

## Some Information about Glassmaking in Roman Siscia\*

It is a well-known fact that, when it comes to the Pannonian area, Siscia was one of the most developed and flourishing Roman colonies. As a colony, it had all Roman urban elements for a city of such importance. The fact that mint was located in Siscia was certainly most significant, and that was a rare privilege which indicates the city's importance. It should therefore not be surprising that Siscia might have had a developed glassmaking activity, signifying that the economy of Roman Siscia was highly developed. Furnace that was possibly used for melting was found while digging the foundation for a residential building at 38 Ante Starčevića Street in 1998, which could be evidence for such activity. During the excavation a furnace area filled with small ceramic fragments and molten glass was discovered. A calotte was not found. On the other hand, numerous glass fragments were found at various sites in Siscia *in situ*: glass bottles, plates, one *lacrimarium*, *balsamaria*, etc. Although we plan to study the research results from 1950, the main focus will be on the research conducted since 2000s, and, based on this, we will bring some new findings related to the manufacture of glass in Roman Siscia.

### *Introduction*

Nowadays, there are no surface archaeological and architectural remnants of ancient Siscia. The early modern city evolved on top of the ancient city and it may be assumed that it extended across the ancient city's urban perimeter.<sup>1</sup> This proves the continuity of the urban area, but it is also a reason for the poor archaeological knowledge about the ancient city.<sup>2</sup>

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<sup>1</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: 1; VUKELIĆ AND PERNJAK 2013: 256.

<sup>2</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: 1; VUKELIĆ AND PERNJAK 2013: 256.

Siscia was given the status of a colony very early on, and as such was furnished with all the elements of a Roman city: forum, *insulae*, defensive walls, protective towers, *thermae*, etc., all of which has been confirmed through archaeological research.<sup>3</sup> The city first appears in the Roman sources in the second century BC. Octavian's conquest of the area in 35 BC laid the foundation for the establishment of the Roman city. After crushing Bato's uprising, the area of the future colony of Siscia started its intense urban development in the second half of the 1<sup>st</sup> century.<sup>4</sup> This process reached its climax under emperor Vespasian (69-79), who raised Siscia to the rank of colony.<sup>5</sup>

An additional impetus to the development of Siscia was given by emperor Septimius Severus (193-211), after whom the colony acquired its new name in 194: *Colonia Septimia Siscia Augusta*.<sup>6</sup> The importance of Siscia laid in the fact that the city was the seat of the administrator of the Dalmatian-Pannonian silver mines - *praepositus splendidissimi vectigalis ferrarium*<sup>7</sup>, as well as a customs station - *publicum portorium Illyrici*<sup>8</sup> and a beneficiary station.<sup>9</sup> During the period of the 3<sup>rd</sup> century crisis Siscia remained economically stable. This is proved by emperor Gallienus' opening of the local mint in cca. 262.<sup>10</sup> After Diocletian's administrative reforms Siscia became the capital of the Pannonian province of Savia, which again confirms the city's important social, political and economic role within the Empire.<sup>11</sup> During the 3<sup>rd</sup> century Siscia also became a bishopric, which was in line with the city's high administrative and economic significance.<sup>12</sup> As a large and developed

<sup>3</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: 1; VUKELIĆ AND PERNJAK 2013: 256. The most comprehensive information about the latest archaeological research in the Sisak area can be found in the annual *Godišnjak Gradskog muzeja Sisak (Yearbook of the Sisak City Museum)*, vols. 1-10, 2000-2011.

<sup>4</sup> RADMAN-LIVAJA 2010: 190-198.

<sup>5</sup> CIL III 3951, 4471; FLUSS 1927: 362; MÓCSY 1962: 597; BARKÓCZI 1964: 260; MÓCSY 1974: 112-113; ŠAŠEL 1974: 734-736; VRBANOVIĆ 1976: 135; VRBANOVIĆ 1981: 188; HOTI 1992: 143; WILKES 2000: 588; LOLIĆ 2003: 134; VUKELIĆ AND RADMAN-LIVAJA 2012: 10.

<sup>6</sup> CIL III 4193; FLUSS 1927: 362; MOCSY 1962: 602; FITZ 1980: 152; POCSY 1980: 268; ŠAŠEL KOS 1986: 382; BOJANOVSKI 1988: 334; HOTI 1992: 144-145; BUZOV 2000: 57; LOLIĆ 2003: 134.

<sup>7</sup> CIL III 3953; BOJANOVSKI 1984: 156.

<sup>8</sup> ŠAŠEL 1974: 736; FITZ 1980: 130; BOJANOVSKI 1984: 156.

<sup>9</sup> RADMAN-LIVAJA AND VUKELIĆ 2016: 205-212.

<sup>10</sup> MÓCSY 1962: 566, 693; ŠAŠEL 1974: 719-721; BARKÓCZI 1980: 105; BIRÓ-SEY 1980: 345; PÓCZY 1980: 268; LOLIĆ 2003: 134; BUZOV 2000: 176-181.

<sup>11</sup> MÓCSY 1962: 570-571, 588; MÓCSY 1974: 273-274; BARKÓCZI 1980: 109-110; RADMAN-LIVAJA 2010: 198.

<sup>12</sup> MIGOTTI 2011: 42

city, as well as a major economic and transportation centre, Siscia had to have developed craft activities, workshops that produced goods for the city and which were undoubtedly exported to nearby areas in the interior and possibly throughout the Empire.<sup>13</sup> The local domestic population probably had developed crafts even before the Roman arrival, and it may be assumed that they were easily included in the craft production in the area of Siscia and under the Empire.<sup>14</sup> In addition to the large-scale craft production there were also many activities for providing services that were an integral part of all large Roman provincial centres.<sup>15</sup>

### *The question of glassmaking in Siscia*

It is not known when the manufacturing of glass started and who was the first to amalgamate silica sand, soda and limestone in a high-temperature crucible. We only know that the manufacturing of glass evolved sometime cca. 3000 BC in Egypt, and possibly in ancient Mesopotamia (now eastern Iraq) or Syria, areas where the essential ingredients of glass were readily available, and where ancient glass artefacts have been unearthed by archaeologists.<sup>16</sup>

The surviving archaeological, textual and iconographic evidence shows that glass had many functions in the cities and towns of the Roman empire.<sup>17</sup> Glass products ranged from tableware for displaying, serving and consuming liquids and solid foodstuffs, to household wares and containers for storing and transporting liquid and semi-liquid foodstuffs as well as cosmetic and medical preparations.<sup>18</sup> Glass was also used to make items of jewellery as well as tokens and gaming pieces, figurines and accessories for statues and many other objects.<sup>19</sup> It also frequently featured in public and private architectural structures; it was used for windows and for decorating floors, walls, vaults and furniture.<sup>20</sup>

For some of the crafts from Roman Siscia tools and raw materials have been found, confirming the production of a certain type of workshops.<sup>21</sup> But for other

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<sup>13</sup> ŠEPER 1954: 305-314; VIKIĆ-BELANČIĆ 1967: 95-96; KOŠČEVIĆ 1980: 38; BURKOWSKY 1999: 64-66; BUZOV 2000: 186; BUZOV 2004: 173. There is no doubt that Siscia's manufactured products had markets throughout Pannonia and along the Danube limes, but there are no archaeological or written evidence indicating that any of Siscia's production areas was important on the level of the entire Empire.

<sup>14</sup> BURKOWSKY 1999: 65.

<sup>15</sup> LOLIĆ 2014: 12-13, 15-16.

<sup>16</sup> ROSSI 1998: 5.

<sup>17</sup> MacMAHON AND PRICE 2005: 167.

<sup>18</sup> IDEM.

<sup>19</sup> IDEM.

<sup>20</sup> IDEM.

<sup>21</sup> Details in: BURKOWSKY 1999.

crafts we only have fragmentary archaeological evidence related to a particular craft production.<sup>22</sup> In such cases, based on material and literary sources, as well as an interdisciplinary approach, we try to determine whether a particular craft production existed there or not.

The question of glassmaking in the Roman colony of Siscia requires precisely such an approach. Due to poor archaeological evidence related to reliable hypotheses about glassmaking in Roman Pannonia the main question is whether glassmaking craft existed in Roman Siscia. Glass objects from Siscia, when compared to archaeological finds of glassware from Iader, do not stand out neither by quality nor by quantity,<sup>23</sup> but they have been found at all archaeological sites, except the sites that were made sterile by looting.<sup>24</sup> In the late 1<sup>st</sup> or early 2<sup>nd</sup> century AD, only imports from the region of Italy are noticeable, while simple forms for everyday use, as Leljak thinks, were soon produced locally.<sup>25</sup> The area of Siscia came under the Roman rule early. Therefore, according to Leljak, due to the needs of the army and the immigrants, some form of glass container production started in the late 1<sup>st</sup> or early 2<sup>nd</sup> century AD.<sup>26</sup>

The majority of vessels dating from the 1<sup>st</sup> and 2<sup>nd</sup> centuries AD were of high quality. The glass is thin with little bubbles. The vessels were mostly made with a free-blowing technique. Most vessels were probably produced in Italy, but we have to assume the possibility of local production by the late 1<sup>st</sup> century.<sup>27</sup> It is almost certain that Siscia might have had a flourishing production of glassware, the only question is from what time. The active local south-Pannonian workshops, in general, date from the late Roman period.<sup>28</sup> It is possible that glassmaking workshops existed in Siscia, both in late antiquity and during the 1<sup>st</sup> century AD. This claim could be supported by a large amount of glassware discovered, both whole vessels and fragments, dating from the earlier Roman period, which is an exception. In fact, most of the glass from Pannonia dates from the late Roman period.<sup>29</sup>

<sup>22</sup> Details in: BURKOWSKY 1999.

<sup>23</sup> Details in: FADIĆ AND ŠTEFANAC 2013; GREGL 2013.

<sup>24</sup> Published in: *Godišnjak Gradskog muzeja Sisak* 2001-2011; BAĆANI, GOSPODINOVIĆ, ŠKRGULJA, TOMAŠ BARIŠIĆ 2011; BURKOWSKY 1999; BURKOWSKY 2000; BURKOWSKY 2010; BURKOWSKY, OBRADOVIĆ, PLAVEC, TOMAŠ BARIŠIĆ 2014; BURKOWSKY, ŠKRGULJA, TOMAŠ BARIŠIĆ, BILIĆ, DRNIĆ, RADMAN-LIVAJA 2015; BUZOV 2000; BUZOV 2004; KOŠČEVIĆ 1980; LELELOVIĆ 2011; TOMAŠ 2007; VUKELIĆ 2011; WIEWEGH 2003.

<sup>25</sup> LELJAK 2014: 58-59.

<sup>26</sup> LELJAK 2014: 59.

<sup>27</sup> LELJAK 2014: 58-59.

<sup>28</sup> ŠARANOVIĆ-SVETEK 1986: 53; GREGL 1997: 72,

<sup>29</sup> LELJAK 2014: 57.

On balance, the paper is aimed at providing a useful starting point for all future researchers inquiring into the subject of ancient glassware in the territory of Roman Siscia. In general, Siscia is rarely mentioned in specialists' circles when it comes to glass objects or glassmaking in antiquity, and the finds of glassware from the area of Siscia are not seen as particularly attractive. It is our intention to change the prevalent belief that, when compared to other Roman colonies, the area of Roman Siscia yielded a relatively small amount of glassware. Having that in mind, we also opt for a strong possibility that there existed a local production of glassware.

### *Glass furnaces in Siscia*

According to Leljak and Lazar, only three glass melting furnaces from the Roman period have so far been found in Croatia: in Solin (Salona), Sisak (Siscia) and Vinkovci (Cibalae).<sup>30</sup> Thus far, the most direct evidence for glassware craft in Siscia could be the discovered Roman furnace for which we can claim with certainty that it was used for glassmaking. So far this has not been clearly proved. Many indicators suggest that this was a glass furnace.<sup>31</sup> Its remnants were discovered during the digging of foundations for a dwelling building at 37 Ante Starčevića Street in Sisak in 1998. The younger layer (from the 1<sup>st</sup> century AD) consisted of the remaining foundations of two walls and two circular structures.<sup>32</sup> The wall that was stretching in the north-south direction was situated between two circular structures, so that the smaller structure was located west

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<sup>30</sup> LELJAK AND LAZAR 2013: 116. The contexts in which the furnaces from Sisak and Vinkovci were found are completely different from that in which the Salonitan furnace was discovered, mostly because, besides the partially preserved furnace, no other concrete finds were observed based on which one could determine with certainty that those were glass furnaces.

<sup>31</sup> Because of the lack of archaeological evidence, the look of Roman glass furnaces has been a mystery for a long time. At many localities evidence was found of their existence, but only in the form of preserved lower part of furnaces. The only evidence of how the furnaces looked like were depictions of ceramic lamps found in Asseria, Ferrara and Spodnje Škofije near Kopar. More in: LAZAR 2006a: 227; LELJAK 2014: 21. The furnace consists of two parts: the lower part, which served as the firebox, and the top with a dome that was used to heat the glass. See: LAZAR 2006a: 230; LELJAK 2014: 21. In 2000, it was confirmed that Roman glass furnaces really looked like as shown on the lamps after two melting furnaces were found in Lyon, one of which had been preserved with its upper part. More in: LELJAK 2014: 34. The furnaces were relatively small, 45-65 cm, each having only one opening, which would mean that only one or two glaziers could work with them. That was the main problem for the dynamics of production. A comprehensive explanation of this topic is dealt by Mia Leljak in her PhD dissertation (LELJAK 2014).

<sup>32</sup> LELJAK AND LAZAR 2013: 116.

of the wall, and the larger structure to the east of the wall, while another wall was stretching in the east-west direction, and touching on a smaller circular structure on the east side.<sup>33</sup>

The furnace was made of bricks with a tiled bottom and covered with a layer of lime plaster. The structure was filled with rubble where the fragments of glass vessels and molten glass were found, which has led to the assumption that this was a glass furnace.<sup>34</sup> Since the Roman coins from the 1<sup>st</sup> century AD were found near the furnace, it is assumed that the furnace dates from that time.<sup>35</sup> The finding of that furnace is significant since there are no reliable finds from area of southern Pannonia<sup>36</sup> that might suggest local production of glassware (except for Poetovio)<sup>37</sup> before the 3<sup>rd</sup>/4<sup>th</sup> century AD.<sup>38</sup> Another circular structure, a larger one, was found near the furnace, for which it is assumed to be a well and a part of the workshop complex.<sup>39</sup> The remnants of a brick paving were found around the furnace. The layer in which furnace, a well and the associated wall were found dates from the mid or the second half of the 1<sup>st</sup> century AD and it is thought, based on the findings of pottery, that these architectural elements could have also been in use during the 2<sup>nd</sup> century.<sup>40</sup> The shape of the furnace corresponds to the standard form for Roman glass furnaces (diameter is 85-90 cm),<sup>41</sup> such as those found in Lyon (Lugdunum)<sup>42</sup> or Nîmes (Nemausus).<sup>43</sup>

This furnace has been the subject of archaeological analysis several times, but it has often been pointed out that the context of findings does not allow a clear determination of its use for glassmaking.<sup>44</sup> We believe that the sum of all the related findings in the wider context could indicate its use for glassmaking. This, of course, does not exclude the multipurpose use of the furnace from Ante Starčevića Street (both for pottery and glass).

<sup>33</sup> LELJAK AND LAZAR 2013: 116; illus. 1, 2.

<sup>34</sup> LOLIĆ AND PETRINEC 2000: 42; VIDOŠEVIĆ 2003:12; BUZOV 2004: 179; LELJAK AND LAZAR 2013: 116.

<sup>35</sup> BUZOV 2004: 179.

<sup>36</sup> BARKOCZY 1988: 27-38.

<sup>37</sup> The manufacturing of glass was confirmed for the 2<sup>nd</sup> century. See in: LAZAR 2006b: 339-340.

<sup>38</sup> ŠARANOVIĆ SVETEK 1986: 53; GREGL 1997: 72; KOŠČEVIĆ 2003: 92.

<sup>39</sup> LELJAK AND LAZAR 2013: 116.

<sup>40</sup> LELJAK AND LAZAR 2013: 117.

<sup>41</sup> Although the furnaces in Lyon were 45- 65 cm in diameter and are relatively small. But that does not mean that furnace could not have a slightly larger diameter in the other provinces and colonies.

<sup>42</sup> BECKER AND MONIN 2003: illus. 4, 5, 6; RAUX, BREUIL AND PASCAL 2010: 76-77.

<sup>43</sup> RAUX, BREUIL AND PASCAL 2010: 71-78, illus. 3, 4, 5, 6.

<sup>44</sup> BURKOWSKY 2000: 42; VIDOŠEVIĆ 2003: 12, 13.; LELJAK AND LAZAR 2013: 116-122.

The firebox as well as the upper part of the dome are not preserved.<sup>45</sup> Given the context of the find and the existence of the surrounding walls as well as the well in the immediate vicinity, it may be assumed that this certainly was a workshop complex.<sup>46</sup>

When we look at the location of this furnace within the urban perimeter of Roman Siscia, the furnace was found near the Roman late imperial bulwark zone which was constructed later, *intra muros*, which is not surprising considering its dating.<sup>47</sup> If we take that the furnace dates from the 1<sup>st</sup>-2<sup>nd</sup> century, this could explain its location, since the early glassmaking workshops were located outside public and residential areas,<sup>48</sup> and yet in their immediate vicinity, and often at crossings of routes and along a river.<sup>49</sup> Due to the development and expansion of the city and the construction of the city's walls, this workshop area later became an integral part of the city.<sup>50</sup> There is a similarity with Lyon, where the glass furnace was situated close to the city's residential area at the time when the city had not yet developed all its residential features which only happened with developed urban structure of Late Roman Antiquity.<sup>51</sup> The finding of a furnace in Salona also shows that it was located in the immediate vicinity of the city's residential area, specifically in the western part of the forum.<sup>52</sup>

The discovery of ancient tools for production and processing of glass would certainly confirm the existence of glassmaking in Siscia. However, when the archaeological research of Roman Siscia is concerned, one should bear in mind

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<sup>45</sup> Only its lower part is preserved, which was probably used for glass melting. See in: LELJAK AND LAZAR 2013: 117.

<sup>46</sup> We are again obliged to Mia Leljak for highlighting these thoughts, since she was the first to introduce them.

<sup>47</sup> Following the Marcomannic Wars, the rebuilding of towns in Pannonia began during the time of Septimius Severus, probably out of gratitude towards the Pannonian legions that played an important role in Septimius Severus' fight for the throne and subsequent victory (HOTI 1992: 143). Some towns in Pannonia were especially awarded with the status of *colonia*, and Siscia was given the epithet *Colonia Septimia Siscia Augusta* (CIL III 4193; HOTI 1992). The dating of the walls to the period of Septimius Severus has been made possible by the analysis of movable objects (KATAVIĆ 2000). The new colonial status of Siscia might also speak in favour of this dating (HOTI 1992: 143). See in LOLIĆ 2014: 79.

<sup>48</sup> In Lyon and Salona glassmaking furnaces were reportedly situated within the city walls and not far from the city centres. In Siscia there could be similar situation, but if we accept as possible the fact that the furnace existed in the early Roman period, when Siscia did not have city walls. In classical antiquity location where the furnace was found (Ante Starčevića Street) certainly forms part the structure *intra muros*.

<sup>49</sup> LELJAK 2014: 44.

<sup>50</sup> MacMAHON AND PRICE 2005: 173-174.

<sup>51</sup> FOY AND NENNA 2001: 51-52; MacMAHON AND PRICE 2005: 174.

<sup>52</sup> BULJEVIĆ 1999: 20.

the fact that almost all the pieces of the ground *intra muros* have been devastated several times in the last two hundred years and that the movable archaeological material was probably taken to private archaeological collections or museums.<sup>53</sup> It should be recalled that Sisak gained the status of a colony early, whereas during the Diocletian era it was the centre of Pannonia Savia. The thesis about the existence of a glass furnace in Siscia even before the 3<sup>rd</sup> or 4<sup>th</sup> century may be further substantiated by a large amount of glassware that has been found thus far, whole vessels and fragments or sherds, as well as several larger fragments of raw glass, which all date from the earlier Roman period.

### *The question of raw materials*

Geologically speaking, the peripheral area of Moslavačka Gora<sup>54</sup> has developed crustal consumption of granite massif, and as the final product of the consumption is quartz sand, which is important for the glassmaking production.<sup>55</sup> The deposit of quartz sand is being exploited at Vrtlinska, and the deposit's central part is made of white sand with the highest content of silicon dioxide (95%). Due to the high quality of quartz sand, it was used in the Lipik glass factory and at plants in Kordun and Banija.<sup>56</sup> So, taking this into consideration, the Roman Siscia was not lacking the natural resources needed for glassmaking.

In addition, during the dredging of the river Kupa in the early 20<sup>th</sup> century, the unprocessed glass mass was found, which was used as raw material in the production of glass objects.<sup>57</sup>

### *Glassware finds from the archaeological excavations in Sisak during the 19<sup>th</sup> century and the first half of the 20<sup>th</sup> century*

This chapter is intended to show the state of the discovery of glass objects at the time when archaeological excavations were not systematic and when the keeping of records of the objects found was still not sufficiently meticulous, and if the

<sup>53</sup> See more in: VUKELIĆ 2011. In Sremska Mitrovica (Sirmium), it is also not certain whether the workshops produced glass objects or were involved in melting the broken glass vessels, considering that no glass tools were found, even though these furnaces were of a different form. See more in: MILOŠEVIĆ 1974: 102-104, RUŽIĆ 1994: 66; LELJAK 2014: 23.

<sup>54</sup> Moslavačka Gora is a small mountain range located in central Croatia at the borders of Bjelovar-Bilogora County and north of Sisak–Moslavina County.

<sup>55</sup> Distance from Siscia to Moslavačka Gora is approximately 50-60 km.

<sup>56</sup> CRNIČKI AND ŠINKOVEC 1993: 21-37.

<sup>57</sup> More on the discovery of archaeological material by dredging of Kupa in Sisak, see in: VUKELIĆ AND RADMAN-LIVAJA 2012. Cf. also *Transparentna ljepota* 2013: 7.



records happen to be meticulous, the discovered archaeological artefact itself was often lost without any trace, from the site of discovery to the depot. Most often, there are cases where records of found objects exist, but there is no data on where these material remains were ultimately stored.<sup>58</sup> Notwithstanding these limitations, we considered it useful to have a chapter on history of the archaeological research and the discovery of glass artefacts, since otherwise one might think that there were no such objects in the sum of artefacts until the archaeological research in the second half of the 20<sup>th</sup> century to the present day.

Thus, we have information that, at the end of the 19<sup>th</sup> century, a certain Josip Jilk gave to “museum of Sisak” as many as 120 pieces of iron and glass from his collection.<sup>59</sup> We do not know, of course, what percentage of glass objects were there, but obviously this was a larger collection. The excavations conducted in 1886 and led by Dragutin Jagić at the site of Mali Kaptol, unearthed the remnants of beautiful dishes made of ceramic and glass at a depth of 4.5 meters.<sup>60</sup> Furthermore, during the railways maintenance in 1887, five glass *balsamaria* and one glass bowl were found.<sup>61</sup> In the area of the so-called New Sisak, several Roman period graves and slab sided tombs were discovered.<sup>62</sup> According to Brunšmid, most of these graves were already disturbed, but one complete preserved tomb was found which contained grave goods: glass cups, a bronze buckle, a bracelet and earrings.<sup>63</sup>

During the deepening of the channel in Strossmayerova Street, more Roman graves were found. Glassware finds included many broken and four whole glass bottles of “special type” and a large glass urn with lead cover, albeit broken.<sup>64</sup>

The year 1912 is considered one of the most abundant for the archaeology of the Sisak area, because the river Kupa was dredged for archaeological purposes. One of the most active participants in this enterprise was Antun Bukvić. A letter from Antun Bukvić dated 24 July 1912 reveals that he received a ring with a glass gem stamped with a depiction of a genius holding a bunch of grapes.<sup>65</sup> Bukvić remembered that he had already seen something similar in the form of fragments of a ring with a similar figure, but since he used to do imprints in wax of all inte-

<sup>58</sup> See more in: VUKELIĆ AND RADMAN-LIVAJA 2012. The monograph has a catalogue of finds on an accompanying CD-ROM.

<sup>59</sup> VUKELIĆ 2011: 116; VUKELIĆ AND RADMAN-LIVAJA 2012: 46

<sup>60</sup> VUKELIĆ 2011: 146.

<sup>61</sup> VUKELIĆ 2011: 148; VUKELIĆ AND RADMAN-LIVAJA 2012: 32.

<sup>62</sup> VUKELIĆ 2011: 191; VUKELIĆ AND RADMAN-LIVAJA 2012: 78.

<sup>63</sup> A report by Josip Brunšmid from the second half of June 1911, Dossier Siscija, Sisak od 1851 – 1935, 42/25, AMZ; VUKELIĆ 2011: 191; VUKELIĆ AND RADMAN-LIVAJA 2012: 79.

<sup>64</sup> VUKELIĆ 2011: 149; VUKELIĆ AND RADMAN-LIVAJA 2012: 64.

<sup>65</sup> Letter of Antun Bukvić dated 24 July 1912, Dossier Siscija, *Sisak od 1851 – 1935*, 42/25, AMZ.

resting objects, he could now compare these two rings and came to a conclusion that they were undoubtedly identical.<sup>66</sup>

From Antun Bukvić's report dated 22 July 1912, we learn that a glass dolphin pendant made of blue glass (2.5 cm) was also discovered.<sup>67</sup>

*Glass objects found in the Sisak area during the past ten years  
- frequency, quality and quantity*

During the past ten years there has been a lot of rescue archaeological research conducted in the area of *intra* and *extra muros*. During the excavations as well as the subsequent processing of the discovered archaeological material, glass objects were not specifically separated or processed. However, we intend to list here the sites and glass objects found in the probes. First and foremost, we wish to highlight the continuity of the archaeological discovery of glass objects in the Sisak area and we believe that this topic deserves such a supplement as to achieve the totality of information with regard to the research problem. Furthermore, some of the authors who have studied the jewellery collections in the archaeological collections they curate have processed some individual glass objects, and we intend to specify them here, without going over their analysis. The intention is here to offer a summarized but complete survey of finds made entirely or partially of glass so that such a survey would provide a sound basis for any further research related to the glassmaking craft in Siscia.<sup>68</sup>

Attention is given to the processing of several Roman glass rings. The first ring, which we have singled out, is a ring with gem made of silver and glass paste with a depiction of a blue horseman/hunter and an animal.<sup>69</sup> The next ring is made of bronze and glass and has a visible blue glass insert.<sup>70</sup> Another ring we have decided to single out is made of bronze and glass and has a red glass insert.<sup>71</sup> The last ring in this group is also made of bronze and glass and has one of the originally two red inserts preserved.<sup>72</sup>

<sup>66</sup> Letter of Antun Bukvić dated 24 July 1912, Dossier Siscija, *Sisak od 1851 – 1935*, 42/25, AMZ; VUKELIĆ 2011: 199; VUKELIĆ AND RADMAN-LIVAJA 2012: 84.

<sup>67</sup> Letter of Antun Bukvić dated 22 July 1912, Dossier Siscija, *Sisak od 1851 – 1935*, 42/25, AMZ.

<sup>68</sup> The survey is based on the published research results by professional archaeologists and museum curators. Since the authors of this paper are not themselves specialists in archaeology, they have not ventured to question the conclusions about characteristics or dating of items.

<sup>69</sup> Inventory number 2259, the site of discovery: the eastern necropolis, 1954; BURKOWSKY 1999.

<sup>70</sup> Inv. no. 3113, the site of discovery: Sisak; BURKOWSKY 1999, catalogue number 153.

<sup>71</sup> Inv. no. 2520, the site of discovery: Kupa river.

<sup>72</sup> Inv. no. 3112, the site of discovery: Sisak; BURKOWSKY 1999, cat. no., 154; TOMAŠ 2006: 17-39.

A rescue archaeological excavation at the “Žitni magazin” site in 2005/6 has unearthed the following glass objects in the Roman age archaeological layer: a glass mosaic piece<sup>73</sup>, a large amount of Roman pottery and glass vessels, glass beads, and fragments of a bracelet made of black glass and bronze.<sup>74</sup>

During the same year, a rescue archaeological excavation was carried out at the playground of the “22. lipnja” Elementary School, where the traces of Roman architecture from two stages were found: a representative building from the 2<sup>nd</sup> century and structures from the later phase which were probably not used for dwelling. From glass objects, the site has yielded as follows: a glass *gutus* (dated to the 1<sup>st</sup>-3<sup>rd</sup> century AD), a piece of glass made in the *mille fiori* technique (dated to the 1<sup>st</sup> century AD), and several fragments of Roman glass.<sup>75</sup>

A rescue archaeological research conducted in 2007 at the Ivan Kukuljević Sakcinski site unearthed the architectural remnants along the road from different stages of construction along with a large amount of movable material. Thus, among other things, a large number of fragments of glass vessels from the early imperial period were discovered.<sup>76</sup>

A rescue archaeological excavation at 28 Gundulićeva Street in 2007 unearthed the remnants of tombs and architecture, along with the accompanying movable archaeological material: two *balsamaria* made of white opaque glass, two glass jars - one blue, the other one made of white glass, and a jug made of transparent green glass (dating: 1<sup>st</sup>-2<sup>nd</sup> c. AD).<sup>77</sup>

A rescue archaeological excavation at the “Lučka kapetanija” site in 2009 unearthed the urban architecture with a possible residential use, the paved road and four furnaces and fireplaces. From the moveable archaeological material, a large quantity of pottery, glass, metal and bones from the period of the so-called Late Roman Antiquity have been found. All of these point to a possible existence of an inn next to a road *intra muros*.<sup>78</sup>

In 2010, a rescue archaeological excavation was conducted at the “Dunavski Lloyd” site. Among other things, the remnants of Roman architecture were discovered, whereas the movable archaeological finds yielded a lot of glass and ceramic fragments.<sup>79</sup> A rescue archaeological research conducted along the route of the future Zagreb-Sisak-Odra-Staro Pračno-Sisak communal area highway in

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<sup>73</sup> Glass mosaic piece might indicate the Late Roman period.

<sup>74</sup> TOMAŠ 2006A: 41-47.

<sup>75</sup> BAĆANI 2006: 49-60.

<sup>76</sup> BAĆANI AND TOMAŠ 2008: 14-16.

<sup>77</sup> PAVLAKOVIĆ AND ŠKRGULJA 2008: 17-21.

<sup>78</sup> BAĆANI, GOSPODINOVIĆ, ŠKRGULJA 2010: 549-554.

<sup>79</sup> *Ibidem*: 554-560.

2009 and 2010. On the right bank of the river Odra, the ancient structures were found, and from movable archaeological finds, among other things, fragments of fine glass vessels and glass beads were discovered.<sup>80</sup>

In 2008, a rescue archaeological excavation was carried out at the “Rimska 25” site. A number of archaeological architectural layers were unearthed, along with the most striking monumental stone building from the 2<sup>nd</sup> century AD. Only a small amount of glassware was found at the site.<sup>81</sup>

During the same year, a rescue archaeological research was conducted at the “Euroagram” site. The walls and a tower with a counterfort next to the city’s wall from the 2<sup>nd</sup>-3<sup>rd</sup> century AD were discovered. From the archaeological material found there, there was a lot of ceramics and glass, particularly vessels and beads.<sup>82</sup>

In 2003 and 2004 a rescue archaeological research was conducted at the “Dr-žavni arhiv” site. Along a large number of various movable material, a late La Tène glass bead made of glass paste (dating: 1<sup>st</sup> c. BC) and a small ribbed bead of a slightly biconic form and made of whitish paste were found at the site (dating: 2<sup>nd</sup>-3<sup>rd</sup> c. AD).<sup>83</sup>

### *The finds of glassware from the area extra muros*

Generally speaking, one of the most completely preserved sites with Roman glassware has been discovered in Siscia’s cemeteries, which have had the luck not to be a century-long target of plunderers of artefacts.<sup>84</sup> The earliest records of the glassware finds are presented two chapters above, where we covered the pioneers of archaeology in Sisak. There are no more recent records of the finding of graves until 1943. Then, during the construction of a new building along the

<sup>80</sup> *Ibidem*: 560-563.

<sup>81</sup> BAĆANI, ŠKRGULJA, TOMAŠ BARIŠIĆ 2009: 69-72.

<sup>82</sup> *Ibidem*: 73-76.

<sup>83</sup> BURKOWSKY, KUŠANIĆ, BURMAZ 2007: 21-31.

<sup>84</sup> When comparing the context of archaeological finds *intra muros* and *extra muros*. The material remains of Roman Siscia are not complete, because this area has been continuously inhabited, with new settlements built upon the previous ones, and often ravaged by wars. Furthermore, there was frequent looting of archaeological sites in the 19<sup>th</sup> century, since the archaeological treasure was not legally protected. The areas that were rapidly rebuilt due to the development of trade and industry became the easiest pray for plunderers of archaeological artefacts. These areas were located in the formal urban complex *intra muros*. On the other hand, the necropolises did not become the preferred building sites until the second half of the 20<sup>th</sup> century, at the time when archaeological excavations were already legally regulated, even though the regulation was still unsatisfactory. That is why sites *extra muros* yielded artefacts within, in general, a complete archaeological context, whereas sites *intra muros* were looted and repeatedly dug over. This survey of the history of excavations is intended to provide a framework for a better understanding of the archaeological context of some sites.

former route that led to the river Sava, 19 skeletal graves with a grave structure made of brick were discovered.<sup>85</sup>

However, the glass grave finds, among others, were found during the construction of the “Segesta” stadium and playfield in the south-eastern part of the city in 1954. On that occasion, 134 graves were unearthed, and 13 of them contained glass grave goods.<sup>86</sup> The graves are numbered as follows: 1 (six *lacrimaria*), 4 (four *lacrimaria*), 6 (one small glass bottle with a neck chipped off, one broken bottle of a larger volume, a glass embryo), 27 (two small bottles), 31 (one *lacrimarium*), 36 (seven *lacrimaria*), 37 (a small purple glass bottle), 39 (a decorative round glass object), 42 (three glass bottles, one of which is decorated with parallel edges and handles made of bronze, found in a deposited urn), 62 (one pear-shaped glass bottle and one *lacrimarium*), 67 (a fragment of a *lacrimarium*), 76 (one glass bottle and one glass cup) and 88 (two *lacrimaria*). During the further work on the “Segesta” stadium in 1955 and 1956, 21 new graves were found. Glass grave goods were discovered in several graves, one glass bottle and *balsamaria*.<sup>87</sup>

A most systematic analysis of this complex, as well as the archaeological material from this site, was presented by Zoran Wiewegh.<sup>88</sup> He cites individual glass objects discovered in the South-eastern necropolis: *balsamaria*, which are the largest group of glass objects found in the necropolis (26 pieces), bottles (4 pieces), cups (5 pieces), two *aryballoi*, one *gutus*, glass beads (5 pieces), and several glass objects of unspecified purposes. All glassware from the necropolis date mainly from the 1<sup>st</sup>-2<sup>nd</sup> century AD, although the tombs from the necropolis are dated to the 1<sup>st</sup>-4<sup>th</sup> century.<sup>89</sup>

In 1955 and 1957, seven graves, not particularly abundant in grave goods, were found in Kralja Tomislava Street, but, among other things, glass beads and some glass fragments are mentioned in connection to the finding.<sup>90</sup>

In Novi Sisak, in Josipa Jurja Strossmayera Street, the third complex of necropolises was discovered, and a number of cremation graves were found with glass grave goods, while a glass bottle with handles, a glass vase and coins were found in one skeletal grave.<sup>91</sup> In the area of town called Pogorelec, graves with urns were discovered, in which fragments of glass and small glass bottles with two handles were found.<sup>92</sup>

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<sup>85</sup> BURKOWSKY 1993: 70, note: 14.

<sup>86</sup> The information on glassware finds as a part of grave goods in the south-eastern necropolis of Siscia is based on BURKOWSKY 1993: 71-75.

<sup>87</sup> BURKOWSKY 1993: 74-75.

<sup>88</sup> See more in: WIEWEGH 2003.

<sup>89</sup> WIEWEGH 2003.

<sup>90</sup> BURKOWSKY 1993: 75, 78.

<sup>91</sup> BURKOWSKY 1993: 78.

<sup>92</sup> BURKOWSKY 1993: 78.

Most recently, Tino Leleković has studied grave goods from the Siscian necropolises in his PhD dissertation titled *Ancient Necropolises of Siscia and Mursa*, among which there are also glassware objects.<sup>93</sup>

### Conclusion

The economy of Roman Siscia is a comprehensive and complex problem that has so far been only partially examined and studied. The researchers have focused their efforts on specific economic activities which have been subjects of their respective personal specialisations. Crafts have also been occasionally studied and the research results in this area have been connected to specific archaeological finds. Consequently, some general knowledge about the economic activity in Roman Siscia is lacking, and the expert audience is mostly familiar with the most important representatives of this economic activity such as metallurgy (metallurgical activities) or trade in a broader sense.

The discovery of a furnace which could produce glass objects, and whose purpose has been determined precisely from the remnants of molten glass found in it, indicates that production of glassware might have existed in Siscia. Dating of the furnace to the 1<sup>st</sup> and 2<sup>nd</sup> centuries AD is consistent with its placement within the city's perimeter. Generally, it is well known that, in Antiquity, a city's crafts activity was located outside the city walls, but since this was the time when Siscia still did not acquire its massive walls, the placement of the furnace in the forum's immediate vicinity, on its western side, is not uncommon. We have a similar situation with the placement of the glass furnace in Salona. After the construction of a bulwark structure, it may be assumed that such crafts were placed *extra muros*.<sup>94</sup>

Glass objects that are part of the archaeological fundus from Siscia are rich in forms and quality.<sup>95</sup> Only a few specimens from the entire group can be singled

<sup>93</sup> When it comes to the movable archaeological objects, the author has only referred to the part of the necropolis at 28 Gundulićeva Street. For more, see: LELEKOVIĆ 2011.

<sup>94</sup> In the western provinces, the early Roman workshops were located outside the cities, often near rivers or major roads. For details, see LELJAK 2014: 44. In late Antiquity, workshops were located inside the city walls, closer to the centre, in public buildings or abandoned residential areas or along the main street. In the eastern part of the Empire, workshops were an integral part of city's crafts life until the early 7<sup>th</sup> century AD. For details, see: LELJAK 2014: 44. As can be seen, the general rule depended on several factors, which opens room for our assumption as stated in conclusion.

<sup>95</sup> The earliest glass vessels had been imported in the territory of modern northern Croatia since the 1<sup>st</sup> century AD, the period of the conquest of Pannonia, and they were manufactured in Italy. Especially important for the territory of modern northern Croatia was Aquileia, from where the goods were also transported to Pannonia (ŠARANOVIĆ-SVETEK 1986: 50; LAZAR 2006: 331; LELJAK 2014: 58). Already during the 1<sup>st</sup> century AD, numerous local manufacturing centres both in western and eastern provinces started operating, and they probably imitated at

out as particular accomplishments of glassmaking craft. However, the quantity of glass objects suggests that they were very much present, even though made in a much simpler crafting designs.

A lack of glassmaking tools discovered is often adduced as a main argument for non-existence of the glassmaking craft in the territory of Siscia. However, the question should be considered within a wider context of a massive looting of archaeological terrains in Sisak in the late 19<sup>th</sup> and 20<sup>th</sup> centuries. Therefore, it is unlikely to expect intact archaeological sites. We believe that the glassmaking tools, if they had even been *in situ*, were probably stolen.

### *Addendum: Gazetteer of glass objects*<sup>96</sup>

Typologically, the glass objects described in the gazetteer are divided in several sections.<sup>97</sup> The intention is to show only the quantity and variety of forms of glass items discovered in the area of Roman Siscia, which has never been done in this way in any previous publication, i.e. specifically for Roman Siscia. The gazetteer also surveys the authors and the methodology they used in their research which also included the area of Siscia.

#### 1. Jewellery

Most of the glass jewellery from the area of Siscia was found during dredging of the river Kupa in 1912. On that occasion a variety of beads, beads with faces, glass rings, glass whorls, pins, chips, etc. were found.<sup>98</sup>

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first the forms from Italian and Mediterranean workshops, but in time created their own recognizable forms. See more in: FADIĆ 1986; LELJAK 2014: 61. It may be assumed that there was no reason to import simpler objects not requiring a developed manufacturing infrastructure or highly expert work force, since they could be manufactured on a local level.

<sup>96</sup> We believe the gazetteer to be an important addition to this paper, but the list is not thematically, technically nor terminologically complete. The cataloguing according to the method of production has been omitted: by moulding or by blowing. The main guiding line for this gazetteer is the use of objects. The complete catalogue, but not focused solely on Siscia, is available in Mia Leljak's PhD thesis: LELJAK 2014. Reference notes are at the end of each paragraph describing an individual item in an attempt not to overburden the text. A reader should thus have a sufficient insight from where to start and where to look for an individual glass item.

<sup>97</sup> For the cataloguing, as proposed by Mia Leljak, we have used for the most part the terminology based on the Irena Lazar's terminology, which she devised in her PhD dissertation *Rimsko steklo u Sloveniji (Roman Glass in Slovenia, 2003)*. We have also adopted Mia Leljak's terminology, but we have adapted the cataloguing to the needs of our paper.

<sup>98</sup> More on the finding of archaeological material during dredging of the river Kupa in Sisak, see: VUKELIĆ AND RADMAN-LIVAJA 2012.

### 1.1. Beads

Within the jewellery group, glass beads appear next to beads made of natural materials (corals, carnelian, amber, jet) and they can be found on expensive necklaces in alternation with beads made of gold sheet.<sup>99</sup> Most of the beads found during the dredging of the river Kupa are stored at the Archaeological Museum in Zagreb.<sup>100</sup> The first group consists of beads, beads made of green and blue glass, and glass paste.<sup>101</sup> 37 beads made of blue glass and 88 made of green glass and glass paste have been preserved.<sup>102</sup> The second group consists of yellow coloured beads which are made by inserting a gold thread between the layers of glass that constitutes the bead. 34 pieces have been preserved.<sup>103</sup>

### 1.2. Beads with faces

Specimens of glass beads with faces, made of glass paste, are also kept at the Archaeological Museum in Zagreb.<sup>104</sup> For example, there is one yellow and one green bead of circular shape, and both beads have a simple face expression engraved. The yellow bead has a notable red circular line which surrounds the head, while the green bead has a red line (a possible representation of a necklace) on its bottom side. The beads probably date from the 1<sup>st</sup> century AD.<sup>105</sup>

### 1.3. Glass rings

Twelve specimens of circular rings, of different colours and shapes, are kept at the Archaeological Museum in Zagreb, nine of which originate from Sisak.<sup>106</sup> Here we intend to mention a few rings, important for this discussion because they indicate possible production of glassware in Siscia.<sup>107</sup>

<sup>99</sup> KOŠČEVIĆ 1993: 81.

<sup>100</sup> AMZ (Archaeological Museum in Zagreb) inv. nos. 7535, 7537, 7542, 7544.

<sup>101</sup> Beads made of green and blue glass are among the most widespread items, and such prismatically shaped beads were popular at the turn of the 3<sup>rd</sup> century. Large colourful beads and the so-called *Augen* beads are a late Roman product, and have most commonly been found, as well as pieces made of jet, in the graves of little girls. See in: ALFÖLDI 1957: 405, 441, 443, illus. 94, 50, 53; VAGO AND BONA 1967: 191, tab. 6, illus. 86; KOŠČEVIĆ 1993: 81, tab. 1, 2.

<sup>102</sup> The catalogue in VUKELIĆ AND RADMAN-LIVAJA 2012: no. 65; SPAER 2001: 74.

<sup>103</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: no. 65; SPAER 2001: 138.

<sup>104</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: no. 66; AMZ inv. no. A-7514; SPAER 2001: 124.

<sup>105</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: no. 66; Inv. br. AMZ A-7514; SPAER 2001: 124.

<sup>106</sup> KOŠČEVIĆ 1993: 82.

<sup>107</sup> The intention was to show the quantity of glass rings kept at the Archaeological Museum in Zagreb as a national archaeological institution and to point to the ratio of rings from the area of Siscia. The Archaeological Museum in Zagreb had the task to collect and preserve the archaeological treasure from the territory of Croatia until the conditions were not created at the



According to Košćević, an oval shaped ring made of green glass stands out in this collection.<sup>108</sup> The ring has no direct parallel among specimens made of glass, but the overemphasized shoulders of the hoop and a big plate put the ring in close connection with the massive bronze signet rings from late Antiquity.<sup>109</sup> There is also a possibility that the deformation of the ring happened later, if the ring was close to fire, or it may be that it was discarded as an irregular piece, since the hoop of the ring is distorted and flattened.<sup>110</sup>

The collection also contains a black signet ring of smaller proportions.<sup>111</sup> A plate with a relief decoration is on the surface of the ring, but it is difficult to determine the motif. Such rings from the Rhineland area usually have a depiction of an animal stamped or embossed on the plate.<sup>112</sup> From the same area, there are also identical rings with relief human portraits in profile, but they are much rarer.<sup>113</sup> Both types date to the 4<sup>th</sup> century AD. Furthermore, there is a specimen of a ring made of transparent blurry light purple glass, which, as a decoration, has a blue drop on top.<sup>114</sup> This ring has a counterpart in the ring from Königsfeld at Windisch, which is made of dark blue glass and has a bead in a different shade of blue.<sup>115</sup> Such rings are considered to be somewhat older and are dated to the early 3<sup>rd</sup> century AD.<sup>116</sup>

The orange ring also has a visible decorative surface, on which a decoration made of glass plastic was inserted, but this decoration is not preserved.<sup>117</sup>

The collection also has two very interesting specimens of glass rings, whose shape is of a serpentine type. One ring is made of greenish glass, and the other

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local level for independent museum units, which in general, did not happen until the mid-20<sup>th</sup> century. Since the Archaeological Museum in Zagreb received the artefacts from other Roman colonies in the territory of modern Croatia, for example Cibalae, where a find of a Roman period glass furnace has been confirmed, it may be interesting to determine this ratio, to say the least. Additionally, KOŠĆEVIĆ 1993 explains quite well why these specimens point to a local production.

<sup>108</sup> AMZ inv. no. A-8193

<sup>109</sup> KOŠĆEVIĆ 1993: 82.

<sup>110</sup> KOŠĆEVIĆ 1993: 82, 85, cat. no. 7; VUKELIĆ AND RADMAN-LIVAJA 2012: no. 66.

<sup>111</sup> AMZ inv. no. A-8193; VUKELIĆ AND RADMAN-LIVAJA 2012: no. 67.

<sup>112</sup> KOŠĆEVIĆ 1993: 82, 85, Tab. I: 7; Tab II: 8; cf. HENKEL 1913: 157, 257, Tab. LXV, 1739-1747, illus. 244, 245.

<sup>113</sup> KOŠĆEVIĆ 1993: 82, 85, Tab. I: 7; Tab II: 8; cf. HENKEL 1913: 157, 257, Tab. LXV, 1739-1747, illus. 244, 245.

<sup>114</sup> AMZ inv. no. A-8193; VUKELIĆ AND RADMAN-LIVAJA 2012: no. 67; KOŠĆEVIĆ 1993: cat. no. 9.

<sup>115</sup> KOŠĆEVIĆ 1993: 82; Compare: HENKEL 1913: TAB. XLV, 1752.

<sup>116</sup> KOŠĆEVIĆ 1993: 82; Compare: HENKEL 1913: TAB. XLV, 1752.

<sup>117</sup> AMZ inv. no. A-8193; KOŠĆEVIĆ 1993: cat. no. 10.

ring is made of yellowish glass. Interestingly, there are no analogies among the glass pieces, and the rings are also difficult to compare with metal specimens of the same type, because they do not have the same details. Due to this, their typological affiliation - the rings with one or two serpentine heads - is, according to Remza Koščević, questionable, since they have overlapping edges as a result of the manner of production dictated by the glass itself.<sup>118</sup> On the other hand, one should not exclude the possibility that these rings were produced in Siscia. This hypothesis would be confirmed by findings of other rings of this type.

Another finding of a ring would certainly support the hypothesis that the glassmaking craft existed in the area of Siscia, at least when the jewellery is concerned. It is a ring that is either an unfinished piece or it was planned to be repaired.<sup>119</sup> If it was a finished specimen, which was to be repaired, the repair must have been made in a workshop equipped with basic utensils for glassmaking production.<sup>120</sup> The ring, compared to the other groups described here, belongs to technically challenging pieces; therefore it should be assumed that the ring was entirely produced locally in Siscia or it was shaped from an already finished bar with molded fibers, which was softened and formed by heating.<sup>121</sup> However, the question is then from where did this kind of raw material arrive to Pannonia and Siscia. Generally speaking, the bijouterie from Pannonian sites, including the glass, especially green and blue beads that are widespread and smooth black bracelets and rings, are in good measure thought to be a local product of provincial centres and major legionary camps,<sup>122</sup> while for some specific glass products from late Roman necropolises is assumed that they stemmed from an so far unidentified 4<sup>th</sup> century Pannonian workshop.<sup>123</sup>

#### 1.4. Bracelets

The already mentioned collection of finds from Siscia at the Archaeological Museum in Zagreb holds several glass bracelet which deserve to be mentioned: a bracelet made of dull opaque black glass,<sup>124</sup> a large bracelet made of dull opaque black glass<sup>125</sup> (almost a half of the bracelets is missing), and a small bracelet made of opaque black glass,<sup>126</sup> of which only a half is still preserved.

<sup>118</sup> KOŠČEVIĆ 1993: 82.

<sup>119</sup> AMZ inv. no. A-8193; KOŠČEVIĆ 1993: 83; BUZOV 2004: 181.

<sup>120</sup> BUZOV 2004: 181.

<sup>121</sup> KOŠČEVIĆ 1993: 84.

<sup>122</sup> KOŠČEVIĆ 1993: 84.

<sup>123</sup> ALFÖLDI 1957: 405; VAGO AND BONA 1976: 189; KOŠČEVIĆ 1993: 85.

<sup>124</sup> AMZ inv. no. 7632.

<sup>125</sup> AMZ inv. no. 7635.

<sup>126</sup> AMZ inv. no. 7635.

### 1.5. Whorls

This type of jewellery was most likely used for making finer textiles or as a decoration on clothes.<sup>127</sup> During dredging of the Kupa river in 1912, whorls made of green glass with flat bottom and a convex top have been found.<sup>128</sup> The surface of the whorls is decorated with ring-shaped protrusions which surround the central opening of the whorls at regular intervals, and descend stepwise towards the bottom part.<sup>129</sup>

### 1.6. A glass needle

This is a decorative needle made of transparent glass.<sup>130</sup> The top of the hairpin needle is not preserved. The eye of a needle is decorated with white wavy lines, while the rest of the needle shows no decorations.<sup>131</sup>

### 1.7. Chips

The chips are made of glass paste.<sup>132</sup> They are simple, without decorations, and probably were used for various kinds of games. It is also possible that they are actually a raw material which was later used for the ornamentation of small glass vessels.<sup>133</sup>

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<sup>127</sup> SPAER 2001: 259-260.

<sup>128</sup> AMZ inv. no. A-7633.

<sup>129</sup> VUKELIĆ AND RADMAN-LIVAJA 2012: no. 68.

<sup>130</sup> AMZ inv. no. A-7665; VUKELIĆ AND RADMAN-LIVAJA 2012: no. 69.

<sup>131</sup> Cf. SPAER 2001: 264-265; BULJEVIĆ 2002: 297-311.

<sup>132</sup> AMZ inv. no. A-7501

<sup>133</sup> Cf. SPAER 2001: 231-236.

## 2. The bowls

### 2.1. One-coloured ribbed bowls

Several such bowls have been found in the Kupa river near Sisak.<sup>134</sup> They are preserved in fragments, and they have a hemispherical body decorated with straight-edged ribs. The fragments date from the 1<sup>st</sup> century AD.<sup>135</sup>



AMZ inv. no. 7689  
Site: Kupa, Sisak<sup>136</sup>  
(photo provided by AMZ)

### 2.2. Ribbed bowls made of mosaic glass

Probably the most attractive glass pieces belong to this group. In Sisak, a few (4) fragments of ribbed bowl of mosaic glass have been found.<sup>137</sup> They are characterized by a hemispherical body decorated with a rib with straight shaped edge. All fragments have been dated to the 1<sup>st</sup> century AD.<sup>138</sup>



GMSk inv. no. 25306  
Site: Sisak, I. K. Sakeinskog bb.<sup>139</sup>  
(photo provided by GMSk)

<sup>134</sup> In the area of northern Croatia, no complete vessel made of mosaic glass have been found so far. Most of the fragments have been found in the Sisak area and are mostly accidental finds from the Kupa river. However, there are also some specimens found at specific sites.

<sup>135</sup> AMZ inv. nos. 11870, 7689,

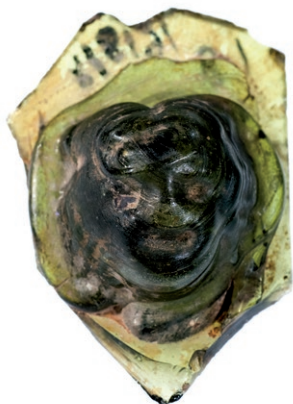
<sup>136</sup> More in: LJELAK 2014: cat. nos. 4.1.1.3.-4.1.1.5., p. 3-4.

<sup>137</sup> Ribbed bowls of mosaic glass were first produced in the late 1<sup>st</sup> century BC. Apparently they were a product of Italian-Roman workshops, since they have been rarely found outside of Italy and the western provinces. See: LELJAK 2014: 28.

<sup>138</sup> Gradski muzej Sisak (Sisak City Museum: GMSk) inv. no. 25306, AMZ inv. nos. 8187/2, 7621

<sup>139</sup> See: LELJAK 2014: cat. nos. 4.1.2.1.-4.1.2.4., pp. 5-6.

### 3. Appliqués



Appliqués on the vessels' bodies appeared from the 1<sup>st</sup> century AD onward.<sup>140</sup> They can be of different shapes and were applied to the vessel's body. The specimens taken here into consideration relate to certain decorations on the vessels' bodies: an appliqué in the form of a stylized lion's head from the 4<sup>th</sup> century AD and an appliqué in the form of grotesque theatre mask - a male head with a wig, also from the 4<sup>th</sup> century. The context of findings is unfortunately unknown.<sup>141</sup>

AMZ inv. no. 8191b

Site: Sisak, unknown location.<sup>142</sup>

(photo provided by AMZ)

### 4. Cosmetic containers

#### 4.1. *Balsamaria*

*Balsamaria* are the most common form of glass containers found at sites, and are most often found in graves. When it comes to glass objects, *balsamaria* are relatively common finds in necropolises. They are mostly dated to the 1<sup>st</sup>-2<sup>nd</sup> century AD.<sup>143</sup>

#### 4.2. Bird shaped droppers

These are cosmetic containers that have a spherical body, stylized tail with a wide opening and a tubular shaped edge with a slightly concave bottom. They are mostly dated to the 3<sup>rd</sup> century AD.<sup>144</sup>

<sup>140</sup> LELJAK 2014: 75.

<sup>141</sup> AMZ inv. nos. 8191a, 8191b.

<sup>142</sup> Cf. LELJAK 2014: cat. nos. 11.1.1., 11.1.2, pp. 7-8.

<sup>143</sup> GMSk inv. nos. 226, 231, 232, 239, 240, 241, 244, 248, 249, 844, 870, 872, 2449, 2459, 242, 854, 840, 845, 847, 849, 850, 851, 855, 856, 857, 858, 859, 863, 864, 873, 874, 875, 862, 865, 901, 930, 2670, 2681, 2683, 2672, 2721, 21937, GmSk bb, AMZ 7666a, 7666b, 7667a, 7668, 7669, 7672, 7687, 7670, 17792. See also: LELJAK 2014: cat. nos. 1.1.3.-1.1.5, 1.2.1, 1.2.3., 1.2.4., 1.2.7.-1.2.14., 1.2.17.-1.2.23., 1.2.25.-1.2.27., 1.2.29.-1.2.41., 1.2.43., 1.2.47., 1.2.49.-1.2.51., 1.2.53., 1.2.59., 1.3.1., 1.4.4., 1.4.6., 1.5.7.-1.5.9., 1.6.2., 1.6.3., 1.6.5., 1.7.6., 1.7.7., 1.8.4., 1.8.5., 1.10.4., 1.10.8., 1.11.2., p. 8-84. All inventory numbers derive from the catalogue in LELJAK 2014: 161-236, with the exception that all other urban centres considered by Mia Lejnak have been omitted.

<sup>144</sup> Cf. LELJAK 2014: 84-85; GMSk inv. no. 24277. See LELJAK 2014: cat. no. 2.1.4., pp. 85-86.

#### 4.3. Spherical cosmetic jars with two handles – *aryballoi*

*Aryballoi* are small glass bowls with short necks and two handles. Such containers were used in baths, to store oil. Visitors used to wear them tied around their wrists.<sup>145</sup>



*Aryballoi* are very specific finds. These jars are characterized by a spherical body with a wide opening and a tubular shaped edge, two oppositely placed crank handles, and a concave bottom. The Sisak specimens, three such containers in total, are dated to the 2<sup>nd</sup> and 3<sup>rd</sup> centuries AD.<sup>146</sup>

GMSk inv. no. 839

Site: Sisak, SE necropolis.<sup>147</sup>

(photo provided by GMSk through courtesy of AMZ)

#### 4.4. Various types of chamber pots

In addition to the forms mentioned above, we also have a number of different forms of chamber pots. In the Sisak area, they have also been mostly found as a part of the grave goods. The dating of these bowls varies.<sup>148</sup>

### 5. Tableware

#### 5.1. Plates

Relatively rare archaeological finds in the present-day Sisak are ancient glass plates. One known specimen is part of a private collection of antiquities. The location of the finding is unknown. The specimen is dated to the second half of the 1<sup>st</sup> century AD. The plate is of a circular shape and has slant walls and wide opening with a tubular shaped edge.<sup>149</sup>

<sup>145</sup> See: LAZAR 2003: 172.

<sup>146</sup> See in WIEWEGH 2003: 86; GMSk inv. nos. 839, 273.

<sup>147</sup> Cf. LELJAK 2014: cat. nos. 2.4.3., 2.4.4., 2.4.6., p. 93-9.

<sup>148</sup> GMSk inv. nos. 238, 838. Cf. LELJAK 2014: cat. nos. 2.5.3., 2.5.4., p. 96-98.

<sup>149</sup> Cf. LELJAK 2014: cat. no. 3.3., p. 99-100.

## 5.2. The bowls



The glass bowls are common finds in the area of Siscian necropolises, while some specimens have been found in the Kupa river. They date from the second half of the 1<sup>st</sup> century to the 4<sup>th</sup> century AD.<sup>150</sup>

AMZ inv. no. 8195  
Site: Sisak, Kupa, 1912<sup>151</sup>  
(photo provided by AMZ)

## 5.3. Glass cups

The archaeological treasure from Siscia includes glass cups. Five specimens have been preserved. They are different in form, colour and dating (from the 2<sup>nd</sup> to the 4<sup>th</sup>/5<sup>th</sup> centuries AD).<sup>152</sup>



AMZ inv. no. 8196  
Site: Sisak, unknown location.<sup>153</sup>  
(photo provided by AMZ)

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<sup>150</sup> GMSk inv. nos. 225, 837, AMZ 8195

<sup>151</sup> Cf. LELJAK 2014: cat. nos. 4.2.2., 4.2.6., 4.4.1., pp. 101-112.

<sup>152</sup> Inv. nos. AMZ 7685, 8196, GMSk 877, 932.

<sup>153</sup> Cf. LELJAK 2014: cat. nos. 5.2.2.1., 5.2.2.3., 5.4.5., 5.5.2.2., 5.6.7., pp. 114-153.

#### 5.4. Jugs

Jugs are also relatively rare finds in the Sisak area. One known specimen is characterized by a conical body with wide opening, inward bent edge, well-defined handle and flat bottom. It dates from the 1<sup>st</sup>/2<sup>nd</sup> century.<sup>154</sup>

#### 6. Lids



This group also includes lids of various containers for storage and transportation. The Siscian specimen is characterized by a conical shape and a plate-like ending with a protrusion in the middle. It is dated to the 1<sup>st</sup>/2<sup>nd</sup> century AD.<sup>155</sup>

AMZ inv. no. 7682

Site: Sisak<sup>156</sup>

(photo provided by AMZ)

#### 7. Bottles

Glass bottles are fairly well represented in the overall glassware finds. The Sisak specimens are of different shapes: from spherical to quadratic bodies to cylindrical bottles with two handles. They date from the 1<sup>st</sup> to 5<sup>th</sup> centuries.<sup>157</sup> Most of them are of greenish colour. For six glass bottles we can confirm that they have been found in Sisak.<sup>158</sup> For the rest, due to deficient details from archaeological excavations, we cannot be sure, although some scientists refer to some of the bottles as finds from Sisak.

#### 8. Glass sticks

A considerable number of these objects have been found, but at unknown sites. This specimen is of a spiral shape, has multi-coloured glass threads, is incomplete and is dated to the 1<sup>st</sup>/2<sup>nd</sup> century AD.<sup>159</sup>

<sup>154</sup> GMSk inv. no. 20247. Cf. LELJAK 2014: cat. no. 6.5.2., p. 166.

<sup>155</sup> AMZ inv. no. 7682

<sup>156</sup> Cf. LELJAK 2014: cat. no. 9.1., p. 175.

<sup>157</sup> Cf. LELJAK 2014: cat. nos. 10.1.1.9., 10.1.1.11., 10.2.1.4., 10.2.1.5., 10.2.1.6., 10.3.3.2., pp. 332-351.

<sup>158</sup> GMSk inv. nos. 129, 228, 889, 890, GMSk bb x 2. Cf. LELJAK 2014: cat. nos. 10.1.1.9., 10.1.1.11., 10.2.1.4., 10.2.1.5., 10.2.1.6., 10.3.3.2., pp. 176-195.

<sup>159</sup> AMZ inv. no. 34 (ten pieces under the same inventory number).





AMZ inv. no. 34  
Site: Sisak, unknown location.<sup>160</sup>  
(photo provided by AMZ)

## 9. Lamps

A single glass lamp makes the Siscian dossier that belongs to this group. The site of the finding is unknown. The lamp is of a bell-like shape with a tubular ending and is incomplete. It is dated to the 5<sup>th</sup>-7<sup>th</sup> centuries.<sup>161</sup>

## 10. Urns

Glass urns are a rare archaeological find in Sisak.<sup>162</sup> For now, there is only one completely preserved specimen from Sisak in the territory of northern Croatia.<sup>163</sup>

This specimen is from a private collection, comes from an unknown site, and is characterized by a rectangular body, a wide opening, a tubular shaped rim and a flat bottom. It is green and dated to the 1<sup>st</sup>/2<sup>nd</sup> century.<sup>164</sup>

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<sup>160</sup> Cf. LELJAK 2014: cat. nos. 11.1.1.-11.1.10., pp. 197-201.

<sup>161</sup> AMZ inv. no. 7682. Cf. LELJAK 2014: cat. no. 11.2.2., p. 202.

<sup>162</sup> Cf. LELJAK 2014: 135.

<sup>163</sup> Cf. LELJAK 2014: 134.

<sup>164</sup> Cf. LELJAK 2014: cat. no. 8.2.1., p. 204.

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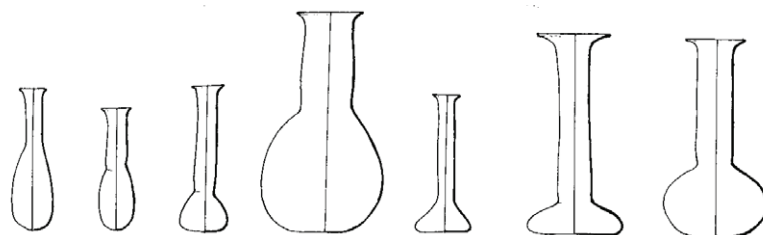
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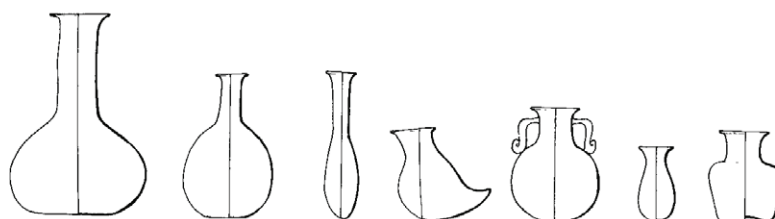
We would like to thank Branka Migotti whose advice and constructive help have been instrumental for this paper's final form. As for the *Addendum*, we are vastly grateful to Mia Leljak, because we have based our paper on her research for the PhD dissertation.

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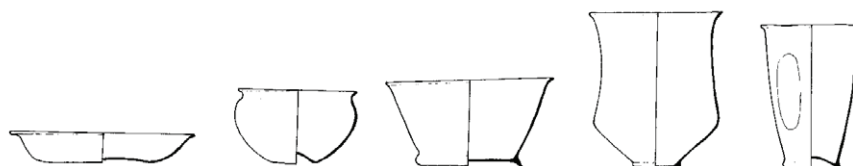
Forms of Glass Bowles



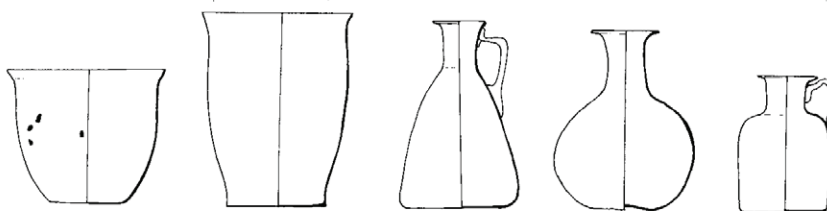
TUBULAR <i>BALSAMARIA</i>	TUBULAR <i>BALSAMARIA</i> WITH NARROWING OF THE NECKS	CONE- SHAPED <i>BALSAMARIA</i>	CONE-SHAPED <i>BALSAMARIA</i> OF LARGER DIMEN- SIONS	TRIANGLE- SHAPED <i>BALSAMARIA</i>	<i>BALSAMA- RIA</i> WITH FLATTENED BODIES	<i>BALSAMARIA</i> WITH BICO- NIC BODIES AND LONGER NECKS
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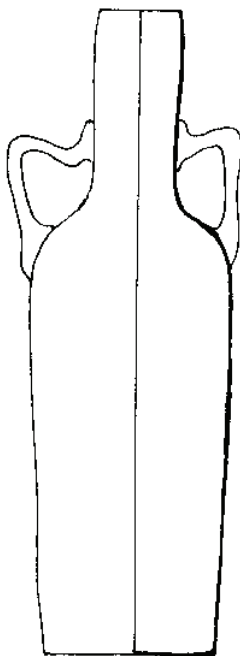
<i>BALSAMARIA</i> WITH WIDE, ROUNDED BODIES	SPHERICAL <i>BALSAMARIA</i>	OVAL <i>BAL- SAMARIA</i>	DROPPERS IN THE FORM OF A BIRD	SPHERICAL COSMETIC CONTAINERS WITH TWO HANDLES ( <i>ARYBALLOI</i> )	VARIOUS FORMS OF COSMETIC CONTAINERS	VARIOUS FORMS OF COSMETIC CONTAINERS
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PLATES	SEMISPHERICAL BOWLS	BOWLS WITH SLANTED SIDES	BICONIC GLASSES ON A LEG	GLASSES WITH DEPRESSIONS
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SEMISPHERICAL GLASSES WITH A DROPS DECORATION	CONE-SHAPED GLASS WITH A DRAWN-OUT STANDING SURFACE	CONE-SHAPED JARS	SPHERICAL BOTTLES WITH STRAIGHT NECKS	RECTANGULAR BOTTLES WITH ONE HANDLE
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CYLINDRICAL BOTTLES WITH TWO HANDLES

## Neka saznanja o staklarstvu u rimskoj Sisciji

Siscija je bila jedna od najvažnijih i najznačajnijih panonskih rimskih kolonija. Kao kolonija, posjedovala je sve elemente urbanog, gospodarskog i društvenog života velikog rimskog središta. Svakako je najvažnija činjenica da je u Sisciji u drugoj polovini 3. stoljeća otvorena kovnica novca, što je bio rijedak privilegij te ukazuje na važnost Siscije na razini cijelog Carstva. Dosadašnja istraživanja o antičkoj Sisciji pokazala su da je njeno gospodarstvo bilo vrlo razvijeno, no ovdje odmah treba naglasiti kako je sfera gospodarske istraženosti sporadična. Primjerice, mnogo se govorilo o metalurškoj djelatnosti ili, recimo, o keramičarstvu, međutim, ti su zaključci prvenstveno bili određeni materijalnim arheološkim nalazima.

Da se, pored navedenoga, u Sisciji proizvodilo i staklo dokazuje pronalazak staklarske peći 1998. godine u Ulici Ante Starčevića br. 37, prilikom kopanja temelja za stambenu zgradu. Prostor peći bio je ispunjen sitnom keramikom i rastaljenim staklom. Kalota nije pronađena, ali su otkriveni brojni stakleni uzorci i predmeti od stakla koji dopuštaju pretpostavku postojanja staklarskog obrta u ovome antičkom gradu.

*Ključne riječi:* Siscija, antika, gospodarstvo, staklarski obrt, staklarska peć.

*Keywords:* Siscia, antiquity, economy, glassmaking craft, glass furnace.

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