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The glass from the Gnalić wreck and its glass cargo

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The glass was probably an important, if not the most important, part of the ship's cargo discovered by the island of Gnalić. Vessel glass from the Gnalić wreck was made of naturally coloured and intentionally coloured glass. In addition to vessel glass, over 1,300 pieces of flat glass were recovered, this forming nearly 25% of the cargo. This divides into two separate types, circular window glass 'crowns' and flat glass for mirrors. Two different shapes of mirror were found, circular and rectangular. Interestingly, not only are finished examples of rectangular mirrors present in the assemblage, the ship was also carry a number of 'sides'- or cast but unground mirror plates. The quantity of glassware, which includes some highly decorated articles (such as the engraved vases) and that was probably produced in Venice, seems to have been destined for a luxury-loving market.

Key words: Gnalić, shipwreck, glass cargo, façon de Venice, engraved glass, goblets, beakers, tankards, window glass, flat glass, coloured glass

Brodolom kod Gnalića i stakleni teret s potonulog broda

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Staklo je važan, ako ne i najvažniji dio tereta broda otkrivenog kod Gnalića. Stakleno posude s brodoloma kod Gnalića izrađeno je od prirodno i umjetno obojenog stakla. Uz staklene posude pronađeno je i više od 1300 staklenih ploča koje tvore gotovo 25 % ukupnog tereta. Staklene ploče mogu se podijeliti u dvije vrste: okrugla prozorska stakla i staklene ploče za zrcala. Pronađena su dva oblika zrcala: okrugla i pravokutna. Zanimljivo je da se među staklenim inventarom nalaze ne samo gotova pravokutna zrcala, nego i određeni broj ploča, odnosno odlivenih, ali još nebrušenih ploča za zrcala. Čini se da je određena količina staklenih predmeta – među kojima su i neki vrlo dekorativni primjerci (kao što su gravirane vaze), koji su, uz to, vjerojatno proizvedeni u Veneciji – bila na putu do tržišta koje je voljelo luksuznu robu.

Ključne riječi: Gnalić, olupina broda, stakleni teret, façon de Venice, gravirano staklo, čaše, pehari, vrčevi, prozorsko staklo, staklene ploče, obojeno staklo

The ship's cargo bears the name of the rocky islet of Gnalić in the eastern Adriatic coast in Croatia, where the ship sank. The islet is situated at the southern entrance to the Pašman channel, which is known as a well-used shipping route from ancient times onwards.¹

The remains of the ship were discovered purely by accident in 1967 and they lay at a depth of between 26 and 29 metres. It was soon clear that this was a merchant ship which sunk with all its cargo on board. The shipwreck was most probably caused by a storm, combined with a strong north-westerly wind typical in the area. Based on the finds from the ship, and two cannons bearing the date 1582 in particular, this probably happened in the 1580s.

The glass was an important, if not the most important, part of the ship's cargo discovered near Gnalić. Only a few months after the discovery the ship the first underwater research was organised. The campaign was mainly aimed at the removal of the cargo and to protect the site from looting. During the campaigns in 1967, 1972 and 1973 divers mainly picked up the material that was visible on the seabed. A good part of the glassware, particularly the drinking glasses, was found on the bottom of the sea away from the perimeter of the ship. The goods probably fell into the sea whilst the ship was foundering or it is possible that this part of the cargo was intentionally jettisoned. The drinking glasses were still packed in wicker baskets, and the flat glass still had straw placed between the various layers. The shipwreck was most probably caused by a storm, combined with a strong wind typical in the area, which resulted in rough seas and bad visibility that obscured the low-lying islet from view. Another factor contributing to the shipwreck during the sailing was that it was most probably overloaded.

The last underwater campaign in Gnalić before our research project was organised in 1996. On the basis of earlier investigations the divers concentrated in two areas: the ship and the area to the south-west of it. The area about 100 metres to the south and south-west of the sunken ship was carefully investigated. Here, another part of the glass cargo was discovered. It is possible that during the storm part of the glass cargo fell off the boat and was carried by the wind. The glass from this area is comprised of exclusively two types of simple goblets, which were obviously transported in a great quantity. To date around 3500 pieces of these goblets have been recovered.

The objects discovered at the shipwreck were first illustrated and discussed in *Vrulje*, the journal of the

Nalazište ovog broda nazvano je po stjenovitom otočiću Gnaliću uz istočnu jadransku obalu u Hrvatskoj, gdje je brod i potonuo. Otočić se nalazi na južnom ulazu u Pašmanski kanal, koji je kao prometni plovni put poznat još od antičkih vremena.¹

Ostaci broda otkriveni su posve slučajno 1967. godine, na dubini između 26 i 29 metara. Ubrzo je postalo jasno da je riječ o trgovačkom brodu koji je potonuo zajedno s cjelokupnim teretom. Havariju je vjerojatno izazvala oluja, u kombinaciji sa snažnim sjeverozapadnim vjetrom koji je karakterističan za ovo područje. Na temelju nalaza s brodoloma, a posebice dva topa na kojima je naznačena godina 1582., brod je vjerojatno potonuo 80-ih godina 16. stoljeća.

Staklo je važan, ako ne i najvažniji, dio tereta broda otkrivenog kod Gnalića. Prvo podvodno istraživanje brodoloma organizirano je tek nekoliko mjeseci nakon njegova otkrića. Prvenstvena svrha te akcije bilo je vađenje tereta i zaštita nalazišta od pljačke. Tijekom istraživanja provedenih 1967., 1972. i 1973. ronionci su uglavnom izvlačili površinske nalaze. Velika količina staklenih predmeta, posebice čaša, pronađena je na dnu mora na određenoj udaljenosti od mjesta na kojem je ležao brod. Ti su predmeti vjerojatno pali u more dok je brod tonuo, a moguće je i da je taj dio tereta namjerno izbačen s broda. Čaše su još bile upakirane u pletene košare, a ploče prozorskoga stakla još su bile međusobno odvojene slamom. Brodolom je najvjerojatnije prouzročila oluja, zajedno sa snažnim vjetrom koji je karakterističan za ovo područje, što je dovelo do valovitog mora i loše vidljivosti, zbog koje se nizak otočić nije mogao primijetiti. Dodatni čimbenik koji je mogao pridonijeti potonuću broda bilo je to što je vjerojatno bio prekrcan.

Prije našeg istraživačkog projekta posljednje podvodno istraživanje kod Gnalića provedeno je 1996. godine. Na temelju ranijih istraživanja ronionci su se usredotočili na dva područja: na samu olupinu i na predio jugozapadno od broda. Područje koje obuhvaća oko stotinu metara južno i jugozapadno od brodoloma pomno je istraženo. Tu je pronađen još jedan dio staklenog tereta. Moguće je da je tijekom oluje dio staklenoga tereta pao s broda i da ga je odnio vjetar. Staklo pronađeno u ovom dijelu sastojalo se isključivo od dvije vrste jednostavnih čaša na stalku koje su se očito prevozile u velikim količinama. Dosad je pronađeno oko 3500 komada tih čaša.

Predmeti koji su nađeni na potopljenom brodu prvi su put objavljeni u časopisu *Vrulje*, glasilu Narodnog muzeja u Zadru,² i izloženi od 1970. do

1 Gnalić 1970; Gluščević 2006, p. 9.

1 Gnalić 1970; Gluščević 2006, str. 9.

2 Gnalić 1970.

Museum in Zadar² and exhibited in 1970 to 1971.³ The first description of the glass finds from Gnalić was written by Sofia Petricioli in volume 15 of the *Journal of Glass Studies*, together with some limited chemical analysis by Robert Brill.⁴ An article about the ship by Astone Gasparetto was published in the same *Journal*. After a systematic examination of the archives and the records of the notaries of the period in Venice, Gasparetto came to conclusion that the wreck most probably belonged to a ship the *Gagiana*, which left Venice in November 1583.⁵ New facts about the ship named *Gagliana grossa* which set off at the end of October toward the Eastern Adriatic coast were published by I. Radić Rossi *et al.*⁶

After the first reports, the work on Gnalić material did not continue until the year 2004. The new study of the material began as a part of an international project The Heritage of Serenissima, joined by Slovene, Italian and Austrian Universities at the end of 2004, with the main portion of the project being finished in 2005.⁷ The glass cargo was studied by a team joined by Slovene and English colleagues. From the amount and variety of the studied glass material we may suppose that it was a very important, if not the most important, part of the ship's cargo. We can now estimate that the amount of the excavated objects totals in excess of 5,500 pieces, and this is by no means all the original cargo, it is likely that the majority of the material is still underwater.⁸

Vessel glass from the Gnalić wreck was made of naturally coloured and intentionally coloured glass. It represents roughly 75% of the entire glass assemblage from the wreck. The tableware included beakers, goblets and tankards, as well as bowls, lids, tazzae and vases. The group of containers is less numerous and included sprinklers, flasks, bottles and jars. A small selection of coloured glass was also discovered. The style of this vessels is very un-European and they represent even less than 0,5 % of the cargo.

We will briefly present the variety of forms and glass groups represented in the cargo. First group are plain beakers. We divided them in two subgroups according to the height (small and large). This is a

1971. g.³ Staklene nalaze s brodoloma kod Gnalića prva je opisala Sofia Petricioli u 15. svesku časopisa *Journal of Glass Studies* i objavila ih zajedno s ograničenom kemijskom analizom Roberta Brilla.⁴ Članak u kojem Astone Gasparetto piše o tom brodolomu objavljen je u istome časopisu. Nakon sustavnog istraživanja arhivske građe i evidencija javnih bilježnika tog doba u Veneciji, Gasparetto je zaključio da se tu vjerojatno radi o olupini broda *Gagiana*, koji je iz Venecije isplovio u studenome 1583. godine.⁵ Nove činjenice o brodu imena *Gagliana grossa*, koji je koncem listopada isplovio prema obali istočnog Jadrana, objavili su I. Radić Rossi *et al.*⁶

Nakon tih prvih objava, istraživanja brodoloma kod Gnalića nisu nastavljena sve do 2004. godine. Nove analize nalaza započele su u sklopu međunarodnoga projekta *Baština Serenissime*, u koji su se krajem 2004. godine uključila slovenska, talijanska i austrijska sveučilišta. Glavni dio tog projekta završio je 2005. godine.⁷ Stakleni teret proučio je tim u kojem su sudjelovali slovenski i engleski kolege. Na temelju količine i raznovrsnosti analiziranog staklenog materijala, možemo pretpostaviti da je riječ o vrlo značajnom, ako ne i najvažnijem dijelu brodskog tereta. Danas možemo procijeniti da je ukupno izvađeno više od 5500 predmeta, a to nipošto nije sav prvobitni teret, nego je većina materijala vjerojatno i dalje pod vodom.⁸

Stakleno posuđe s brodoloma kod Gnalića izrađeno je od prirodno i umjetno obojenog stakla. Ono tvori otprilike 75 % staklenih nalaza s ovog brodoloma. Među staklenim posuđem nalaze se pehari, čaše i vrčevi te zdjele, poklopci, pladnjevi i vaze. Skupina posuda za pohranu tekućih sadržaja manje je brojna, a obuhvaća raspršivače (malene bočice izduženog vrata), druge bočice, boce i staklenke. Otkrivena je mala zbirka obojenog stakla. Stil izrade tih predmeta izrazito je neeuropski, a čine manje od 0,5 % ukupnoga tereta.

Ukratko ćemo predstaviti različite oblike i pojedine skupine staklenih nalaza zastupljene u brodskom teretu. Prvu skupinu tvore neukrašene čaše. Podijelili smo ih u podskupine na temelju visine (male i velike).

2 Gnalić 1970.

3 After the aforementioned project the Gnalić wreck was exhibited also in Trento (Lazar 2010), Zadar (Gnalić 2011) and Zagreb (Gnalić 2013), to mention only the latest exhibitions.

4 Petricioli 1973, pp. 85-92; Brill 1973, pp. 93-97.

5 Gasparetto 1973, p. 82.

6 Radić Rossi *et al.* 2013, pp. 78-79.

7 Gnalić 2004; Serenissima 2006.

8 Lazar, Willmott 2006a, 2006b.

3 Nakon toga predmeti iz olupine kod Gnalića izloženi su i u Trentu (Lazar 2010), Zadru (Gnalić 2011) i Zagrebu (Gnalić 2013), da spomenemo tek najrecentnije izložbe.

4 Petricioli 1973, str. 85-92; Brill 1973, str. 93-97.

5 Gasparetto 1973, str. 82.

6 Radić Rossi *et al.* 2013, str. 78-79.

7 Gnalić 2004; Serenissima 2006.

8 Lazar, Willmott 2006a, 2006b.



Fig. 1. Gnalić: Plain goblets in boxes (photo: Caroline Jackson)

Sl. 1. Gnalić: Neukrašene čaše na stalku u kutijama (foto: Caroline Jackson)

simple form with nearly straight sides and simple, low pushed-in base.⁹

The next broad group are goblets (Fig. 1). We divided them in subgroups according to their stem shape and type, and further variants according to the bowl forms and decoration. The majority of goblets are plain, but some groups are decorated with mould-blowing or engraving.

Goblets with a hollow foot are made of two separate paraisons that form the bowl and the foot. The foot is joined to the bowl directly. Goblets with a low hollow foot and a plain bowl are the most numerous form in this glass assemblage. The bowl shapes vary slightly and are either straight and tapering or tulip-shaped. In the last campaign in 1996 this form was found in the area away from the ship, and in total 2300 vessels were found. Goblets of this form can also have a decorated bowl, with optic-blown pattern of tear-drops, but they are not so common.

Only few examples of a goblet with a hollow foot and folded bowl were found. In this form a foot is joined to the bowl with a flattened disk – merese.¹⁰ A group of goblets with high hollow foot have a hemispherical bowl, the foot is joined to the bowl with separate reel-shaped merese. The hemispherical bowl is usually plain, or very occasionally decorated with optic-blown ribs that can sometimes grow into a

Riječ je o jednostavnom obliku, gotovo ravnih stijenci i niskog, udubljenog dna.⁹

Sljedeću opsežnu skupinu čine čaše na stalku (sl. 1). Podijelili smo ih u podskupine ovisno o obliku i vrsti stalka, dok dodatne varijante određuju oblici i ukrasi na samoj čaški. Većina čaša na stalku je neukrašena, no neke su skupine ukrašene puhanjem u kalup ili graviranjem.

Čaše na šupljem podnožju izrađene su od dva odvojena dijela koji tvore čašku i stalak (nogu). Stalak se izravno spaja s čašom. U ovom staklenom inventaru najbrojnije su čaše s niskim šupljim stalkom i neukrašenom čaškom. Oblici čaške malo se razlikuju te su ili ravni i blago se šire u gornjem dijelu ili su pak u obliku tulipana. Tijekom posljednjeg podvodnog istraživanja 1996. godine čaše ovog oblika pronađene su na mjestu udaljenom od broda, a otkriveno ih je ukupno 2300. Čaše ovakvog oblika mogu imati i ukrašenu čašku u obliku šišarke, ali takve nisu toliko česte.

Pronađeno je tek nekoliko primjeraka čaša na šupljem podnožju sa svinutom čaškom. Kod ovog oblika stalak se spaja sa čaškom plosnatim prstenom.¹⁰ U skupini čaša na visokom šupljem podnožju i čaškom u obliku polukugle stalak je spojen sa čaškom zasebnim prstenom u obliku kalema. Kalotasta čaška obično je neukrašena, a u rijetkim slučajevima ukrašena je puhanim rebrima koja katkad prerastaju u ukrase u obliku šišarke. Ovo je još jedna prilično brojna skupina, jer je 1996. godine izvađeno oko 900 primjeraka takvih čaša.

Čaše na stalku u obliku obrnutog balustra zastupljene su sa četiri inačice: čaša na punom stalku u obliku obrnutog balustra može imati neukrašenu ili ukrašenu čašku, dok se ona na stalku u obliku rebrastog obrnutog balustra pojavljuje u maloj i velikoj varijanti.

Čaše na stalku s nodusom s Gnalića izrađene su od kvalitetnog tankog puhanog stakla, po sastavu vjerojatno od mješavine lužina ili sode, a njihove čaške i stalci katkad su ukrašeni graviranjem. Čaše na stalcima imaju neukrašene ili rebraste spljoštene noduse, ili pak kombinaciju neukrašenih i rebrastih nodusa, ili spiralno rebrasti nodus, a u samo dva slučaja trostruki rebrasti nodus.¹¹ Gravirani ukrasi na čaški sastoje se od motiva listova i vitica, dok je stalak ukrašen jednostavnim graviranim listovima.

Skupina posuda za piće na stalcima puhanim u kalup nađenih na brodolomu kod Gnalića sastoji se od dva osnovna oblika: čaša na stalku s motivom ljestava i čaša na stalku s motivom lavlje glave. Čaše na stalku

9 Lazar, Willmott 2006b, p. 26, figs. 17-18.

10 Lazar, Willmott 2006b, p. 30, fig. 21.

9 Lazar, Willmott 2006b, str. 26, sl. 17-18.

10 Lazar, Willmott 2006b, str. 30, sl. 21.

11 Lazar, Willmott 2006b, str. 34, sl. 25-31.

teardrop-shaped decoration. This is another rather numerous group, with around 900 examples being recovered in 1996.

Goblets with inverted baluster stem are represented by 4 variants: a goblet with a solid baluster stem can have either a plain or decorated bowl, whilst a ribbed inverted baluster stem appears as both a small and a large variant.

Knopped-stem goblets from Gnalić were made in a good quality thinly-blown glass, probably of a mixed-alkali or soda composition, and the bowls and feet are sometimes decorated with engraving. The goblets have stems with either plain or ribbed flattened knops, or a combination of plain and ribbed knop, or a spiral ribbed knop, or in only two examples a ribbed three-stepped stem.¹¹ Engraved decoration on the bowl is composed of leaf, scroll and foliage design, and the foot is decorated with simple leaf engraving.

The group of drinking vessels with mould-blown stems from Gnalić consists of two basic forms – the ladder and lion-mask stem goblet. Ladder stem goblets are not very numerous and appear in two subgroups with a plain or decorated (optic-blown ribbed) bowl.

Examples of the lion-mask stem are quite numerous and were divided in 5 variants according to the height of lion-mask and bowl decoration. The study of more than hundred preserved stems provided further answers to questions concerning about mould types. Lion mask stems are the epitome of *façon de Venise* glassware of the second half of the 16th and beginning of the 17th centuries. This form is an Italian innovation of the mid 16th century and within a few decades they were produced in most areas of northern, central and southern Europe. Studies from England and Belgium have shown that relatively few moulds were used in each region. It is not surprised therefore that such a large number from Gnalić (over 100 examples) can be grouped only into five categories.¹²

Tankards are larger drinking vessels. The general form in ceramic appears in the 15th century, although the earliest glass examples are early 16th century, but they are known also from late 17th century.¹³ Traditionally this form is thought to be Northern European in origin, although they may have been produced in southern Europe for an alternative market. Given their large capacity they were presumably used for consumption of beer, although we can not exclude that they may have also functioned as jugs. Generally they can be found with either a cylindrical or bellied shape to the body. Only tankards with a spherical body are

s motivom ljestava nisu brojne, a pojavljuju se u dvije podskupine, koje se razlikuju po tome je li čaška ukrašena ili nije (narebrena puhanjem).

Primjerci čaša na stalcima s motivom lavlje glave prilično su brojni, a podijeljeni su u pet inačica, ovisno o visini motiva lavlje glave i ukrasu na čaški. Analiza više od stotinu sačuvanih stalaka dala je dodatne odgovore na pitanja koja se odnose na vrste kalupa. Stalci s motivom lavlje glave karakteristični su za stakleno posuđe *façon de Venise* iz druge polovice 16. stoljeća i početka 17. stoljeća. Taj je oblik predstavljao talijansku inovaciju iz sredine 16. stoljeća koja se unutar nekoliko desetljeća počela proizvoditi diljem sjeverne, srednje i južne Europe. Istraživanja provedena u Engleskoj i Belgiji pokazala su da se u svakoj pojedinoj regiji rabio razmjerno mali broj kalupa. Stoga ne iznenađuje da se tako velik broj nalaza s brodoloma kod Gnalića (više do 100 primjeraka) može grupirati u tek pet kategorija.¹²

Vrčevi su veće posude za piće. Ovaj se oblik među keramičkim posuđem pojavljuje u 15. stoljeću, a iako prvi stakleni vrčevi potječu s početka 16. stoljeća, bilo ih je i krajem 17. stoljeća.¹³ Obično se smatra da ovaj oblik posuda potječe iz sjeverne Europe, ali mogle su se proizvoditi i u južnoj Europi za druga tržišta. S obzirom na veliku zapreminu, vjerojatno su se upotrebljavali za pijenje piva, ali ne možemo isključiti mogućnost da su se rabili i kao vrčevi za točenje. Općenito, tijelo im je ili cilindrično ili trbušasto. Među teretom s brodoloma kod Gnalića pronađeni su samo vrčevi kuglastog oblika. Sastoje se od okomitog grla i ruba, zaobljenog tijela i svinute stope. Za grlo i rame pričvršćena je puna ručka. Izrađeni su od kvalitetnog stakla i ukrašeni tehnikama *vetro a fili* ili *vetro a retorti*, istaknutim neprozirnim bijelim nitima ili graviranjem dekoracijom.¹⁴ Uz vrč dolazi i poklopac s punom drškom, kupolastim vrhom i svinutim osloncem. Poklopci mogu biti neukrašeni, ili pak ukrašeni jednako kao i vrčevi.

U skupinu zdjela spadaju posude u obliku polukugle koje se pojavljuju u manjoj i većoj inačici, kao i zdjele na nozi. Takve veće otvorene posude upotrebljavale su se ponajprije za privremeno pohranjivanje i posluživanje i tekuće i krute hrane na stolu. U nekim su se slučajevima mogle rabiti i za pranje ruku ili čak kao posude za pijenje. Različite varijante zdjela postojale su u svim razdobljima, no postale su osobito uobičajene krajem 15. i tijekom 16. stoljeća. Njihov jednostavan kalotasti oblik omogućavao je da se velik broj takvih zdjela jednostavno naslaže jedna na drugu

11 Lazar, Willmott 2006b, p. 34, fig. 25-31.

12 Lazar, Willmott 2006b, p. 38, fig. 35-39, pl. 4-5.

13 Willmott 2002, p. 55.

12 Lazar, Willmott 2006b, str. 38, sl. 35-39, T. 4-5.

13 Willmott 2002, str. 55.

14 Lazar, Willmott 2006b, str. 40, sl. 40-43.

found amongst the cargo of the Gnalić wreck. They have a vertical neck and rim, rounded body and folded pedestal foot. A solid handle is attached to the neck and shoulder. They are made of high quality glass and decorated with either *vetro a fili* and *vetro a retorti* trails, prominent opaque white trails or engraved decoration.¹⁴ Associated with the tankard is a lid with solid finial, domed top and folded rest. They can be plain or decorated in the same manner as the tankards.

The group of bowls includes a hemispherical vessel in both smaller and larger variants as well as footed bowls. These larger open vessels were primarily used for the temporary storage and serving of both, liquids and solids at the table. They could also in some cases have been used for hand washing or even as drinking vessels. Variations of bowls are found throughout most periods, although they become increasingly common during the late 15th and 16th centuries. Their simple hemispherical design would have allowed for large numbers of them to be easily stacked in the containers. However, given the most have very thin bodies and rims, in the majority of vessels only the foot has survived. The first group consists of simple vessels with a pushed-in base or applied base ring. Smaller examples are decorated with applied twisted opaque white, or white and blue *vetro a retorti* trails to their rim. Footed bowls are found as plain or decorated examples. Plain footed bowls are by far the most numerous, there being 167 in this group, whilst decorated vessels are very few, and only one is completely preserved (Fig. 2). Its engraved decoration is composed of a foliage design in the central portion, with a band of scrollwork above it and another band of foliage below the rim. The vessel is made in a high quality glass and very thinly blown.

Among the forms represented by only a few examples are bowl lids and tazzae. Glass lids were an Italian innovation of the later 15th century, appearing on bowls and tankards but in some cases also on goblets. Flat lids survive that have a solid finial and plain, optic-blown or engraved surfaces. Domed lids can be plain or decorated with engraving. It seems most likely that they would have been associated with bowls. Tazzae predominantly appear in the 16th century and were used to form elaborate displays holding fruits, sweetmeats and other exotic foods. Two basic varieties of tazzae have been found: those with a knob stem and those with an open applied foot; their diameter exceeds 20 cm and their shape and elaborate appearance means that these were expensive items. Examples with an open foot have a simple decoration of



Fig. 2. Gnalić: Engraved footed bowl (photo: Tomaž Lauko)

Sl. 2. Gnalić: Gravirana zdjela na nozi (foto: Tomaž Lauko)

i da se tako zapakiraju. No budući da je većina zdjela imala vrlo tanke stijenke i rubove, od najvećeg broja sačuvani su samo stalci (noge). Prva se skupina sastoji od jednostavnih posuda s udubljenim podnožjem ili pričvršćenim prstenom koji obavija dno. Manji primjerci ukrašeni su nanesenim uvijenim neprozirnim bijelim, ili bijelim i modrim nitima *vetro a retorti*, koje se protežu do ruba. Nađene su neukrašene i ukrašene zdjele na nozi. Neukrašene zdjele na nozi daleko su najbrojnije, sa 167 nalaza, dok je ukrašenih zdjela na nozi pronađeno tek nekoliko, a samo jedna od njih posve je sačuvana (sl. 2). Gravirana dekoracija na toj zdjeli sastoji se od motiva lišća u središnjem dijelu, pojasa vitica iznad njega te još jednog pojasa lišća ispod ruba. Posuda je izrađena od kvalitetnog i vrlo tanko puhanog stakla.

Među oblicima koji su zastupljeni malim brojem nalaza su poklopci zdjela i pladnjevi (podnosi). Stakleni poklopci talijanska su inovacija s kraja 15. stoljeća, a pojavljuju se na zdjelama, vrčevima, a u nekim slučajevima i na čašama na stalku. Sačuvani su plosnati poklopci s punom drškom i površinama koje su neukrašene, optički puhane ili gravirane. Kupolasti poklopci mogu biti neukrašeni ili ukrašeni graviranim crtežom. Čini se najvjerojatnijim da su to bili poklopci zdjela. Pladnjevi se uglavnom pojavljuju u 16. stoljeću, a na njima su se slagali aranžmani od voća, slatkiša i druge egzotične hrane. Pronađene su dvije

14 Lazar, Willmott 2006b, p. 40, figs. 40-43.



Fig. 3. Plain sprinklers (photo: Tomaž Lauko)
Sl. 3. Jednobojne bočice (raspršivači) (foto: Tomaž Lauko)

applied trails, which can be plain or pinched.¹⁵ Tazzae with a knob stem have more elaborate decoration of *filigrana* or engraving. One of the engraved vessels is decorated with foliage and fruits in its central portion, and on outer panels with a laurel and foliage design, whilst a second one has applied trails and engraving of alternating blank and foliage panels.¹⁶

A vase is a form that typically has a narrow neck with out-turned rim, ovoid body and a foot. A group of vases from the Gnalić wreck includes smaller vessels with engraved decoration of leaves and foliage and two examples with mould-blown decoration. There are significant differences in size between examples which suggest that they may have been used for a variety of functions. One of them was blown in a mould with human faces (possibly with three faces in its original form and two of them can still be recognised on the surviving portion).¹⁷ Large vases are represented by footed examples with handles and a spout. This very elaborate form is made of a good quality glass, thinly blown and primarily decorated with engraving, although applied raspberry prunts, shell appliqué, trails and a lid with domed top, also decorated with leaf engraving and raspberry prunts, complement

osnovne inačice pladnja: oni na stalku s nodusom i oni na otvorenoj apliciranoj nozi. Promjer im je veći od 20 cm, a njihov oblik i otmjen izgled upućuju na to da je riječ o skupim predmetima. Primjerci koji imaju otvorenu nogu ukrašeni su jednostavnim apliciranim nitima, koje mogu biti obične ili mjestimice valovite.¹⁵ Pladnjevi na stalku s nodusom imaju složenije ukrase, koji se sastoje od filigrana ili gravirane dekoracije. Jedna od graviranih posuda ukrašena je motivima lišća i voća u središnjem pojasu te lovorom i lišćem u vanjskim pojasevima, dok se na drugoj naizmjenice nižu polja ukrašena apliciranim nitima, odnosno graviranim crtežima lišća.¹⁶

Vaza je posuda koja u pravilu ima usko grlo s izvnutim rubom, ovalno tijelo i podnožje. U skupini ovakvih predmeta s brodoloma kod Gnalića nalaze se manje posude s graviranom vegetabilnom dekoracijom te dva primjerka ukrasa puhanog u kalup. Nalazi ove vrste znatno se razlikuju po veličini, što upućuje na to da su se ovakvi predmeti možda rabili za različite namjene. Jedna od vaza puhana je u kalupu s ljudskim licima (možda su prvobitno bila tri lica, od kojih se na sačuvanom dijelu još mogu razaznati dva).¹⁷ Velike vaze predstavljene su primjercima na nozi, s ručkama i kljunom. Taj pomno izrađen oblik načinjen je od kvalitetnog tanko puhanog stakla koje je prvobitno ukrašeno graviranjem, a potom je dekoracija nadopunjena apliciranim malinama, školjkama, nitima i kupolastim poklopcem, koji je također ukrašen graviranim lišćem i apliciranim malinama. Visina vaza kreće se od 20 do 25 cm.

Posljednja opsežna kategorija obuhvaća posude koje su služile za pohranu tekuće i krute hrane. Među teretom s brodoloma u ovu skupinu spadaju spremnici, bočice i boce. To su bili prvi oblici posuda koje su se izrađivale od stakla, a pojavljuju se u velikom broju inačica. Boce dugoga grla, karakterističan i popularan oblik u ovome razdoblju koji se pojavio još u 12. stoljeću, pronađene su u dvije neukrašene varijante (od kojih jedna ima uzak otvor, a druga ljevkastu rub), kao i ukrašene, na kojima je ili dekoracija od neprozirnih bijelih niti ili od jednostavnih bezbojnih niti. Jednostavna obična ili valovita nit katkad je aplicirana oko gornjeg dijela grla.

Zasebnu i homogenu skupinu tvore raspršivači – male bočice okrugloga tijela i visokog stožastog vrata (sl. 3). To je prepoznatljiv oblik posude, budući da je to jedina posuda u kojoj je sadržaj bio posve zatvoren. Općenito se pretpostavlja da su se u raspršivačima držali parfemi i druge dragocjene tekućine. Bočice su

15 Lazar, Willmott 2006b, p. 47, pl. 13.

16 Lazar, Willmott 2006b, pl. 12 and pl. 11.

17 Lazar, Willmott 2006b, p. 51, fig. 61, pl. 16: 2.

15 Lazar, Willmott 2006b, str. 47, T. 13.

16 Lazar, Willmott 2006b, T. 12 i T. 11.

17 Lazar, Willmott 2006b, str. 51, sl. 61, T. 16: 2.

its form and decoration. Their height varies between 20 and 25 cm.

The last broad category includes vessels intended for the storage of liquids and solids. The group from the cargo represent containers, flasks and bottles. This is one of the earliest forms that appear in glass and there are a considerable number of variations. The long necked bottle, a typical and popular form of the period that appeared as early as the 12th century, is represented by two plain variants (one with a narrow and one with a funnel-mouth rim), as well as those decorated with opaque white trails or simple colourless trail decoration. A simple plain or wavy trail is sometimes applied around the upper neck.

A separate and homogenous group is the sprinkler – a small flask with a spherical body and a tall tapering neck (Fig. 3). This is a very distinctive form of container as it is the only one in which contents were completely sealed. Sprinklers are usually assumed to have held perfumes and other precious liquids. The bottle was designed so that its narrow top could easily be snapped off and the contents dripped out. The form causes the contents of the vessel to pour slowly, or in drops, as would be needed for perfume-sprinkling. This use is not certain, but the shape has led us to regard it as the most likely function for these vessels. The examples from Gnalić are plain, optic-blown with ribbing or decorated with opaque white trailing. They are all made of high quality glass and are excellently manufactured.

In this context we should also mention the small pear-shaped flask, represented by only few examples. The form of the flask leads us to the tentative possibility that these are parts of sandglasses.¹⁸ This was an instrument for measuring time, and took the form of a reversible device made of two vertical connected phials. The sandglasses are known archaeologically from the early 13th century in Italy, but most examples date to the 17th century and continued in common usage until the 18th century.¹⁹ The first production centres to specialise in them were in Venice, the Low Countries and Germany.

Whilst the vast majority of the vessels could be shown to belong to a relatively few well-defined categories, there were some smaller groups of glass which were much more unusual. Perhaps one of the most interesting of these was a number of intentionally coloured oval bottles and shallow small bowls that were distinctly un-European in style. However, this assemblage is small and of the over 5,000 vessels



Fig. 4. Small oval bottle with splashed decoration (photo: Hugh Willmott)

Sl. 4. Mala ovalna bočica s intarziranom dekoracijom (foto: Hugh Willmott)

izrađene tako da se njihov uzak vrh mogao jednostavno otkinuti, a sadržaj kapanjem istočiti. Zbog oblika posude sadržaj bočice mogao se istočiti samo vrlo polako, u kapljicama, kao što bi bilo potrebno ako je riječ o parfemu. Nije sigurno da su se ovakve bočice rabile za tu namjenu, ali ovaj nas je oblik naveo da zaključimo kako je to najvjerojatnija namjena ovih bočica. Nalazi ove vrste s brodoloma kod Gnalića neukrašeni su, rebrasti, s puhanim ukrasima ili ukrašeni neprozirnim bijelim nitima. Svi su načinjeni od kvalitetnog stakla i izvrsne su izrade.

U ovom kontekstu treba spomenuti i malu kruškoliku bočicu koja se pojavljuje u samo nekoliko primjeraka. Oblik bočice naveo nas je da pretpostavimo kako je možda riječ o dijelovima pješčanog sata.¹⁸ To su bile naprave za mjerenje vremena u obliku dviju okomito povezanih posuda koje su se mogle okrenuti. U arheologiji su pješčani satovi poznati u Italiji od početka 13. stoljeća, ali većina nalaza potječe iz 17. stoljeća, a u širokoj su upotrebi bili do 18. stoljeća.¹⁹ Prva središta koja su se specijalizirala za njihovu proizvodnju bila su u Veneciji, Nizozemskoj i Njemačkoj.

18 Lazar, Willmott 2006b, p. 55, fig. 66.

19 Willmott 2005.

18 Lazar, Willmott 2006b, str. 55, sl. 66.

19 Willmott 2005.



Fig. 5. A group of flat glass from the Gnalić wreck (photo: Tomaž Lauko)

Sl. 5. Prozorska stakla s brodoloma kod Gnalića (foto: Tomaž Lauko)

recovered just 65 (or less than 0.012%) of the assemblage falls into this group.

The most striking of these are decorated with blobs of coloured glass which are 'marvered' or smoothed into their surfaces (Fig. 4). Plain, but no less unusual, are over 40 examples of plain blue oval flasks with a distinctive 'stepped' rim. All of these vessels cannot be paralleled by examples from known centres of Western European glass production. Their presence, albeit in relatively small numbers, on what had been assumed to be a Venetian galley is curious. Certainly they confirm that the cargo consisted of a more complex mixture of vessels than originally first thought.

In addition to vessel glass, over 1,300 pieces of flat glass were recovered, this forming nearly 25% of the cargo (Fig. 5). This divides into two separate types. Over 700 of these are circular window glass 'crowns'. The window glass was made by blowing and opening out a bubble of glass on the blowing iron, and then spinning it so the centrifugal force created an even-shaped disc. Window panes were not commonly used in this period, and when used they would be purchased

Iako se za većinu posuda može utvrditi da pripadaju razmjerno malom broju dobro određenih kategorija, postoji i nekoliko manjih skupina stakla koje su mnogo neobičnije. Možda je među njima najzanimljivije nekoliko namjerno obojenih ovalnih boca i plitkih zdjelica koje su po svom stilu izrazito neeuropske. Međutim, ta je skupina mala i obuhvaća tek 65 (odnosno manje od 0,012 %) od ukupno više od 5000 izvađenih posuda.

Najupečatljivije takve posude su one ukrašene kuglicama obojenog stakla koje je utisnuto u njihovu površinu (intarzirana dekoracija) (sl. 4). Nešto jednostavnije, ali ništa manje neobično, više je od 40 primjeraka neukrašenih plavih ovalnih bočica s prepoznatljivim 'stepenastim' rubom. Ni za jednu od tih posuda ne postoje paralele među primjercima iz poznatih središta staklarske proizvodnje u Zapadnoj Europi. Njihova nazočnost, neovisno o njihovu razmjerno malom broju, na brodu za koji se prethodno pretpostavljalo da je bio mletačka galija, vrlo je neobična i svakako potvrđuje da se teret sastojao od složenije mješavine posuda nego što se prvobitno mislilo.

Uz staklene posude pronađeno je i više od 1300 staklenih ploča koje tvore gotovo 25 % ukupnoga tereta (sl. 5). Staklene ploče možemo podijeliti u dvije vrste. Više od 700 ploča su okrugla prozorska stakla. Prozorska stakla izrađivala su se puhanjem i otvaranjem staklenoga mjehura na staklarskoj luli, te njegovim okretanjem kako bi centrifugalna sila dovela do stvaranja plosnate okrugle ploče. U to doba prozorska stakla nisu bila u uobičajenoj uporabi, a kad su se upotrebljavala, kupovalo bi se više komada kako bi se njima ostaklio veći broj okna unutar svakoga prozora. Prozorska stakla ponajprije su se rabila za ostakljivanje prozora u crkvama i kućama u vlasništvu imućnih obitelji. Pronađena zrcala, i okrugla i pravokutna, standardiziranih oblika i veličina, nisu bila dovršena, te su se prevozila do odredišta na kojem su trebala biti dovršena slojem kositra i žive.²⁰ Skupina običnih prozorskih stakala ne sadrži stakla standardizirane veličine niti raspon veličina stakala za prozore. Vjerojatno su proizvedena za konkretan graditeljski poduhvat, dok bi za različite građevinske projekte bila potrebna stakla različitih veličina. Mali broj prozorskih stakala dodatno je dekoriran puhanjem u kalup, no budući da ih je nađen tako malen broj, moguće je da su i ona bila izrađena za konkretnu namjenu.

Druga kategorija staklenih ploča su zrcala (sl. 6). Pronađena zrcala izrađena su zahtjevnijim postupkom kako bi se osigurala dostatna kakvoća stakla koja može dati reflektiranu sliku bez izobličenja. Debeli sloj stakla najprije se lijevao u odgovarajuću

20 Herrera *et al.* 2008.

in multiples to provide a glazing pattern within each window. Their primary use would be for glazing in churches or building owned by rich families. The mirrors, both circular and rectangular and of standardized shapes and sizes, were incomplete, and were in transit to be finished with the mirroring of tin and mercury elsewhere.²⁰ The group of plain window panes shows that there was no standardised size or range of sizes of the panes produced. This was most probably done intentionally for a specific building project while different glazing projects would require panes of different sizes. A handful of examples are further decorated with mould-blown designs, but given that so few were found it might be that these were also made for a specific purpose.

The other category of flat glass comes from mirrors (Fig. 6). The mirrors found are all made by a more laborious process, to ensure that the glass is of sufficient flawless quality to reflect without distortion. A thick sheet of glass was first cast into the approximate size and once cooled its surfaces were ground smooth and the sheet cut and 'grozed' or chipped to the appropriate shape. Two different shapes of mirror were found, circular and rectangular. Interestingly, not only are finished examples of rectangular mirrors present in the assemblage, (three distinct size categories) the ship was also carry a number of 'sides' - or cast but unground mirror plates. These were presumably being traded with the intention that they be finished off elsewhere. Part of the mirrors, both circular and rectangular and of standardized shapes and sizes, were incomplete, and were in transit to be finished with the mirroring elsewhere.²¹ Some of the mirrors retain evidence for their 'silvered' backing, although contrary to popular belief silver was not actually used to make them reflective, rather an amalgam of tin and mercury was applied.

The quantity of glassware, which includes some highly decorated articles (such as the engraved vases) and that was probably produced in Venice, seems to have been destined for a luxury-loving market, and this would not be unlikely if the ship was heading for Constantinople or perhaps also Dubrovnik? However most of the simple forms (such as the goblets, bowls, jars) were made for everyday use. But were they really all produced in Venice? Which and where are local glass centres that may be involved in the Venetian glass trade? Some examples from the wreck also give the evidence of the long popularity of some Gothic forms, for which we had previously only indirect evidence.



Fig. 6. Rectangular and circular mirrors (photo: Tomaž Lauko)

Sl. 6. Pravokutna i okrugla zrcala (foto: Tomaž Lauko)

veličinu, a kad bi se ohladio, njegova bi se površina brusila kako bi bila glatka. Potom bi se ploča rezala ili lomila u odgovarajući oblik. Pronađena su dva oblika zrcala: okrugla i pravokutna. Zanimljivo je kako ne samo da se među staklenim inventarom nalaze gotova pravokutna zrcala (i to u tri različite veličine), već je brod prevezio i određen broj ploča, odnosno odlivenih, ali još nebrušenih ploča za zrcala. Pretpostavlja se da se njima trgovalo s namjerom da ih se dovrši negdje drugdje. Dio zrcala, kako okruglih tako i pravokutnih i standardiziranih oblika i veličina, nije bio dovršen i nalazila su se u provozu, a reflektirajući sloj trebao im je biti dodan negdje drugdje.²¹ Na nekim se zrcalima vide tragovi 'posrebrene' pozadine, premda se, unatoč uvriježenom mišljenju, srebro nije rabilo prilikom izrade zrcala, već se u tu svrhu upotrebljavala legura kositra i žive.

Čini se da je određena količina staklenih predmeta, među kojima su i neki vrlo dekorativni primjerci (kao što su gravirane vaze), koji su uz to vjerojatno proizvedeni u Veneciji, bila na putu do tržišta koje je voljelo luksuznu robu. Ne bismo li mogli zamisliti da

20 Herrera *et al.* 2008.

21 Herrera *et al.* 2008, p. 44.

21 Herrera *et al.* 2008, str. 44.

Caroline M. Jackson has been responsible for sampling the glass and for chemical analysis using ICPS.²² The numerous broken fragments combined with the multiple replication of some of the forms has enabled us to take in excess of 212 samples and these proved crucial in aiding in a comprehensive characterisation of the whole assemblage.²³ Compositional analysis was conducted on a selected number of vessels, windows and mirrors to ascertain whether these were of a common origin or from diverse centres.

There were few glass artefacts for which a putative provenance could be suggested; most were of undiagnostic and common forms, and so the origins of the glass assemblage have been debated. Early suggestions favoured a Venetian origin, based on stylistic analysis and the proximity of the wreck to the glass-making centre at Venice.²⁴ This has more recently been questioned and more local manufacturing centres were proposed on the basis of stylistic analysis.²⁵ Whilst the majority of vessels were goblets which had no stylistic attributes linking them to a specific provenance, others were typologically English and Islamic in style.²⁶ It was not clear whether these were produced elsewhere or within Italy (Venice) for a specific market.

The results of analysis²⁷ suggested that all the glass, regardless of form, was of a common compositional type – *vitrum blanchum*, a glass composition found widely across Europe and possibly manufactured at many different places. This is rather surprising given the diverse nature of the cargo, which included mirrors, windows, goblets and a smaller number of higher status items. The composition can be explained by the use of very specific raw materials. This glass is thought to have been manufactured using imported alkalis, possibly from Syria or Egypt, but made using local sands, which would account for the similarity of compositions between the different stylistic groups.

More detailed interpretation by Caroline M. Jackson²⁸ has revealed that, within this general glass composition, a number of slightly different compositional groups can be discerned, which related to trace elements (barium (Ba), zirconium (Zr) and sometimes strontium (Sr)) associated with the use of different sand or silica sources. Some of these compositional groups could be linked to specific styles of goblets

je ovaj brod plovio prema Carigradu ili možda i Dubrovniku? Međutim, većina jednostavnih oblika (kao što su čaše na stalku, zdjele, staklenke) bila je namijenjena svakodnevnoj upotrebi. Jesu li uistinu svi ti predmeti proizvedeni u Veneciji? Koja su to lokalna staklarska središta koja su mogla sudjelovati u trgovini venecijanskim staklom i gdje se nalaze? Neki nalazi s brodoloma pokazuju da su neki gotički oblici dugo bili popularni, o čemu smo prethodno imali tek neizravne dokaze.

Caroline M. Jackson bila je zadužena za uzorkovanje stakla i kemijsku analizu uporabom ICPS-a.²² Brojni ulomci i velik broj primjeraka istih oblika omogućili su nam da uzmemo više od 212 uzoraka koji su se pokazali ključnima za sveobuhvatan opis čitavog staklenog inventara ovoga brodoloma.²³ Na određenom broju posuda, prozorskih stakala i zrcala obavljena je analiza sastava ne bi li se ustanovilo potječu li ti predmeti iz jednog te istog središta ili više različitih središta.

Bilo je malo staklenih predmeta za koje se moglo odrediti pretpostavljeno podrijetlo. Većinom se radilo o nedijagnostičkim i uobičajenim oblicima, tako da je podrijetlo staklenog inventara postalo predmetom brojnih rasprava. Na temelju stilske analize i zbog blizine olupine Veneciji kao staklarskom središtu, prvotne naznake govorile su u prilog venecijanskom podrijetlu.²⁴ Ta je pretpostavka u novije vrijeme stavljena u pitanje, a na temelju stilske analize zaključeno je kako je bilo više lokalnih proizvodnih središta.²⁵ Premda se većina posuda odnosila na čaše bez stilskih obilježja koje bi ih povezivale s određenim podrijetlom, ostale su prema stilu bile tipološki engleske i islamske.²⁶ Nije bilo jasno jesu li proizvedene negdje drugdje ili u Italiji (Veneciji), a za određeno tržište.

Rezultati analize²⁷ dali su naslutiti kako je, bez obzira na oblik, sve staklo prema svom sastavu jedne te iste vrste – *vitrum blanchum* – što je sastav stakla koji naširoko nalazimo diljem Europe, a moguće je da je proizvedeno na nekoliko različitih mjesta. To poprilično iznenađuje s obzirom na raznolik narav tereta, koji je obuhvaćao zrcala, prozorska okna, čaše i manji broj luksuznijih predmeta. Taj se sastav može objasniti uporabom vrlo specifičnih sirovina. Smatra se kako je to staklo proizvedeno od uvezenih alkalija, moguće iz Sirije ili Egipta, ali uz uporabu lokalnog pijeska, što bi objasnilo sličnost sastava različitih stilskih skupina.

22 Jackson 2006.

23 Jackson 2006, pp. 87-93; Jackson 2014, pp. 30-34.

24 Petricioli 1973; Brill 1973.

25 Lazar, Willmott 2006b, p. 77.

26 Lazar, Willmott 2006b, p. 76.

27 Jackson 2006, p. 92.

28 Jackson 2014, pp. 30-31.

22 Jackson 2006.

23 Jackson 2006, str. 87-93; Jackson 2014, str. 30-34.

24 Petricioli 1973; Brill 1973.

25 Lazar, Willmott 2006b, str. 77.

26 Lazar, Willmott 2006b, str. 76.

27 Jackson 2006, str. 92.

which would indicate a common manufacturing location. However, the location of production of these, and other identified groups, is relatively enigmatic. De Raedt²⁹ suggests that glasses made in Venice have low concentrations of Zr compared to *vitrum blanchum* glasses manufactured elsewhere in Europe. The glasses from the Gnalić wreck displayed similar low Zr concentrations which might indicate their provenance was around Venice or on the Italian mainland.

From this analysis may be suggested that it is likely the cargo consisted of a consignment of vessels from different manufacturing centres, possibly within Italy, all producing a very common glass composition. The analysis of the glass has indicated a putative manufacturing area and has surprisingly suggested that the glass is all of the same type, despite the mixed stylistic assemblage.³⁰ It would be interesting to see if similar patterns are seen in other assemblages lying within the Adriatic.

Potanje tumačenje što ga daje Caroline M. Jackson²⁸ otkrilo je kako se unutar tog općeg sastava stakla može razlučiti nekoliko skupina koje se ponešto razlikuju po svojem sastavu, što proizlazi iz elemenata u tragovima (barija (Ba), cirkonija (Zr) i ponekad stroncija (Sr)), koji su povezani s korištenjem različitih izvora pijeska ili zemlje kremenjače. Neke od tih skupina razlučenih prema sastavu mogle su se povezati s određenim stilovima čaša, što bi ukazivalo na jedno te isto mjesto proizvodnje. De Raedt²⁹ tvrdi kako stakleni predmeti proizvedeni u Veneciji imaju nisku koncentraciju cirkonija u usporedbi sa staklenim predmetima *vitrum blanchum*, koji su proizvedeni drugdje u Europi. Stakleni predmeti iz olupine kod Gnalića odlikovali su se sličnim niskim koncentracijama cirkonija, što bi moglo ukazivati na to da su potjecali iz okolice Venecije ili unutrašnjosti Italije.

Iz ove se analize može naslutiti kako je izgledno da se teret sastojao od pošiljke staklenih predmeta iz različitih proizvodnih središta, možebitno unutar Italije, od kojih su sva proizvodila staklo vrlo uobičajena sastava. Analiza stakla ukazala je na pretpostavljeno područje proizvodnje te je iznenađujuće pokazala kako je sve staklo jedne te iste vrste, unatoč stilski mješovitom inventaru.³⁰ Bilo bi zanimljivo vidjeti mogu li se slični obrasci uočiti i u inventarima s drugih olupina na dnu Jadrana.

29 De Raedt 2001.

30 Jackson 2014, p. 32.

28 Jackson 2014, str. 30-31.

29 De Raedt 2001.

30 Jackson 2014, str. 32.

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