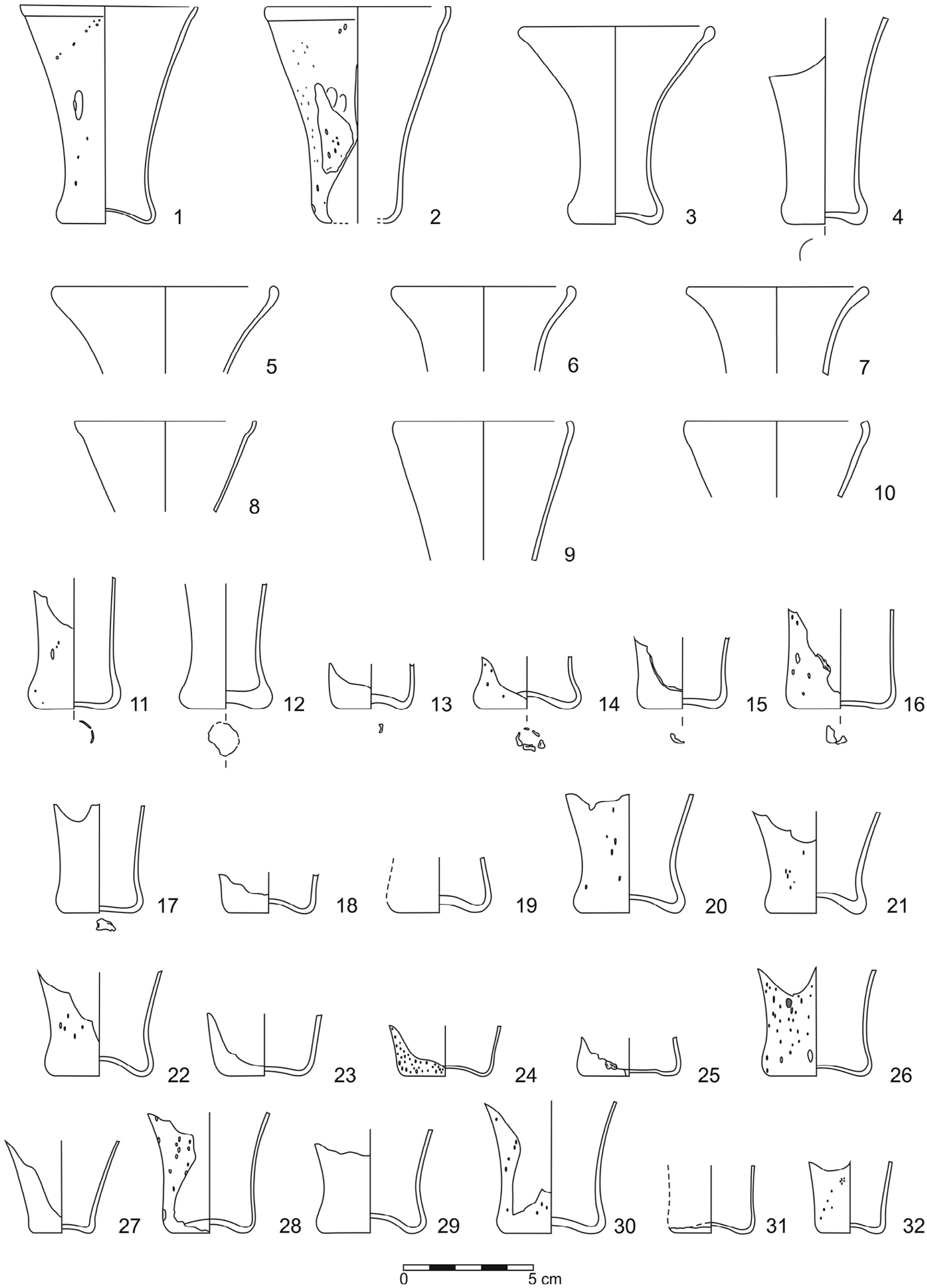

Figure 2: Group of conical vessels (drawings by the author).

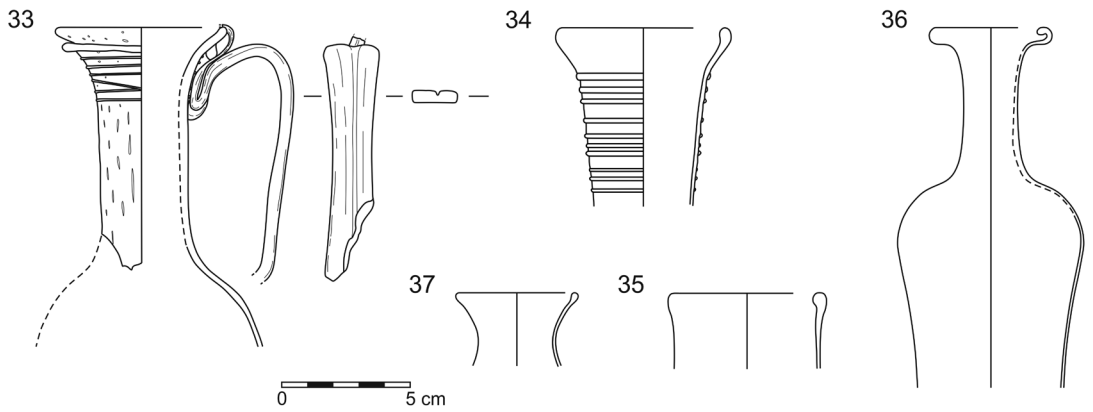

Figure 3. Group of jugs/flasks (drawings by the author).

127), some distinctive features should be pointed out.

According to the techniques of vessel finishing, the finds could be divided in two subgroups. The first one comprises one nearly complete vessel (Fig. 2.3; Table I.3), along with several rim fragments with fire-rounded edges[1] (Fig. 2.5-7; Table I.5-7) and bases with marks on the underside (Fig. 2.4, 11-19; Table I.4, 11-19) that certainly indicate the use of pontil for their manufacture. The reconstructed shape has a plain, slightly concave (sometimes nearly flat) base with a constriction of the walls, just above the bottom, cylindrical lower and conical upper body parts, with out-turned or slightly in-turned rim (Fig. 2.3-7, 11-19).

The second subgroup consists of two nearly complete vessels (Fig. 2.1-2; Table I.1-2), several cracked-off rim fragments (Fig. 2.8-10; Table I.8-10) and plain concave bases (Fig. 2.20-32; Table I.20-32), all suggesting that pontil was not involved in the manufacturing process. Characteristic of the reconstructed shape are the out-turned or slightly in-turned rims, almost straight sides with slight, less distinctive constriction of the walls above the base and more or less pronounced widening towards the rim (Fig. 2.8-10, 20-32). In addition, the particular concave profile of some of the bases could be explained using a former (Jennings 2006, 118–119).

Jugs and flasks

This group comprises five vessels (Fig. 3; Table I.33-37). One of them is a jug with a double ribbed handle, a plain flaring rim with a rounded edge and a decoration of self-coloured glass trail in relief, applied just below the edge (Fig. 3.33; Table I.33). The rest of the finds (Fig. 3.34-37; Table I.34-37) could be collectively referred to as flasks. None of them carries any scars of missing handles on the preserved parts of their bodies, and only one (Fig. 3.34) has a self-coloured glass trail in relief applied under the rim, similarly to the already described jug (Fig. 3.33).

Lamps

Five vessels could be surely assigned to the present group (Fig. 4; Table I.38-42). The first one is identified as a lamp with the base knob, although in this particular case, the knob is missing (Fig. 4.38). A feature worth noting is the pontil scar at the lower part of the preserved glass piece, just above the pointed base.

Three fragments from different parts of the body most certainly belong to a single vessel, according to the characteristics of the glass. A form reconstruction represents a hemispherical cup

1 Although the study includes a selected number of rim fragments (both fire-rounded and cracked-off), assigned to the conical vessels, the examples illustrate the variety of the group in terms of finishing and morphological characteristics.

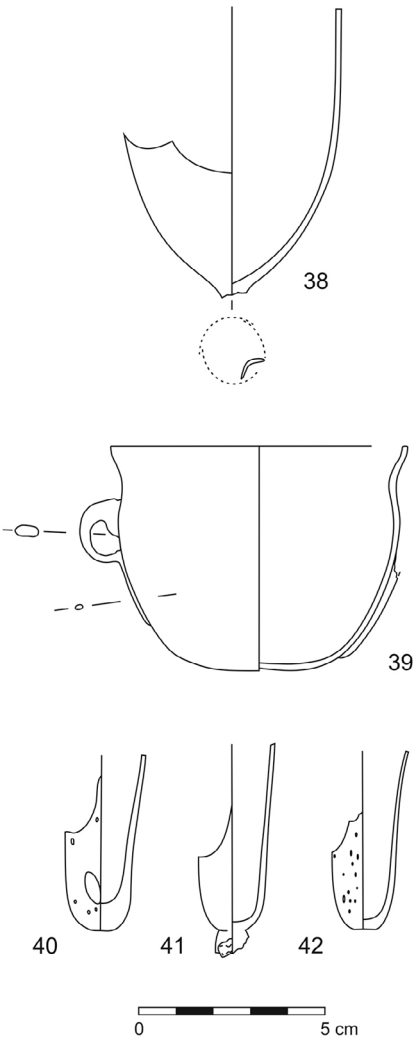

Figure 4: Group of lamps (drawings by the author).

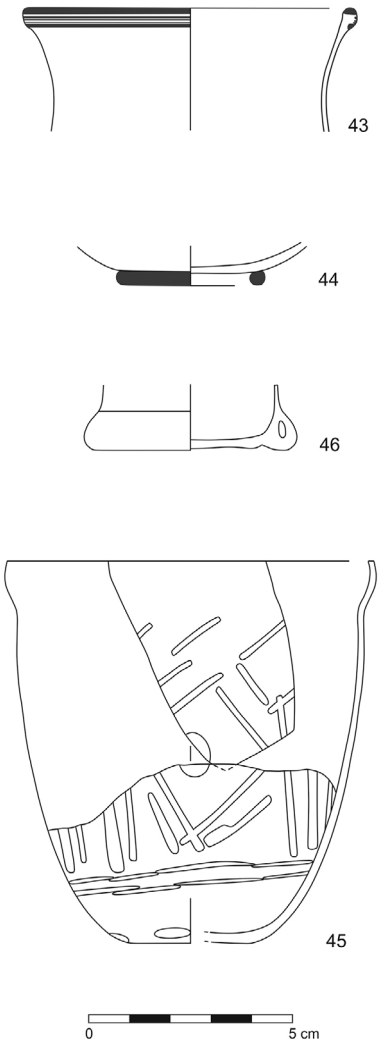

Figure 5: *Varia* Group (drawings by the author).

with three vertical suspension handles applied to its body (Fig. 4.39; Table I.39).

The last examples included here are lamps with tubular bases or stemmed lamps (Fig. 4.40-42; Table I.40-42). All three base fragments have marks of pontil attachment, including unremoved glass (Fig. 4.41), indicating that the vessels had fire-rounded rims. Unfortunately, none of the preserved rim fragments from the assemblage could be related to this particular form (Olczak 1995, 51, typ II; Băjenaru, Bâltâc 2000-2001, Pl. I-III, 497–499; Cholakova, Rehren and Freestone 2016, Fig. 2, 627).

Varia

The remaining finds (Fig. 5.43-46; Table I. 43-47) – sherds of four vessels and a window pane fragment, are presented here as they cannot be certainly attributed to either of the other groups.

Two rim fragments have a fire-rounded rim with dark blue trails applied on edge and below it, marvered into the wall (Fig. 5.43; Table I.43). Although the preserved parts cannot give enough evidence for the complete reconstruction of the shape, they most likely belong to the same vessel (a beaker or a lamp).

The use of coloured glass is attested on another fragment – base with an applied ring of dark green glass and no traces of pontil on the glass surface, probably from a cup/beaker (Fig. 5.44; Table I.44).

The assemblage also includes four fragments – two cracked-off rims, a partially preserved, slightly concave, nearly flat base, and a wall sherd, that even though not joining, certainly belong to a single vessel and allow identification of the shape – Isings 96/107 (Isings 1957, 114–116, 133). It stands out with its abraded/freehand engraved decoration arranged in horizontal bands of geometric motifs (Fig. 5.45; Table I.45).

A fragment of a tubular base ring (formed together with the body) is also included in the present group (Fig. 5.46; Table I.46). Its size and plausible reconstruction make it comparable to form Isings 109a/c (Isings 1957, 136–138).

The last find (Table I.47), also the only one of its kind from the assemblage, is a windowpane fragment with preserved part of one of the edges (not illustrated).

Discussion

The identified vessel forms of the Serdica glass assemblage have their close analogies discovered at different archaeological sites. The conical vessels (Fig. 2) find similarities in published examples from Nicopolis and Istrum (Shepherd 1999, Fig. 11.16, nos. 555–562, 349–350), "Gradishteto" near Dichin (Cholakova 2009, cat. nos. 68, 69, 274, tabl. IX/10, 11, 296) and in other published material (Ružić 1994, 50, tabl. XXXVI-II/1,2,5,7-10; Sternini 2001, 31, Fig. 17, no. 185, 65; Jennings 2006, 118, Fig. 5.32; Leljak 2011, 151, cat. nos. 4-6, 9-12). The finds from the present group have been identified both as beakers and lamps (Lazar 2003, 198–199, Fig. 52, 9.1.3; Leljak 2011, 151, cat. nos. 4-6, 9-12). In this case, it is difficult to determine their exact function, considering only the context of discovery. Therefore, considering different characteristics of vessel finishing (for example, fire-rounded or cracked-off rim edge) or quality of the glass and manufacture could be helpful as criteria for further interpretation.

The jugs/flasks (Fig. 3) resemble typical for the period forms of tableware/containers for cosmetic substances and decoration – applied glass trails. These vessels are comparable to examples from published late antique glass assemblages (Sternini 1989, 106, Fig. 9, 109; Jennings 2006, 110–111, Fig. 5.24; Cholakova 2009, cat. nos. 101, 102, 279-280, tabl. XII/1, 2, 299).

Parallels to the first identified type of oil lamp from the assemblage, the one with the base knob (Fig. 4.38), are attested at other archaeological sites and provide good analogies for this example (Sternini 1989, 109, Fig. 7, nos. 36, 37; Ružić 1994, 55-56, tabl. XLIII/5,7-9; Uboldi 1995, 116–120; Jennings 2006, 137–138, Figs. 6.10.11–14; Cholakova 2009, cat. nos. 91–93, 278, tabl. XI/1-3, 298). The variety of the popular for the period hemispherical cup with the concave base that includes applied small loop handles (Fig. 4.39) is usually also identified as a type of lighting device (Gomolka 1979, 154, tabl. 61, no. 32; Turno 1989, 166–167, Fig. 2, no. 4; Cherneva-Tilkian 1995, 77, Fig. II.17; Olczak 1995, 51, typ III; Băjenaru, Bâltâc 2000-2001, 479–483, tabl. X, 506). The lower part of the bodies of the tubular oil lamps (Fig. 4.40-42) makes them easy to be identified and assigned to their actual form due to abundant parallels illustrating the slight varieties and details of the shape (Olczak 1995, 51, typ II, 55–58; Băjenaru, Bâltâc 2000-2001, Pl. I-III, 497–499; Jennings 2006, 142–143, Fig. 6.16; Cholakova, Rehren and Freestone 2016, Fig. 2, 627).

Decoration of applied coloured glass trails can be seen on different vessel forms (both closed and open), and it is quite distinctive of this period's glass repertoire (Jennings 2006, 155, Figs. 7.1-7.9; Cholakova 2009, tabl. VII, 294). The example described here (Fig. 5.43) is comparable to similar vessels discovered in well-dated contexts at other archaeological sites, including from Serdica (Cholakova 2009, tabl. VII.6-9, 294; Cholakova, Rehren 2018, 56, Fig. 3.1).

Similar (but not identical) to the base with an applied ring of coloured glass trail (Fig. 5.44) are finds from other sites in Serdica, as well as from more distant ones like Beirut (Jennings 2006, 163–165, Figs. 7.8, 7.10; Cholakova, Rehren 2018, 56, Fig. 3.1).

The reconstructed cup (Fig. 5.45) is resembling partially the decoration on vessels discovered, for instance, in Mainz and Bonn (Harter 1999, Taf. 16, no. 348; Fünfschilling 2015, 336, Abb. 425, 3,5), while morphologically it is more closely related to form Isings 96/107 (Isings 1957, 114–116, 133).

Assuming that the tubular base fragment (Fig. 5.46) belongs to the widespread form Isings 109a/c, it could be associated with finds from numerous sites[2].

Conclusion

According to the stratigraphic observations of the researchers and preliminary examination of the discovered materials, it is presumed that the well went out of use and was filled with debris, most likely in the 5th century. The attested construction activities during the 6th c., when a new building was erected in the area, and the setting of one of its walls over the well, in particular, is considered a definite terminus ante quem for the exploitation of the abandoned facility[3].

Concerning the chronological distribution of the listed parallels, the vessels from the assemblage could be broadly dated between the 4th and the 6th century. The conical beakers/lamps, along with the single fragment with tubular base ring and the cup with engraved/abraded decoration, could be regarded as some of the earliest examples[4]. Their presence in the well might be related to the initial phase of its repurposing as a dump site. Of course, there is also the possibility (at least for some of them) of accidental dropping while the water facility was still in use. At the same time, the occurrence of some of the other examples in the assemblage (the tubular oil lamps in particular) is a bit peculiar, considering their later date, based on analogous finds[5]. A possible explanation for this could be found in the abovementioned construction activities during the 6th c. Furthermore, digging the trenches for the foundations of the wall in question might have caused later material to enter the deposit.

Because of the studied material's fragmentary state, it was impossible for all the finds to be ascribed with certainty to a particular vessel form/type or to a specific function. Nonetheless, the short review of the present assemblage illustrates well enough some of the glass vessel groups popular during the late antique period in *Serdica*.

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Summary

The archaeological research at the Western Gate of Serdica, present-day Sofia, Bulgaria, was carried out in two separate campaigns, between 1974 and 1980 and 2011–2014. A deposit comprising a considerable number of glass fragments was discovered inside abandoned water well during the 2012 excavations. Conical vessels, lamps and jugs/flasks are the identified glass vessels' shapes. The decoration is rarely attested.

According to the stratigraphic situation and the finds, the well went out of use and was filled with debris, most likely in the 5th century. However, based on the listed parallels, the glass finds could be dated between the 4th and the 6th centuries. The earliest vessels in the assemblage might be related to the initial phase of the well's repurposing as a dump site or to the possibility that some of them could have been dropped there by accident before it was abandoned. Furthermore, a possible explana-

2 For a number of analogous finds see Antonaras 2017, 79-80.

3 Dr. Borisova-Katsarova, pers. comm.

4 For the conical vessels see Antonaras 2017, 77-80; for the cup with abraded/engraved decoration see Harter 1999, 71 and Fünfschilling 2015, 336.

5 For well-dated examples see Cholakova, Rehren and Freestone 2016, Fig. 2, 627.

tion for the discovery of the latest glass artefacts in the same complex could owe to a probable disturbance of its stratigraphy due to the construction of a new building in the area during the 6th century. The setting of one of its walls over the well serves as a definite terminus ante quem for the accumulation of the deposit.

Povzetek

Arheološke raziskave ob zahodnih vratih mesta *Serdica,* današnje Sofije v Bolgariji, so potekala v dveh kampanjah, med letoma 1974 in 1980 in med letoma 2011 do 2104. V opuščenem vodnjaku so med raziskavami leta 2012 odkrili depozit s precejšnjim številom steklenega gradiva. Opredeliti je bilo mogoče oblike kot so konične čaše, svetilke, stekleničke in vrči, posode so bile obdelane in okrašene v toplem in ohlajenem stanju.
Glede na stratigrafijo in odkrito gradivo je bil vodnjak najverjetneje opuščen in napolnjen z odpadom v teku 5 stoletja. Na osnovi primerjav pa lahko stekleno gradivo datiramo v čas med 4. in 6. stoletjem. Starejše gradivo je verjetno ostanek zgodnje faze uporabe opuščenega vodnjaka kot odpadne jame, najmlajše najdbe pa bi lahko povezali z mešanjem plasti, ki so verjetno posledica gradnje novega objekta na tem območju v 6. stoletju. Postavitev enega od njegovih zidov preko vodnjaka služi kot *terminus ante quem* za nalaganje depozita.

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Table I: Description of the glass finds.

№	Form	Description	Colour and quality of the glass	Illustration
1	conical vessel	entire profile, rough unfinished cracked-off rim	light green glass, small amount of gas bubbles of different size and shape	Fig. 2.1
2	conical vessel	entire profile, rough unfinished cracked-off rim	nearly colourless glass with slight greenish tint and significant amount of gas bubbles of different size and shape	Fig. 2.2
3	conical vessel	entire profile, fire-rounded rim	light green glass, small amount of gas bubbles	Fig. 2.3
4	conical vessel	nearly entire profile, missing rim, probably fire-rounded, considering the pontil mark on the underside	yellow-green glass, small amount of elongated gas bubbles and contamination of a single metal? particle right above the base area	Fig. 2.4
5	conical vessel	fire-rounded rim fragment	nearly colourless glass with slight greenish tint and only a few gas bubbles, contamination due to a couple of tiny metal? particles affecting the colouration of the glass	Fig. 2.5
6	conical vessel	fire-rounded rim fragment	light blue glass with only a few gas bubbles	Fig. 2.6
7	conical vessel	fire-rounded rim fragment	the colour of the glass varies from light green to yellow-green, small amount of gas bubbles and a tiny metal? particle inclusion	Fig. 2.7
8	conical vessel	cracked-off rim fragment	nearly colourless glass with slight greenish tint and a few gas bubbles	Fig. 2.8
9	conical vessel	cracked-off rim fragment	nearly colourless glass with greenish tint and gas bubbles of different size and shape	Fig. 2.9
10	conical vessel	cracked-off rim fragment	nearly colourless glass with slight greenish tint	Fig. 2.10

№	Form	Description	Colour and quality of the glass	Illustration
11	conical vessel	the lower part of entirely preserved slightly concave/almost flat base with pontil scar	light blue glass of noticeably good quality, with only a few gas bubbles	Fig. 2.11
12	conical vessel	the lower part of entirely preserved slightly concave base with a pontil scar	light blue glass of distinctly good quality, with only a few gas bubbles but contaminated due to several metal? particle inclusions (one of them more noticeable)	Fig. 2.12
13	conical vessel	partly preserved base with pontil mark	nearly colourless glass with yellowish tint	Fig. 2.13
14	conical vessel	almost entirely preserved base with pontil mark	nearly colourless glass with yellowish tint and gas bubbles	Fig. 2.14
15	conical vessel	partly preserved base, slightly concave/ almost flat with pontil mark	nearly colourless glass with greenish tint	Fig. 2.15
16	conical vessel	the lower part of the body and almost entirely preserved concave base with pontil mark	nearly colourless glass with slight greenish tint, significant amount of gas bubbles of different size and shape and a metal? particle inclusion	Fig. 2.16
17	conical vessel	the lower part of the body and entirely preserved slightly concave/ almost flat base with unremoved glass from the attachment of the pontil	nearly colourless glass with greenish tint	Fig. 2.17
18	conical vessel	the lower part of the body and entirely preserved concave base with a hardly noticeable pontil mark	nearly colourless glass with slight yellowish tint and gas bubbles of different size and shape	Fig. 2.18
19	conical vessel	partly preserved base with pontil mark?	nearly colourless glass with yellowish tint	Fig. 2.19
20	conical vessel	the lower part of the body and entirely preserved concave base	nearly colourless glass with greenish tint and gas bubbles of different size and shape, a couple of metal? particle inclusions	Fig. 2.20
21	conical vessel	the lower part of the body and entirely preserved concave base	nearly colourless glass with greenish tint and significant amount of gas bubbles of different size and shape	Fig. 2.21
22	conical vessel	the lower part of the body and entirely preserved concave base	nearly colourless glass with greenish tint, gas bubbles and a couple of tiny metal? particle inclusions	Fig. 2.22
23	conical vessel	the lower part of the body and entirely preserved concave base	light green glass with gas bubbles of different size and shape	Fig. 2.23
24	conical vessel	the lower part of the body and almost entirely preserved slightly concave/flat base	nearly colourless glass with slight yellowish tint and significant amount of gas bubbles of different size and shape	Fig. 2.24
25	conical vessel	partly preserved base, concave (particular profile probably achieved by the use of a former)	light green glass with significant amount of gas bubbles of different size and shape	Fig. 2.25
26	conical vessel	the lower part of the body and entirely preserved concave base	nearly colourless glass with greenish tint and significant amount of gas bubbles of different size and shape, a few particle inclusions	Fig. 2.26
27	conical vessel	partly preserved base, slightly concave/almost flat	nearly colourless glass with slight yellowish tint and gas bubbles	Fig. 2.27

№	Form	Description	Colour and quality of the glass	Illustration
28	conical vessel	the lower part of the body and partly preserved concave base	light green glass with significant amount of gas bubbles of different size and shape and contaminated due to a particle inclusion	Fig. 2.28
29	conical vessel	the lower part of the body and entirely preserved concave base	nearly colourless glass with greenish tint and significant amount of gas bubbles of different size and shape	Fig. 2.29
30	conical vessel	the lower part of the body and a concave base	nearly colourless glass with yellowish tint and gas bubbles of different size and shape	Fig. 2.30
31	conical vessel	partly preserved base	nearly colourless glass with yellowish tint and significant amount of gas bubbles of different size and shape	Fig. 2.31
32	conical vessel	the lower part of the body and entirely preserved concave base	light green glass with small amount of gas bubbles	Fig. 2.32
33	jug	the upper part of the body with double ribbed handle; decoration of self-coloured glass trail in relief applied below the rim and around 1/3 down the neck of the vessel	glass of light green colour with multiple gas bubbles and metal? particle inclusions	Fig. 3.33
34	flask?	rim and neck; decoration of applied self-coloured glass trail in relief, starting below the rim and going down the preserved neck part of the vessel	glass of light blue-green colour	Fig. 3.34
35	flask?	rim and part of the neck	nearly colourless glass with slight yellowish tint, small amount of gas bubbles and matt white iridescence	Fig. 3.35
36	flask?	folded-in rim, neck and partly preserved shoulders	nearly colourless glass with yellowish tint and small amount of gas bubbles	Fig. 3.36
37	flask?	fire-rounded rim and neck	light blue-green glass with small amount of gas bubbles	Fig. 3.37
38	conical lamp with solid knob	the lower part of the body, missing knob; there is a pontil scar on the wall, just above the pointing base	nearly colourless glass with light blue-green tint	Fig. 4.38
39	hemispherical cup/lamp	three fragments (not joining) – a cracked-off rim, a wall with preserved loop handle and a base with partially preserved trails of two other handles (missing)	nearly colourless glass with greenish tint and significantly small amount of gas bubbles	Fig. 4.39
40	lamp with tubular base	the lower part of the body; small pontil mark on the base	light yellow-green glass with numerous elongated gas bubbles and yellowish-white iridescence	Fig. 4.40
41	lamp with tubular base	the lower part of the body; unremoved glass from the attachment of the pontil	light yellow-green glass with elongated gas bubbles and yellowish-white iridescence	Fig. 4.41
42	lamp with tubular base	the lower part of the body; small pontil mark on the base	light yellow-green glass with elongated gas bubbles and yellowish-white iridescence	Fig. 4.42
43	beaker/lamp?	two rim fragments (not joining) with dark blue trails, applied directly on the rim and below it, marvered into the wall	the vessel is made of nearly colourless glass with slight yellowish tint	Fig. 5.43

№	Form	Description	Colour and quality of the glass	Illustration
44	cup/beaker?	base fragment with not evenly applied ring	ring of green glass; the main body of the vessel is made of nearly colourless glass with yellowish-green tint; the green glass trail is full of gas bubbles	Fig. 5.44
45	hemispherical cup	four fragments (not joining) – a cracked-off, slightly polished rim, two wall fragments and a slightly concave, almost flat base; decoration of abraded/free-hand engraved lines, circles and grain-shaped facets, forming geometric patterns in horizontally arranged bands	nearly colourless glass with a slight yellowish tint	Fig. 5.45
46	conical beaker?	base fragment with tubular ring	light green glass	Fig. 5.46
47	window pane	fragment with partly preserved side edge	green glass with multiple gas bubbles of various size and shape	–

Glass *exagia* from Stobi
Steklene uteži (exagia) iz Stobija

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Abstract
The paper presents the glass weights discovered during the excavation between 2009 and 2012, contextually belonging to the last stage of organized and urban life in Stobi. There are three circular glass weights used for measuring golden coins. The glass weights were discovered in similar contexts chronologically: one was discovered in one of the dwellings constructed between the radial and circular walls of the summa cavea of the Theater after it went out of use, the second one in a storage unit that was part of the shops and workshops behind the Semicircular Court, and the third in the Residential and Commercial quarter.
Key words: Stobi, Roman theater, glass weights, glass *exagium*, solidi

Izvleček
Članek predstavlja steklene uteži, ki so bile odkrite med raziskavami mesta Stobi, v obdobju med 2009 in 2012, in sodijo v kontekst zadnjega obdobja organiziranega mestnega življenja. Gre za tri okrogle steklene uteži, ki so jih uporabljali za merjenje teže zlatih novcev. Odkrite so bile v sorodnih kronoloških kontekstih. Ena je bila odkrita v poslopju zgrajenem med zidovi *summa cavea* gledališča Stobi, ko je bilo le-to že opuščeno, druga v skladišču, ki je bilo del trgovin in delavnic za polkrožnim dvoriščem, tretja pa v naselbinski in trgovski četrti.
Ključne besede: Stobi, rimsko gledališče, steklene uteži, glass *exagium*, solidi

Introduction

The Roman city of Stobi is one of the best-preserved archaeological sites in the Republic of North Macedonia. It is built on the confluence of two rivers: Erigon (Crna) and Axios (Vardar; Livy XXXIX.53.16, Heuzey 1873). Its strategic position on the main road connecting the Danube and the Aegean had a crucial role in its development as a commercial and administrative centre, covering the period between the 2nd century BC and the early 7th century AD.

The city was known as oppidum civium Romanorum during the time of Augustus. Later it became a municipium with an established provincial mint under Vespasian. Large public buildings were built in the early 2nd century (theatre, building with arches - library?, the temple of Isis, synagogue). During Late Antiquity, it became an episcopal seat and the capital of the province Macedonia Secunda, at least between 482 and 535 AD. The city's urban layout was transformed with the construction of large private residences, public baths and early Christian churches on the middle and upper terraces, organised within the street network. Surviving

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Figure 1: Stobi ground plan (after Blaževska 2021).

the earthquakes and barbaric raids during the 6th century, the city was finally abandoned at the end of the 6th or beginning of the 7th century AD (Papazoglou 1988, 313–323; Wiseman 1984, 289–314; Wiseman 1986, 37-50; Wiseman 2007, 85–110; Blaževska 2021, 189). The Late Antique city is well preserved as a direct consequence of the fact that there was no urban occupation after it was abandoned (Wiseman 1984, 294). The excavation data shows that during the 6th century, Stobi was still a vibrant city with an active commercial life, visible through the excavated shops and workshops along the collonaded Via Sacra, leading from the main city gate to the Semicircular court and the Episcopal basilica, the presumed centre of the city during this period (Nikolovski 2018, 325).

During the excavations between 2009 and 2011, a large portion of the southwestern part of the city was excavated, positioned between the fortification walls and the Semicircular court, named the Residential and Commercial quarter. This quarter consists of modest residential and commercial buildings, representing the last stage of urban life in Stobi from the late 6th and early 7th century AD (Blaževska 2021). During the same excavations, modest houses dating from the same period were also discovered on top of the *summa cavea* of the Theater and around the Temple of Isis.

During the aforementioned excavations an enormous quantity of material was discovered, including various weights and weighing equipment. Most of them are still unpublished, with the exception of a few that were uncovered in the excavations at the Semicircular Court in 2012 (Nikolovski 2018, 315–319).

The three glass weights that are the focus of this paper were discovered in the context of the last period of urban life in Stobi, in the Residential and Commercial quarter, as well as in the dwellings built on top of the Theater.

The finds

The first sample (CT-09-69) was discovered in one of the dwellings constructed between the radial and circular walls of the *summa cavea* of the Theater after it was abandoned and became a quarry for building material. The context in which the exagium was discovered is dated to the second half of the 6th century AD. The glass weight was made of light greenish glass, and has a circular shape (Fig. 2). It has a diameter of 2.1 cm, is 0.5 cm thick and weighs 3.93 g. It is flat and rough on the backside, and has a rolled rim and a stamped box monogram in the central part (Fig. 3), containing the letters A, E, Υ and O. The context of discovery did not contain other finds related to weighing.

Figure 2: Glass exagium with box monogram (CT-09-69; NIS archive).

Figure 3: Monogram on the exagium (CT-09-69; NIS archive).

The second sample (CT-12-36) was discovered in a closed deposit, on a floor level in Storage room 9 behind the Semicircular court, closely connected to commercial activities. It was made of pale, yellowish glass, and also has a circular shape with a rolled rim and a stamped box monogram in the central part (Fig. 4), containing the letters A, M, O, Υ and T. Like the first sample, its backside is flat and rough. Its monogram is difficult to discern, and I have not identified an analogy. The glass weight has a diameter of 2.15 cm, its thickness varying between 0.64 and 0.84 cm, and weighs 4.35 g. There are numerous other finds in this deposit, but I

Figure 4: Glass exagium with box monogram (CT-12-36; NIS archive).

Figure 5: Glass exagium with a bust of an eparch and an inscription (CT-09-68; NIS archive).

will only mention the ones relevant to weighing: a bronze balance with two bronze scale pans, four bronze coin weights, a lead weight with a pyramidal shape with a ring on top and a square bronze lock (Nikolovski 2018, 319). The context in which this glass weight was discovered completely follows what a money changer's kit would contain. They were usually kept in a closed wooden box. Well preserved boxes with weighing equipment have been found mostly in shipwrecks (Pitarakis 2012, 407–410). The latest coin discovered in the same deposit is a follis struck in Thessalonica between 583-584 AD, during the first years of the reign of Maurice (Nikolovski 2018, 319).

The third glass weight in question (CT-09-68) was discovered in the residential and commercial quarter, in the yard of an enclosure around one of the towers on the northwestern fortification wall. In one of the rooms of this enclosure, multiple weights were discovered and a part of a kampanos - a steelyard. The glass weight is circular in shape, with relief decoration, depicting a bust holding an object with its right hand in the air (Fig. 5). Its backside is flat and rough. The let-

ters read ΘΕΟΔωΡΟΥ. It has a diameter of 2.6 cm, is 0.4 cm thick, and weighs 3.91 g.

Two of the Stobi samples (CT-09-69, CT-12-36) belong to the box monogram type, named Type C according to Entwistle, representing the most common form of circular glass weights. Most scholars agree that the box type of glass weights was predominant between 500 and 550 AD, with the cruciform type slowly but surely superseding it through the course of the second half of the century (Entwistle and Meek 2015, 4). This does not mean that the box type glass exagia were not used during the second half of the 6th century AD, as is the case with two Stobi examples.

The third sample (CT-09-68) belongs to the type with a bust of an eparch with an inscription surrounding it. The eparch usually holds a *mappa* - the linen handkerchief thrown to indicate the start of races in the circus games. The inscription reads ΘΕΟΔΩΡΟΥ, probably the name of the eparch that issued the weight. It has been suggested that the person named Theodoros was an official responsible for the royal treasury, called *comes sacrarum largitionum* (Vladimirova-Aladzhova 2008, 248) during the reign of Justin II and whose seals were laid on contemporary silver objects (Dodd 1964, 244). Theophanes also mentioned an *eparch* named Theodoros, son of Peter, *comes sacrarum largitionum*, as well as an additional prefect bearing the same name during the reign of the emperor Justin I. The third person with the name Theodoros was prefect of Constantinople in 612, during the reign of Heraclius (Vladimirova-Aladzhova 2008, 245). We have to take into consideration that these are only the officials that we know the names of, as opposed to so many that we are unfamiliar within the entirety of the Byzantine Empire. For this reason, I can not be certain in connecting this glass weights' inscription to any of the previously mentioned possibilities, although they remain viable options.

The type with the bust of an eparch and an inscription belongs to Type B according to Entwistle, and it is dated widely because of the possibilities in comparing the names with officials documented in historical sources. The generally accepted date range for this type is between the reigns of Justin II and Heraklios (Entwistle and Meek 2015, 4).

Discussion

Glass *exagia* have been unearthed at various places in the eastern Mediterranean, in Constantinople, at other sites in Asia Minor, Egypt, Crete, Cyprus, along the Danube, etc. One shop in commercial contexts in Sardis has yielded three glass weights, stamped with cruciform monograms, discovered along other coin weights, a copper alloy steelyard with a lead weight, as well as fragments of balance and pans (Crawford 1990, 86). They were also found in commercial contexts in Israel, notably in Tel Naharon, where there are several sets of weights of glass, bronze, and haematite, as well as at the site of Shiqmona, where three glass weights have been discovered (Entwistle and Meek 2015, 3). Glass weights were found throughout the Balkans: in Bulgaria, at least eleven samples (Vladimirova-Aladzhova 2008); in Serbia, at least two samples (Ivanišević and Jovanović 2018); in North Macedonia, at least four samples - three presented in this paper and an additional one from *Heraclea Lyncestis* (Lilčić 2001), etc.

The appearance of the glass coin weights is strongly connected to the widespread fiscal and administrative reforms initiated by the emperor Anastasius and continued by Justinian I. The reforms included a revamping of the copper coinage that saw the introduction of major denominations such as the follis and half follis, and an increase in the number of mints, which subsequently led to a proliferation in the circulation of the gold coinage, exemplified by increased releases of the nomisma and its divisions, the semissis and tremissis (Grierson 1982, 4). It is through this monetary reform that the initial introduction of glass as a material used for coinage weights may have taken place (Entwistle and Meek 2015, 1).

Glass weights vary in color; they are found in shades of blue, brown, red, green, and yellow (Vikan and Nesbitt 1980, 36–37). The advantages of glass as a material over the metal have been stated many times, as it is easy to manufacture, it is readily detectable if tampered with and it is not prone to immediate oxidation or corrosion (Entwistle and Meek 2015, 2). This makes it ideal for smaller denomination coin weights.

Their precise function has been disputed, but the most likely interpretation is that they were used for weighing gold coins. The state issued a gold coin of full weight, as well as fractions thereof, one-half and one third. Glass weights obviously did not compete with bronze flat weights, since they were a very specific tool for weighing the full weight or the fractions of a gold coin. They were very useful for small transactions and were thus used as a complement to their heavier, metallic counterparts. After an examination of the weights of over two hundred glass weights, the eminent Arab numismatist, George Miles, concluded that glass pieces were used for weighing the solidus weighing around 4.55 grams, the semis, weighing ca. 2.27 grams, and the tremissis, weighing around 1.55 grams.

In the Theodosian Code 12.7.1, there is an explanation on how these transactions occurred, and it is explicitly explained how to hold the scales in order to achieve a fair measurement: "when gold is paid, it shall be received with level pans (*aequa lance*) and equal weights (*libramentis paribus*) in such a fashion, naturally that the end of the cord (*summitas lini*) is held with two fingers, the remaining three being free and extended toward the tax-receiver (*susceptor*) so as not to depress the weights (*pondera*) by restraining either of the pans suspended from the tongue (*examen*) of the balance, but so as to permit the level and equal movement of the balance (*stater*)" (Morrisson 2012, 386–387).

The actual weighing was done by a state official called *zygostates*, "the one who weighs with a balance". This official not only weighed, but also verified the quality of the gold coins (Morrisson 2002, 913). In the 6th century, during Justinians' reign, the *zygostatai* were singled out in one of his aedicts as responsible for changing the purity of gold coins (Kazhdan *et al.* 1991, 2232).

There are many questions related to the identification of the official who was responsible for the emitting of a distinct type of *exagia* and it is evidenced by the great variety of monograms (Bendall 1996, 60), related to the names of eparches not only in Constantinople but in all provinces of the Byzantine Empire as well (Feissel 1986; Bendall 1996).

Assumedly, traders acquired glass weights in Constantinople and carried them about in their travels (Vikan and Nesbitt 1980, 37). A hoard of glass weights discovered in Sardis in Asia Minor, challenges this claim however, since Fulghum and Heinz believe that the 21 glass weights bearing monograms of Heraclius are local products, based on the imperfect physical appearance and asymmetrical shape (Fulghum and Heintz 1998, 115).

As indicated by the numerous inscriptions on surviving exagia, other officials not mentioned in the imperial legislation also were involved in the issuance of weights. In the western provinces, *proconsuli*, *viri laudabiles* and *viri clarissimi*, and *anthypatos*, *comes* and *ephoros* in the eastern provinces. Chapter 15 of Novel (CXXVIII) 128 of Justinian, dated to 545 AD, states that the praetorian prefect of the city was responsible for the commodity weights and the Count of Sacred Largesses (*comes sacrarum largitionum*, κομες των θείων θησαυρών) as well as coinage weights of gold, silver and bronze. The *comes* was also responsible for minting all coinage except silver and gold, and until Justinians' reign, the procurators of the mints remained in his authority (Morrisson 2002, 911). All weights and measures were now "to be preserved in the most holy church of each city" (Morrisson 2012, 385). The role of the church as a depository and guarantor of weight standards was very important, and it was closely connected to the influence of bishops as leaders of cities (Paunov 2005, 99). The role of the church in practicing honest weighing and assaying is well exemplified by

an edict proclaimed in Alexandria by John the Almsgiver, on his accession to the patriarchate in the early seventh century (Morrisson 2012, 385–386).

The weight of the glass weights from Stobi is 3.93 g and 4.35 g for the box monogram ones, and 3.91 g for the e*xagium* with a bust of an eparch. The 4.35 g *exagium* is the one closest to the theoretical weight of the solidus, which is 4.55 g. The sample weighing 4.35 g was used for weighing *solidi*, which is the closest comparison in terms of coin weights. For comparison, there are 5 samples of *solidi* discovered at Stobi, weighing between 4.38 g and 4.50 g, minted during the reigns of Justinian and Justin II (Radić and Ivanišević 2006). As can be deduced from the information above, the weight of the glass exagium from Stobi fits the parameters of the weight of the solidi discovered in the city, with a minimal inconsistency.

The remaining two samples weigh less than the aforementioned weight for the *solidi*. There is a possibility that they were used for weighing light-weight *solidi*. The function of these light weight gold coins still eludes modern scholars, even though they have gained significant attention in the last few decades (Gökalp and Gandilla 2015, 323). Their average weight is difficult to determine precisely, but it is always less than 4.00 g, which contributes toward the determination of the function of the two glass weights from Stobi, weighing 3.93 g and 3.91 g, as weights for light-weight *solidi* (Adelson 1957; Hendy 1972).

Additionally, the five *tremissis*, discovered along fragmented bronze scale pans in one of the shops behind the Semicircular court in Stobi (Nikolovski 2018, 319), all vary in weight minimally, even though four out of five were part of the same emission, during the reign of Justin II, issued in Constantinople, but they still represent approximately one third of the weight of the *solidi*. It should be noted that the weight of the *tremissis* was very small to begin with, and it would have been nearly impossible to notice the weight difference from its theoretical weight.

Conclusion

Glass weights were used during a short period of time of approximately 150 years in the 6th and the first half of the 7th century AD throughout the Byzantine Empire. In general, the prosopographical evidence for the dating of glass weights ceases at the same time when the glass-producing provinces Syria, Palestine and Egypt were lost to the Arabs, by the middle of the 7th century AD. The coinciding with the so-called transitional series of glass weights from Egypt in the period between 642 and 692 AD, contributes to this idea (Entwistle and Meek 2015, 12; Entwistle 2016, 293). The tradition was continued by their Arabic counterparts, issued in vast numbers by successive dynasties from the Umayyads to the Ayyūbids (Balog 1976).

The presence of glass exagia in Stobi contributes greatly toward the general picture of the city at the end of the 6th and the beginning of the 7th century AD. It demonstrates that the city and its inhabitants were commercially active, even if the city did not live up to its urbanistic peak. Although a small amount, in combination with other finds connected to measuring and weighing, the glass *exagia* from Stobi offer an insight to the importance of weighing of solidi, the basis of the monetary system of the Byzantine Empire.

Summary

The three glass weights that are the focus of this paper, were discovered in the context of the last period of urban life in Stobi. The first sample (CT-09-69) was discovered in the context dated to the second half of the 6th century AD. The glass weight was made of light greenish glass, has a diameter of 2.1 cm, is 0.5 cm thick and weighs 393g. The second sample (CT-12-36) was discovered in a closed deposit, on a floor level in Storage room 9; it was made of pale, yellowish glass, has a diameter of 2.15 cm, its thickness varying between 0.64 and 0.84 cm, and weighs 4.35 g. The third glass weight is circular in shape, with a relief decoration, depicting a bust with its right hand in the air, holding an object. The letters read ΘΕΟΔωΡΟΥ. It has a diameter of 2.6 cm, its 0.4 cm thick, and weighs 391 g

Glass exagia have been unearthed at various places in the eastern Mediterranean and the Balkans. The appearance of the glass coin weights is strongly connected to the widespread fiscal and administrative reforms initiated by the emperor Anastasius and continued by Justinian I. Glass weights were used during a short period of time of approximately 150 years in the 6th and the first half of the 7th century AD throughout the Byzantine Empire. The presence of glass exagia in Stobi contributes greatly toward the general picture of the city at the end of the 6th and the beginning of the 7th century AD. It demonstrates that the city and its inhabitants were still commercially active.

Povzetek

Članek predstavlja tri steklene uteži, ki so bile najdene v kontekstu zadnjega obdobja urbanega življenja mesta Stobi. Prva najdba (CT-09-69) izhaja iz konteksta datiranega v drugo polovico 6. stoletja. Utež je izdelana iz rahlo zelenkastega stekla, ima premer 2,1 cm, db. 0,5 cm in težo 3,93 g. Drugi primerek (CT-12-36) je bil najden v zaprtem kontekstu, na hodni površini skladiščnega prostora 9; izdelan je iz stekla rahlo rumenkastega odtenka, ima premer 2,15 cm, db. med 0,64 in 0,84 cm, teža znaša 4,35 g. Tretja utež je kroglaste oblike; ima reliefni okras, ki predstavlja doprsno figuro z dvignjeno desnico, v kateri drži predmet. Utež nosi napis ΘΕΟΔωΡΟΥ. Premer uteži je 2,6 cm, db. 0,4 cm, njena teža je 3,91 g
Steklene uteži so znane z več najdišč vzhodnega Sredozemlja in tudi Balkana. Najdbe steklenih uteži za kovance so tesno povezane z obsežnimi fiskalnimi in administrativnimi reformami cesarja Anastazija, ki jih je nadaljeval tudi Justinijan I. Steklene uteži so bile v uporabi relativno kratek čas, približno 150 let, in sicer v 6. in prvi polovici 7. stoletja na območju Bizantinskega cesarstva. Najdbe steklenih uteži (*exagia*) v mestu Stobi dokazujejo trgovsko in gospodarsko aktivnost mesta in njegovih prebivalcev in pričajo o njegovem življenju na koncu 6. in v prvi polovici 7. stoletja.

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Stained glass from the research of the Dubrovnik cathedral
Slikano steklo odkrito med raziskavami dubrovniške katedrale

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Abstract
The Dubrovnik Republic maintained its own glass production in the late Middle Ages, including records of window glass manufacturing. This paper will contribute to the study of stained glass in the Balkan region. It will outline late medieval stained-glass fragments (mid-14th to the first half of the 15th century) excavated from the Dubrovnik cathedral during the renewal of the building after a large earthquake in 1979 and are extremely rare in the Balkan region. Analogous examples of Dubrovnik archaeological material can be found among Western European stained-glass windows. These finds indicate that Dubrovnik was influenced by Western European technology through trade or that this way of making stained glass began to be applied in local workshops.
Key words: Dubrovnik, cathedral, late Middle Ages, stained glass, local production

Izvleček
Dubrovniška republika je imela v času poznega srednjega veka lastno proizvodnjo stekla, ki je vključevala tudi proizvodnjo okenskega stekla. Članek prinaša novosti v študiju vitražev na Balkanu. Predstavlja odlomke obarvanega okenskega stekla z vitražev (sredina 14. – prva pol. 15. stoletja), ki so bili odkriti med obnovo dubrovniške katedrale po potresu leta 1979 in predstavljajo redkost med steklenimi najdbami na Balkanu. Primerjave predstavljenemu gradivu najdemo med najdbami v zahodni Evropi. To kaže na vpliv tehnologije zahodno evropskih delavnic, ki je dosegla Dubrovnik s trgovino ali pa so lokalne delavnice v svoji proizvodnji kopirale zahodno tehnologijo.
Ključne besede: Dubrovnik, katedrala, pozni srednji vek, vitraži, lokalna proizvodnja

Introduction

The Dubrovnik Republic had a significant influence on trade in the late Middle Ages and early post-medieval times. Its position made it an intermediary for the trade of various goods between the East and West. In addition to various merchandise, they also traded in glassware – buying various items from the Eastern Mediterranean to Western Europe and selling domestic glass products in the Balkan hinterland and throughout the Mediterranean, as the City had its own glass production from the 14th to the 16th centuries (Han 1981). This indicates that Dubrovnik had developed crafts, as well as a high culture of living and extensive trade connections.

Earthquakes are frequently recorded in the Dubrovnik area, and this fate befell the cathedral as well. These circumstances damaged the cathedral several times, but it was always restored. Unfortunately, this beautifully decorated Romanesque building did not survive the Great Earthquake that struck the city in 1667. After

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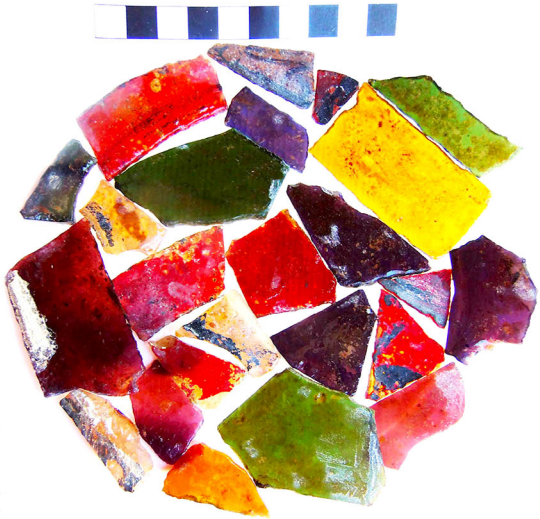

Figure 1: Archaeological finds of stained glass from the Dubrovnik cathedral, 14th-15th century (all photos by the author).

that catastrophe, a new Baroque cathedral was erected, which still stands proudly in Dubrovnik today. The last major earthquake that struck the city also dealt damage to the cathedral in 1979 (Horvat-Levaj 2016, 25). This last strong earthquake was followed by the restoration of many historic buildings in the city, including the cathedral, and archaeological excavations were also carried out during this time. The cathedral was explored between 1981 and 1987, and in addition to many fragments of stained glass (Fig 1),[1] a number of finds of various types, origins and date were also found (Stošić 1988, 15–36; Stošić 1989, 326–338).

Fragments of stained glass from the Dubrovnik cathedral are very rare archaeological finds of this kind in the Balkans. So far, only a few archaeological excavations in the Balkan region have resulted in similar finds: Kraljeva Sutjeska in Bosnia (Anđelić 2004, 228–229; Han 1981, 75), Studenica in Serbia (Stamenković 2015, 369–372, Fig. 6), Brškovo in Montenegro (Živanović 2018, 51–53, Fig. 3), and the island of Mljet in Croatia (Topić *et al*. 2016, 575, 578, 587, Fig. 1/20; Topić 2017b, 52–53).

Stained glass origins and techniques

Windowpanes have a long tradition, and their manufacture is believed to have been found in Egypt (Gasparetto 1958, 149). The Romans made windowpanes in the 1st century (Brisac 1986, 7; Gasparetto 1958, 149; Ignatiadou and Antonaras 2011, 57; Kanyak 2009, 26), and glazed windows were already common in not only late antique sacral buildings but also in private houses (Milavec 2015, 79–80, 93). In the Middle East, windowpanes were also used in Muslim buildings (Brisac 1986, 7). In Early Byzantine window architecture, small windowpanes have been documented, made in various techniques (Kanyak 2009, 26, 35, 40). Such windows were used in Western Europe during the Middle Ages. These first stained glass windows probably had a purely decorative function (Brisac 1986, 7).

In the 7th century, glass was intentionally coloured, and the forerunners of stained glass were developed (Milavec 2015, 81). Stained glass details are made by the process of glass staining, which has been in use since the Early Christian period (Ignatiadou and Antonaras 2011, 26). It is probable that stained glass windows were first painted in Western Europe. Religious depictions intended for the education of believers were painted. In the beginning, these were small stained-glass panels because they had to be adapted to the architecture of the time (Brisac 1986, 7). The windows of Romanesque buildings already show the high quality of painting, as well as precision of execution and the elaborate nature of these structures (Brisac 1986, 10–14), which is still much improved in Gothic-Renaissance stained glass (Brisac 1986, 33–130; Chieffo Raguin 2013, 33–35). Lead cames replaced plaster, stucco and wooden armature, which simplified the making of windows because even smaller pieces of glass could be easily inserted (Brisac 1986, 7).

1 The material presented here is part of the project Discovering of old Dubrovnik cathedrals – Research-educational workshops of the Department of Art History, Faculty of Humanities and Social Sciences, University of Zagreb and City parish of the Assumption of the Virgin Mary in Dubrovnik. These stained-glass finds will be published as part of a book expected in late 2022.

Figure 2: Stained glass windows, Canterbury cathedral, 13th century.

Monumental churches and cathedrals were built in Europe around 1200, and the size of their windows was particularly pronounced in Gothic cathedrals with finely painted stained glass (Brisac 1986, 33–34; Cowen 2008, 9, 11; Gasparetto 1958, 151–153). Sacral buildings now use large windowpanes to present biblical stories through images, which are understandable to the poorly educated and often illiterate believers (Fig. 2). Scenes from everyday life in the late Middle Ages were also created (Brisac 1986, 14; Chieffo Raguin 2013, 29–48; Cowen 2008, 18, 21).

If we exclude the cost of construction, stained glass was the most expensive segment of the building and was an important part of window architecture. The masters who painted them were highly respected artists (Raguin 1986, 30). The process of making stained glass required good cooperation between artists and patrons, who financed the costs of their production (Chieffo Raguin 2013, 42, 55). However, in addition to sacral structures, secular buildings also had glazed windows, which is especially noticeable in the 14th century in developed areas. In western Europe, window glazing was considered a luxury, so there were special taxes on private window glass (Sarti 2006, 109).

Several techniques were used to make windowpanes: casting, crown and cylinder. The casting technique was applied in the Roman period to obtain flat window glass by pouring glass mass on a flat surface or into an open shallow mold (Ignatiadou and Antonaras 2011, 57; Kanyak 2009, 26–27, Fig. 1; Milavec 2015, 80). However, such glass was often uneven and did not provide the necessary transparency but affect-

ed the more beautiful experience of the interior of the building (Milavec 2015, 80). The crown glass technique was performed in a way to blow a paraison, which would open and rotate rapidly until a glass disc was created under centrifugal force. It was primarily used to make circular glass (discs) but could also be cut into rectangular pieces (Brisac 1986, 180–181; Chieffo Raguin 2013, 15; Ignatiadou and Antonaras 2011, 55; Kanyak 2009, 33–34, Fig. 14). This technique was applied throughout the Roman Empire in the 4th century (Kanyak 2009, 33). The Romans also utilized the technique of cylinder blown sheet – a blown glass cylinder is cut along its long side, and such flat sheets of glass are cut into smaller rectangular pieces (Ignatiadou and Antonaras 2011, 104; Kanyak 2009, 38–39, Fig. 25). The cylinder technique is characterized by the procedures used in free blowing (capturing the glass mass with a blow pipe and blowing the paraison), but it is also necessary to level the glass on a flat metal surface until the shape of the cylinder is obtained. This was followed by punching and expanding the top of the cylinder, removing it from the blow pipe, cutting it longitudinally, and reheating and separating the two glass flat sheets (Brisac 1986, 180; Chieffo Raguin 2013, 15; Kanyak 2009, 38–39, Fig. 25). The technique was used from the beginning of the 2nd century to the beginning of the 19th century (Kanyak 2009, 38). This is the most common and the most effective technique used in making stained glass.

The design of stained-glass depictions was made on a scale of 1:10. The colours of the glass available at the workshop were also selected (Brisac 1986, 181). Next, depictions of exact dimensions were made on wooden boards and on paper (Brisac 1986, 181–182; Chieffo Raguin 2013, 25–26). This was followed by cutting pieces of glass. Glass cutting was a separate craft from glassmaking. Masters who specialized in cutting glass knew how to straighten glass mass and cut it into various shapes, as well as join pieces of glass to lead cames (Roller 1951, 137). In the Middle Ages, glass was cut with red-hot iron, requiring great skill of a master. However, as early as the end of the Middle Ages, diamond was used to cut glass, which contributed to the result (Brisac 1986, 182). After cutting, stained glass was painted, and fired in an oven to solidify the paint (Chieffo Raguin 2013, 26–27).

Stained glass can be composed of quadrangular, circular, or other pieces of glass, which are inserted into a panel using lead cames or plaster (Ignatiadou and Antonaras 2011, 26). There were also masters who framed glass panels into window frames, but they were also engaged in the production of glass (Roller 1951, 138). The windows were divided into parts of less than one square meter during construction, and were later joined (Brisac 1986, 16, 185).

A detailed description of the making of stained glass can be found in Theophilus (Treatise on Diverse Arts / De diversis artibus – The second book, The Art of the Worker in Glass; 12th century), who wrote about the process of glass cutting, painting, casting cames and assembling glass (Theophilus, book 2, chapters 17–29, pages 61–72; Brisac 1986, 186–187; Chieffo Raguin 2013, 16–179.

Archival data on window glass and glassmakers in Dubrovnik

Dubrovnik churches were already ornamented with stained glass in the 14th century, which can be seen in archival sources (Han 1971, 52). The Franciscan church of the Little Brothers (Mala braća) in Dubrovnik had glazed windows as early as 1348. It is possible that they were made as a combination of polychrome polygonal glass pieces and oculi that were embedded in lead cames, or of monochromatic and polychromatic oculi. Apse windows of the church of St. Dominic were glazed around 1366 (Han 1979, 457–459).

Benedictine monasteries were the primary centres of glass production in the Middle Ages. Although the number of glass workshops affiliated with monasteries declined considerably in the following centuries, the making of stained glass still took place in such workshops during the 14th and 15th centuries, especially among the

Franciscans, Dominicans and Jesuits (Han 1981, 47–48, note 17).

In the first decades of the 15th century in the western (Pile) and eastern (Ploče) parts of the city, multiple craft workshops could be found, including those that produced glass. In 1418, the Dubrovnik Small Council decided to build a small glass workshop in the Dominican monastery, which would house a glassmaker, a Dominican friar, specialized in stained glass (Han 1981, 46–47). The archival documents list the names of Dubrovnik masters of glassmaking, among which the first known master of stained glass documented was the Dominican monk Petar (*frater Petrus a fenestris, magister vitri, magister vitriorum fenestrarum*) (Han 1981, 48-49, 55). Glassmaker Petar Božiković-Natalis from Zadar (*Petrus, Piero Boxicchouich-Natalis*), who was not a monk, also made windowpanes in Dubrovnik (Han 1981, 49, 65–69). Nikola Petrov (*Nicola Petri*), the son of the glassmaker friar Petar, specialized in making stained glass as well (Han 1981, 55, 69–70). He had the title of magister vitriorum fenestrarum and was accepted into municipal service in 1444 (Han 1981, 57). Dubrovnik was a very developed city in both economic and cultural terms, so it is expected that it had masters specialized in making stained glass. Even in smaller parts of Europe, masters of making and painting stained glass were very common artisans-artists (Marks 1993, 41). The price of one glazed window in Dubrovnik was 7.5 gold ducats (according to 8 red windows that cost 180 perpers = 60 gold ducats) (Han 1981, 73).

Throughout the 15th century, the glazing of windows in Dubrovnik churches continued. The Church of St. Blaise (St. Vlaho) received windows in 1440 (Han 1971, 55; Han 1979, 463; Han 1981, 52), and the monastery of St. Claire (St. Klara) was glazed in 1433 (Han 1971, 54; Han 1979, 462–463; Han 1981, 51). In addition to sacral structures, secular, and private buildings (houses of nobles and merchants) in Dubrovnik also had glazed windows (Han 1971, 55–56; Han 1979, 463; Han 1981, 67). The Rector's Palace was glazed with stained glass in 1434, but the windows were damaged in 1435 in an explosion and fire, and were rebuilt in 1442 (Han 1971, 55; Han 1979, 463–464; Han 1981, 67–69). It seems that these stained-glass windows did not last long, because as early as 1463, there was an explosion of gunpowder in the Palace, which caused great damage to the building and probably the stained-glass windows with it (Han 1979, 464; Han 1981, 68).

Archival documents state that masters who painted stained glass also worked in local workshops. The stained-glass master and painter Bernard Nikolin (*Bernardus Nicole vitrarii, pictor, magister fenestrarum de vitro*), who collaborated with the local painter Vukac Rajanović (*Vuchaz Raianouich*), is mentioned. The Dubrovnik school of painting flourished in the third decade of the 15th century, at a time when intensive stained-glass production was taking place, so painting and glassmaking likely functioned in a complementary manner (Han 1981, 72, 76).

One archival data is particularly interesting regarding the stained glass from the Dubrovnik cathedral: Friar Petar, a Dominican monk in Dubrovnik, is mentioned as a glazier who in 1431 undertook the making of eight high-quality red glass windows with white frames for the cathedral. It is possible that these windows represented red flashed glass. They were made for the dome of the cathedral (Han 1979, 461–462; Han 1981, 50–51, 73), while other polychromatic stained-glass windows from the cathedral were not mentioned in archival documents.

According to archival data, some windows of the Dubrovnik cathedral were broken in 1573 and replaced. Their complete destruction occurred in 1667, when the cathedral collapsed in the greatest earthquake that struck the city (Han 1979, 462; Han 1981, 51).

Finds

It is possible that stained glass windows were imported to Dubrovnik from Venice in the 14th century, or that Murano masters came to Dubrovnik to make them (Han 1971, 54; Han 1979, 460). The Venetians made stained glass

for many Italian cities, and less for Venice itself (Gasparetto 1958, 154–155; Han 1971, 54). However, in the 15th century, domestic glassmakers made windowpanes for Dubrovnik buildings in local workshops (Han 1979, 465), and archival data testify that, at that time, Dubrovnik craftsmen specialized in glassmaking went to Venice to get tools (Han 1981, 57).

Dubrovnik developed intensively during the 14th and in the first half of the 15th century, so the number of stone buildings (sacral and secular) increased, which caused a greater demand for glazed windows (Han 1971, 52; Han 1981, 48). It can be assumed that the cathedral, as the most important sacral building, had more luxurious stained-glass windows than other buildings in Dubrovnik. Although glass finds from the research of the Dubrovnik cathedral are numerous and of different shapes, they are very fragmented and with modestly preserved paintings.

Figure 3: Pieces of red *flashed* stained glass (H. 5.1 cm; H. 4.4 cm), Dubrovnik cathedral, 15th century.

The finds are of diverse colours: yellow, ochre yellow, red, purple, green, brown violet (Fig. 1, 3–14), cobalt blue, and turquoise (Fig. 15). Among the material, red flashed glass (made of a lower thicker and colourless or yellowish layer of glass, and an upper thinner red layer of much higher density) stands out (Fig. 3, 11–12). Black painting is preserved on several fragments (made of red flashed, yellow, ochre yellow and brown

Figure 4: Fragments of yellow stained glass with black painting (H. 1.8 cm; H. 2.5 cm), Dubrovnik cathedral, 14th- 15th century.

Figure 5: Fragments of yellow stained glass with black painting (H. 4.9 cm; H. 3.7 cm; H. 3.3 cm), Dubrovnik cathedral, 14th- 15th century.

Figure 6: A rectangular piece of yellow stained glass (H. 3.2 cm, W. 6.2 cm), Dubrovnik cathedral, 14th- 15th century.

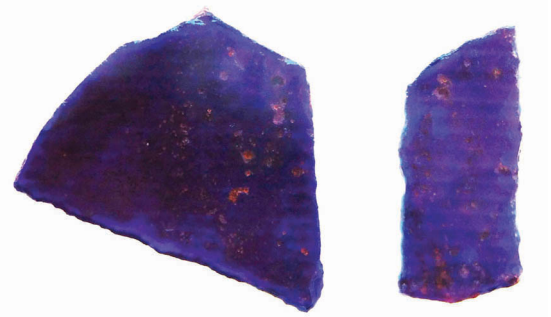

Figure 7: Fragments of purple stained glass, Dubrovnik cathedral (H. 37 cm; H. 34 cm), 14th- 15th century.

Figure 8: A rectangular piece of brown violet stained glass (H. 2.8 cm, W. 6.4 cm), Dubrovnik cathedral, 14th- 15th century.

violet glass – Figs. 4–5, 9, 11), but insufficiently to reconstruct its depictions. Lead cames (Fig. 16) in which the cut glass pieces were inlaid, and copper wire mesh remains (for protection of windows) were found as well (Fig. 17). Thick mortar lines can be found in some fragments, which revealed the way in which the panels were attached to the stone frames (Fig. 14). These finds demonstrate the methods of installation and protection of stained glass in late medieval Dubrovnik, which were the same as in the largest centres of that time.

Although the paintings are poorly preserved, based on Philip de Diversis's allegation that there were depictions of saints on stained glass in the cathedral (De Diversis, part II, chapter 4, page 27; Han 1979, 462), we can assume some simplified iconographic solutions. Some fragments of yellow glass have painted black curved lines that may represent parts of saintly halos (Fig. 4) as part of a larger stained-glass composition. Theophilus states that such motifs were painted on yellow glass (Theophilus, book 2, chapter 21, page 65), which was common on the stained-glass windows of many European cathedrals and churches throughout the 12th and 13th centuries (Brisac 1986, 80–81, 91–92, 103; Williamson 2003, 17, 36, 131, 135, Figs. 1, 19). Yellow glass (Fig. 5) was also used to depict hair, hands, feet, wings, and gold. Saintly halos could also be made of red glass (as in the cathedrals of Canterbury, Troyes, Chartres, Auxerre, Saint-Denis, Reims) (Brisac 1986, 12, 37, 57, 91; Chieffo Raguin 2013, 102, Fig. 70; Williamson 2003, 20, 25, 27–29, 32–33, 37, 40, 46,132–136, 138, Figs. 4, 9, 11–12, 15–16, 20, 23, 29). Among the finds are two slightly curved pieces made of red flashed glass (Fig. 3), which could have served such a purpose, but could also have formed part of the frame of some iconographic display (like those in French cathedrals through the 12th-14th centuries) (Brisac 1986, 12, 57, 66, 88; Chieffo Raguin 2013, 34, Fig. 20; Williamson 2003, 25, 27, 30–36, 44, 133–135, 137, Figs. 9, 11, 13–19, 27). One piece of stained glass is rectangular in shape and made of ochre yellow glass, and probably served as the frame of some depiction (Fig. 6). A smaller number of purple (Fig. 7) and brown violet (Figs. 8, 9) fragments of glass were found, while green glasses are quite numerous (Fig. 10). These colours of glass were used for various parts of the composition (frame, clothing, decoration, field filling), as evidenced by depictions from Western European cathedrals and churches (Brisac 1986, 12, 14–15, 42, 52–55, 70–71, 96–97; Chieffo Raguin 2013, 30–31, 34, Figs. 18, 20; Williamson 2003, 25, 28, 30–32, 35, 39–40, 43, 136–137, Figs. 9, 12–14, 16, 18, 22–23, 26).

Red flashed glass from the Dubrovnik cathedral (Fig. 3, 11–12) is made of yellow glass dipped in a pot with red glass using the *cylinder blown sheet technique*. The layered glass cylinder was then opened and, while it was hot, was cut lengthwise thus obtaining flat sheets of coloured glass.

When a thick red glass mixture was applied in thin layers to the base glass, a ruby red

effect was achieved. Otherwise, a very expensive ingredient – gold – was used to make ruby red glass, which made it necessary to invent a cheaper method of production. This prompted the development of the flashing technique, by applying a layer of thick red paint obtained with copper oxide to the base of the window glass (Kunicki-Goldfinger *et al.* 2014, 103). Red glass is poorly permeable to light, so it had to be applied in very thin layers on as colourless a base glass substrate as possible (Williamson 2003, 9), so that daylight could effectively reach the interior of the space.

Red flashed glass forms part of the stained-glass compositions of Western European cathedrals, dating from the 12th to the 16th century (England - York Minster, France, the Netherlands, Germany, Spain). Analysis of this glass showed that a thin layer of glass above the yellow glass was obtained by use of copper oxide, which is represented by 1% in all cases (the red layers have a high-Cu, and the colourless / yellow have low-Cu) (Kunicki-Goldfinger et al. 2014, 89–95, 101). Analysis also showed that it was potassium (forest) glass obtained using wood ash, which is characteristic of Western Europe. Additionally, medieval red flashed glasses are not a homogeneous group in terms of chemical composition. The layers of colourless and coloured glass differ in composition, indicating that the red glass was not obtained in a simple way – by adding copper to a mass of colourless glass – but that the masses were prepared separately (Kunicki-Goldfinger *et al.* 2014, 98–101). The existence of two basic types (with subtypes) of red glass has been documented: A – a multilayer glass of striated structure with several white and red layers (made before 1400); B – two or three separate layers with only one red (from late 14th century): B-2 – a simple red layer overlying a white base & B-3 – with an additional white layer over the red – the coperta layer (Kunicki-Goldfinger *et al.* 2014, 93-94, 102–103). The finds from the Dubrovnik cathedral correspond to type B-2.

Analyses of medieval red flashed glass from Western Europe revealed that it was stained

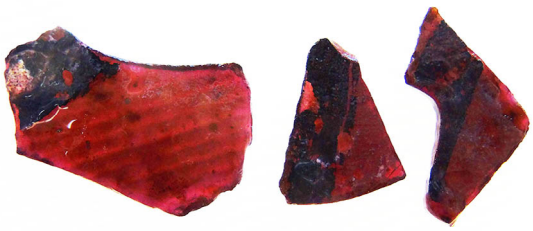

Figure 9: Fragments of brown violet stained glass with black painting, Dubrovnik cathedral (H. 1.8 cm; H. 2 cm; H. 2.1 cm), 14th- 15th century.

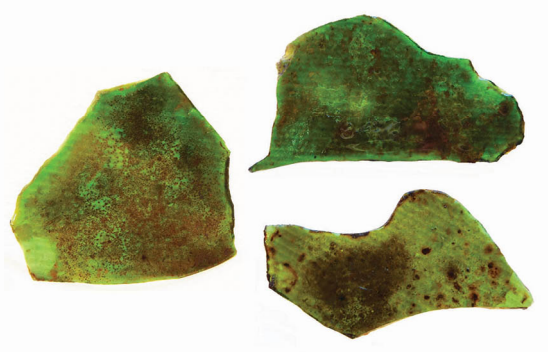

Figure 10: Fragments of green stained glass (H. 6 cm; H. 4.4 cm; H. 3.5 cm), Dubrovnik cathedral, 14th- 15th century.

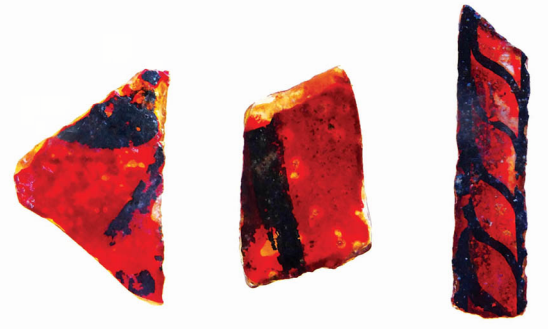

Figure 11: Pieces of red flashed stained glass with black painting (H. 3.8 cm; H. 2.2 cm; H. 4.5 cm), Dubrovnik cathedral, 15th century.

with copper nanoparticles, and that gold (commonly used to obtain a red colour) was not found in the composition. The technology of making flashed glass type A (striated structure), has not been demonstrated from the early 15th

Figure 12: Fragments of red flashed stained glass (W. 3 cm; W. 2.8 cm), Dubrovnik cathedral, 15th century.

to the 20th century, and perhaps until recently, so the archaeometric analysis carried out by J. Kunicki-Goldfinger *et al.* (2014, 103–104) represent a rediscovery of this forgotten medieval technique. Fragments of stained glass made of two or more layers of red glass were found in the excavations of the Paderborn cathedral as well, and date from the second half of the 12th century (Lobbedey, Wedepohl, and Kronz 2008, 124). But, flashing technique could have been even more sophisticated as we see in the example of potassium glass from Carthusian monastery at Pavia in the 15th century, which was made of layers of blue and purple, green and colourless, and red and colourless glass (Azzoni *et al.* 2005, 381–388).

According to archival sources, Venetian glaziers at the time did not make red transparent window glass, so such an origin can be discarded according to current knowledge. In Venice, in the church of San Giovanni e Paolo from the end of the 15th century, fragments of red stained glass were found. Analysis of this glass demonstrated that it is potash glass, i.e. imported from northern Europe (Verità 2013, 532).

It is believed that this complex and mysterious technique of making red glass was limited to a small number of workshops and skilled craftsmen (Kunicki-Goldfinger *et al.* 2014, 101, 104). The red flashed glass from the Dubrovnik cathedral can be associated with the year 1431, when the glassmaker friar Petar committed to make eight quality windows from red and white glass for the dome of the cathedral (Han 1979, 462; Han 1981, 50–51). This possible production of red flashed glass in a Dubrovnik workshop reveals excellent contacts between domestic glass-

Figure 13: Pieces of stained glass with serrated edges (H. 4.7 cm; H. 3.5 cm; H. 4.5 cm), Dubrovnik cathedral, 14th-15th century.

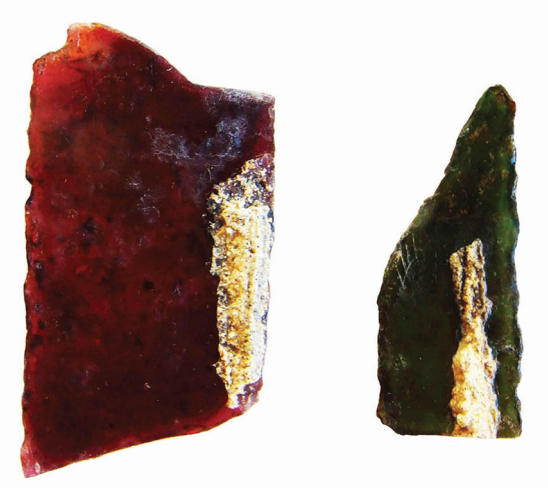

Figure 14: Fragments of corroded stained glass with lines of mortar (H. 5.8 cm; H. 4.3 cm), Dubrovnik cathedral, 14th- 15th century.

makers and Western European craftsmen and technologies. It also indicates that Dubrovnik followed the highest technological trends of glassmaking and the use of stained glass in the late Middle Ages. Fragments of red flashed glass from the Dubrovnik cathedral need to be chemically analysed in order to know their origin more reliably.

Stained glass finds from the Dubrovnik cathedral can be dated from the middle of the 14th century (because they already existed in the local churches of the begging orders – Franciscan and Dominican – so it is to be expected that

the most important sacral building in the city also had them (Han 1979, 459–460) until 1440 (when Philip de Diversis mentions the stained glass windows of the cathedral in his book Description of the Famous City of Dubrovnik, in which he states that the windows were painted with depictions of saints) (De Diversis, part II, chapter 4, page 27; Han 1979, 462; Han 1981, 51). V. Han (1979, 462) expressed the opinion that the red glass, which was made for the dome of the cathedral in 1431, was probably the final part of the stained glass, and that the other stained-glass windows were installed earlier. Precise dating of the finds via stratigraphy is not possible because they were found in backfilled layers of rubble without accompanying material to date them exactly, but we can rely on the mentioned archival-historical data and analogous examples. Only rare fragments of oculi (15th–16th century) and early post-medieval glazed pottery were found with the remains of stained glass, which does not coincide with the dating of stained glass. Cobalt blue and turquoise blue fragments (Fig. 15) differ in the type and thickness of the glass, so it is possible that they are not from the same period as other stained glass finds. This is also indicated by the context in which they were found: the northern vaulted room behind the sacristy, with the finds of Italian and Turkish (Iznik style) glazed pottery from the 15th-16th century (Topić 2017a, 59–79).

Since the Dubrovnik fragments of stained glass are made of a wide range of vivid colours, they certainly created beautiful scenes, the effectiveness of which was contributed to by the details painted in black. After the pieces of glass were arranged in imaginary scenes, it was necessary to paint them. The colour applied to the stained-glass windows was dark brown or black and enamel-like. In Theophilus, we find data on the preparation of a painting mixture. First, the copper had to be crushed and burned until it became a powder. Then pieces of green and Byzantine blue glass had to be ground separately. All three ingredients were then mixed in a ratio of 1/3 each. They were then ground on the same

Figure 15: A fragment of blue window glass (H. 3 cm, W. 5.8 cm), Dubrovnik cathedral, 15th- 16th century (?).

Figure 16: H-section lead cames (in which the cut glass pieces were inlaid), Dubrovnik cathedral, 14th- 15th century.

stone with wine or urine and placed in an iron or lead pot. He also stated that it was necessary to use three shades of colour for highlights on glass (Theophilus, book 2, chapters 19–20, pages 63–64). Typically, multi-layered coats of paint were applied, and the details were painted at the end. When the painting process was over, the enamel had to be fixed, so the painted stained-glass windows were heated in an annealing or cooling furnace, at temperatures that had to be significantly lower (approximately 680 °C) than the melting point of the substrate (1300-1500 °C) in order to not melt (Marks 1993, 34, 36; Chieffo Raguin 2013, 14, 26–27; Cowen 2008, 12).

A large number of fragments of H-section lead cames were found in the investigation of the cathedral (Fig. 16). This lead armature was probably made by the master friar Petar because he was also engaged in casting lead plates for cov-

ering churches (Han 1981, 54), so he could apply this knowledge when assembling glass panels. This way of connecting pieces of glass as a whole was much faster and more efficient than wooden frames, because lead is soft and easy to shape, which allowed the masters to more freely create a variety of iconographic scenes. The edges of some pieces have been preserved serrated because they were cut with grozing iron, indicating that these pieces had irregularities that were corrected in this way to fit in the provided frames (Fig. 3, 8, 13) (Brisac 1986, 182; Chieffo Raguin 2013, 16, 27). After the fragments were inserted into the lead frames, they were joined as a whole by soldering to reinforce the lead lattice, and the finished glass panels were placed in the groove of the stone window frame. The frames were mostly made of flat wrought iron bars, but in the Romanesque period, wooden frames were sometimes used as well. Glass panels were fastened to the stone frames with mortar, and T-bars and clamping wedges were used for the iron window frames (Brisac 1986, 185; Chieffo Raguin 2013, 27; Rauch 2004; Marks 1993, 36–37). Finds of fragments of stained glass with thick lines of mortar (Fig. 14) from the Dubrovnik cathedral indicate that, in the 14th–15th century in Dubrovnik. the same techniques of installing stained glass were applied as in the largest Western European centres.

The stained-glass windows had to be waterproof, and in order to achieve this, cement or a glazing compound (made of whiting powder – calcium carbonate, linseed oil and drying agent) were applied with a brush. It was necessary to leave the glass for a few days for the cement to dry (Brisac 1986, 184–185; Chieffo Raguin 2013, 27).

Fragments of copper wire mesh to protect the outside of the stained glass are also important finds from the Dubrovnik cathedral (Fig. 17). Copper wire mesh and iron frames are the products of domestic workshops, as evidenced by the Dubrovnik archives (Han 1971, 54–57; Han 1981, 73, 75; Roller 1951, 137–138). Such a

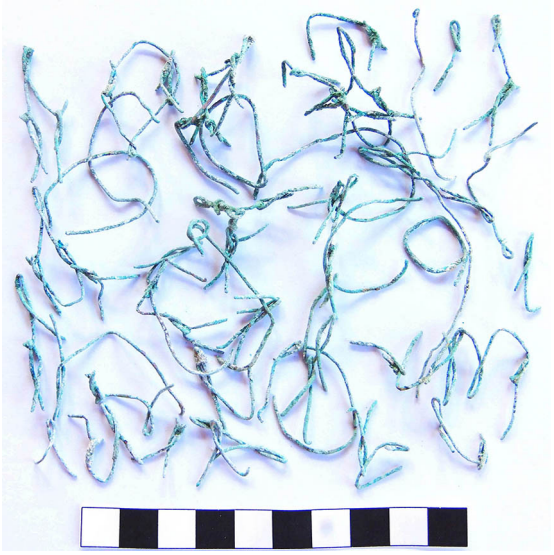

Figure 17: Remains of copper wire mesh (for protection of windows), Dubrovnik cathedral, 14th- 15th century.

Figure 18: Corrosion on a piece of green stained glass (H. 35 cm, W. 7.5 cm), Dubrovnik cathedral, 14th- 15th century.

form of stained-glass protection is also found on modern buildings.

Stained-glass windows, in addition to decorative and educational, had the role of protecting the building from external influences, and were constantly exposed to various atmospheric changes, UV radiation from the sun, and pollution caused by humans and animals (pigeons, bats, different microorganisms – mold, algae). As a result, stained glass windows on both sides were often covered with a thick, sticky layer of dirt (dust, candle soot, glass glue and similar substances), which was sometimes mixed with

corroded layers of paint. Such material can be found on fragments of stained glass from the Dubrovnik cathedral. The deterioration of the lead lattice and frame also affected the glass and caused structural damage. Vibrations generated during the use and repair of the building also had a detrimental effect and could cause damage and increase corrosion. The glass can sometimes be completely affected by corrosion, causing their opacity. The formation of a brown layer due to the oxidation of manganese – browning, is particularly characteristic of glass from the 13th-14th century (Rauch 2004). This phenomenon is also visible on the Dubrovnik fragments, especially on purple and green glass (Fig. 18).

Final remarks

These attractive fragments of stained glass from the Dubrovnik cathedral represent very rare finds of this kind in southeast Europe. The glass is made of different colours, and some have black painting. Dubrovnik stained-glass windows were made using the *cylinder blown sheet* technique, which was more effective than the *casting* or the *crown technique*. The glass thus obtained was very suitable for stacking windowpanes and framing. Red flashed glass found demonstrates that Dubrovnik followed the latest trends of Western Europe.

Although the origin of the material from the cathedral is not entirely clear, we can assume that the stained-glass windows from the Dubrovnik cathedral may have been partially produced in Dubrovnik under Western European influence (as evidenced by native glass-maker friar Petar initiating the creation of eight windows of high-quality glass with red interior and white frames for the cathedral in 1431) or imported from western Europe (14th century stained-glass).

The cathedral stained-glass could have been made between the mid-14th century (at which time stained-glass was already in use in the city according to archival documents) and 1440 (when Philip de Diversis mentioned the cathedral glass windows with representations of saints in his book). The cathedral windows were damaged in 1573, and the 1667 Dubrovnik earthquake caused their final destruction. The windows were of high quality since they lasted for approximately 230 (red flashed glass) or 300 years (other glass).

Future chemical analysis will offer more answers about these significant finds, and hopefully will reveal the workshop from which they originate. Dubrovnik was one the most developed cities in the Mediterranean at that time, which was due to its extensive trade and important geographical position. This enabled the arrival of the best products and craft novelties, including this beautiful polychromatic window glass.

Acknowledgements

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Summary

Stained glass windows were an important part of late medieval window architecture, and they had both a decorative and educational function. The Dubrovnik Republic maintained its own glass production in the late Middle Ages, with records of window glass manufacturing as well. Dubrovnik developed intensively during the 14th and in the first half of the 15th century. Fragments of stained glass from the research of the Dubrovnik cathedral are numerous and of different shapes, but very fragmented with modestly preserved paintings.

The finds are of diverse colours: yellow, ochre yellow, red, purple, green, brown violet, cobalt blue, and turquoise. Among the material, red flashed glass (made of a lower thicker and colourless or yellow layer of glass, and an upper thinner red layer) stands out. Black painting is preserved on several fragments, but insufficiently to reconstruct its depictions. Lead cames in which the cut glass pieces were inlaid and copper wire mesh remains (for protection of windows) were found as well. Thick mortar lines can be noticed in some fragments, which

revealed the way in which the panels were attached to the stone frames. These finds demonstrate the methods of installation and protection of stained glass in late medieval Dubrovnik, the same as in the largest centres of that time. Since archaeological finds of stained glass are extremely rare in the Balkan region, this is a significant finding.

In the Middle Ages, red glass was poorly transparent. To obtain a translucent ruby red colour in glass, the *flashing* technique was applied. Red flashed glass from the Dubrovnik cathedral was made of yellow glass dipped into a pot with red glass by a *cylinder blown sheet technique*, which was more effective than the *casting* or *crown technique*. This yielded a thin red layer on the surface and a thicker yellow layer beneath it. Red flashed glass also testifies that Dubrovnik followed the latest trends of Western Europe.

Stained glass from the Dubrovnik Cathedral may have been partially produced in Dubrovnik under Western European influence or imported from Western Europe. The cathedral's stained glass could have been made between the mid-14th century and 1440 (when Philip de Diversis mentioned the cathedral glass windows with representations of saints in his book). The cathedral windows were damaged in 1573 and the 1667 Dubrovnik earthquake caused their final destruction.

Povzetek

Vitraži so bili pomemben del poznosrednjeveške okenske arhitekture in so imeli tako dekorativno kot izobraževalno funkcijo. Dubrovniška republika je imela v poznem srednjem veku lastno proizvodnjo stekla, zabeleženi so tudi podatki o proizvodnji okenskega stekla. Dubrovnik se je v teku 14. in v prvi polovici 15. stoletja hitro razvijal. Odlomki vitražev iz raziskav dubrovniške katedrale so številni in različnih oblik, vendar fragmentirani in s skromno ohranjenimi poslikavami.

Najdbe stekla so različnih barv: rumena, oker, rdeča, vijolična, zelena, rjavo vijolična, kobaltno modra in turkizna. Med materialom izstopa rdeče steklo (izdelano iz spodnje debelejše brezbarvne ali rumene plasti stekla ter zgornje tanjše rdeče plasti). Črna poslikava je ohranjena na več fragmentih, vendar upodobitev ni mogoče rekonstruirati. Najdeni so bili tudi svinčeni odlomki okvirjev, v katere so bili vstavljeni koščki stekla, in ostanki bakrene žice za zaščito oken. Na nekaterih odlomkih je opaziti linije malte, ki kažejo kako so bile plošče pritrjene na kamnite okvirje. Te najdbe dokazujejo načine vgradnje in zaščite vitražev v poznosrednjeveškem Dubrovniku, enako kot je bilo v navadi v največjih središčih tistega časa. Ker so arheološke najdbe vitražev na območju Balkana izjemno redke, gre za pomembne najdbe.

V srednjem veku rdeče steklo ni bilo povsem prosojno. Za ohranitev prosojne in sijoče rubinasto rdeče barve v steklu je bila uporabljena tehnika ***flashing***. Rdeče steklo iz dubrovniške katedrale je bilo izdelano iz rumenega stekla, potopljenega v posodo z rdečim steklom s tehniko pihanja cilindra, ki je bila učinkovitejša od tehnike ulivanja ali krone. To je dalo tanko rdečo plast na površini in debelejšo rumeno plast pod njo. Rdeče steklo tako tudi dokazuje, da je Dubrovnik sledil najnovejšim trendom zahodne Evrope.

Vitraži iz dubrovniške katedrale je bili morda delno izdelani v Dubrovniku pod zahodnoevropskim vplivom ali pa uvoženi iz zahodne Evrope. Nastali so verjetno med sredino 14. stoletja in 1440 (ko je Philip de Diversis v svoji knjigi omenil steklena okna katedrale s podobami svetnikov). Okna katedrale so bila poškodovana leta 1573 dokončno uničenje pa je povzročil potres leta 1667.

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Recenzija
Review

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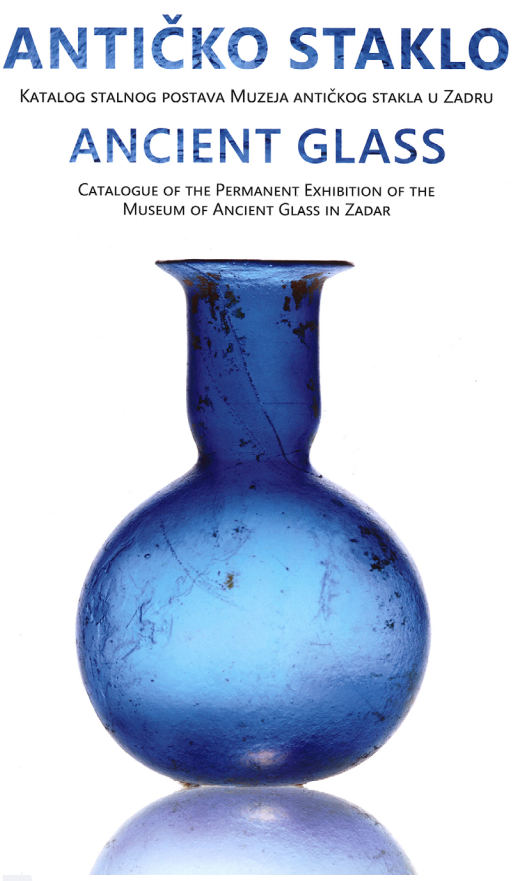

Anamarija Eterović Borzić in Berislav Štefanac, 2021. Antičko staklo. Katalog stalnog postava Muzeja antičkog stakla u Zadru / Ancient Glass. Catalogue of the Permanent Exhibition of the Museum of Ancient Glass in Zadar. Zadar: Muzej antičkog stakla. ISBN 978-953-8320-04-0

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V letu 2021 so kolegi iz Muzeja antičkog stakla v Zadru na Hrvaškem pripravili obsežno dvojezično publikacijo, ki v hrvaškem in angleškem jeziku predstavlja celoten katalog razstavljenega steklenega gradiva v muzeju. Leta 2006 osnovani muzej, ki si je kot temo svojega poslanstva izbral antično steklo, je bil za ogled uradno odprt v letu 2009. Ideja za osnovanje muzeja, ki jo je muzeološka in strokovna javnost sprejela precej skeptično, je temeljila na veliki količini izkopanega arheološkega gradiva, s poudarkom na rimskem steklu, s številnih nekropol na območju Zadra in njegove okolice, ki ga, kljub obstoječemu Arheološkemu muzeju v Zadru, zaradi obsega ni bilo mogoče ustrezno prezentirati.

Avtorja monografije Anamarija Eterović Borzić in Berislav Štefanac, oba kustosa arheologa v muzeju stekla, sta združila moči za pripravo obsežnega kataloga, v katerem je na 464 straneh velikega formata objavljenih 1467 kataloških enot eksponatov s stalne muzejske postavitve, vsi so predstavljeni tudi z barvnimi fotografijami.

V Uvodu je naprej predstavljena zgodovina ustanovitve in razvoja Muzeja antičnega stekla, sledi kratka predstavitev stalne razstave, ki je tematsko razčlenjena v osmih posamičnih sklopih oziroma dvoranah, zaključi pa se z opisom arheološkega porekla oziroma najdišč razstavljenega steklenega gradiva. Slednje je bilo v največji meri pridobljeno z dolgoletnimi terenskimi raziskavami Arheološkega muzeja v Zadru, med ka-

terimi posebej izstopajo najdišča rimskih naselbin in njihovih nekropol, kot so *Iader* (Zadar), *Aenona* (Nin), *Argyruntum* (Starigrad), *Asseria* (Podgrađe pri Benkovcu) in *Burnum* (Ivoševci pri Kninu).

Kataloški del se začne z dvorano oz. sobo 1, katere tema je odkritje stekla, razvoj steklarstva, tehnike izdelave in krašenje. Žal ob kataloški predstavitvi gradiva pogrešamo vsaj osnovni vsebinski uvod k izbrani temi posamezne dvorane in predstavljenim eksponatom, ki bi strokovnjaku, študentu ali laičnemu bralcu z nekaj več besedami kot v uvodnem poglavju predstavil, kaj nam izbrani predmeti ilustrirajo, o kateri temi iz naslova govorijo in zakaj so bili izbrani.

Ob branju oz. pregledu kataloga nam takoj umanjkata najmanj opredelitev tehnike izdelave posameznega predmeta in vrsta ali način izvedbe okrasa. Če pri nekaterih najdbah oz. kataloških enotah, ki imajo navedeno bibliografijo, to lahko preverimo na drugem mestu, pa je pretežni del gradiva neobjavljen in bralcu te informacijo manjkajo. V pomoč bi bile tudi vsaj osnovne analogije oz. primerjave sorodnega gradiva. Pri dataciji predstavljenega gradiva prav tako ni povsem jasno, ali je časovni okvir izbran tipološko ali na osnovi grobne celote oz. datiranih plasti izbranih najdb. Navadno so tovrstne informacije podane na začetku, kot spremna informacija h katalogu.

Druga dvorana govori o importih, lokalnih delavnicah in reliefnih žigih. Bogat nabor gradiva nepoučenega ponovno pušča v dvomih, katere vrste gradiva lahko pripišemo lokalnim delavnicam ter zakaj in na osnovi česa je uveljavljeno tako mnenje. Pri importih steklenega posodja, še posebej omenimo kvadratne steklenice (kat. št. 321, 325) in nizke balzamarije s širokim vratom (npr. kat. št. 339, 341, 343, 344, 345 itd.), ki imajo na dnu odtis imen in kratic, ali čaše gubanke z odtisom novca (kat. št. 323, 327), bi risba dna in odtisa oz. žiga povedala več kot samo fotografija. Hkrati bi bila pomembna nekoliko širša informacija o pomenu tovrstnih žigov in odtisov, še posebej ker vemo, da je muzej tej tematiki leta 2012 namenil posebno monografijo.

V uporabljeno terminologijo in poimenovanje se ne želimo spuščati preveč podrobno, saj izrazi očitno sledijo publikaciji *Terminološki rječnik antičkog staklarstva*, ki jo je ta muzej izdal leta 2017. Opozoriti pa velja vsaj na eno od neskladnost, ki vpliva tudi na prevod v angleški jezik in zaradi tega lahko povzroči precej zmede in nerazumevanja, v stroki pa tudi upravičeno kritiko. Vrčić je izraz, ki ga kolegi v publikaciji uporabljajo za kvadratne steklenice in vrče skupaj in prevajajo kot juglet (angl.), kar ni sporno. Ni pa potrebno posebej opozarjati, da za opredelitev vrča in steklenice v stroki veljajo določena pravila. Steklenica, cilindrična ali kvadratna (angl. square bottle, cylindrical bottle), s široko stojno ploskvijo, sodi med transportno posodje. Zaradi vsebine in široke distribucije se na kvadratnih steklenicah pojavljajo imena ali kratice izdelovalcev, lastnikov delavnic ipd. Široka uporaba izraza *vrčić* oz. *juglet* (angl.), ki sodi med namizno posodje, namenjeno strežbi in serviranju tekočin, je torej neustrezna oz. napačna z več vidikov.

Dvorana 3 je namenjena steklenim posodam, uporabljenim v kozmetiki, farmaciji in medicini. Predstavljen je širok nabor balzamarijev, kroglastih in kvadratnih lončkov, vrčev in steklenic. Tudi v tem primeru pogrešamo nekaj uvodnih misli o področjih njihove uporabe ter o izboru in naboru predstavljenega posodja, še posebej ker med gradivom najdemo tudi širok nabor krožnikov, čaš in skodelic. Prav gotovo bi bila zanimiva tudi kaka grobna celota z ene od nekropol.

Nekropolam in pogrebnemu ritualu je namenjena četrta soba. Žal je tudi v tem sklopu gradivo predstavljeno tipološko; to je morda razumljivo za posamične ali starejše najdbe brez konteksta, ne pa za novo izkopano gradivo. Ustrezen izbor grobnih celot bi brez dvoma pričaral drugačno sliko in bolj celosten pogled na izbrano tematiko.

V naslednji sobi, dvorani 5, je izbrana tema nakit. Izbrana skupina steklenih prstanov, igel, jagod in diskov preslic lahko služi kot uporabne in želene analogije za številne grobne in naselbinske najdbe.

Gospodinjstvu oz. uporabi stekla v hiši in rimskem vsakdanu je namenjena šesta tema. Pester nabor gradiva bi morda lahko bil razdeljen v podskupine, npr. namizno posodje, shrambeno posodje, seti namiznega posodja, uporabne oblike (lijaki, rog, ampula, črnilnik itd.), zabava (žetoni), in z nekaj uporabnimi informacijami iz rimskega vsakdana in življenja v hiši podal zanimiv vpogled v življenje rimske *domus* ali celo vojaškega tabora.

Miniaturne steklene posodice so zbrane v sobi 7. Med njimi so predvsem številni balzamariji, bolj zanimive pa so miniaturne skodelice, čaše in vrčki, izdelani iz stekla vseh barv, ki pretežno izvirajo iz grobov. Velikokrat jim najdemo identične vzporednice v enakih oblikah večjih dimenzij, kar poznamo npr. tudi z grobišč rimske Poetovione. O njihovem namenu in pomenu v grobovih bi veljalo posebej razmišljati, predvsem na osnovi primerjav z najdbami ostalih rimskodobnih najdišč in tudi drugih oz. starejših kultur.

Zadnji sklop govori o redkih in izjemnih najdbah (*Rariteti i unikati*). Izbor je seveda raznolik, verjetno tudi oseben oz. pogojen z muzejsko zbirko. Izpostavljeni so izdelki iz mozaičnega stekla, v kalup pihane posode v obliki ribe, datljev, glave, z napisi v grščini (tu ponovno pogrešamo opredelitev tehnike izdelave, prevod napisov), črno steklo, rdeče steklo itd. Večina teh najdb je bila zaradi svojih posebnosti že obravnavana in objavljena, kar je sicer navedeno v kataloški predstavitvi, pa vendar bi navedba nekaterih primerjav in stavek ali dva o tem, zakaj so posamezni predmeti unikatni oz. redki, pripomogli k razumevanju izbora.

Predstavljeni katalog gradiva iz Muzeja antičnega stekla v Zadru je brez dvoma dosežek, kljub izpostavljenim pomanjkljivostim. Z nekaj več ambicije pa bi bil lahko vsebinsko mnogo bogatejši in bolj izpoveden, čeprav naj bi bil predvsem katalog stalne postavitve. Brez dvoma bo zajetna publikacija tudi zaradi dvojezične objave našla mesto v strokovnih in javnih knjižnicah. Nekateri bomo v njej iskali primerjalno gradivo za svoje študije, drugi pa bodo uživali v oblikah, barvah in krhki lepoti stekla.

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