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RECENT DISCOVERIES IN THE SANCTUARY AREA OF THE ROMAN SETTLEMENT AQUAE IASAE (VARAŽDINSKE TOPLICE)

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Izvleček

[Novejše raziskave v svetiščnem kompleksu rimske naselbine *Aquae Iasae* (Varaždinske Toplice)]

Rimska naselbina *Aquae Iasae* je ležala na mestu današnjih Varaždinskih Toplic. Zaradi termalnega vrelca na zgornji terasi hriba, kjer je danes mestni park, je bilo območje poseljeno več tisočletij. Okrog "svetega" izvira so Rimljani zgradili svetišče in na njegovi južni strani kopališče. Nedavna izkopavanja so osvetlila številne vidike razvoja svetišča od 1. do 4. stoletja n. št. V začetku 1. stoletja je Rimljanom uspelo "nadzorovati" izvir, okolico urediti kot svetišče in tako dati naravnemu fenomenu nadih "svetega izvira". V 2. stoletje sodi kompleksna gradnja novega svetišča z več templji. Takrat so izvir tudi ogradili s pravokotnim zbiralnikom (8 x 13,5 m). Na začetku 4. stoletja so prenovili svetišča in zbiralnik ter pri tem za gradbeni material uporabili številne starejše napise, reliefe in celo skulpture. Dobro je dokumentirano čaščenje različnih zdravilnih božanstev, med katerimi izstopa kult nimf. Najdbe, povezane z bogom Apolonom, in geološke razmere termalnega vrelca kažejo, da je bil kraj tudi preročišče. Pozneje, v 4. stoletju, je mogoče v nekaterih zgradbah zaslediti elemente krščanstva. Najdbe potrjujejo sožitje politeističnih kultov in krščanstva do samega konca kompleksa.

Ključne besede: Zgornja Panonija, *Aquae Iasae*, termalna voda, sveti izviri, svetišče, nimfe

Abstract

The present town of Varaždinske Toplice (Croatia) was the site of the Roman settlement Aquae Iasae. The area was inhabited over several millennia due to the thermal spring on the upper terrace of the hill, where today's city park is located. The Romans built the sanctuary around the 'sacred' spring and a bath complex to the south. Recent excavations shed light on many aspects of the sanctuary's development from the 1st to 4th century AD. At the beginning of the 1st century, the Romans managed to 'control' the spring and organised the area around it as a sanctuary to give the natural phenomenon a 'sacred spring' ambient. In the 2nd century, complex works were carried out to construct a new sanctuary with more temples. In this phase, the spring was enclosed with a rectangular reservoir (dimensions 8 × 13.5 metres). The beginning of the 4th century was the time frame of the renovation of the sanctuary and spring reservoir when numerous earlier inscriptions, reliefs, and even sculptures were used as construction material. The worship of various healing deities is well documented, but the main feature of the sanctuary was a strong cult of nymphs. Findings related to the god Apollo and the geological situation with a thermal spring suggest it was also a place of oracles. Later in the 4th century, some elements of Christianity can be traced back to certain buildings. However, the findings confirm the coexistence of polytheistic cults and Christianity, leading to the very end of the complex.

Keywords: Pannonia Superior, Aquae Iasae, thermal water, sacred spring, sanctuary, nymphs

Fig. 1.: Varaždinske Toplice, pressumed narrower area of the Roman settlement Aquae Iasae (circled in yellow) and locations of Roman remains: **1** – public section of the Roman settlement in the town park; **2** – commercial part (investigated 1959–1961); **3** – remains of bathing facilities in Braće Radić Street (houses nos 5,7); **4** – remains of Roman building (baths?) recorded in 1878; **5** – location of the research in 1867 (opposite the entrance to the park); **6** – Bregovita Street; **7** – Varaždin Street; **8** – Saint Martin's Square; **A** – Roman tunnel catchment; **B** – Ciglenica (Roman remains); **C** – Gromače 1 (remains of Roman road); **D** – Gromače 3 (villa rustica), **E** – Tuhovec (villa rustica); **F** – today's cemetery; **G** – Poljana (Roman remains).

INTRODUCTION

The Roman settlement of Aquae Iasae was located in the area where the town of Varaždinske Toplice stands today, on the terraces and at the foot of Toplice Hill (*Fig. 1*). The specific terraced configuration of the terrain with travertine layers is due to the long-term deposition of thermal waters. The main spring is located on the highest terrace (*Fig. 2*), surrounded by slopes on three sides, from which sulfurous thermal water constantly springs out at 20 liters per second (nearly 2 million liters per day) at a temperature of 58 °C. A large amount of hot water flowing from the ground evaporates and fills the space with a specific smell that has attracted people since ancient times, arousing admiration and awe. Numerous prehistoric artifacts from the period from the Paleolithic to the Iron Age have been found in the area of Varaždinske Toplice (on the nearby slopes and foothills, in the valley of the Bednja River).[1] However, besides the two prehistoric axes,[2] no strong traces of activity around the spring confirm its use before the Roman period. Regardless of the lack of findings, the assumption is that this natural phenomenon and the mystical space surrounding it were considered a holy place since ancient times. It remains unknown whether the spring was used only by individuals (sorcerers and priests) or whether it was available to ordinary worshipers. The Roman poet Lucan describes the atmosphere at the place considered a holy site in the Pre-Roman period.[3] A similar presumption, where local deities were worshiped around a natural phenomenon and specific rituals were performed, also exists concerning the spring at Varaždinske Toplice, at least in the 1st millennium BC. In that period, the area between the Sava and Drava Rivers (area abundant with hot springs), was inhabited

[1] Čabrian et al. 1973, 4–5; Malez 1979, 261–262; Bekić 2006, 21–30, 265–268, 271–272.

[2] Kušan Špalj, Nemeth-Ehrlich 2012, Fig. 25, 26; J. Čabrian mentioned several Neolithic artefacts that were in found on the slope above the site in the early 20th century (Čabrian et al. 1973, 4).

[3] Lucan, *Pharsalia,* III, 399–455. Although there are various opinions about Lucan's description of sacred groove near Massilia (Marseilles), as to whether it is a description of a real place or not, most probably he was describing in general the worship of natural cults present in Gaul at that time (Hunink 1992, 170–171).

Fig. 2: Varaždinske Toplice, 2022. The sanctuary area with the spring reservoir, view to the south. (Photo: D. Kušan Špalj)

by the Iasi tribe.[4] They were, as their name says,[5] most likely well acquainted with the healing properties of the thermal waters. The fact that the Romans encountered the Iasi living in the area[6] and using thermal water is also confirmed by the name given to the Roman settlement – *Aquae Iasae*. Since archaeological excavation did not confirm any building activity around the spring at Varaždinske Toplice before the Roman period,[7] we can only speculate how the spring was used.[8] The Romans, most likely as early as the second half of the 1st century BC, while conquering the area between the Sava and Drava rivers,[9] became aware of the exceptional medicinal properties of the thermal water that sprang onto the upper terrace, today known as Toplice hill. In that period, the medicinal benefits of the water may have been exploited without the undertaking of any major construction around the spring, but the well-planned capture of the spring and the construction of the surrounding area were carried out most probably by the early 1st century.

THE ROMAN SETTLEMENT OF AQUAE IASAE

The first archaeological investigation at Varaždinske Toplice was conducted in 1844 in the park, south of the spring, and included a part of the 4th-century Roman bath,[10] which was systematically investigated later, in the period 1956–1959 (*Figs. 1:* 1; *3*).[11] Literature from the

[4] Plin. *NH* III.25, 147–148; Ptol. II; Schejbal 2004, 101–102; Domić-Kunić 2006, 76.

[5] Iasi – "healers", a tribe living near the healing hot springs (Schejbal 2003, 397).

[6] At the Gradec site (Škarnik, near Varaždinske Toplice) an Iron Age settlement, i.e., a fortified Iasi settlement, is assumed to have existed (Bekić 2006, 266–268).

[7] Given the intense building activity taking place as early as the first century, these traces may have been destroyed.

[8] There are some assumptions that the canals dug in the travertine layers under the 1st-century baths belonged to the Pre-Roman Period, but this has not been confirmed with certainty (Vikić-Belančić 1996, 11).

[9] Domić Kunić 2006, 97.

[10] This research is known thanks to a sketch made by M. Sabljar during his visit to Varaždinske Toplice in 1854–1856 (Solter 2016, 28).

[11] Vikić-Belančić, Gorenc 1961.

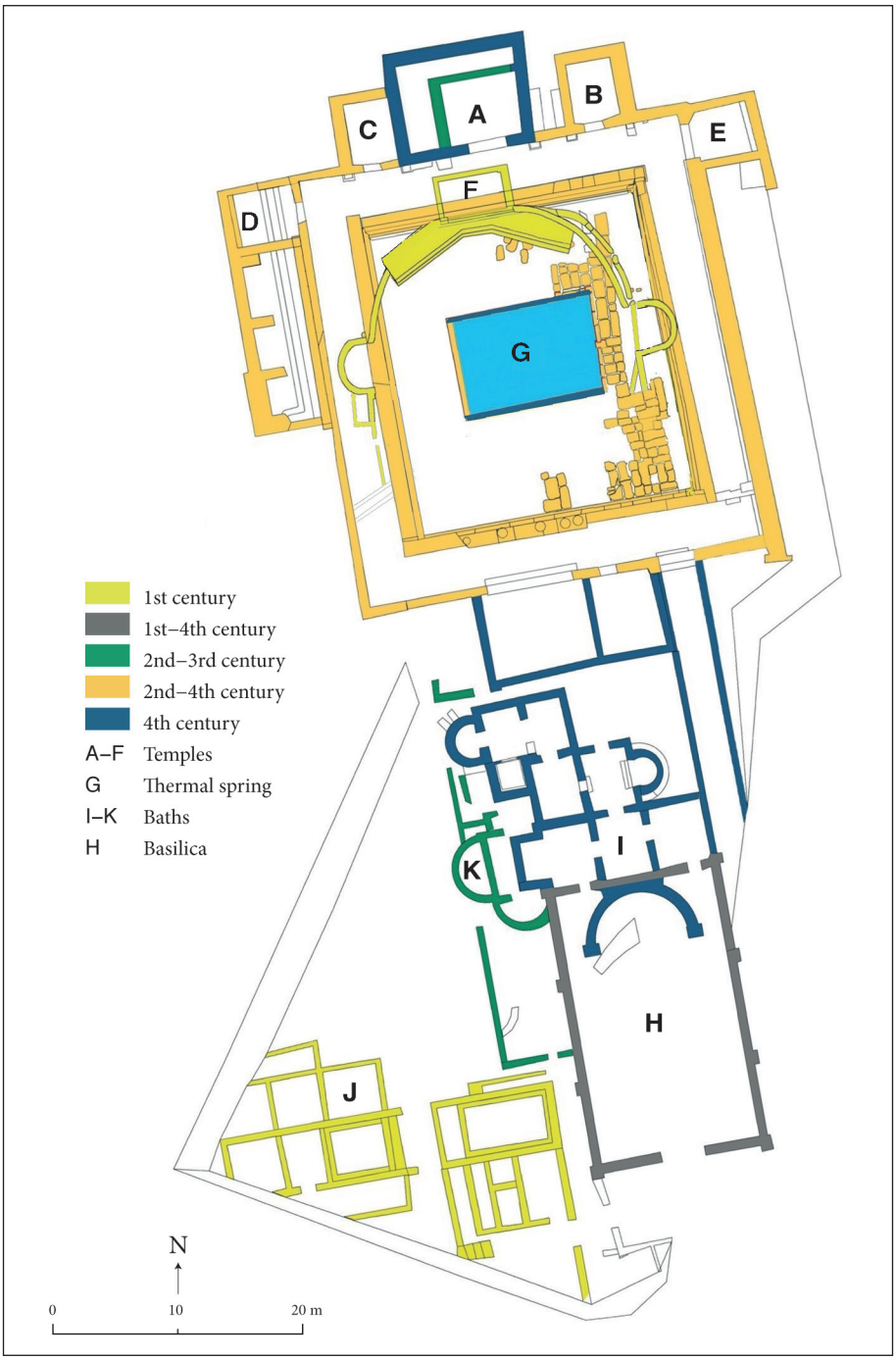

Fig. 3: Plan of public section of the Roman settlement in the city park of Varaždinske Toplice, sanctuary area and bath complex.

19th century also mentions investigations conducted at several locations in Varaždinske Toplice in 1867 (*Fig. 1*: 5, E),[12] but unfortunately, the finds and detailed information have not been preserved.

[12] The research was conducted under the leadership of I. Kukuljević Sakcinski and Count MacDonell, opposite the entrance to the park, in a field called Gromača and in the village of Tuhovec (Tkalčić 1869, 23.)

Systematic investigation around the thermal spring in the town park (*Fig. 1*: 1), conducted by the Zagreb Archaeological Museum since 1953, has provided much information about the appearance and construction phases of the public section of the Roman settlement. The Romans built a sanctuary around the main thermal spring and the baths in the immediate vicinity. Well-preserved buildings excavated in the area covering 6,000 m^2

Fig 4: Varaždinske Toplice: Braće Radić Street, eastern wall of the house at number 5 with remains of the Roman wall and plastered floors. (Photo: D. Kušan Špalj)

testify to several construction phases from the 1st to 4th century (*Fig. 3*).[13] Evidence that the bathing facilities were spread over a wider area was provided by the rescue archaeological excavation carried out in 2012 on Braće Radić Street (*Fig. 1*: 3). The remains of walls, wall paintings, floors, and a hypocaust system were found in front of the houses at numbers 5 and 7, some 30 m east of the bathing complex discovered in the park.[14] After an unfortunate incident[15] leading to the demolition of houses at number 7 in 2018, parts of the same Roman (bath) building, i.e., a wall about 170 cm high and two levels of a plastered floor, were uncovered in the structure of the eastern wall of the house at number 5 (*Fig. 4*). In the inner wall of the same house, part of a Roman wall with frescoes was discovered, and the structures of the other walls also show that the material from the Roman period was already used for construction.

Continuing along Braće Radić Street, some 150 m to the east, remains of a Roman building, most probably baths, were uncovered back in 1878 (*Fig. 1*: 4).[16] Given the importance of the settlement as a thermal spa center, it is reasonable to assume that the bathing facilities were located across a larger area to meet the demands of the numerous visitors from that time. The position of these buildings on the slope descending to the Bednja valley, east of the hot spring, provided a gravitational supply of thermal water due to the natural fall, while the excess water was drained into the river that flowed closest to the settlement on the eastern side.

From 1959 to 1961, experts from the Zagreb Archaeological Museum also conducted investigations at the foot of Toplice Hill, where several buildings built from the 1st to the 4th centuries were discovered (*Fig. 1*: 2).[17] The first phase is characterized by wooden architecture, and two subphases are visible (structures from the second half of the 1st century and those better preserved date back to the first half of the 2nd century). The researchers assumed that these were most likely small workshops or shops, or possible barracks, with several smaller rooms (traces of 5 hearths were found) for more modest accommodation, such as for soldiers requiring treatment. The later phase at this site includes stone structures dating to between the late 3rd and late 4th centuries, which appear to have been a fair hall, perhaps for trading horses or other livestock.[18] The settlement of Aquae Iasae was an important fair center, as indicated by Emperor Constantine's famous inscription,[19] in which, in addition to investing in the reconstruction after the great fire, it also mentions that the Emperor introduced fairs once a week throughout the year. It shows the economic importance of the settlement, where trade was a logical activity considering the large number of

[13] Vikić-Belančić 1996; Vikić-Belančić, Gorenc 1958; Vikić-Belančić, Gorenc 1961; Vikić-Belančić, Gorenc 1970.

[14] Vlahović 2013; Vlahović 2020.

[15] The house was destroyed in a gas explosion in 2018.

[16] Š. Ljubić mentions that the remains were found in front of the then "new" school, the present kindergarten (Ljubić 1879, 35).

[17] Vikić-Belančić 1972.

[18] Vikić-Belančić 1996, 29.

[19] *CIL* III 04121.

people who visited the spa. The workshop facilities were also located at the foot of the hill, as confirmed by the presence of a pottery kiln discovered by chance in the vicinity of the investigated site.[20]

Other interesting information about the Roman settlement was obtained thanks to the rescue archaeological excavations and the survey performed from the 1950s onward.[21] Accordingly, several locations containing various Roman material remains, canals, and parts of wall structures from various buildings have been identified.[22] Also important is information on the chance finds (often stone monuments) recorded during the 19th and 20th centuries.[23] Although there is no specific information on the layout of the streets within the settlement, given the orientation of the buildings investigated in the city park, and their arrangement along a slightly shifted N-S axis (12° towards the west), the assumption is that some of today's streets in that direction, correspond to the Roman streets (e.g. Bregovita Street, Varaždin Street; *Fig. 1*: 6, 7).

On several positions in the area of Varaždinske Toplice, canals and stone pipes were found, proving the existence of a well-organized system of (running and thermal) water supply, as well as a sewage system that discharged excess water into the Bednja River. Running water was directed from the hill above the thermal spring, where natural sources can be found. Records from the first half of the 19th century mention the existence of the Roman water supply system and the Roman tunnel catchment on Tonimir Hill,[24] which is still preserved today (*Fig. 1*: A). The Roman tunnel catchment is located on the hill above the thermal spring (height difference is about 100 m), about 1000 m to the north, along the road from Martinkovec to Toplice. The tunnel (built of bricks) is more than 10 meters long (width 95 cm, height 240 cm), at the end of which is a spring called Zviranjek. The Roman water supply system was in use until 1974[25] and was renovated several times in the 19th century when stone pipes were uncovered at several positions.[26] There is also a record of stone pipes found in 1940 along the current street (Saint Martin's Square).[27] Interestingly, one part of that street fits into the presumed grid of Roman streets, and possibly confirms the partial continuity of the urban layout since Roman times (*Fig. 1*: 8). Stone pipes were also found in 2006 during archaeological excavation of the sanctuary but were used secondarily in the 19th-century structures built close to the spring (*Fig.* 5).[28]

Fig 5: Varaždinske Toplice. Part of a stone pipe (groove diameter 7 cm), found in 2006 in archaeological excavation of the sanctuary. (Photo: D. Kušan Špalj)

Based on the above information, the specific layout and size of the narrower area of the Roman settlement of Aquae Iasae can be assumed. The settlement extended onto the slopes and foothills of Toplice Hill, below the present houses of the modern town. The conditions for the specific arrangement of the Roman settlement were primarily subject to the location of the main thermal spring and the geographical relief containing natural terraces and plains at the foot of the hill. Thus, located on the highest terrace around the hot spring were the main public buildings, including a sanctuary and a bathing complex (extending on the eastern slope of the hill). There were probably residential buildings and visitor accommodation facilities on the terraced slopes. Located at the foot of the hill were stores, workshops, magazines, and perhaps visitor facilities (e.g. tabernae), a convenient location near the roads passing through the valley of Bednja River. At least two roads were located to the south of the settlement, one leading to the east, towards Iovia (Ludbreg), and the other approaching the settlement from the south. Part of that road was discov-

[20] Vikić-Belančić 1975, 33, 36.

[21] Vlahović 2013; Vlahović 2015, Vlahović 2016; Vlahović 2020.

[22] Although there are only finds of individual walls, and not sufficient to reconstruct the appearance of the entire buildings, on several locations on the slope south of the thermal spring, it was assumed that they were parts of residential buildings (Vikić-Belančić 1996, 12; Vikić-Belančić 1972, 75).

[23] Tkalčić 1869; Ljubić 1879; Brunšmid 1907, etc.

[24] From the documents of I. Kukuljević Sakcinski (dating back to 1836), on whose property the tunnel was located, gathered information shows that he led his guests through the tunnel (under a torch light) to enjoy the excellent water from the spring (Filipan 2002, 74–75).

[25] Due to insufficient capacity of Roman water supply and other springs, the town of Varaždinske Toplice was connected to the water supply system of the Drava basin in 1974 (Filipan 2002, 81).

[26] Filipan 2002, 75–76, Fig. 1.

[27] Two pipes are stored in the Varaždinske Toplice Local History Museum (ZMVT; Inv. nos 417, 418; Dimensions: length 115 cm, width 31 cm, thickness 14 cm, groove diameter 7 cm).

[28] Kušan Špalj, Nemeth-Ehrlich 2012, Fig. 5.; There is also a lead pipe found in the area south of the Roman basilica (Vikić-Belančić 1996, 16).

ered in 2002, at a slightly elevated position, about 50 m west of the current road *(Fig. 1:* C*)*.[29] There was probably a necropolis right next to this road, but unfortunately, it has not been confirmed in recent research.[30] However, the discovery of graves in the area is mentioned and relates to the excavations which took place in 1867.[31]

The fertile soil in the valley of Bednja River provided excellent conditions for agriculture, hence the remains of the Roman villas in that area are not unexpected. As early as 1867, traces of Roman buildings were found in the rural settlement of Tuhovec, on the Gradišće site (southeast of Varaždinske Toplice),[32] and a survey of that site in 2004 confirmed that the remains most probably belonged to a Roman villa rustica (*Fig. 1*: E).[33] Remains of a building discovered during the survey of the area south of Varaždinske Toplice (*Fig. 1*: D), may also belong to a villa rustica and according to the finds, it dates back to the period from the 1st to the 3rd century, like the one in Tuhovec.[34] Other Roman architecture found at several locations in the valley (e.g. Ciglenica, Poljana), outside the settlement, may indicate that there were other smaller buildings, probably used for production and handicrafts.[35]

The hot spring was undoubtedly the main reason for the settling of this area in Roman times, but the development of the settlement was also due to its strategic location, favorable climate, availability of sources of drinking water, as well as the gentle, fertile valley of the Bednja River and nearby slopes providing pastures and forests. Based on the obtained results, the conclusion is that the settlement of Aquae Iasae was a very popular thermal spa but also an important trade center that underwent development from the 1st to the 4th century. Based mainly on the results of the research of the sanctuary and bathing area in the city park, we can assume that the settlement experienced its most significant growth and peaked in popularity in the 2nd and 1st half of the 3rd century. This assumption is confirmed by the existence of numerous epigraphic monuments from that period, and Emperor Constantine's investment in its reconstruction after the fire, documented in the inscription,[36] indicates the importance of the settlement even in the 4th century.

ARCHAEOLOGICAL EXCAVATIONS IN THE CITY PARK OF VARAŽDINSKE TOPLICE

Seventy years have passed since the experts from the Archaeological Museum in Zagreb, Marcel Gorenc, Branka Vikić-Belančić and Valerija Damevski, at the request of Josip Čabrian, the founder of the Local History Museum, began excavations in the city park of Varaždinske Toplice, in the area where the natural thermal spring was located (*Fig. 2*).[37] Between 1953 and 1981, they uncovered bath buildings that had been hidden for centuries under travertine sediments deposited by flowing thermal water, as well as the area of the sanctuary built around the thermal spring.[38] Funding for work on this site was restarted in the early 1990s,[39] and thanks to Dorica Nemeth-Ehrlich (from the Archaeological Museum in Zagreb), work was resumed and has continued to this day. Particularly challenging was the research around the natural thermal spring, an area unexplored until 1998, where various post-Roman installations were located.[40] Before beginning the excavations in 1998, the Austro-Hungarian canals and the well had to be removed, including the facility for supplying thermal water to the spa after 1962 (when boreholes were used to extract water from deeper layers). Before the excavations began, there was speculation about how the Romans had organized the use of the natural spring. So discovering that the dimension of the spring reservoir was 13.5 x 8 meters in 1998 was

[29] The road was found at the location called "Gromače 1" during the archaeological rescue excavation before the construction work on the new Varaždinske Toplice bypass road (Bekić 2006, 5–20).

[30] Bekić 2006.

[31] I. Tkalčić mentions that the Roman graves (burnt bones, ceramics, glass, etc.) were found in the investigation carried out in the field called Gromače (Tkalčić 1869, 24). Unfortunately, the exact position of the mentioned location has not been determined yet, since the name Gromače refers to a wider area of the valley south of Toplice. The expectation is that future geophysical or archaeological investigations of the area will reveal the location of the necropolis of the Aquae Iasae settlement.

[32] Tkalčić 1869, 24.

[33] The survey was performed during the 2004 archaeological supervision of the regulation of the Bednja River (Bekić 2006, 278–280).

[34] The survey was performed before work began on the Varaždinske Toplice bypass, at the position called Gromače 3, located about one hundred meters east of the modern road leading to the city from the south (Bekić 2006, 268–271).

[35] Several other Roman sites have been recorded during archaeological works before the construction of the Varaždinske Toplice bypass in 2002, such as Roman walls near the current cemetery (Bekić 2006, 5), Roman remains located at Poljana (Bekić 2006, 273–276) and Ciglenica (Bekić 2006, 31–66).

[36] *CIL* III 04121

[37] Čabrian et al. 1973.

[38] Vikić-Belančić 1996; Vikić-Belančić, Gorenc 1958; Vikić-Belančić, Gorenc 1961; Vikić-Belančić, Gorenc 1970.

[39] Works on the site (from the beginning of the 1990s until today) have been financed thanks to the support of the Ministry of Culture and Media, Republic of Croatia.

[40] The same spring is still in use and thanks to excellent cooperation with the Varaždinske Toplice Special Hospital for Medical Rehabilitation, successful arrangements have been made to overhaul the pipelines from the Roman site which made it possible to commence research in the area.

a great surprise.[41] It was only during research in 2006 that the walls were excavated up to the foundation level, confirming that from the 2nd century, the Romans had captured the thermal spring, inside a rectangular pool, with walls approximately 2 meters high.[42]

The archaeological excavations around the natural spring were challenging due to the presence of toxic gases[43] and the thermal water constantly springing up, which meant that several pumps had to be used to make the work and digging possible. After the work was completed in 2006, pumps used in the excavations were deactivated, and thermal water filled the spring reservoir for the first time since Roman times.

The work continued from 2011 to 2017, exploring the deeper layers and area around the reservoir, leading to new and unexpected discoveries.[44] It turned out that the renovation took place in the 4th century and that the earlier inscriptions, reliefs and even sculptures had been used as construction materials. About 18,000 Roman coins were found in the mud layers inside the spring reservoir,[45] testifying to the large number of visitors who threw votive offerings into the "sacred spring."[46]

All these finds are an inexhaustible source of new information about the sanctuary built around the thermal spring, the divine worship and rituals, and the people who visited the spa hoping for healing.

SANCTUARY AREA

The results of recent archaeological research of the sanctuary area give a clearer picture of the construction phases from the 1st to 4th century and how the natural spring was captured in a given period (*Fig. 3*).

Back at the beginning of the 1st century, the Romans were able to "control" the spring, organizing the area around it as a sanctuary and giving the natural phenomenon an important "sacred spring" ambient. The geological situation of the terrain indicates that the thermal water springs in the area surrounded on three sides by natural slopes, with no natural barrier to the south. It means that the Romans found a situation where the water overflowed freely to the south, and the main prerequisite for capturing the spring was to construct a "dam" in that area. The remains of an early 1st-century structure have been found, south of the spring reservoir (under the pavement, and southern arcades) consisting of oak piles[47] connected by wooden boards with well-compacted clay between them (*Fig. 6:* yellow). In this way, a barrier equivalent to about 200 m^2 was constructed, allowing the "retention" of thermal water in a smaller area for controlled use. The dam structure was very solid, so that the water was closed in watertight area, enabling the floor level of the baths to be lower than the water level in the spring reservoir in all phases. It was important to be able to drain the thermal water from the spring to the bathing area in free fall through the canals. While the dam prevented water from flowing south, the water level in the reservoir depended on the height of the overflow channel for draining excess water. In the southwestern corner of the pool-shaped spring reservoir (2^{nd}–4^{th} centuries), two levels of overflow channels were found exactly on top of each other (*Fig.* 7), and a wooden channel from the 1st century was found in the immediate vicinity *(Fig. 6:* 1,2,4). Their height confirms that the water level in the spring was in all phases higher than the bath floors, e.g. the 4th-century overflow channel was 50 cm higher than the bath floors. Excess water was drained through the channels and into the sewers, running through the western part of the complex in all phases (*Fig. 6*: 8).

Given that the walls of the 1st-century reservoir "enclosing" the thermal spring were destroyed in a later construction, there is some possibility they were made of stone, or it may have even been a wooden structure, most likely in the form that simply followed and surrounded the natural pit.[48] This form was complemented by the sanctuary walls containing niches and a temple to the north, most likely dedicated to nymphs (*Fig. 3*).[49] The preserved walls indicate they were built in two phases (1a and 1b),[50] but in continuity with the design of the space around the spring. In front of the temple was a stepped stone and wood-plastered structure, and on the west and east sides of the area were walls with semicircular niches (in phase 1b) or rectangular niches (phase 1a).[51] In front of the walls

[41] Kušan Špalj 1999.

[42] Nemeth-Ehrlich, Kušan Špalj 2011; Kušan Špalj, Nemeth-Ehrlich 2012.

[43] The presence of carbon monoxide (CO) and hydrogen sulfide (H2S) was ascertained. The volume of gas emissions had to be continually measured and when the amount exceeded the allowed level, the work inside the reservoir was halted and ventilators were used.

[44] Nemeth-Ehrlich, Kušan Špalj 2014; Nemeth-Ehrlich, Kušan Špalj 2015; Kušan Špalj 2017a; Kušan Špalj 2020a; Kušan Špalj 2020b; Kušan Špalj 2022a; Kušan Špalj et al. 2019.

[45] The reservoir was filled with an extremely greasy layer of mud which, after removal, was rinsed on specially made platforms equipped with sieves.

[46] Kušan Špalj et al. 2014, cat. no. 90–145; Kušan Špalj et al. 2015, cat. no. no. 90–145.

[47] The wood is dated using the C14 method (Lab. No. Beta 435090, calibrated date 75–55 BC (Cal BP 2025–2005)).

[48] It is possible that two well-preserved oak piles connected with boards and found close to the wooden canal south of the spring belonged to that construction period; the wood is dated using the C14 method (Lab. No. Beta 435087, calibrated date BC 10 to AD 0 (Cal BP 1960–1950)).

[49] Inscriptions dating to the 1st century are dedicated to the nymphs (*CIL* III 04118; *CIL* III 10893).

[50] Only a few walls can be determined as belonging to phase 1a (e.g. the rectangular niche) or phase 1b (semicircular niche), since most of the walls were probably used in both phases.

[51] Kušan Špalj 2022b, Fig. 2.

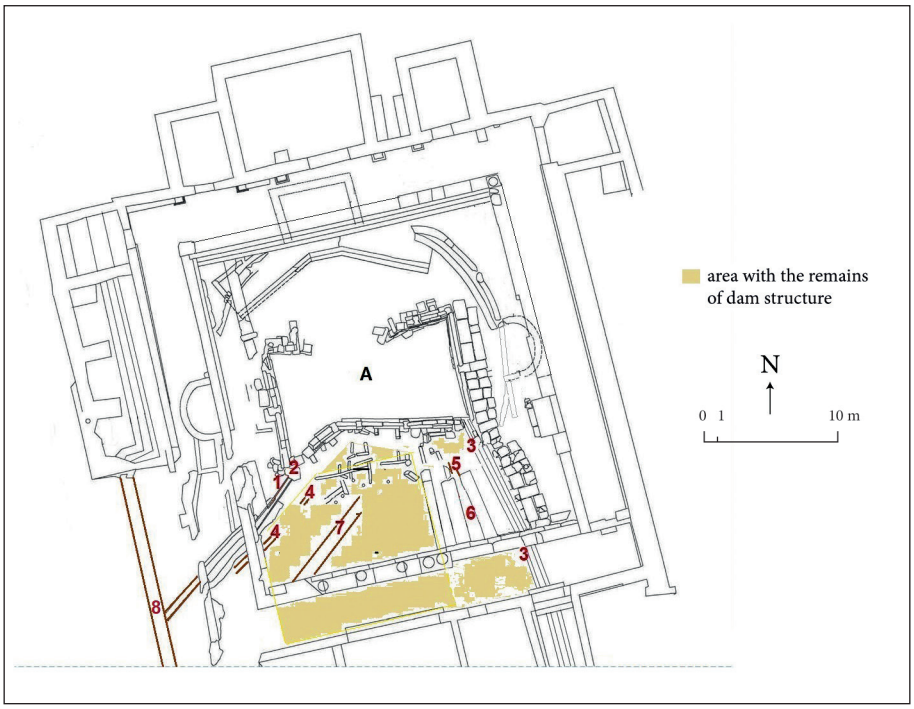

Fig. 6: Plan of the sanctuary area: **A** – sanctuary area with the spring reservoir; **1, 2** – overflow channels; **3** – the 4th century channel for suppying baths; **4** – remains of the 1st century wooden overflow channel; **5** – remains of "deep" 1st century wooden channel; **6** – "deep"2nd century channel; **7** – "deep" 4th century wooden channel; **8** – wooden drainage channel.

Fig. 7: Varaždinske Toplice, excavations in 2013. Two levels of overflow channels on southwest corner of the spring reservoir, view to the north. (Photo: D. Nemeth-Ehrlich)

were probably porches, given that plastered floors were found in the niches and in front of the walls, and a groove was preserved in which a porch pillar probably stood. As already mentioned, the walls of the 1st-century reservoir are not preserved, but channels indicate how water was drained and brought to the bathing area, located at that time in the southwestern part of the complex. Although it is not possible to completely reconstruct the appearance of the 1st-century sanctuary, clearly already at that stage, the Romans were able to control the thermal water and

organize the area around the spring with well-planned spatial interventions. Excavations of the 1st-century baths show also two phases of construction. There are some partially preserved walls dating to the 1st half of the 1st century, while the better-preserved structures date back to the middle and the 2nd half of the 1st century.[52]

Another construction phase on the site can be dated to the first half of the 2nd century, when the entire area was completely renovated, including new baths and a much more monumental sanctuary. To obtain as much space as possible, the construction was extended to the surrounding hillside, with monumental temples on the north side and elevated arcades around the "sacred spring," which at this stage was captured by the large pool-shaped reservoir (13.5 x 8 m; *Fig. 3*). These changes in the sanctuary certainly resulted from the new demands of worship, when various deities related to health and healing were introduced,[53] and due to the growing popularity of the baths and the increasing number of visitors. The source of significant investment was probably the city of Poetovio,[54] which became a colony at the time, and Aquae Iasae was very likely the main thermal spa center in its territory.[55]

The spring reservoir (built in the 2nd century) was most likely restored in the early 4th century, which corresponds to the hypothesized phase of restoration of Aquae Iasae (after it had been destroyed by fire) as mentioned on the "inscription of Emperor Constantine."[56] Archaeological excavations show that, as the inscription says, it was primarily a renovation with no major changes in the organization of the sanctuary in this phase, only new construction in the bath complex.[57] Typical of this phase is the frequent use of recycled materials, parts of earlier buildings and various monuments (inscriptions, altars, sculptures),[58] indicating a well-thought-out project in which already processed stone was used to restore building structures. It lowered the cost of removing materials and processing and delivering new ones, saving time and labor. This approach is typical of the 4th century and reflects the state's efforts to rationalize costs and invest more in renovation than new construction.[59]

The manner in which the sanctuary was renovated, retaining all the features of the earlier design of the space, shows that most of the religious practice of the earlier period very likely continued. Although there is no evidence of votive inscriptions from the site dating back to the 4th century (probably removed from the sanctuary in a later period), the finding of the statue of the goddess Minerva (and the pedestal with an inscription)[60] in her temple[61] suggests that the worship of some polytheistic cults was practiced until the complex ceased functioning.

The decoration style and character of the sanctuary area in the first half of the 4th century indicate the fragments of three monumental metric inscriptions, as only epigraphic monuments found at the site dating to the time of Emperor Constantine.[62] They are very interesting mystical texts written in dactylic hexameter and iamb, in the glory of water, sun and nature, and were supposed to have been originally placed on the walls of the arcades.[63] The character of the texts testifies to the atmosphere of the sanctuary, where the mystical forces responsible for healing are celebrated.

Some changes happened in the second half of the 4th century, when part of the complex was already used for Christian ceremonies. At that time, the *basilica thermarum* was converted into a Christian basilica, in which even two construction phases during the 4th century related to the early Christian horizon are noticeable.[64]As for the continuation of the "life" of the sanctuary in the later 4th century, interesting information has been revealed by the votive gifts found in the spring, which show that the cult of the "sacred spring" was still relevant at the time. So, a few rings with a Christogram motif [65] testify not only to the coexistence of Christianity and the Roman cult but also to the inclusion of members of the Christian community into the centuries-old rituals of the sanctuary.

SPRING RESERVOIR – CONSTRUCTION PHASE IN THE 2ND CENTURY

Construction in the area of the thermal water spring was a demanding process, requiring continuous draining of water to build on dry ground. The 1st-century construction shows that the Romans were skilled in "managing"

[52] Vikić-Belančić 1996, 14.

[53] Kušan Špalj 2014; Kušan Špalj 2015, 56–103; Kušan Špalj 2017a, 269–271; Kušan Špalj 2020b, 176–183; Kušan Špalj 2022a.

[54] Kušan Špalj 2022a.

[55] Horvat et al. 2003, 106; Ragolić 2014, 335–336.

[56] *CIL* III 04121.

[57] Vikić-Belančić, Gorenc 1970.

[58] Kušan Špalj 2017b.

[59] Marano 2011, 149–157.

[60] Gorenc 1984; *AE* 1979, 0468; *HD*000496; *lupa* 5388; etc.

[61] The statue and the pedestal were found mostly in the western temple and some parts in front of it (excavation in 1967, 1968).

[62] There is only one chance finding (in the 19th century) of a monument with a similar character (*AIJ* 470; Lučić 2013, 213–214.) also dated to the time of Constantine the Great (based on the content and the shape of the letter L, with a curved leg as on the tablet of the Emperor Constantine and the metrical inscriptions mentioned). The presumed mention of a nymph ([- - - n]ympha est) could be a confirmation of this cult in the 4th century.

[63] Kuntić Makvić et al. 2012; Fragments were found in a later 4th century pavement.

[64] Kušan Špalj 2020a.

[65] Kušan Špalj et al. 2014; Kušan Špalj et al. 2015, cat.107, 108.

the spring because they first built a dam to prevent the water from flowing southward. After "enclosing" the water in a smaller area, they were able to control its flow using canals. The discovery of a deeper wooden canal, dated to the 1st century[66] discovered south of the presumed spring boundary, was most probably used to drain water from building area (*Fig. 6:* 5). Likely, the space around the spring was drained during construction in the 2nd century in a similar way. The same wooden canal may have also been used at the beginning of the construction process, and soon after, a new stone canal (deeper than the bottom level of the reservoir) was built at the same location (*Fig. 6:* 6). The solid construction of the canal shows that it was probably used for cleaning and maintaining the reservoir throughout 2nd and 3rd century. The excavation of the deeper layers under the south wall was not possible due to the instability of the terrain but it is very likely that there was an overflow channel (placed in a gap of pile construction under the foundation) that allow a drainage of the excess water. Also of interest is the finding of a deep wooden canal in the area south of the spring (*Fig. 6:* 7), dated to the 4th century and certainly made for the same purpose.[67] Based on its appearance, it was probably only in temporary use at the time of construction in the 4th century.

The preserved walls of the stone spring reservoir have provided us with information on the construction solutions from the two different phases. The eastern and western walls testify to how the reservoir was built in the 2nd century, while the northern and southern walls were repaired in the 4th century (*Fig. 3*).[68] During the construction of the spring reservoir, work on the pavement around the reservoir was also carried out in the 2nd and 4th centuries. The paving laid in the 2nd century is visible in the eastern part of the sanctuary and is constructively connected to the reservoir structure with connecting stones. The reconstruction of the northern and southern walls in the 4th century was carried out from the bottom of the foundation, so it was also necessary to restore the paving behind those walls.

In order to build solid walls in the 2nd century, the walls of the previous reservoir were demolished, so the construction process could include building the wall and reinforcing the ground under and behind the walls. The complex construction methods applied in the 2nd century show that the Romans were very familiar with the local soil conditions and instability around the spring

Fig. 8: Varaždinske Toplice, excavation in 2011. The piling system (2nd century) in northwest corner of the spring reservoir, view to the west. (Photo: D. Nemeth-Ehrlich)

and invested a lot of effort in preparing and solidifying the ground beneath the foundations. The natural slopes on eastern and western side provided a solid foundation while very unstable ground was waterlogged mud in whole area around the spring. Because of that it was primarily necessary to form a stable working surface on northern and southern area with wooden piles rammed into the mud. The piling continued also on eastern and western side, in layers of natural solid clay that slope towards the spring, in order to create a stable foundation for the walls. Excavations in front of and behind the western and eastern walls revealed some differences in the piling system, in the way the material was selected and assembled. Prior to the construction of the western wall, a sort of foundation wider than the wall was built. This solid structure was fenced by rectangular piles and connected with oak boards, filled with smaller and larger uncut stones and clay between the oak piles (*Figs. 8; 10*). In this way, the ground was prepared before construction, and foundation rows (made of larger limestone blocks and smaller stones underneath) were laid onto it. Two piles were also found, placed in front of the foundation row of the wall after construction to further strengthen the structure from the front.[69]

The upper part of the wall consists of three rows of ashlars built using the *opus quadratum* technique, with headers only in the lowest row, while in the upper rows, all blocks were placed parallel to the wall (*Fig. 9*). The top row consists of stone slabs which served as beds for the fence (with central grooves on the upper surface). Only a part of one fence beam (the others were removed in post-Roman times and used for canals) and a connecting stone that served to interconnect the fence beams and the pavement were preserved *in situ* on this wall.

[66] The wood is dated using the C14 method (Lab. No. Beta 435086, calibrated date BC 170 to AD 5 (Cal BP 2120 to 1945)).

[67] The canal is made of oak piles connected with boards on the sides, and wooden boards as the bottom. The wood is dated using the C14 method (Lab. No. Beta 435089, calibrated date AD 230 to 380 (Cal BP 1729 to 1570)).

[68] Nemeth-Ehrlich, Kušan Špalj 2014; Nemeth-Ehrlich, Kušan Špalj 2015, pp. 26–32, 40–45.

[69] Nemeth-Ehrlich, Kušan Špalj 2011, Fig. 14.

Fig. 9: Varaždinske Toplice. Western wall, northwest corner of the spring reservoir (2nd century). (Photo: D. Nemeth-Ehrlich)

Fig. 10: Varaždinske Toplice, excavations in 2013. Back side of the western wall of the spring reservoir (2nd century), view to the northeast. (Photo: D. Nemeth-Ehrlich)

The specific way of building can be seen on the back side of this wall, where the foundation structure construction of piles and uncut stones continues to the height of the first row of the wall (*Fig. 10*). To achieve stability, the headers of the first row and the oak beams, acting as supports between the slope and the wall, were incorporated into that structure. In this way the lower part of the wall was made to be very stable, strengthened, and anchored from the back while backfilling with layers of stone and clay up to the height of the upper row of the wall provided strength and stability to the whole structure.

It seemed that the construction of the eastern wall was done somewhat differently, with ground preparation done in a simpler way. In front of the wall there are oak (round) piles combined with smaller uncut stones and clay (*Fig. 11*). The height of the oak piles in front of the wall shows that they were placed after the large limestone blocks (the foundation row of the wall), obviously with the intention of securing their position but also it was a solid foundation for the bottom level of the reservoir. With no doubt consolidation was done also before the wall was built, so that piling continued under the eastern wall, but it could not be checked. There were some piles found in the area behind the wall, where the excavations were done.

Interestingly, the eastern wall appears to have "sunk" in the middle section, but based on the horizontal line of the upper row, it is clear that this was intentional in the construction (*Fig. 11*). In particular, the lowest row of the wall has taller stones in the middle than those on the edges, and the same is visible in the upper row. It seems that reason for that kind of the construction was to get the lowest point of the foundation row in the middle as that was the height of the bottom of the reservoir.[70] Thus it was achieved that the lowest point of the bottom of the reservoir was in the middle of the eastern wall. As is common in modern pools, there is always a lowest point where the water can collect during cleaning or draining. So it seems that the strange appearance of the wall has very good practical reason. This situation probably caused other differences in the appearance of the wall structure when compared to the west wall in relation to the height of the rows and the different use of headers and stretchers. As both walls are built using the *opus quadratum* technique, it is interesting how this construction system was applied differently. Unlike the western wall with headers only in the lowest row (incorporated into the solid foundation structure), the blocks are arranged in all three rows of alternating headers and stretchers in the eastern wall. In this way, the blocks placed perpendicular to the wall (with its end toward the face of the wall) provided stabilization, like anchors in the ground. The weight of the material covering the blocks on the back side of the wall provides additional strength and ensures the good statics of the entire structure. In order to achieve the required height of each row and to have high quality of jointing, to fit all the blocks to perfection, it was necessary to procces each stone very precisely. On the back of the east wall, the remains of stone working were found at the height of each row of stone blocks. The stone was obviously worked on-site to fit the wall structure better.

While only two fence elements were preserved on the western wall, the finding of stone beams on the eastern wall reveals the fence construction method in the 2nd century.

The fence consisted of three rows of stone beams, with the lowest beam completely preserved and placed into the grooves of the uppermost row of the wall and

[70] The spring reservoir did not have a solid floor, since the thermal water was springing up in a wider area. The top of the foundation row was the height of the bottom level of the reservoir. Up to that height there were piles (connected with boards, with clay and uncut stones), most probably sealed with the clay as the bottom level of the reservoir.

Fig. 11: Varaždinske Toplice, excavations in 2011. View to the east wall of the spring reservoir. (Photo: D. Nemeth-Ehrlich)

Fig. 12: Varaždinske Toplice, excavations in 1998. Northeast corner of the spring reservoir (before excavation of the reservoir), detail of the fence on the east wall and corner with the northern wall, view to the southwest. (Photo: D. Nemeth-Ehrlich)

level with the pavement. The beams were connected to each other (the grooves and profiles at the ends are preserved), and a binding stone block connected this construction with the pavement in the middle of the wall.[71] The cornerstone blocks on the northern part are connected to the fence of the north wall (*Fig. 12*). The situation was different in the southeast corner, where there was a canal (carrying water to the baths) at the height of the lowest row of the fence. The total height of the fence was 70 cm, as shown by the completely preserved fence in the northeast corner.

[71] Nemeth-Ehrlich, Kušan Špalj 2011, Fig. 7.

The walls were built of several types of local limestone, which, based on its characteristics, was used for different parts of the walls. On both walls, the foundation rows were built with larger, coarsely treated limestone blocks (and smaller stones underneath), slightly wider than the upper rows. This type of coarse grained limestone (*Lithothamnion* limestone) was most often used as a building material for walls at this site. Recent geological research and analysis have shown that a possible site exploiting this type of stone is the Bela Pećina site (about 2 km northwest of V. Toplice).[72] Analysis of samples from the upper rows of the eastern and western walls of the reservoir shows the use of *biomicrite* type of limestone.[73] This is a very soft, fine-grained limestone obviously chosen for its ease of use, so that the blocks adhere very well to each other.[74] A very interesting feature of this stone has been observed: when wet or soaked with water, its surface is very soft (can be cut even with nails), but dry, it becomes much harder again. It may be that

[72] Preliminary research of the Bela Pećina area shows that stone was exploited at that site. The analyzed samples confirmed that it is the same type of limestone as most often used for building materials on the site in the Roman period (Aljinović et al. 2023). Further research of the Bela Pećina site and the surrounding area is planned in order to determine whether the stone was exploited at that position back in Roman times.

[73] Aljinović et al. 2023.

[74] On the western wall, no binding material was found between the stones, though on eastern wall some external fissures were filled with a plaster (analysis made by FEAD, Gmbh, Berlin) showing that its composition was 85% binder material. Likely it was a way of repairing stone joints.

Fig. 13: Varaždinske Toplice, excavations in 2011. View to the eastern part of the north wall of the spring reservoir. Red line marks the 2nd century structure of the wall; **a–m** – secondarily-used altars; **A** – pedestal with the inscription dedicated to *Q. Gavius Fronto*, *praefectus civitatium Scordiscorum et Breucorum et Iasorum* (*HD*075016); **B** – pedestal with the inscription dedicated to the nymphs (Kušan Špalj 2022a, 63). (Photo: D. Nemeth-Ehrlich)

the Romans also noticed this specific characteristic and used it to facilitate material processing. Traces of various tools are still visible on the surface of all the biomicrite limestone blocks. Above the sections of the east and west walls, made using the *opus quadratum* method, was an upper row (with a groove for the fence) also made of biomicrite limestone but less dense and with larger pores. The same material was used for the beams with which the fence was assembled, while the connecting stones interconnecting the fence stone beams and the paving slabs were made of denser limestone, similar to that used in the main wall structure. The place where this type of stone was quarried has still not been identified, but the assumption is that it originates nearby. This type of stone was also used for some altars; it was easy to carve an inscription into it, and there are several examples when it was used for other construction elements (columns, capitals). For the pavement of the area around the spring from the 2nd century, large travertine slabs were used. It is a type of continental limestone formed around the thermal springs as a result of a processes involving calcium carbonate excretion.[75] This type of stone was used for paving open spaces because of its strength, hardness, and availability in the area.[76]

SPRING RESERVOIR – CONSTRUCTION PHASE IN THE 4TH CENTURY

The Romans fortified the grounds during construction in the 2nd century. Nonetheless, by the end of the 3rd or beginning of the 4th century, the north and south walls were severely damaged due to the nature of the soil and the constant springing of water. For this reason, these 2nd-century wall structures remained only along the corners, while the rest were rebuilt in the 4th century. More than 50 various inscriptions, altars, reliefs, and other processed stones that had been placed in the sanctuary during the 2nd and 3rd centuries were found in secondary use in the renovated walls of the 4th-century reservoir and the surrounding pavement.

Though the central part of the northern wall had collapsed, the eastern and western parts have preserved the remains of the 2nd and 4th century constructions. The

[75] Aljinović et al. 2005; Aljinović 2014; Aljinović 2015.

[76] Šimunić 1988, 16–17.

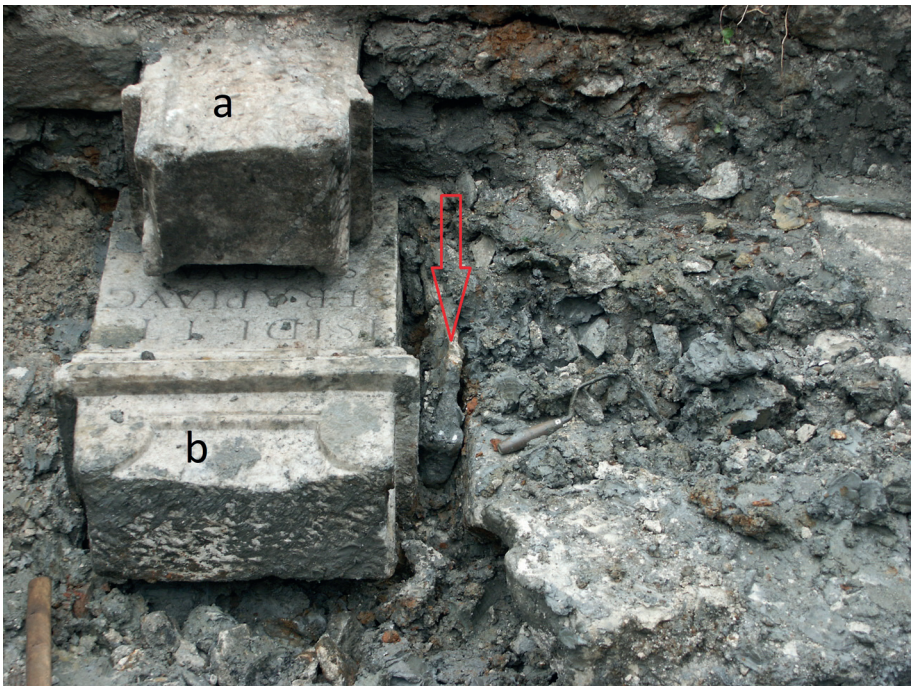

Fig. 14: Varaždinske Toplice, excavations in 2012. View of the back of the eastern part of the north wall of the spring reservoir with secondarily-used altars: **a** – votive inscription dedicated to nymphs (Kušan Špalj 2022, cat. no. 7); **b** – votive inscription dedicated to Isis and Serapis (*AE* 2014, 1048); red arrow marks position of secondarily-used fragment of the relief depicting three nymphs (*Fig. 15*). (Photo: D. Nemeth-Ehrlich)

2nd-century construction of the wall with ground reinforcement (using wooden piles and stones) is preserved on the western side (*Fig.* 8), and it is also visible in the northeast corner of the reservoir. Only three blocks in 3 rows in the *opus quadratum* technique built in the same manner as the construction of the east wall have been preserved, and one preserved stone with a groove for fencing (*Fig. 13*). However, this stone lost its use in the new wall construction, as another row of stones with grooves was placed above it. Therefore, the height of the top row of the northern wall does not match that of the eastern and western walls. The last row with a groove on the northern wall is at pavement level, while it is lower, equivalent to the thickness of the slabs, on the eastern and western walls.

The remaining part of the northern wall was rebuilt in the 4th century when the various stones that had already been processed were used and selected based on suitable characteristics and dimensions. Although an attempt was made to recreate the earlier construction, due to the size of the available stones, the regularity of the structure was lost, and the rows became much more irregular (*Fig. 13*). Some limestone blocks were most likely reused from the earlier wall construction or nearby structures. Many stone monuments (of marble or limestone) were more or less processed and incorporated as ordinary building material into the wall. Interestingly, the marble altars are much better preserved, while most of the local limestone altars lack profiled bases and crowns. This outcome is understandable because the softer stone was much easier to process and adapt for incorporation into the walls. Therefore, most limestone altars found in secondary use have a simple square shape, but tool traces in the upper and lower parts indicate that the profiled parts were carved and removed.[77] Also of interest are the findings of parts of thinner marble slabs, mostly fragments of reliefs and inscriptions, which were used to support larger stone blocks in constructing the north and south walls (*Fig. 14*). Thus, several fragments of individual reliefs have been found, some of which could be completely reassembled (*Fig. 15*). Interestingly, parts of the same reliefs are found in various places, in the northern and southern walls of the spring, but also, for example, in the walls of temples and baths, indicating simultaneous renovation of various parts of the complex.[78]

The northern wall was renovated from the foundation level, meaning coinciding with the construction of the wall, the space behind was filled with larger or smaller stones and clay. Parts of sculptures of Apollo Sol and Diana Luna,[79] various inscriptions, reliefs and other processed stones were found in these layers. After the

[77] Kušan Špalj 2022a, cat. no. 3, 7, 8.

[78] Kušan Špalj et al. 2014, cat. no. 80, 82, 83, 146; Kušan Špalj et al. 2015, cat. no. 80, 82, 83, 146.

[79] *lupa* 30106, 30107; Kušan Špalj 2017a, 280–285.

Fig. 15: Marble relief depicting three nymhs with traces of colour (green) used to paint the parts of reeds and plants (Kušan Špalj 2014, cat. no. 82). Fragments were found in 2011 and 2012 excavations, in the ruins and structure of northern and southern walls of the spring reservoir. (Photo: Zottmann GmbH)

Fig. 16: Marble slab with a relief representing gods of medicine and an inscription dedicated to the health and victories of Emperor Caracalla (*HD*075019; *lupa* 30105). (Photo: Zottmann GmbH)

Fig. 17: Varaždinske Toplice, excavations in 2006. View to the south wall of the spring reservoir. (Photo: D. Nemeth-Ehrlich)

construction of the wall was completed, the pavement was renewed, and several monuments were utilized as secondary paving material. In the rubble of that area, two large marble pedestals for statues with inscriptions were found; one is dedicated to three nymphs,[80] while the other has an inscription in honor of Quintus Gavius Fronto, who was *praefectus civitatium Scordiscorum et Breucorum et Iasorum* (*Fig. 13:* B,A).[81] In the pavement south of the spring, also restored in the 4th century, two very significant reliefs with inscriptions were found. It is a marble slab with a relief representing gods of medicine (and an inscription dedicated to the health and victories of Emperor Caracalla) (*Fig. 16*)[82] and a relief representing three nymphs with an inscription.[83]

The structure of the south wall shows less damage than the north wall, where the 4th-century reconstruction was performed only in the central part of the wall (*Fig. 17*). In the eastern and western parts of the wall, the 2nd-century structure is still visible, along with three rows in the *opus quadratum* technique, with the upper row where the fence was placed. The appearance of the preserved structure has similar characteristics to the eastern wall, where taller blocks were used toward the middle of the wall. Likely, the lowest point on this wall (the top of the foundation) was also in the middle of the wall, at the bottom level of the reservoir, so that in a case of cleaning the reservoir the water could be collected. The 4th-century construction with more irregularity is visible in the middle part of the south wall. The idea of building a wall in the same manner as in the previous phase by combining large blocks as stretchers and headers to make the construction more stable, was visible during excavations in the area behind the wall (*Fig. 18*). Two marble altars with inscriptions were placed in the lower part of the wall to function as headers (laid with their ends facing the wall) and as anchors in the ground, while another four altars were used parallel with the wall face. The fence on this wall is almost entirely preserved, and two construction phases are present. The eastern part was constructed in the similar way as on the eastern wall, with 2 rows of beams, while in the central part, the fence was renovated in the 4th century using large slabs placed next to each other. They are laid on upper row with the grooves that is on higher position than the upper row in preserved 2nd century structure. The beams and slabs were connected with binding stones. One has a simple relief decoration preserved *in situ*,[84] while another decorated binding stone was found directly under the wall (corresponding to the position connecting the two beams). Another similarly shaped stone was found in the collapsed section of the northern wall. These are all elements that make it possible to reconstruct with considerable certainty the appearance of the spring reservoir in the 4th century (*Fig. 19*).

The system for capturing the continually springing water flowing at 20 liters per second included the canals on two sides of the pool. Canals used from the beginning of the 4th century are still visible on both ends of the south wall. The overflow channel that drained excess water into the sewage was preserved in the southwest corner. It was

[80] Kušan Špalj 2022b, 62–63.
[81] *HD*075016; Kušan Špalj 2022b, 60–61.
[82] *HD*075019; *lupa* 30105; Kušan Špalj 2017a, 280–285.
[83] *HD*075022.
[84] Nemeth-Ehrlich, Kušan Špalj 2011, Fig. 13.

Fig. 18: Varaždinske Toplice, excavations in 2012. View to the back side of the southern wall of the spring reservoir. (Photo: D. Kušan Špalj)

Fig. 19: Connecting stones of the fence (of the northern and southern walls) and 3D reconstruction of the sanctuary in 4th century, on the exibition *Aquae Iasae – Recent Discoveries of Roman Remains in the Region of Varaždinske Toplice*, in Archaeological museum in Zagreb, 2015. (Photo: I. Krajcar)

Fig. 20: Varaždinske Toplice, excavations in 2015. The channel through which water was carried from the southeast corner of the spring reservoir to the baths, 4th century. (Photo: D. Kušan Špalj)

about 10 cm higher than the channel in south east corner, through which water was carried into the baths (*Fig. 20*) and when it was closed the reservoir was full to the height of overflow channel (and water was drained through it). Recent research shows that an important part of this system was also the compact clay layers around the spring, preventing the water from spilling over a larger area.

At some time after the Roman period, the southern and northern walls collapsed again. Finding these walls in a very damaged state shows how the ground shifted even after their restoration in the 4th century. The central part of the northern wall was found to have collapsed (along with the pavement behind it). The southern wall simply moved toward the center of the reservoir, "taking with it" the pavement of the southern part. Traces of wooden piles found around these walls show that efforts were made to reinforce the ground as much as possible in the 4th-century renovation. However, due to instability and the constant inflow of water, all these efforts were insufficient to prevent a new collapse, which, fortunately, most likely happened in some period after Roman times.

CONCLUSION

Archaeological excavations at the site of the Varaždinske Toplice park, conducted by the Zagreb Archaeological Museum between 2011 and 2017, revealed continuous use of thermal spring at least from the 1st century to the late 4th or early 5th century. Roman custom to transform natural phenomena, sulfurous hot springs, into sacred springs was known throughout the Roman Empire, where hot springs were honored as divine places and votive offerings were dedicated to the gods. It was Seneca who, in his letter to Lucius, mentioned: "*...we erect altars at places where great streams burst suddenly from hidden sources; we adore springs of hot water as divine…*"[85]

Although the spring catchment method varies across localities, as does the shape and size of sacred springs, the common feature of many Roman thermal spas explored so far is that of votive gifts thrown into the thermal water and the temples or sanctuaries built nearby.[86] The sacred spring in the sanctuary of Aquae Iasae is built in the shape of a large pool, directly on the site where the hot spring rises and one similar catchment of the spring is known to have existed in Aquae Sulis.[87] Partly preserved walls around the spring on the site of Campo Muri point to a similar construction solution.[88] The sacred spring in Aquae Iasae contained mostly coin offerings, around 18,000, thrown into the spring during the Roman period.[89] However, the stone monuments found at the site provide the most information about the very complex religious life around the sacred spring. Based on numerous epigraphic monuments (mostly dated to the 2nd and 3rd centuries), the worship of various deities associated with the power of healing is documented (nymphs, Minerva, Apollo (Apollo-Sol), Diana (Diana Luna), Silvanae, Aesculapius, Hygia (Salus), Isis, Serapis, Fortuna (Isis-Fortuna), Juno and others).[90] Findings related to Apollo and the geological situation around the thermal spring suggests that this was also a place of oracles.[91] However, the main feature of this sanctuary was a very strong cult of the nymphs that took place throughout all its phases. There are almost 50 inscriptions dedicated to them (sometimes with other deities),[92] and eight reliefs (and five frag-

[85] Sen. *Ep*. 41.3.

[86] It is confirmed by recent excavations on different sites with thermal springs (eg. Matilla Séiquer 2017; Carniero 2017; Tabolli 2021).

[87] Cunliffe, Davenport 1985; Davenport 2021.

[88] Salvi, Tabolli 2022.

[89] Kušan Špalj et al. 2014; Kušan Špalj et al. 2015.

[90] Kušan Špalj 2014; Kušan Špalj 2015; Kušan Špalj 2017a; etc.

[91] Kušan Špalj 2017a, 282.

[92] Rendić-Miočević 1992; Lučić 2013; Kušan Špalj 2022a.

ments) have been found so far.[93] They were considered patronesses and personifications of the spring, and the epithet *Iasae* on several votive inscriptions[94] confirm their strong connection and belonging to the sacred spring in the sanctuary of Aquae Iasae.

Based on 70 years of research and especially due to the results obtained in recent excavations, the conclusion is that there were three main construction phases in the development of the sanctuary area belonging to the Aquae Iasae settlement.

Back in the 1st century, the sanctuary was organized as an enclosed area with porticoes and a temple built around the spring. It was a place dedicated to the nymphs, protectors of the "sacred" spring, and probably their reliefs, sculptures and inscriptions were placed in the niches, porticoes and temple. Although the appearance of the sanctuary in the 2nd century became much more monumental, neglecting the location and structures of the previous sanctuary, the basic concept of the space is still preserved, with the sacred spring in the middle and the sanctuary area encompassing it. In this phase, Roman engineers enclosed the spring with a rectangular reservoir and the area around it was an open paved courtyard with elevated porticoes. The construction of the spring reservoir was a well-planned project that included solid preparation of the terrain, the selection of the most suitable construction material, and the method of construction which achieved the required strength of the walls, but also met all the needs for water use (drainage, cleaning, etc.). The use of local limestone, obviously chosen for its ease of use, very carefully worked to effect well- fitting joints, with the layers of clay behind the walls, contributed that it was a watertight structure. It all shows that the catchment of thermal water in the 2nd century was very carefully planned hydraulic system which enabled the completely controlled use of the thermal spring.

The construction of more temples, in the 2nd century phase, is associated with the introduction of new cults, confirmed by dedications to different deities considered responsible for the miraculous effects of its waters. Monumental temples and numerous votive altars, reliefs and sculptures placed in the sanctuary in the 2nd and 3rd centuries enhanced the mysterious aura. The atmosphere of the sanctuary did not change in the 4th century to when the third phase of construction is dated. As already mentioned, there were no significant changes in the appearance of the space; it was rather a renovation of the existing building. In this phase also the reservoir was repaired as well the channel system which enabled the functioning of the entire spring system in the same manner as in the previous phase. Obviously, until the very historical end of this complex, the pagan sanctuary retained its function, corresponding to the condition of the Roman Empire after Constantine's Edict, when Christianity was legalized, but paganism was still allowed to exist. This situation was acceptable, especially in a popular spa such as Aquae Iasae. The main reason for this specific situation was the thermal spring and mysticism of healing in this sanctuary over several centuries.

Fig. 21: Varaždinske Toplice, 2022. The sanctuary area with the spring reservoir. (Photo: M. Vuković)

From the 1st to 4th centuries, it is evident that carefully planned constructions were made, mainly to faciliate controlled use of the thermal waters. However, at the same time, the idea was to give the spring a sacred character, shaping the surrounding area as a sanctuary (*Fig. 21*). Although the buildings were constructed in line with standard Roman architectural practices, the main features of the construction in all phases were the use of local and available building materials and construction methods that respected local conditions. It is obvious that the geological situation was carefully studied, and building activities were planned to make the best use of natural resources and the location. The natural slopes from three

[93] Kušan Špalj et al. 2014, cat, 2, 4, 74, 77, 78, 80, 82–88; Kušan Špalj et al. 2015, cat, 2, 4, 74, 77, 78, 80, 82–88.

[94] *AE* 1985, 00714; Kušan Špalj 2022a, cat. no. 9, 10.

Fig. 22: Varaždinske Toplice, 2022. The sanctuary area with the spring reservoir, view to the south. (Photo: D. Kušan Špalj)

sides surround the spring that rises in the center of the natural terrace. With carefully planned construction in all phases, Roman engineers designed and incorporated the sanctuary into the scenery, emphasizing its mysticism. In that way, they created a place of worship where ceremonies took place around the spring and from which the baths complex was supplied via a well-planned channel system. The sacred spring poured out hot thermal water, while the drinking water supply to the sanctuary came from the higher hill terraces. Even though more than 20 liters of hot water (59 °C) per second flowed out of the spring, the Romans could control its use, distribution, and drainage. The dam, installed as early as the 1st century to contain the thermal waters in the sanctuary area, allowed the thermal water to flow in free fall into the bathing area during all construction phases. Findings of stone and wooden channels from different phases of construction show that a very similar system of draining water into the bathing area, excess water into the sewers, and draining the reservoir during building activities existed throughout the Roman period.

Inspecting the arrangement of the buildings and the design of the space around the spring during the various phases of construction from the 1st to the 4th century, leads us to conclude that the same concept of space organization was applied. This fact may have depended on the continuity of certain rituals that were part of the religious practice in this particular sanctuary. It was a place of worship and sacrifice where ceremonies took place. Visitors probably moved through the arcades, perhaps in some ritual procession, and approached the sacred spring in the middle, into which they threw votive offerings in the hope of receiving healing. We can only imagine the impression of visitors who gathered in the sanctuary, where the smell and steam of the thermal water must have enhanced the mystical atmosphere *(Fig. 22)*.

It seems logical that visitors throughout the Roman period, irrespective of their religious affiliation, dropped coins (or some jewerlly items) into a sacred spring, hoping for recovery.

Abbreviations

AE = L'Année Epigraphique
AIJ = Antike Inschriften aus Jugoslavien
CIL = Corpus inscriptionum Latinarum
HD = EDH, Epigraphische Datenbank Heidelberg (skrbnik / Service provider: Heidelberger Akademie der Wissenschaften). http://edh-www.adw.uni-heidelberg.de/home?&lang=de
lupa = UBI ERAT LUPA - F. und O. Harl, http://lupa.at (Bilddatenbank zu antiken Steindenkmälern)

ALJINOVIĆ, D. 2014, Geološke razmere okrog termalnega vrelca in izvor gradbenega materiala / Geological features of the area around the thermal spring and the origin of the building materials. – In: Pirnat Spahić 2014, 126 –130.

ALJINOVIĆ, D. 2015, Geološka situacija oko termalnog izvora i porijeklo građevinskog materijala / Geological features of the area around the thermal spring and the origin of the building materials. – In: Pirnat Spahić 2015, 120–130.

ALJINOVIĆ et al. 2005 = ALJINOVIĆ, D., U. BARUDŽIJA, D. KUŠAN ŠPALJ, D. NEMETH-EHRLICH 2005, Mixed thermal and ambient water travertines of ancient Roman spa-Aquae Iasae, Croatia. – In: M. Özkul, S. Yagiz, B. Jones (eds.), *Proceedings of 1st International Symposium on travertine – Denizli*, 71–74, Ankara.

ALJINOVIĆ et al. 2023 = ALJINOVIĆ, D., A. MARIČIĆ, U. BARUDŽIJA, D. SMIRČIĆ 2023, *Porijeklo građevinskog materijala i osnovna fizičko-mehanička svojstva najčešćih tipova građevnog kamena nalazišta Aquae Iasae*. – Unpublished report, Archive RGN, Archive AMZ.

BEKIĆ, L. 2006. *Zaštitna arheologija u okolici Varaždina: arheološka istraživanja na autocesti Zagreb - Goričan i njezinim prilaznim cestama / Rescue Archaeology in the Varaždin Environs. Archaeological Research on the Zagreb Goričan Highway and its Access Roads.* – Zagreb.

BRUNŠMID, J. 1907, Kameni spomenici Hrvatskoga narodnoga muzeja u Zagrebu. – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 1, 9, 82–184.

CARNIERO S. 2017, New data from the Roman healing spa of Aquae Flaviae (Chaves, Portugal). – In: G. Matilla Séiquer, S. González Soutelo *(eds.), Termalismo Antiguo en Hispania, Un análisis de tejido balneario en época romana y tardorromana en la península ibérica,* 65–94, Madrid.

CUNLIFFE, B., P. DAVENPORT 1985, *The Temple of Sulis Minerva at Bath*. – Volume (1), The site, Monograph 7, Oxford.

ČABRIAN et al. 1973 = J. ČABRIAN, M. GORENC, B. VIKIĆ 1973, *Pregled povijesti Varaždinskih Toplica*. – Varaždinske Toplice.

DAVENPORT, P. 2021, *Roman Bath, a New History and Archaeology of Aquae Sulis*. – Cambridge.

DOMIĆ-KUNIĆ, A. 2006, Bellum Pannonicum (12-11. pr. Kr.) posljednja faza osvajanja Južne Panonije (Bellum Pannonicum (12-11 B.C.) The final stage of the conquest of Southern Pannonia). – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 39, 59–164.

FILIPAN, B. 2002, Rimski vodovod u funkciji razvoja kupališta u Varaždinskim Toplicama. – In: B. A. Filipan (ed.), *Kukuljevićevi dani u Varaždinskim Toplicama, Zbornik radova znanstveno-stručnih skupova Matice hrvatske 1995-2000*, 73–88, Varaždinske Toplice.

GORENC, M. 1984, Minerva iz Varaždinskih Toplica i njezin majstor (Varaždinske Toplice Minerva, the statue and the sculptor). – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 16–17, 95–108.

HORVAT et al. 2003 = HORVAT, J., M. LOVENJAK, A., DOLENC VIČIĆ, M., LUBŠINA-TUŠEK, M., TOMANIČ-JEVREMOV, Z., ŠUBIC 2003, Poetovio, Development and Topography. – In: M. Šašel Kos, P. Scherrer (eds.), *The autonomous towns of Noricum and Pannonia, Pannonia* I / *Die autonomen Städte in Noricum und Pannonien. Pannonia* I, Situla 41, 153–189.

HUNINK, V. 1992, *M. Annaeus Lucanus, Bellum Civile, Book III, A commentary.* – Leiden.

KUNTIĆ MAKVIĆ et al. 2012 = KUNTIĆ MAKVIĆ, B., A. RENDIĆ-MIOČEVIĆ, M. ŠEGVIĆ, I. KRAJCAR 2012, Intergracija i vizualna prezentacija ulomaka monumentalnog metričkog natpisa iz Varaždinskih Toplica (Intergration and visual presentation of the fragment of a metrical inscription from Varaždinske Toplice). – In: J. Balen, M. Šimek (eds.), *Arheologija varaždinskog kraja i srednjeg Podravlja*, Izdanja HAD-a 28, 285–295.

KUŠAN ŠPALJ, D. 1999, Forum rimskog naselja Aquae Iasae-njegov razvoj i značaj tijekom stoljeća (The Roman Forum in Varaždinske Toplice-its development and significance through the centuries). – *Histria Antiqua* 5, 109–120.

KUŠAN ŠPALJ, D. 2014, Aquae Iasae – zdraviliško, kultno in preroško svetišče. Rekonstrukcija prostora okoli naravnega izvira termalne vode – rituali in uporaba / Aquae Iasae – a Center of Health, Cult and Oracle, Reconstruction of the Area Around the Natural Thermal Spring-Rituals and Utilization. – In: Pirnat Spahić 2014, 56–119.

KUŠAN ŠPALJ, D. 2015, Aquae Iasae – lječilišni, kultni i proročki centar. Rekonstrukcija prostora oko prirodnog izvora termalne vode / Aquae Iasae – a Center of Health, Cult and Oracle, Reconstruction of the Area Around the Natural Thermal Spring-Rituals and Utilization. – In: Pirnat Spahić 2015, 56–119.

KUŠAN ŠPALJ, D. 2017a, Aquae Iasae – new Discoveries in the Roman Sanctuary – with special regard to the cults of Apollo, Asclepius, and Serapis. – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 50, 255–304.

KUŠAN ŠPALJ, D. 2017b, Rimsko naselje *Aquae Iasae* (Varaždinske Toplice), primjer recikliranja građevinskog materijala. – In: I. Miloglav et al. (eds.), *Recikliraj, ideje iz prošlosti,* 163–180, Zagreb.

KUŠAN ŠPALJ, D. 2020a, Aquae Iasae (Varaždinske Toplice) – ranokršćanski horizont (Aquae Iasae [Varaždinske Toplice] – the Early Cristian Horizon). – In: M. Sanader et al. (eds.), *Zbornik I. skupa hrvatske ranokršćanske arheologije,* 303–320, Zagreb.

KUŠAN ŠPALJ, D. 2020b, Roman settlement Aquae Iasae-recent discoveries in the sanctuary area. – In: V. Sekulov (ed.), *Vth International Symposium on Archaeology "Cult, Myth, Religion",* Acta Musei Tiberiopolitani 3, 151–170, Strumica.

KUŠAN ŠPALJ, D. 2022a, Aquae Iasae – novi spomenici posvećeni nimfama iz rimskog svetišta – I. dio / Aquae Iasae – new Monuments dedicated to nymphs, from the Roman Sanctuary – part I. – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 55, 73–114.

KUŠAN ŠPALJ, D. 2022b, Sanctuary area in the Roman Settlement Aquae Iasae. – In: M. Šteiner, I. Ciglar (eds.), *Poetoviona in njen ager / Poetovio and its ager*, Archaeologia Poetovionensis 4, 53–68, Ptuj.

KUŠAN ŠPALJ, D., D. NEMETH-EHRLICH 2012, Aquae Iasae – Varaždinske Toplice. Arheološka istraživanja rimskog izvorišnog bazena i okolnog prostora (Aquae Iasae – Varaždinske Toplice – archaeological research of Roman spring pool and its surroundings). – In: J. Balen, M. Šimek (eds.), *Arheologija varaždinskog kraja i srednjeg Podravlja*, Izdanja HAD-a 28*,* 107–129.

KUŠAN ŠPALJ et al. 2014 = KUŠAN ŠPALJ, D., N. PEROK, T. BILIĆ, M. NAĐ, S. HABUS, J. BALEN 2014, Katalog razstavljenih predmetov / Catalogue of exibited items. – In: Pirnat Spahić 2014, 131–188.

KUŠAN ŠPALJ et al. 2015 = KUŠAN ŠPALJ, D., N. PEROK, T. BILIĆ, M. NAĐ, S. HABUS, J. BALEN 2015, Katalog izloženih predmeta / Catalogue of exibited items. – In: Pirnat Spahić 2015, 131–188.

KUŠAN ŠPALJ et al. 2019 = KUŠAN ŠPALJ, D., N. PEROK, T. KARAVIDOVIĆ 2019, Construction and Building Technology in Sanctuary of Roman Settlement Aquae Iasae with the Review of Conservation Works on the Site. – In: D. Torrealva et al. (eds.), *Structural Analysis of Historical Constructions: an interdisciplinary approach,* Rilem bookseries 18, 96–104.

LUČIĆ, L. 2013, Rimski natpisi iz Varaždinskih Toplica / The Roman inscriptions from Varaždinske Toplice. – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 46, 185–255.

LJUBIĆ, Š. 1879, Aquae Iasae (Toplice Varaždinske). – *Viestnik hrvatskoga arheologičkoga družtva* 2, 1879, 33–64.

MALEZ, M. 1979, Nalazišta paleolitskog i mezolitskog doba u Hrvatskoj. – In: A. Benac (ed.), *Praistorija jugoslavenskih zemalja* I, 227–276, Sarajevo.

MARANO Y. A. 2011, La ' voce' degli antichi (Appendice II). – In: E. Petteno, F. Rinaldi (eds.), *Memorie del passato di Iulia Concordia un percorso attraverso le forme del riuso e del reimpiego dell'antico*, 141–160, Rubano.

MATILLA SÉIQUER, G 2017, El balneario Romano de Fortuna. Visíon de conjunto tras la última campańa de excavaciones. – In: G. Matilla Séiquer, S. González Soutelo (eds.), *Termalismo Antiguo en Hispania, Un análisis de tejido balneario en época romana y tardorromana en la península ibérica,* 131–170, Madrid.

NEMETH-EHRICH, D., D. KUŠAN ŠPALJ 2011, The results of the latest excavations at the Roman forum in Aquae Iasae – Varaždinske Toplice. – In: I. Lazar (ed.), *Religion in public and private sphere,* Acta of the 4th International Colloquium, 211–232, Koper.

NEMETH-EHRLICH, D., D. KUŠAN ŠPALJ 2014, Rimska naselbina Aquae Iasae – izsledki arheoloških raziskav mestnega parka v Varaždinskih Toplicah / The Roman Settlement Aquae Iasae – Findings of Archaeological Excavations in the Area of the Varaždinske Toplice Municipal Park. – In: Pirnat Spahić 2014, 21–49.

NEMETH-EHRLICH, D., D. KUŠAN ŠPALJ 2015. Rimsko naselje Aquae Iasae – rezultati arheoloških istraživanja na prostoru gradskog parka u Varaždinskim Toplicama / The Roman Settlement Aquae Iasae – Findings of Archaeological Excavations in the Area of the Varaždinske Toplice Municipal Park. – In: Pirnat Spahić 2015, 21–49.

PIRNAT SPAHIĆ, N. (ed.) 2014, *Aquae Iasae – Najnovejše rimske najdbe na območju Varaždinskih Toplic / Aquae Iasae – Recent Discoveries of Roman Remains in the Region of Varaždinske Toplice.* – Ljubljana.

PIRNAT SPAHIĆ, N. (ed.) 2015, *Aquae Iasae – Nova otkrića iz rimskog razdoblja na području Varaždinskih Toplica / Aquae Iasae – Recent Discoveries of Roman Remains in the Region of Varaždinske Toplice.* – Zagreb.

RAGOLIĆ, A. 2014, The territory of Poetovio and the boundary between Noricum and Pannonia / Upravno območje Petovione in meja med Norikom in Panonijo. – *Arheološki vestnik* 65, 323–351.

RENDIĆ-MIOČEVIĆ, D. 1992, O akvejasejskoj epigrafskoj baštini i o posebnostima njenih kultnih dedikacija (On the epigraphic heritage of Aquae Iasae

and the pecularities of its cult dedications). – *Vjesnik Arheološkog muzeja u Zagrebu*, ser. 3, 24–25, 67–76.

SALVI, A., J. TABOLLI 2022, L'economia del sacro e le sorgenti termali di Campo Muri (Rapolano Terme, SI); Nuove indagini sul deposito votivo di Buca delle Fate. – *Scienze dell' Antichitá* 28 (2), 527–537.

SCHEJBAL, B. 2003. Nova razmatranja o Aquae Balissae i narodu Jaza: Pejzaž – Vode – Etimologija – Kultovi – Mitologija, pitanje atribucije i kontinuiteta. – *Opuscula archaeologica* 27, 393–416.

SCHEJBAL, B 2004, Municipium Iasorum (Aquae Balissae), – In: M. Šašel Kos, P. Scherrer (eds.), *The autonomous towns of Noricum and Pannonia, Pannonia I / Die autonomen Städte in Noricum und Pannonien. Pannonia II,* Situla 42, 99–129.

SOLTER, A. 2016, *Arheološki muzej u Zagrebu: život od 19. do 21. stoljeća*. – Zagreb.

ŠIMUNIĆ, A. 1988, Geološko-tektonska osnova termomineralnih vrela u Varaždinskim Toplicama (Geological-tectonic basis of thermo-mineral springs in Varaždinske Toplice). – *Radovi Zavoda za znanstveni rad Jugoslavenske akademije znanosti i umjetnosti* 2, 9–29.

TABOLLI, J. 2021, Lost and Found: The Discovery of a Sanctuary at the Bagno Grande in San Casciano dei Bagni. – In: E. Mariotti, J. Tabolli, *Il santuario ritrovato, nuovi scavi e ricerche al Bagno Grande di San Casciano dei Bagni*, 13–22, Livorno.

TKALČIĆ, I. K. 1869. *Sumporne Toplice kod Varaždina u Hrvatskoj (Varaždinske Toplice*). – Zagreb.

VIKIĆ-BELANČIĆ, B. 1972, Prilog istraživanju antičkog naseobinskog kompleksa u Varaždinskim Toplicama (Beitrag zur Erförschung des Antiken Ansiedlungskomplexes in Varaždinske Toplice). – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 6–7, 75–127.

VIKIĆ-BELANČIĆ, B. 1975, Keramika grublje fakture u Južnoj Panoniji s osobitim obzirom na urne i lonce (Rauhe Keramik in Südpannonien mit besonderer Berüksichtigung der Urnen und Töpfe). – *Arheološki vestnik* 26, 25–53.

VIKIĆ-BELANČIĆ, B. 1996, Rezultati arheoloških istraživanja lokaliteta u Varaždinskim Toplicama (Results of the archaeological research on the Roman locality in Varaždinske Toplice – Aquae Iasae). – *Radovi Zavoda za znanstveni rad HAZU Varaždin* 8–9, 11–34.

VIKIĆ-BELANČIĆ, B., M. GORENC 1958, Arheološka istraživanja antiknog kupališta u Varaždinskim Toplicama od 1953-1955. g. (The archaeological excavations of antique thermas at Varaždinske Toplice-Aquae Iasae -1953-1955). – *Vjesnik Arheološkog muzeja u Zagrebu,* ser. 3, 1, 75–127.

VIKIĆ-BELANČIĆ, B., M. GORENC 1961, Istraživanja antiknog kupališta u Varaždinskim Toplicama od 1956. godine do 1959. godine (Untersuchungen in den Thermen von Varaždinske Toplice [Aquae Iasae] von 1956 bis 1959). – *Vjesnik arheološkog muzeja u Zagrebu,* ser. 3, 2, 181–223.

VIKIĆ-BELANČIĆ, B., M. GORENC 1970, Završna istraživanja antičkog kupališnog kompleksa u Varaždinskim Toplicama (Abgeschlossene Ausgrabungen des Antiken Badenkomplexes in Varaždinske Toplice). – *Vjesnik Arheološkog muzeja u Zagrebu*, ser. 3, 4, 121–157.

VLAHOVIĆ, S. 2013, Lokalitet: Varaždinske Toplice-plinovod. – *Hrvatski arheološki godišnjak* 9/2012, 270–272.

VLAHOVIĆ, S. 2015, Lokalitet: Varaždinske Toplice-plinovod. – *Hrvatski arheološki godišnjak* 11/2014, 230–231.

VLAHOVIĆ, S. 2016, Lokalitet: Varaždinske Toplice-plinovod. – *Hrvatski arheološki godišnjak* 12/2015, 261–263.

VLAHOVIĆ, S, 2020, Nekoliko crtica o otkrivenim kasnoantičkim fragmentima fresaka i arheološkim nalazima iz ulice braće Radić u Varaždinskim Toplicama (Some dashes about late ancient discovered fresco fragments and archaeological findings from the Brothers Radić Street in Varaždinske Toplice). – *Radovi zavoda za znanstveni rad HAZU Varaždin* 31, 9–29.

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