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BLOCK-TYPE MILITARY BALNEUM IN TIMACUM MINUS
Its spatial arrangement, social impacts, and architectural analogies

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Abstract. – The remains of a Roman bath are situated northeast of the remains of the Timacum Minus castrum. The discovered building is small in size, with a total area of about 242 m². According to the specific layout of rooms, with a reduced spatial organization of its plan, the building belongs to the reduced block-type of military small baths - balneae. In the territory of Serbia, no military balneae of this type have been discovered so far, which are otherwise common for border areas throughout the Roman Empire. The specific spatial relationship between the individual rooms and the characteristic building forms registered in the building plan indicate that the origin of the architecture of the military balneum in Timacum Minus should be associated with the Roman architecture of the balneae that belong to the villae rusticae in Central Europe.

Key words. – Roman bath, block-type balneum, Timacum Minus

The remains of a Roman fortification identified as the castrum of Timacum Minus are situated near the present-day village of Ravna, 8 km north of Knjaževac (eastern Serbia), on the left bank of the river Beli Timok. This fortification, built in the last third of the 1st century, functioned until the middle of the 5th century, when it was abandoned after the Hun invasion of 441–443.[1] The military contingent of the fortification in the first half of the 2nd century consisted of the *cohort I Thracum Syriacae*, and then the cavalry units: *cohort II Aurelia Dardanorum*, in the second half of the 2nd to the 4th century, and *pseudocomitatenses Timacenses auxiliarii*, from the last decades of the 4th to the middle of the 5th century.[2] From the beginning of the 2nd to the last quarter of the 4th century, an urban settlement with public buildings was formed around the fortification, including temples dedicated to Jupiter and Diana.[3] Also, in the civilian settlement formed south of the fortification, economic and residential buildings were registered.[4] The large area of the necropolis, which stretches west and northwest of the fortifications (localities of *Širine*, *Slog* and *Ropinski potok*) testifies to the long and intense life of the Roman fortification and the settlement of Timacum Minus.[5]

Downstream from Timacum Minus, about 100 m northeast of the northeastern fortification tower, a Roman bath was discovered, marked by earlier researchers as "Terme I".[6]

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[1] Petrović 1995, 40–41; Петковић, Јовановић 2001, 277–279.

[2] Petrović 1995, 44–45; Petković et al. 2005, 13.

[3] Numerous epigraphic votive monuments, as well as parts of reliefs and sculptures, testify to the respect of many deities (Jupiter Dolichen, Sabasius, Mithras, Mars, Venus, Hecate), but above all to the existence of the temples of Jupiter and Diana. Inscriptions on two altars testify to the erection and reconstruction of the sanctuary dedicated to Diana. – Petrović 1995, 42, cat. no. 3–4, 6–12, 14; Петровић, Јовановић 1997, 23–24; Petković, Ilijić 2013, 54–57, Figs. 2a–b, 3a–b; Petković et al. 2020.

[4] Петковић, Илијић 2012, 153–178.

[5] Petković et al. 2005, 142–145; Petković et al. 2017b, 97–101.

[6] Петровић, Јовановић 1997, 23–24, сл. 22; Petković et al. 2005, 16, Fig. 5, Plan 2.

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The state of research of the object

The place where the Roman bath is located was first marked on the situation plan by Lieutenant Colonel Jovan Mišković, in 1888. The plan indicates a square castrum called "*Kulište or Gradište*", which was located to the west, not far from Beli Timok River. At the north-eastern end of the river embankment, next to the riverbank, the remains of the building are marked briefly. After that mention, this place was forgotten for a long time by researchers.[7]

Before the start of systematic research, the building was exploited as a source of construction material by the local population for decades. In the diaries of archaeological excavations, the extraction of stones and bricks was registered in several places to such an extent that some walls completely disappeared and only ‚*negatives*' of the traces of the walls were preserved.[8] The walls of the baths were mostly preserved only to the level of the foundations and hypocaust, while there were few traces of in situ above-ground constructions that indicated the composition of the floors.

The Roman bath building near the castrum of Timacum Minus was systematically excavated during the period 1977–1980. The methodological approach to the research, first of all, meant establishing the excavations in a grid system that covered the entire space of the building. No absolute value of a fixed benchmark on the site was specified.[9] The rooms within the western block complex (whose total area is 160m^2), the praefurnii (furnaces), and the eastern larger room of the building were completely explored by the archaeological excavations, while the area southwest of the baths was partially explored.

The results of the archaeological excavations in the Roman bath complex in Timacum Minus have never been fully processed or published. Expecting that the systematic archaeological excavations of Timacum Minus will be continued after the wars in our country, the first researchers did not manage to process in detail the analysis of the discovered remains of bath architecture, or the archaeological findings from this site. At the end of the 1990s, two leading researchers passed away: the head of the research and the director of the Institute of archaeology in Belgrade, PhD Petar Petrović, as well as the then only archaeologist of the Homeland Museum in Knjaževac, Svetozar Jovanović. This, along with the constant problems of financing the archaeological excavations of the Roman site of Timacum Minus, led to the absence of conclusions for a long time.

Although the archaeological research project of the Roman fortification and settlement of Timacum Minus was renewed in 2011, modest funding enabled only the processing and analysis of archaeological and anthropological material (2011–2012) and limited protective excavations at the Slog necropolis (2013–2015).[10] Research on the architecture of Timacum Minus did not continue until 2019, when the archaeological teams of the Institute of Archaeology, in Belgrade and the Homeland Museum, in Knjaževac returned to this topic for conservation and reconservation, to present this important Roman archaeological site.[11] During the renewal of the research, numerous questions and problems were opened, especially regarding the availability of technical documentation and its validity in some aspects.

The documentation available today in the Institute of Archaeology, in Belgrade and the Homeland Museum, in Knjaževac is incomplete or insufficiently precise on some issues.[12] Our considerations of the

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[7] Ilijić 2014, 7.

[8] AI documentation, inv. 368: Diary of archaeological excavations for 9/21/1978; Diary of archaeological excavations for 9/29/1978; Diary of archaeological excavations for 9/28/1978; Diary of archaeological excavations for 24.9.1977; Diary of archaeological excavations for 9/19/1979

[9] The measurement values of individual levels were reconstructed by the author of this text during the research in 2019 by comparing the old technical documentation, photo-documentation, a geodetic survey from 2003 and recorded condition in 2019.

[10] Petković et al. 2014a, 33–38; Petković et al. 2014b, 76–81; Petković, Miladinović-Radmilović 2014, 87–130; Petković et al. 2017a, 113–120; Petković et al. 2017b, 97–101; Miladinović-Radmilović, Petković 2020, 240–267.

[11] The leader of the team of the Institute of Archaeology, in Belgrade "Archaeological research, presentation and promotion of the Roman fortress and settlement Timacum Minus in Ravna near Knjaževac" is PhD Sofija Petković, a scientific advisor. Other members of the team are: PhD Igor Bjelić (Institute of Archaeology, Belgrade) and the archaeologists: Marija Jović MA Institute of Archaeology, Belgrade), Bojana Ilijić MA (Homeland Museum, Knjaževac), Milena Muminović MA (Homeland Museum, Knjaževac) and Nikola Radinović MA (Belgrade).

[12] During the building excavation during 1977–1980, plans that lack a large number of elevations were made. The majority of the *absolute measurement* values of elevations in this paper are the result of a reconstruction of the elevations by the author of this article. Also, the technical documentation from previous excavations lacks sketches of cross-sections of archaeological cultural layers, based on which the stratigraphy and levels of floors (elevations) and preserved parts of architecture could be precisely analysed. In the preserved diaries of archaeological excavations from the period of the research, the elevations of the bottom of the foundations of the individual walls are missing. Also, at that time, an architect was

Roman baths in Timacum Minus are, therefore, largely limited to architectural remains, illustrated by chronologically indicative archaeological finds of building material. From the technical documentation of the excavation, there are two general plans, one building section, some partial plans of specific rooms, and a modest fund of excavation photographs of the Roman bath, that are preserved.[13] One fortunate circumstance is that most of the diaries of the archaeological excavations, with valuable observations of their researchers, have been preserved.[14]

The results of the archaeological excavations of the building

The building as a whole has a complex plan, with five excavated rooms. There is a small deviation of 19° in the orientation of the bath from the northern axis toward the east. The plans of the individual rooms are rectangular. In the building plan, two parts stand out – a block on the west composed of small rooms and an eastern part that consists of a large room (Fig. 1).

The block part is divided into four small rooms by the inner walls of a north-south and east-west direction. In the north-western quarter, there is room 2, and south of it is room 7. In the north-eastern quarter there is room 3, and south of it is room 8 with annex 10 to the south (Fig. 2).[15] The remains of a hypocaust were found in rooms 2, 3, and 7, which show that they were heated. In none of these rooms was found any fully preserved hypocaust pier, or at least a partially preserved floor surface that was heated from below. There was one furnace *(praefurnium)* next to each of these rooms. Only in one room (8/10) there are no traces of the hypocaust or *praefurnium*. A preserved floor surface built with large bricks – (*bipedalis*) is on the south side of room 8/10, inside Annex 10, at an elevation ▼193.20 m.[16] This is also the only remnant of preserved floor surface in the entire building. The wall thickness of the western part of the bath is between 90 and 95 cm.

The eastern part consists of a large room, east of room 8, which, according to earlier researchers, is divided into two parts – northern (9) and southern (11). These two spaces are separated by the remains of shallowly founded masonry masses in an east-west direction, which was determined by earlier researchers as a wall. The south-eastern part of this area is very damaged (Fig. 2).

Room 2 inside the block part has a rectangular plan, with its internal dimensions of 3.85 × 3.53 m. The longer side is oriented in an east-west direction. It is been preserved only in the ground floor, that is, at a height of only four bricks of the hypocaust pillars. Only 11 hypocaust piers (*pilae*) were preserved inside the room. Based on their position, it can be reconstructed so that the *suspensurae* of the hypocaust consisted of six rows of piers, each arranged in six columns. On

not present, which can be seen from the Diary of Archaeological Research. Photo-documentation also did not follow in detail the course of the excavation of the Roman bath. During the research in 2019, only the bottom angle of the wall II foundation could be registered.

[13] On the plans made during 1977–1980, the depths of the excavation layers and the levels of preserved architectural remains and archaeological finds are very rarely marked. Elements have only relative measurement values, with no specific attachment to any particular permanent height benchmark over the years of research. The remaining two general plans (from S. Jovanović and S. Gušić) are incomplete, because both of them lack relevant data. For example, S. Gušić's plan does not indicate the grid system division of the excavated surface that was used during the entire research process. Also, the wall mass with the channel south of room 10 is missing. S. Jovanović's plan is insufficiently precise in terms of wall directions and room sizes. Also, the remains of the walls southeast of the apse of room 7 and the south wall of room 11 are missing. Squares 1 to 4, which were excavated during 1978 in the area southwest of the baths, are not marked. There was no sketch of any wall before the building went through the conservation process. Only by cross-referencing the data from both plans and overlapping them with the geodetic survey from 2003, and with field checks, was it possible to reconstruct a precise building plan (Fig. 1 and Fig. 2).

[14] Unfortunately, the diary of the archaeological excavations for 1980 is missing, and the excavations in this campaign are briefly described in the report on the archaeological excavations at the Timacum Minus site near the village of Ravna (Knjaževac) in 1980 (Documentation AI, inv. 368).

[15] In order to enable future interested researchers to practically check our opinion in this paper, the ordinal numbers of rooms and individual walls in the text and plans in this paper have not been changed in relation to the markings in the Diaries of Archaeological Research by P. Petrović and S. Jovanović.

[16] After a series of repeated readings of the diaries of archaeological excavations, the author concluded that this elevation served as a "permanent fixed benchmark". Although this term is sporadically mentioned in three places during the period 1977–1978, its absolute measurement value is not defined in any diary (diary of archaeological excavations for 24.9.1977 and 28.9.1977, 13.9.1978). For the date 28.9.1977 in the context of the research of squares A3 and A2, it is stated that a "permanent fixed benchmark" is "on the wall surface", and that the difference from the benchmark to the elevation of the bottom of the excavated surface in room 8/10 is 1.3–1.4 m. This led the author to the conclusion that the "permanent fixed benchmark" is a position that has not been changed in the process of conservation – that is, the level of the large bricks (*bipedalis*) at a floor level of 193.20 m in room 8/10 in contact with wall IV. From this point to the bottom of the excavated surface inside room 8, the elevation difference is still 1.3 m.

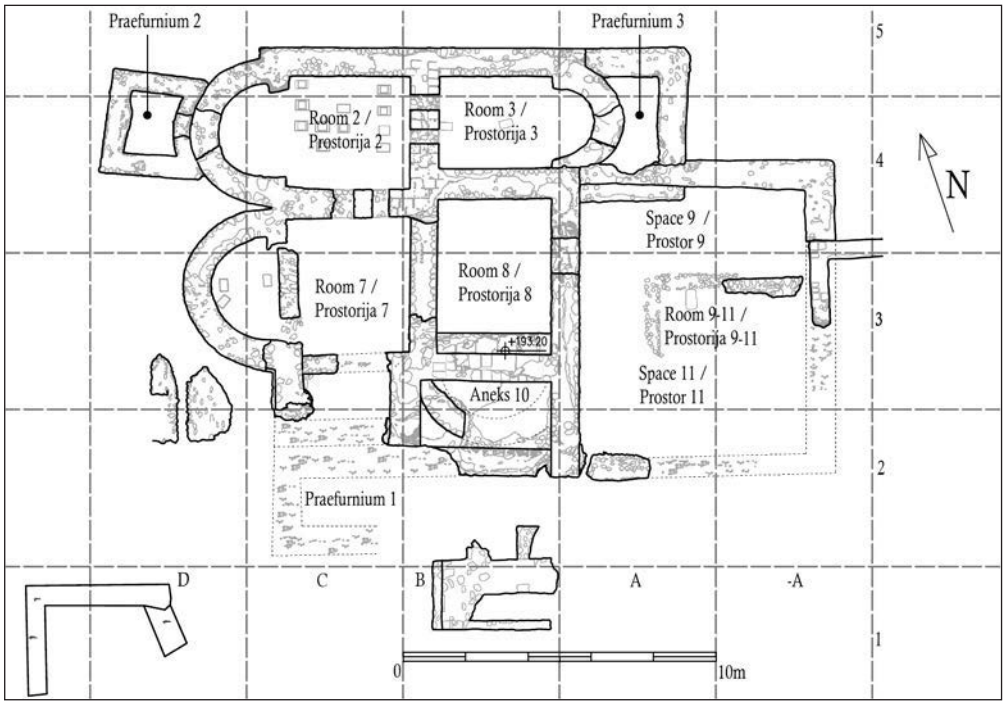

Fig. 1. Plan of the Roman bath in Timacum Minus in a grid system and with room numbering (according to the documentation of the Institute of Archaeology, Belgrade)

Сл 1. План римског купатила у Тимакум Минусу са квадратном мрежом и нумерацијом просторија (према документацији Археолошког института у Београду)

the west side of this room, there is an apse 2.95 m wide and 1.62 m deep. An opening was formed in the apex of the plan of the apse wall. The damaged opening is 73 cm wide. In the interior of the apse, in square D4, the rubble consisted mainly of broken stone, pebbles, and pieces of bricks.[17] A rare occurrence of calcareous tufa was noted between apses in rooms 2 and 7.[18]

To the west of the apse of room 2, a rectangular space was formed, bounded by walls, within which a large amount of ash and red baked earth was found under the rubble.[19] The thickness of the ash layer was 20 cm.[20] This space apparently served as a furnace (*praefurnium*) for the apse of room 2.

Room 3 has a rectangular plan, measuring 3.58 × 2.92 m inside. The longer side is oriented in an east-west direction. On the east side of this room is an apse 2.28 m wide and 1.25 m deep. Inside the apex of the apse, the wall has an opening 70 cm wide. The room is preserved only at the foundation level, i.e. at a height of four bricks of the piers of the hypocaust. Only three hypocaust piers were preserved inside the room. Based on them, it can be reconstructed so that the *suspensurae* of the hypocaust consisted of six rows of piers, arranged in five columns. Hypocaust piers are built in a specific way. In addition to the use of bricks in the format commonly used in the Moesia Superior area for the hypocaust *suspensurae* (25 × 25 × 10 cm), bricks with larger dimensions (40 × 27 × 5 cm) at the bottom were also used. No piers were registered in the apses of rooms 2 and 3, although they undoubtedly existed, taking into account the position of the furnaces next to them. Room 3 was separated from room 2 by the northern part of wall X. At the height of the hypocaust, three arched channels were formed in the wall, separated from each other by a masonry pier.

[17] AI documentation, inv. 368: Diary of archaeological excavations for 9.21.1977.

[18] AI documentation, inv. 368: Diary of archaeological excavations for 20.9.1978.

[19] AI documentation, inv. 368: Diary of archaeological excavations for 20.9.1977.

[20] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1977 and 22.9.1977.

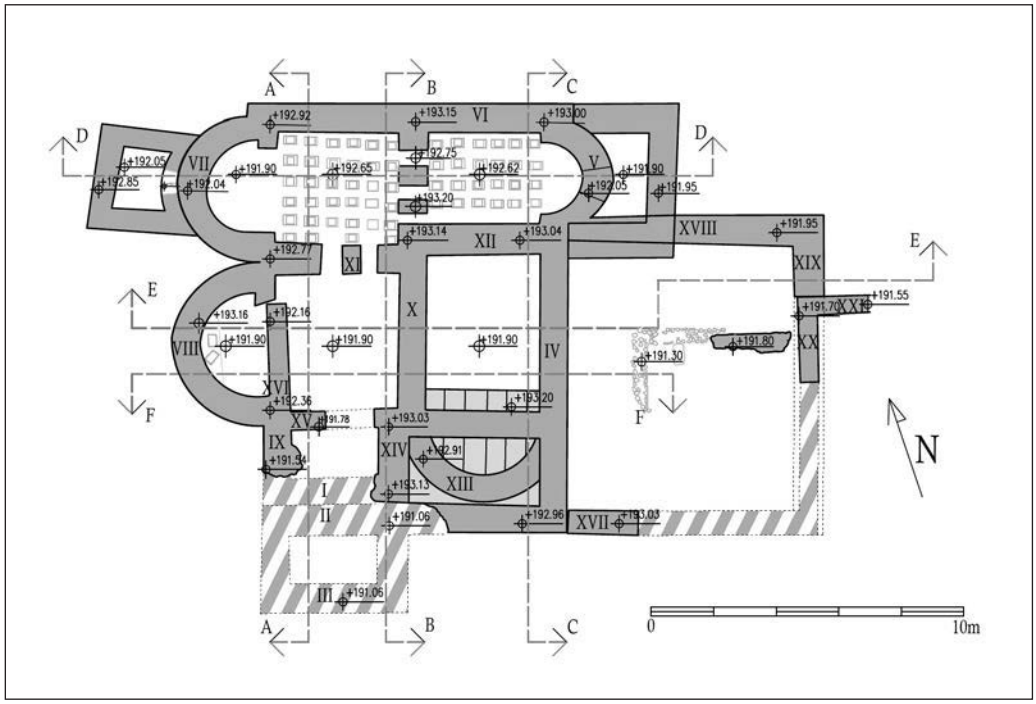

Fig. 2. Reconstruction of the plan of the foundation of the Roman bath with the indicated levels, the numbering of walls, and sections

Сл. 2. Реконструкција плана основе римског купатила са ознакама нивелета, зидова и пресека

According to earlier researchers, two phases of the hypocaust should be distinguished in heated rooms. This circumstance was registered in room 3, where the space under the base level of the later hypocaust (▼192.65 m) to the base level of the primary hypocaust (▼192.40 m) was excavated (Fig. 3: Section D–D). On the cross-sectional sketch, made by S. Jovanović, a mortar surface was registered on that level, while between the two base levels, according to the diary, there was rammed black earth and pebbles. One earring was found on the primary base level.[21]

To the east of the apse of room 3, a rectangular space bounded by walls was formed. Inside, very extensive building debris was found, as well as in the area of the apse of room 3.[22] The most intense debris was present along the west wall of this room and consisted of mortar and broken stone.[23] Under the layer of rubble in the area east of the apse, ash along with red baked earth was found, which indicates that the area served as a *prefurnium*.

Room 7 has a complex plan (Fig. 2). Its basic space has a rectangular plan, measuring 4.00 × 4.27 m. The longer side is oriented in a north-south direction. A rectangular annex measuring 2.79 × 1.49 m was formed along the southern side of this space. On the west side, an apse 3.30 m wide and 2.17 m deep was formed. Opposite the apex of the apse, wall XVI in a north-south direction was found. The wall is made of broken stone and larger pebbles and it has a face made using the flush pointing technique. Only this wall within the western part of the bath is 0.6 m thick, while others are 0,8–1,0 m thick. Traces of hypocaust piers were very scarce inside this room.[24] Hypocaust bricks were

[21] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1977. Cross-sectional sketch is in the technical documentation.

[22] AI documentation, inv. 368: Diary of archaeological excavations for 22.9.1977.

[23] AI documentation, inv. 368: Diary of archaeological excavations for 26.9.1977.

[24] Due to the scarce remains of the pillars, it was impossible to reconstruct their number and arrangement at the level of the hypocaust of room 7. Documentation AI, inv. 368: Diary of archaeological excavations for 21.9.1978.

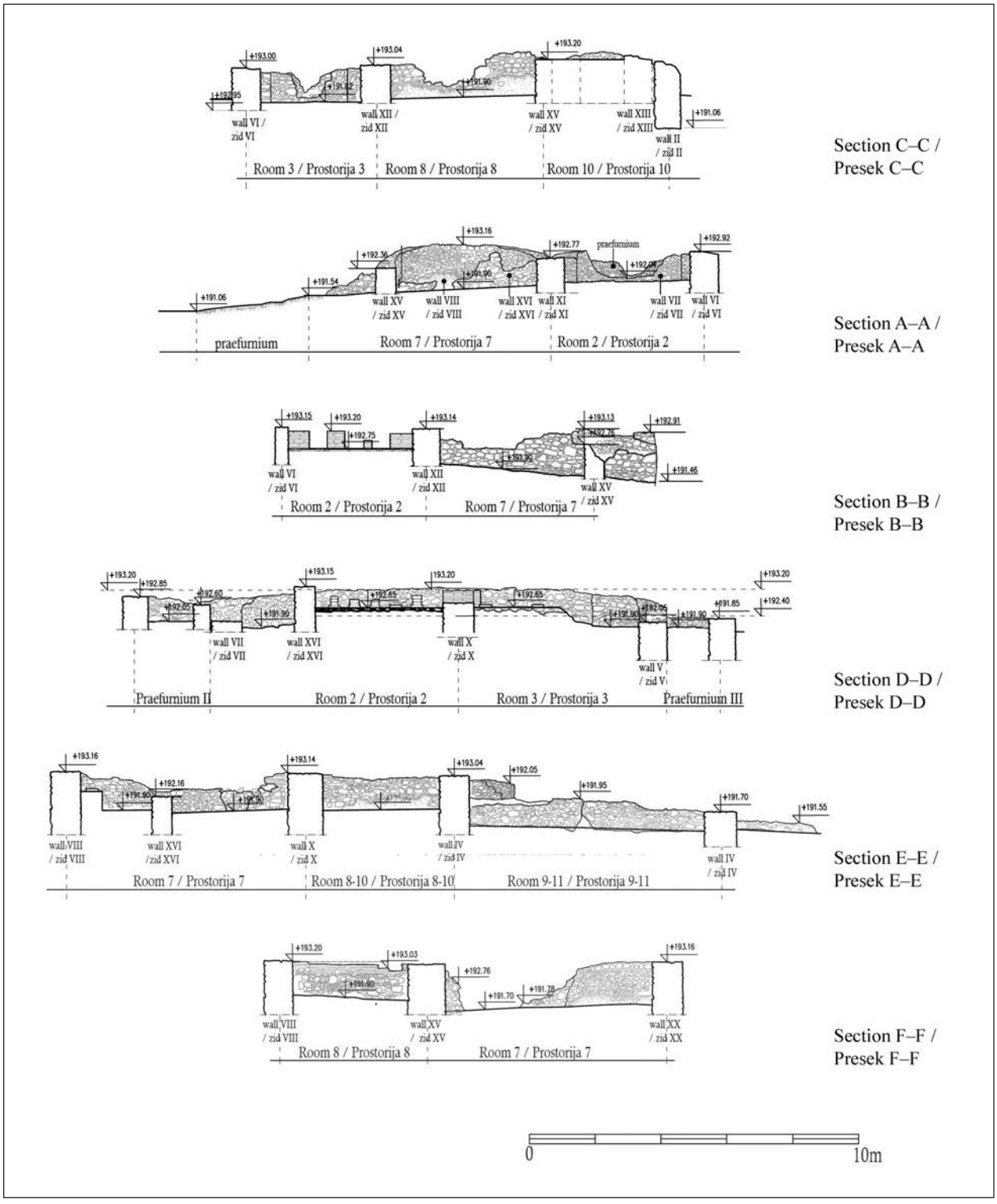

Fig. 3. Transverse and longitudinal sections of the Roman bath in Timacum Minus, current state (the remains of the hypocaust columns are additionally indicated in the section D–D, according to the older technical documentation of the Institute of Archaeology, in Belgrade)

Сл. 3. Поūречни и ūодужни ūресеци римскоī куūаūила у Тимакум Минусу, ūосūојеће сūање (на ūресеку D–D додаūно су назначени осūаци сūубића хиūокауса, ūрема сūаријој ūехничкој докумеūūацији Археолошкоī инсūиūуūа у Беоīраду)

also discovered in the apse space (Fig. 1, Fig. 3: Section E–E).[25] Under the hypocaust of this room, there was a mortar base level, as well as inside the apse of this room, at a depth of ▼ 192.40 m. In the northern part of the room, that is, along the northern end of its apse, the base level was damaged by subsequent digging. Gravel was used as a base for the mortar level of room 7.[26]

The walls I, II, III south of room 7 are very damaged (Fig. 1, Fig. 3: Section A–A). Their traces have been excavated at a greater depth in the form of the ‚*negatives*' of the *walls* in the soil. The southern wall of room 7 inside square C2 is formed as a double wall. Initially, only traces in the form of large pebbles were noticed from the wall. Deeper in the ground, the stones were mostly removed, which was apparent based on the lumps of mortar in which there were stone prints.[27] The inner wall I was 55 cm thick. The remains of the wall were found at a depth of ▼191.10 m, as along with the remains of wall II.[28] Wall II's direct contact with the wall masses of annex 10 is severely damaged.[29] The southwest corner has been much damaged by recent digging and quarrying. Both walls were connected to the south-western wall mass of annex 10.[30]

At the southern end of room 7's apse, a projection of foundations was noticed on the outside at a depth of ▼192.00 m.[31] On the inner side of the same part of the apse, there is a reinforcement made of pebbles with mortar at a depth of ▼192.13 m.[32] After excavation of the north-western corner of room 7 to a depth of ▼191.9 m, the inner corner of the north wall of room 7 was registered, and its connection with the apse of room 2 was discovered.[33] Room 7 was separated from room 2 by wall XI. In the level of the hypocaust, two openings, 72 cm and 52 cm wide, were formed in the wall. The two openings are separated by a 59 cm wide masonry pier.

South of the apse of room 7 is a rectangular space bounded by walls II, III, and by an extension of wall IX to the south. The eastern end of wall III, which is located south of room 7, is unclear. The function of this small space was determined by the baked earth and ashes in its interior. The descriptions related to the presence of rubble, ash, and baked earth in and around this area do not differ from those related to the furnaces of rooms 2 and 3.[34] Therefore, it can be concluded with a good degreee of certainty that another praefurnium was found in this area.

Room 8 has a rectangular plan, with internal dimensions of 3.63 × 4.91 m. The longer side is oriented in the direction north-south. Inside room 8 and its annex 10, very extensive building debris was found.[35] It is important to point out the rare appearance of a piece of mortar with a coating, 1 cm thick, of red hydraulic mortar, which was discovered in square B2. Inside room 8 and annex 10, a large amount of debris of pieces of brick, pebbles, and broken stones was found. Fragments of ceramic vessels as well as lead cramps in the rubble were rare.[36] A part of a mortar surface (floor) was found in the centre of the room.[37] The layer of mortar defined in the diaries as the "floor surface" (although uneven and dilapidated according to the notes) in this room was found 1.30 m deeper, at an elevation of ▼ 192.20 m.[38]

Annex 10 is rectangular in plan, measuring 4.18 × 2.11 m. The longer side is oriented in an east-west direction. Annex 10 was within the boundaries of walls

[25] Although this information is not mentioned in the diaries, we came to this fact using data from the technical and photo-documentation of the Institute of Archaeology, in Belgrade. The elevation of these columns is not marked in the technical documentation.

[26] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978.

[27] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978.

[28] The relative value of 2.1 m to the "permanent fixed point" is stated in the diary. Documentation of the Archaeological Institute, inv. 368: Diary of archaeological excavations for 28.9.1978.

[29] AI documentation, inv. 368: Diary of archaeological excavations for 29.9.1978.

[30] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1978.

[31] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1978.

[32] The relative value of 1.2 m to the "permanent fixed point" is stated in the Diary. AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1978.

[33] The relative value of 1.07 m to the "permanent fixed point" is stated in the Diary. AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1978.

[34] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978, 22.9.1978 and for 29.9.1978.

[35] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1977 and for 22.9.1977.

[36] AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977.

[37] AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1977.

[38] It is noted in the diary that this mortar surface was located at a depth of 1.30 m from the upper surface of the walls. AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977. This layer could not be confirmed in the recent field prospecting.

II, IV, XIV and XV. These walls also had preserved interior faces in the above-ground part (above the floor level). Within this space, at the floor level, an apse 3.36 m wide and 1.15 m deep was formed. The apse limited the space of the floor surface made from bricks of larger dimensions 60 × 60 × 8 cm (*bipedalis*).[39]

Remains of above-ground structures were registered, such as those from the wall installations or the roof covering in the area of rooms 2, 3, and 7. Ceramic spacer pins were mostly found at the beginning of the excavation on the surface near the outer walls of rooms 2, 3, and 7, while other pins were found inside rooms 2 and 7 on the level of the later phase hypocaust base, between the hypocaust piers.[40] There is no mention of findings of marble slabs, window glass fragments, frescoes, or iron wedges. There were a lot of pieces of tiles in the building debris, some of which certainly belonged to the roof covering that fell from the vaults to the outside of the building boundaries, which can be determined based on their location. Inside room 7, pieces of bricks and tiles were also found under and between the pebbles in the first excavation layer.[41] In the area of the south-eastern corner of the annex of room 7 and near its prefurnium, fragments of *tubuli* were found.[42] The faces of the foundation walls were mostly found with the remnants of the flush pointing technique originally applied on their surface.[43]

Outside the boundaries of the block complex, in the eastern part of the Roman bath, there is room 9/11. The width of the room, in an east-west direction, at its northern fully excavated wall is 7.19 m. The total length of room 9/11 is 8.6 m.

The room is divided into the northern part (space 9) and the southern part of the room (space 11) in its spatial relationship with the devastated masonry of an east-west orientation. The crown of the damaged masonry mass is located at a depth of ▼ 191.80 m, and only two rows of stone of that structure were registered.[44] The masonry mass is registered as 0.5 m shallower than the older walls of the Roman bath. Also, the mass was found in a space that was previously levelled. At the same depth, in the centre of the western half of space 9, a pebble base layer and two rows of horizontally laid bricks were discovered (one over the other).[45] About half a meter deeper, researchers found the remains of pebble dry stone walls (at elevation ▼ 191.30 m).[46]

The north wall of the new room 9 rested over the older south wall of the praefurnium of room 3.[47] This circumstance is sure proof of the termination of the function of the praefurnium of room 3 because its vault no longer had support on the side of the rebuilt wall.[48]

The southern boundary of room 9/11 is defined by a part of a wall 0.9 m thick and over 2 m long in an east-west direction. The remains of the wall slope to the south. It is noticeable that it was built entirely of pebbles covered with lime mortar. Previous researchers have not established a strong connection between the wall and the south-eastern corner of the block complex.[49]

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[39] AI documentation, inv. 368: Diary of archaeological excavations for 15.9.1977.

[40] AI documentation, inv. 368: Diary of archaeological excavations for 14.9.1977; also within squares C3 and C4 during 20.9.1977–21.9.1977.

[41] For the area of the north-eastern corner of square 4 – AI documentation, inv. 368: Diary of archaeological excavations for 16.9.1977 and 19.9.1978; For room 7 – Diary of archaeological excavations for 20.9.1978.

[42] AI documentation, inv. 368: Diary of archaeological excavations for 19.9.1978 and 20.9.1978.

[43] AI documentation, inv. 368: Diary of archaeological excavations on September 21, 1978; The faces of the walls of room 8 and inside the apse of room 7, according to the photo-documentation of the Institute of Archaeology in Belgrade.

[44] The author compared the current eastern appearance of wall IV, which was also geodetically surveyed, as well as older photographs from excavations of the eastern appearance of this wall. The date of these photographs according to the diary is known, as well as the depth of excavation for that date. The author concluded that the relative elevation 0.00 for 1979 in room 9/11 has an absolute value of 192.20 m (which is the upper level of the control profile next to the entrance between rooms 8 and 9 in 1979). Thus, the relative depth of 0.40 m corresponds to the absolute level value of 191.80 m. As a precaution, the notes also include relative depths for each recalculated value in the text, which are the only ones mentioned in the diaries of archaeological excavations.

[45] AI documentation, inv. 368: Diary of archaeological excavations for 14.9.1979.

[46] At a relative depth of 0.9 m from the ground surface according to Documentation AI, inv. 368: Diary of archaeological excavations for 24.9.1979.

[47] This circumstance was not mentioned by older researchers, but it is an obvious situation on the ground, which is also indicated on the building plans (Fig. 1 and Fig. 2).

[48] That would also explain the larger amount of rubble on that side of the prefurnium, although it should be borne in mind that it could also have originated from the collapsed upper structure of the apse.

[49] AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977.

[50] AI documentation, inv. 368: Diary of archaeological excavations for 19.9.1979.

The end of the east wall of the room to the south could not be defined – traces of mortar only hinted at its extension in that direction. The thickness of the wall is 57 cm.[50] There was a similar situation with the eastern end of the south wall XIX. During the research, a special trench was excavated in order to follow the direction of the wall. In the part where the south-eastern corner of the Roman bath was expected, only a layer of mud and sand was found, based on which older researchers concluded that it was river sediment.[51]

From the above-ground constructions in the eastern room (9/11), the finds of *tegulae mammatae*, window glass fragments, fragments of frescoes, and roof tiles should be pointed out. There was only one find of an iron wedge. Inside the room, a large amount of ash, charred wood and soot mixed with brown loose earth and lime mortar was found.[52] There is no mention of marble slabs or marble architectural elements. *Tegulae mammatae* were excavated at levels of ▼191.80 and ▼191.50 m.[53] Fragments of two *tubuli* were excavated in the same layer. A large number of fresco fragments with red paint were excavated inside space 11 at elevations of ▼192.20 and ▼191.60 m.[54] Window glass fragments were found mostly in space 11 between an elevation of ▼191.90 and ▼191.40 m.[55] Inside space 9, window glass fragments were found only in rare cases at an elevation of ▼ 191.40 m.[56]

Next to the east side of room 9/11, walls XX and XXI were found. They have a maximum width of only half a meter. Their faces are very damaged. The corner of these walls is leaning against the end of the east wall XIX of room 9/11, where, on the trace of that wall, the direction of wall XX extends. The trace of wall XXI stretches to the east, that is, to the coast of the Beli Timok River.[57] These walls, due to the nature of the connection with the east wall XIX of room 9/11, obviously belong to a later phase.

In the area southwest of the Roman bath, masonry walls of an object of an as yet unknown function were also explored in 1978.[58] Excavations of these structures have not established a direct connection with the Roman bath.[59] In addition to traces of walls, archaeologists also found channels made of fragmented bricks, two ceramic pipes, red-baked earth and pieces of floor and wall coverings.[60] These findings indicate the existence of another building. Its structures were not directly connected to the bath complex, although this fact does not exclude the possibility that the building was indirectly connected to the Roman bath in a part of the unexplored zone.[61]

Analysis of results

Room function and communication scheme of the building

Previous research tried to determine the function of each room of the Roman bath (Fig. 4a). [62] In this paper, this determination will be revised in further

[51] AI documentation, inv. 368: Diary of archaeological excavations for 27.9.1978; Diary of archaeological excavations for 21.9.1979.

[52] AI documentation, inv. 368: Diary of archaeological excavations for 13.9.1979 – 24.9.1979.

[53] The relative depths from 0.40 m to 0.70 m correspond to the values ▼191.80 and ▼191.50 according to the Diary of archaeological excavations for 14.9.1979, 18.9.1979 and 19.9.1979; I. Bjelić also found one *tegula mammata*, during a tour of the terrain on the outer side of the north-eastern corner of room 9, near the praefurnium of room 3.

[54] These elevations correspond to the relative depth of 1.30–1.40 m from the point where, according to the author of this paper, a permanent reference point was marked, and at a relative depth of 0.60 m from the soil surface of space 11; Diary of archaeological excavations for 28.9.1977 and 15.9.1979.

[55] These elevations correspond to the relative depth of 0.30 m to 0.80 m; Diary of archaeological excavations for 29.9.1977, 15.9.1979, 18.9.1979 and 21.9.1979.

[56] These elevations correspond to the relative depth of 0.80 m. AI documentation, inv. 368: Diary of archaeological excavations for 22.9.1979.

[57] There is no data on the depth of the bottom of the foundations of these walls in the Diaries of Archaeological Research.

[58] This explored area is defined within squares 1–4 outside the previously established grid system. Square 4 is positioned so that it is closest to room 7, where the north-eastern corner of square 4 rested over the junction of walls I and XVI. AI documentation, inv. 368: Diary of archaeological excavations for 7.9.1977–13.9.1977.

[59] AI documentation, inv. 368: Diary of archaeological excavations for 7.9.1977–13.9.1977.

[60] According to the technical documentation, the only two drawn ceramic pipes were two fragments that were attributed to the heating pipes, although they belong to the vault pipes. The date under which they are recorded in the technical documentation and the text is the same. Also, in the diaries, there are no statements of what sort were floor and wall coverings. – AI documentation, inv. 368: Diary of archaeological excavations for September 8, 1978.

[61] According to the author, this possibility is small, if we take into account the position of praefurnium 1, whose furnace opening would be facing these structures in that case.

[62] See the plan in: Петровић, Јовановић 1997, 24, Fig. 22. According to that plan, room 8 was a tepidarium, room 10 was a frigidarium, room 2 was a caldarium, and the apse of room 2 was a sudatorium, room 3 was a caldarium, and the apse of room 3 was a sudatorium, room 7 was a tepidarium, and its apse was a caldarium, and room 9/11 an apodyterium. Deeper reasons for this determination of the functions of the mentioned rooms are not stated. In this paper, the author gives a different interpretation based on the relevant architectural remains and the latest knowledge regarding the

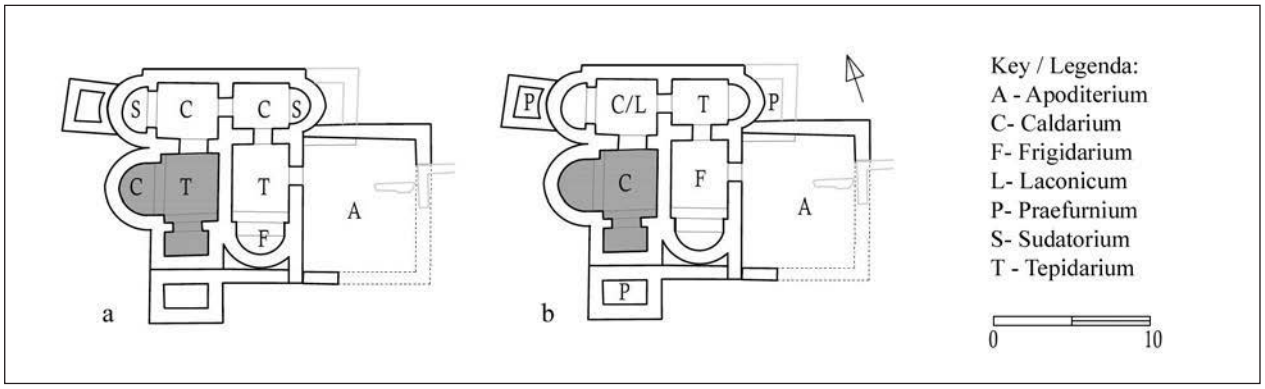

Fig. 4. Function determination for all excavated rooms in the plan of the Roman bath in Timacum Minus: a) according to the previous researchers (Петровић, Јовановић 1997, сл. 22); b) according to the solution elaborated in the paper analysis

Сл. 4. Одређење функција свих откривених просторија у плану римског купатила у Тимакум Минусу: а) према: Петровић, Јовановић 1997, сл. 22; b) према решењу изложеном у раду

text, so a different interpretation of the room functions can be suggested (Fig. 4b). As will be seen from the elaboration, the solution is only based on the final building phase of the baths, so a detailed analysis of previous building phases, successive additions, room functions and communication is needed.

The function of the rooms of the Roman bath is closely related to the communication pathways between them. The object of the bath in Timacum Minus is quite devastated – it is mostly preserved at the level of the foundations and the hypocaust, so the position of the entrances to separate rooms can only be reached by analyzing the remains of the architecture. Individual rooms had to be within boundaries of the masonry walls on all sides, due to the specific needs for heat maintenance. Due to the size of the room, the number of entrances had to be reduced to a minimum. The position of the entrances between the rooms at the level above the floor was most practically determined through the openings (i.e. channels) connecting the hypocausts of the individual rooms exposed to heating at the level under the floor.

The function of a room is directly indicated by the existence or absence of a hypocaust. Therefore, we have an insight into which of the rooms had floor-heating and wall-heating, and which did not. Unfortunately, the measures taken to prepare the baths for conservation, as well as the conservation itself, included "removal of piers and hypocaust floors built in the secondary phase of use."[63] This is why the present state of the building, after the conservation and restoration activities, does not give a true picture of the excavated hypocaust of the Roman bath in Timacum Minus. After revision of the available materials, it was noted that in the original condition of the western block, only one of the rooms was truly excluded from the heating structure. That room is located to the southeast of the west building part – room 8 with annex 10.

Previous data indicates the division of the block arrangement of the Roman bath into one "cold" room (certainly a frigidarium) and three "warm" rooms. Within the three rooms with warm bathing, each of them could have a different degree of heating. The generally accepted terminology indicates that the caldarium with alveus (or multiple alvei) was intended for hot bathing, while the tepidarium was dedicated to warm bathing.[64] Both rooms had floor-heating. The caldarium was directly exposed to the furnace, while the tepidarium had to be further away from the direct

use of small Roman baths in the Roman provinces, in territorially and chronologically close analogies. The way of bathing directly influenced the communication of the users inside the Roman bath.

[63] The report on archaeological excavations in Ravna for 1978.

[64] On certain dilemmas about the terminology of individual rooms following the degree of heating, see: Maréchal 2012, 146.

[65] Such spatial arrangements of the caldarium were common in Roman baths throughout the empire. Almost a century ago, Krenker pointed out the typological features of the caldarium arrangement in the plan. Krencker et al. 1929, 329, Fig. 329.

source of heating. Through the openings (channels) under the floor, the hypocaust of the tepidarium could be connected to the hypocaust of the caldarium. In this way, the floor of the tepidarium was indirectly heated. At the Roman bath in Timacum Minus, furnaces were registered next to all three warm rooms, which make the identification of caldarium and tepidarium rooms difficult.

When determining the precise position of the caldarium, the remains of the destroyed walls at the base of room 7 are of particular importance. Many Roman baths that were discovered in the Roman Empire have at least one room with a layout identical to room 7 in Timacum Minus.[65] This plan, in most examples in the region of Moesia Superior and its immediate surroundings, is characterised by a central space of a rectangular plan

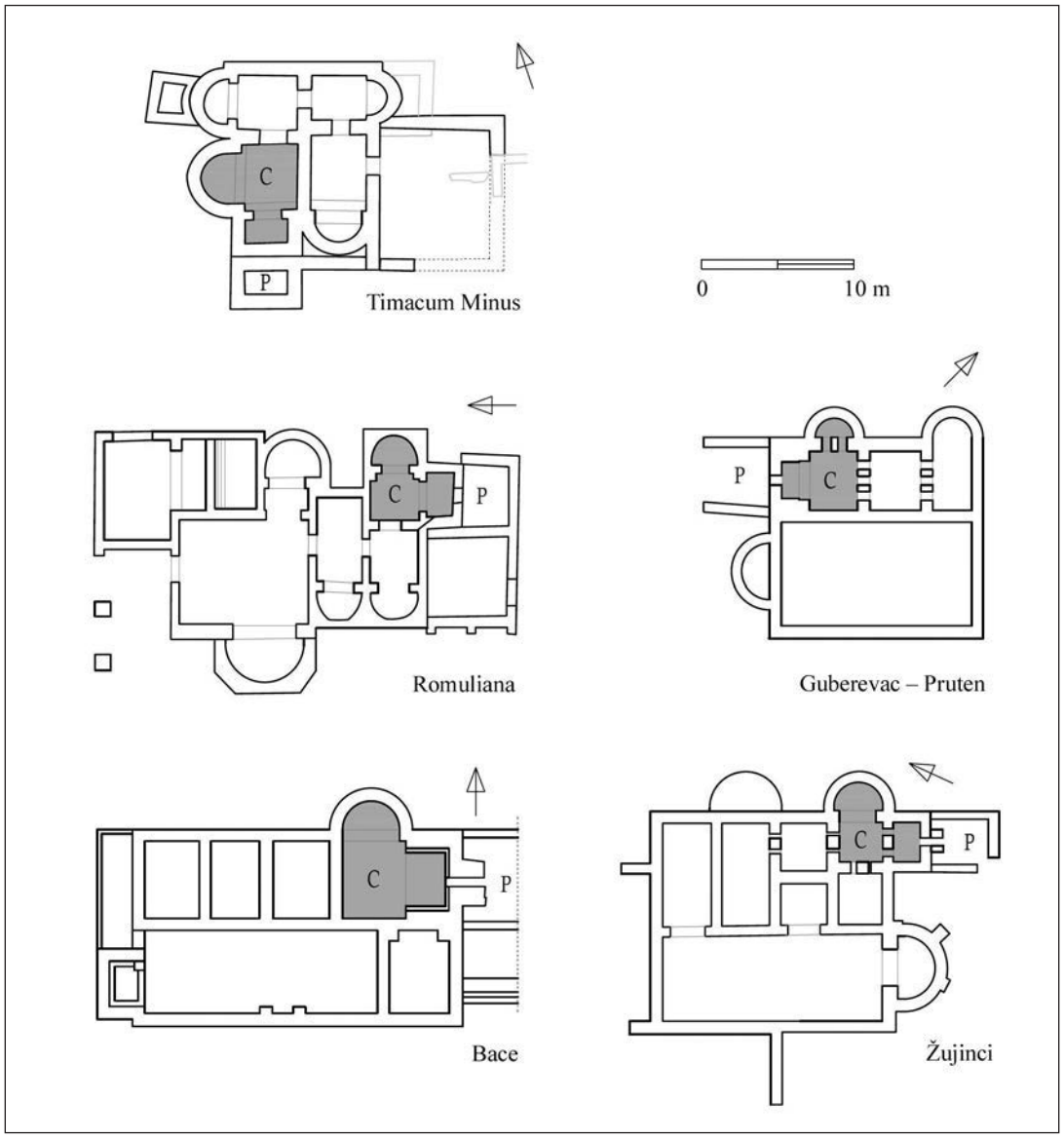

Fig. 5. Examples of the position and shape of the caldarium room in the plans of the Roman baths in the region of Moesia Superior: The room of the caldarium is marked with a grey tone and with the letter C, the position of the prefurnium is marked with the letter P

Сл. 5. Примери положаја и облика просторије калдаријума у основама римских купатила на тлу Мезије Супериор: сивим тоном и словом С означена је просторија калдаријума, а словом Р означен је положај префурнијума

which has a semicircular apse on one side and a rectangular annex on the other (Fig. 5).[66] At the same time, the furnace (*praefurnium)* is leaning on a rectangular annex. In these examples, the walls of the annex lean against the parallel walls of the praefurnium or the common wall between the annex and the praefurnium is of a greater thickness. It was necessary to make the masonry walls of the annex and praefurnium doubled or to increase the thickness of these walls at their junction because they were exposed to extremely high temperatures that could cause cracks in the wall mass due to constant heating and cooling. With these interventions, above the praefurnium, there could be special installations (boilers) for heating the water that flowed out into the alveus of the caldarium.[67] Inside the rectangular annex of the room was a tub that was directly heated. Inside the semicircular apse of room 7, another tub could be registered. In older examples of Roman architecture, a labrum could often be found here instead of a tub.[68] In addition to the fact that no traces of a labrum have been found, the position of wall XVI primarily leads to the conclusion of the existence of a space partially separated from the remains of room 7.[69] The thickness of the wall foundation of 60 cm indicates that it could only be a support for the low wall of the front side of the tub, which separated the semicircular apse of the pool from the rest of the room. The caldarium, together with the accompanying praefurnium, was obviously part of the original spatial concept of the balneum, as one of the basic rooms of the Roman bath.

The spatial relationship between the caldarium and the frigidarium in the reduced spatial arrangement of the block-type in Timacum Minus caused a problem regarding the practical functioning of these rooms.[70] In such a solution, the frigidarium and the caldarium are placed practically next to each other. The inner faces of walls II, IV, XIV and XV were found inside the frigidarium, which leads to the conclusion that the floor of the pool in the frigidarium was initially on a lower level in relation to the floor of the rest of the frigidarium, as were the tubs in the warm rooms. Such a spatial solution resulted in the heating of the caldarium to have unfavourable effects on the cold pool in the frigidarium, by heating it. At the same time, a larger amount of cold water inside the frigidarium would slow down the heating of the adjacent alveus of the caldarium and increases the consumption of energy (fuel) for heating (Fig. 6a). The initially established unfavourable solution for heating the balneum caused subsequent construction interventions, which would have had to improve the original condition. Certainly, in the second phase of the use of the baths, the inner space of the frigidarium pool was filled, that is, the space between the mentioned walls (Fig. 6b). On the filled mass of the former swimming pool, a semicircular apse was then built (by building wall XIII), within which a new swimming pool was formed. By this action, the floor level of the new pool was raised. The new pool was separated from the rest of the frigidarium by a low wall, built using 24 cm long bricks. On both sides of this wall, a floor of larger bricks, (bipedalis) 60 cm wide, was found. Inside the apse, the floor of the bipedalis extends to the semicircular wall of the pool, which indicates that this level is certainly simultaneous with the construction of the semicircular apse of the frigidarium. By filling the space of the previous pool and forming a masonry platform for the new pool, the level of its floor was raised above the level of the hypocaust in room 7.

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[66] Although this room very often appears within balneae in the region of Moesia Superior, as well as in its surrounding region, it is mostly treated as any space in a series of caldaria or tepidaria. This problem is also indicated by Kuzmanović-Novović et al. 2019, 30. There are several examples where rooms similar to room 7 in the Roman bath at Timacum Minus have been registered: in Čačak and at the site of Mansio Idimum (in both previous balneae the caldarium position was correctly identified according to: Јеремић, Гојгић 2012, Fig. 7 and Vasić-Milošević 2000, Fig. 13). At the balneum in Žujinci, it is located in the south-eastern corner – Томовић et al., 2005, 322. At the balneum at Mediana in the south-western corner – Петровић 1994, Fig. 16. At the Guberevac site – Pruten is in the eastern corner – Величковић 1958, Fig. 3. In Bace it is in the north-eastern corner – Jordović 1999, Fig. 1. In Romuliana it is at the southern end – Medić, Stojković-Pavelka 2010, Fig. 43 (in the Figure the north-mark is wrong). The position and constructive arrangement, which refers to the caldarium, is the subject of a special work by I. Bjelić, since this topic with all analogies from Moesia Superior and the surrounding area requires a longer explanation – Bjelić 2020, in press.

[67] An illustrative example of such installations above the praefurnium was given by Bouet, based on field findings. Bouet 2003, 192.

[68] Labra are usually large in diameter, about 2 m. They appeared in caldaria from the 1st century to the end of the first half of the 2nd century AD. Starting from this period, there are significantly more common solutions where there is one pool in the caldaria within each annex or apse. Biernacki, Klenina 2015, 53.

[69] Construction of this type has already been noted according to Krencker et al. 1929, 194, Abb. 257.

[70] It should be pointed out that even with more elaborated plans of Roman baths, there were cases where the frigidaria were positioned directly next to the caldarium. One example is in Histria in today's Romania (Suceveanu 1982, Figs. 35, 38 and 46).

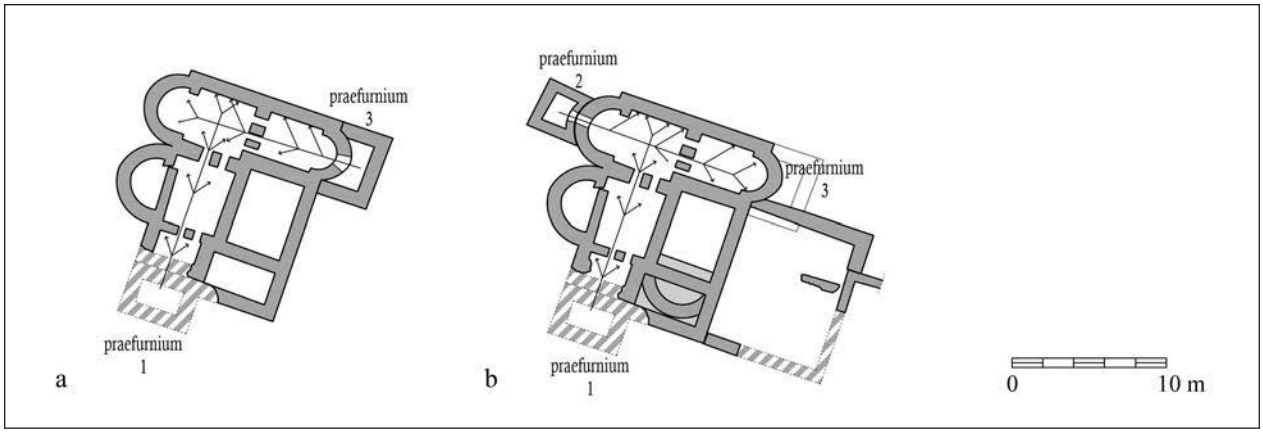

Fig. 6. Functioning of the hypocaust system: a) the first phase, before the addition of the apodyterium, with the indicated spread of hot air from prefurnium 1 and 3; b) the second phase, after the addition of the apodyterium, with the indicated spread of hot air from prefurnium 1 and 2

Сл. 6. Функционисање система хипокауста: а) прва фаза, пре доградње аподитеријума, са назначеним простирањем топлог ваздуха из префурнијума 1 и 3; b) друга фаза, након доградње аподитеријума, са назначеним простирањем топлог ваздуха из префурнијума 1 и 2

This improved the thermal insulation of the frigidarium space from the closeness of the caldarium.

The fact that room 7 was defined as a caldarium suggests that above the floor level there could have been no direct communication between it and room 8 (the frigidarium) because the connection between the two rooms would suppress their opposite functions of hot and cold bathing.[71] Communication between the caldarium (room 7) and the frigidarium (room 8) therefore had to take place through rooms 2 and 3, which would serve to adapt the human body to the gradual changes in temperature and humidity (Fig. 7).[72]

At this point, it is important to consider the reasons for the establishment of three furnaces (prefurnii) for the small block arrangement of the Roman baths in Timacum Minus. The existence of three furnaces 1, 2 and 3 is caused by the spatial relationship between rooms 2, 3, and 7. The block arrangement with the division of internal space by transverse and longitudinal walls imposed a solution where heated rooms are arranged in the form of the Latin letter L. Hot air from a praefurnium at one end of the L-shaped form would certainly not be heated up enough under the room at the other end of this form. Therefore, it is important to consider the heating of the floors of rooms 2, 3 and 7 by the functioning of praefurnium 1. Previously, it was indicated that room 7, a caldarium, was planned at the very beginning of the construction of the balneum, as well as praefurnium 1. Hot air from praefurnium 1 could move directly through the hypocaust system to the north wall of room 2. In this way, the floors of rooms 2 and 7 could certainly be heated by hot air from praefurnium 1. However, heating room 3 from the direction of praefurnium 1 would not be practically possible. Since room 3 was initially planned as a heated space, as indicated by the remains of an older hypocaust, it was necessary to provide it a better, direct way of heating. This initial problem of heating room 3 was certainly solved by the simultaneous construction of praefurnium 3 in the first phase of the use of the baths (Fig. 6a).

Room 2 and room 3 had their separate furnaces, which could heat rooms 2 and 3 equally strongly, as praefurnium 1 heated room 7. This could be a circumstance that relativizes the statement regarding the adaptation of the user's body to increasing temperatures

[71] During the reconstruction of communications in a similar case at a Roman bath in Romania, a different approach was noted. In Histria, where the frigidarium is also next to the caldarium, a solution with direct communication between these two rooms was applied, although it would make it impossible to maintain the desired temperature in each of them. During the excavations of this object, it was registered that the wall separating the two rooms was preserved at a level below the floor level – Suceveanu 1982, Fig. 46.

[72] Kuzmanović-Novović et al. 2019, 30.

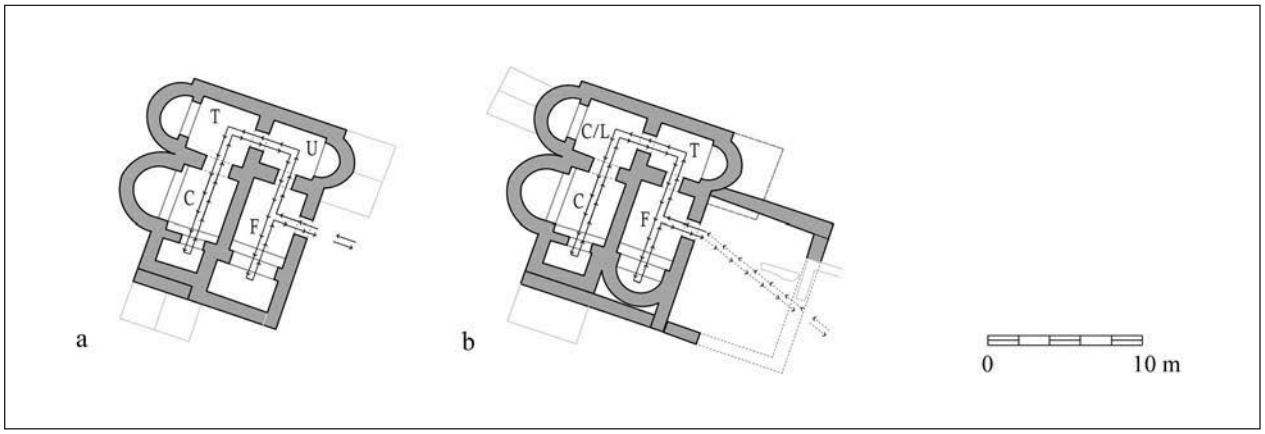

Fig. 7. Reconstruction of the plan of the building at the level above the floor:
a) the first phase, before the addition of the apodyterium; b) the second phase, after the addition of the apodyterium

Сл. 7. Реконструкција плана грађевине на нивоу изнад подне равни:
а) прва фаза, пре доградње аподитеријума; b) друга фаза, након доградње аподитеријума

on the way from the frigidarium to the caldarium. However, there are some differences in the construction concept between these prefurnii. The praefurnium of room 3 is built in the same way as praefurnium 1 – across the full width of the heated room, with walls of equal thickness. In contrast, the width of praefurnium 2 is noticeably smaller than the width of the room it heats. Also, praefurnium 2 has slightly thinner walls than the previous two, as well as the front wall with which its construction is separated by the semicircular apse wall. In this way, praefurnium 2 was built as a separate construction in relation to the corresponding apse of room 2, which is not the case with praefurnium 3. Judging by the equal width of praefurnium 3 and the room it heated, they are part of a unique spatial design concept. According to the above, prefurnii 2 and 3 cannot be simultaneous. Judging by the similarity of the constructions, praefurnium 1 and praefurnium 3 would be simultaneous (Fig. 6a), while praefurnium 2 would be a later construction (Fig. 6b).

Some other circumstances indicate the later construction of praefurnium 2. Namely, in the second phase (phase II) of the use of the building, the original block arrangement of the balneum was expanded to the east with the addition of room 9/11. By building the north wall of this room over the south wall of praefurnium 3, this furnace stopped functioning, because there was no more space to support its barrel vault.[73] With these activities, room 3, which was heated by praefurnium 3, was left without a direct supply of hot air in the new solution. At the same time, the new interventions were certainly the reason for the construction of praefurnium 2 at the opposite, western end, different in width and span from the previous ones (Fig. 6b). The new position for the praefurnium was chosen next to a semicircular apse that had not been exposed to direct heating until then. Praefurnium 2 enabled the direct heating of room 2 and indirect heating of rooms 3 and 7. In such a concept of heating, room 7 was the warmest one, room 2 somewhat less so, while room 3 was the least heated among the warm rooms.

The function of rooms 2 and 3 can be determined only in the context of considering the communication of users from the frigidarium to the caldarium. In the first phase, room 3 with the associated praefurnium 3 was closer to the entrance and certainly had a specific function (Fig. 7a). Certainly, room 2 could have served as a tepidarium because it was equidistant from praefurnium 1 and 3. Since the position of the caldarium was precisely determined in room 7, determining room 3 as another caldarium with a tepidarium between the previous two rooms would not make sense. There is, however, a strong possibility that room 3

[73] The purpose of a praefurnium is to perform a protective structure, which is resistant to fire (from the fire itself) and water (from the atmosphere). Such a construction is primarily a masonry vault.

had the function of a specially heated warm room in which the user was anointed with oils. This possibility would be corroborated by the fact that Romans had the custom of undergoing oiling before bathing.[74] However, this thesis does not change the fact that rooms 3 and 7 were the warmest in the first phase of the use of the bath. This arrangement of room functions also had a practical drawback in the first phase, because the user could not adjust the body to the increasing temperature values on the way to the caldarium (room 7). Certainly, this circumstance caused the termination of praefurnium 3 and the construction of the north wall of room 8 on the route of the south wall of the previous, although there was space to avoid such a solution.

When the use of praefurnium 3 was terminated in the second phase of the use of the bath, the hot air in the hypocaust of room 3 could only come indirectly, i.e. from the direction of praefurnium 2. Therefore, room 3 in this phase certainly acquired the role of a tepidarium (Fig. 7b). Since praefurnium 2 began to function directly next to room 2, it could have become another caldarium.[75] Some rooms on the way from the tepidarium to the caldarium were often, by earlier researchers of Roman baths, interpreted as sudatoria – rooms for sweating, which in our case could also apply to room 2.[76] By spilling water on the heated floor of this room, steam rose, which stimulated the sweating of the users and allowed them to get used to the atmosphere rich in vapour in the caldarium.

In the second phase of the use of the bath, after a series of the above-mentioned improvements, the bath in Timacum Minus functioned better than in the first one. The entrance to the block system was established on the east wall of room 8/10, that is, the frigidarium, which at that stage was directly connected to the apodyterium. The position of entrances in most examples of Roman baths is in close relation to the frigidarium. After conversations with some colleagues, the author concluded that there is slight confusion about the location of the entrance in Roman baths. The cause of this is the well-known Pliny's statement, where it is said that after bathing in hot water, bathing terminated with a cold plunge in a frigidarium. If we rely only on that statement, it would be logical to expect that the entrance was placed next to the caldarium room. Excavated examples of Roman baths largely relativize this thesis and indicate that the entrance was located on the opposite side and that the frigidarium was usually closer to or directly leaning on the entrance.[77]

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[74] Yegül 1992, 33.

[75] Two rooms of caldarium were found in Neptune's small baths in Ostia, Velleila, and Philadelphia; Yegül 1992, Figs. 74, 81 and 278. Two rooms of the tepidarium were found in small baths in Derventum, Leptis Magni, Timgad; Yegül 1992, Figs. 77, 279, and 281. Two rooms of indeterminate function with hypocaust constructions that were on the route from the frigidarium to the caldarium were found in small baths in Mirabriga, Cherchel, Volubilis, Humei-Tepe baths in Millet, Constantine's bathroom in Arles, Quasr-al-Hayr: Yegül 1992, Figs. 88, 272, 275, 307, 411 and 427. Several examples with two rooms each between the frigidarium and the caldarium were discovered in Germany. See Krencker et al. 1929, 236.

[76] The Sudatorium (Laconicum) was located at the direction from the tepidarium to the caldarium at Cimiez, the Virgilius baths at Millet, and the Agora baths at Side: Yegül 1992, Figs. 79, 301 and 383.

In science, there is still a vague differentiation between sudatorium and laconicum. According to Vitruvius, the laconicum was intended for sweating inside a dry heated atmosphere, while the sudatorium was used for sweating inside a humid heated atmosphere. Seneca cited the sudatorium in the service of sweating inside a dry heated atmosphere. Apparently, the use of the two terms was fairly free (according to Yegül 1992, 384). According to Vitruvius, every decent Roman bathroom had to have a laconicum, and it was positioned next to the tepidarium (Yegül 1992, 386–389).

[77] The relationship between the frigidarium to the apodyterium and the warm rooms in the region of Moesia Superior is also indicated by Kuzmanović-Novović et al. 2019, 30.

In one Roman bath, the organization of the rooms was usually done so that the caldarium was normally at the opposite end to the position of the entrance. In that way, the entrance was connected to the frigidarium, which provided ventilation and constant cooling of the frigidarium with the outer door. At the same time, the caldarium furnaces (i.e. its praefurnii) were remote from the entrance, which ensured that there was no close contact between the user and the caldarium furnace. Such an organization is represented regardless of the size of the Roman baths throughout the empire. Even in large baths where there was more space to bypass the frigidarium, the communication was resolved so that the frigidarium with the associated pools (tubs) was closer to the entrance than the warmer rooms. For examples in the western provinces see plans at: Yegül 1992, Figs. 74, 76, 77, 79, 82–84, 87–89, 91, 93, 94, 97, 98, 408 and 411. For the examples in north. Africa sees plans at Yegül 1992, Figs. 212, 217, 220, 226, 228, 243, 244, 249, 250, 265, 272, 274, 276, 278–282 and 288. For the examples in Asia Minor see: Yegül 1992, Figs. 300, 307, 336, 341, 343, 344, 346, 350, 351, 355, 359, 360, 383, 384, 401, 403 and 404. For the examples in the eastern provinces see: Yegül 1992, Figs. 414, 416 and 423–427.

The same organization can be seen at the imperial baths in Rome itself, such as Trajan's, Caracalla's, Diocletian's, Maximian's and Constantine's baths, but also outside Rome at the imperial baths of Hadrian's villa in Tivoli, at Villa Piazza Armerina, at the baths in Trier and Licinius in Duga. For examples of imperial baths see Yegül 1992, Figs. 97, 99, 101, 104, 181, 190, 191, 212, 217, 220 and 231.

All the examples have certainly not been given here, but only the more well-known ones, in order to understand the extent of such a solution of communication in Roman baths, as well as the order of certain bathing methods and other activities in maintaining hygiene.

The user moved from the entrance through rooms 2 and 3, adjusting the body to a higher temperature.[78] Therefore, from space 8 it was necessary to enter room 3, with a lower temperature, and from there to the warmer room 2, followed by the use of the hottest room 7 (caldarium). After bathing in the hot water of the caldarium, the user came to the frigidarium on the way back through rooms 2 and 3. In that way, the user adjusted the body again, but this time to a lower temperature. In the frigidarium, the bathing terminated with a cold plunge at the very end of the use of the Roman bath.[79]

Communication within the bath of a reduced block-type is precisely reduced to the direction from the apodyterium through the frigidarium and warm rooms to the hot caldarium. After bathing in hot water, the user would have to go through all the above rooms again in reverse order (Fig. 5b).[80] This kind of movement was valid with the reduced type of small baths arrangement, regardless of whether their rooms were arranged in a row, with a central layout or in a block-arrangement. The difference in communication between the rooms in a row arrangement and the block layout is that the direction of movement in the first solution is set along one line, while in the block-type the communication is performed via a detour.[81] When setting rooms in a row, it is always possible to add an antechamber (apodyterium or palaestra) next to the peripheral walls of the rooms, which would practically play the role of a communication corridor, in case the user wants to skip the use of one of the bath's rooms.[82] Subsequent additions of this type are practically impossible with the block type of room layout.[83]

In the eastern room, as already mentioned, there was no heating installation, but the fragments of frescoes, glass, a large amount of burnt wood and fragments of a roof covering were found. This room certainly served as an apodyterium – which in the modern sense of using the baths can mean a space for changing, storing clothes and cosmetics, as well as a place for storing sports equipment.[84] The apodyterium spaces were often equipped with benches and wooden chests or cabinets for storing things. Larger quantities of burnt wood can be interpreted as remnants of the wooden roof structure, wooden furniture inside the space, but they can also represent the remains of the wooden construction of the walls. The registered remains of the walls of this room are preserved only at the foundation level. A wooden structure on the above-ground level could have been supported on masonry foundations. The remains of a window (fragments of flat glass) indicate that the room was lit from the outside.

When it comes to walls XX and XXI and the space to which the walls belonged, the question of the function of this space must remain open until archaeologists systematically excavate the entire part of the space towards the Beli Timok River.[85]

Regarding the dating of the construction of the small bath in Timacum Minus, from the point of view of architectural remains, bricks with the stamp of *cohort II Aureliae Dardanorum* are indicative. Along the western wall of praefurnium 2, on the inside, a fragmented brick with the stamp *Coh II* was cleaned (Inv. 282). There are no brick stamps among the construction remains of the small bath, which would testify to

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Referring to the accuracy of Pliny's statements regarding the functioning of Roman baths, Yegül pointed out other problems such as the origin of the hypocaust system. Although Pliny claims in his letters that they were founded by a certain Sergius Oratus in the 1st century, Yegül pointed to the fact that archaeological excavations of Roman baths indicated that the invention of the hypocaust was much older. Yegül 1992, 38, 130; Nielsen 1992, 153, Fig. 1; Campbell 2009, 53.

78 It was determined by Yegül 1992 and Fagan that the user had to go through warm rooms to get to the hot water bathing (that is, to the caldarium) precisely because of the adjustment of the body. Fagan 2005, 10; Yegül 1992, 33; Campbell 2009, 53.

79 This pattern of movement was observed almost a century ago by Krencker et al. 1929, 234 b, c, d. It is globally accepted by Yegül 1992a (Yegül 1992, 130–132) and Nielsen (Nielsen 1992, Fig. 1), and in our environment in Romania (Tentea, Burkhardt 2017, 5) and Bulgaria (Petrova 2012, 319, Fig. 26). In our country, this thesis is more common in recent times (Kuzmanović-Novović et al. 2019, 30). We have already pointed out in note 62 that in the example of defining the functions of the rooms in the Roman bath in Timacum Minus by previous researchers, a different way of bathing was considered (Петровић, Јовановић 1997, 24, fig. 22). The deeper reasons for this approach remain unknown.

80 See types of Roman baths at: Krencker et al. 1929, 177–181, Abb. 234 a, b. This typology is accepted by Yegül, Nielsen, and in our environment by Tente and Burkhardt: Yegül 1992, 130–132; Nielsen 1992, Fig. 1; Tentea, Burkhardt 2017, 5.

81 Krencker et al. 1929, 177–181, Abb. 234 a, b, c, d, e.

82 Krencker et al. 1929, 177–181, Abb. 234 a, c, d.

83 Krencker et al. 1929, 177–181, Abb. 234 b, e.

84 Yegül 1992, 34.

85 The rather small thickness of these walls may indicate the existence of a vestibule or a palaestra – a space for physical activity, surrounded by a lighter wall construction. Its position in front of the apodyterium would be similar to numerous plan solutions of Roman baths: Yegül 1992, 37. Since there has been no complete excavation of the terrain towards the Timok River, this possibility remains only an assumption.

the presence of some other military formations.[86] The bricks with the mentioned stamp are one of the important findings that indicate the engagement of the army in the construction of this Roman bath at the end of 2nd century, or during the 3rd century AD. This dating is also in line with the archaeological material. Based on movable archaeological finds from the balneum in Timacum Minus, this building can be dated to the 3rd century, with the possibility that it was erected at the end of the 2nd century and abandoned in the 4th century.[87]

The balneum near the Timacum Minus castrum is so far the only building in this settlement which reliably served as a bath. However, one of the questions is whether it is a bath that is open, i.e. public, or closed, intended for private use? In that sense, modern analyses of the spatial relationship between individual rooms that influence the social behaviour of users are important.

Analysis of the relationship between indoor spaces and the social activities of users in the balneum

With the help of the Analytical Theory of Architecture we seek to understand architecture as a phenomenon, that is, as an organized system, which implies a quantitative representation of qualitative values in architecture.[88] At the same time, the qualitative value of architecture emphasises its influence on social behaviour.[89] One of the methods used by the analytical theory of architecture is the use of spatial syntax and visibility graph (VGA) analysis. Syntax in this case is established as a set of structures based on the relationships and rules of behaviour imposed by a space and it is composed of elementary combinations, elementary objects, relationships, and observations.[90]

For the analysis of spatial syntax and the influence of a space on social processes within the built environment, there have been, for some time, special software platforms, among which the DepthMapX-software platform should be highlighted in this case.[91] The software goal is to obtain variables that indicate the social significance of the space, in this case, the interior of a Roman bath. The use of the DepthMapX-software platform involves the application of groups of operations that consider the relationship between individual spaces, angles, obstacles, individual distances, and the maximum and minimum values in the field of action. The human eye can consider a particular position concerning the rest of the space in which the user operates. The quality of the DepthMapX-software platform is that it observes comprehensively the relationship of all points to the rest of the space, and marks out regions in which there is more or less pronounced social behaviour of users (e.g. communication axes, different regions in which visual communication is expressed and those in which communication is direct, that is, physical). Among the basic values that indicate the type of impact a space has on social action, there are the *isovist area*, *connectivity, visual integration,* and *the mean shortest path*.[92] The analyzed space is divided into several fields (points) over a square grid, respecting the given marked positions of communications (entrances and empty spaces of rooms) and obstacles (walls). Each of the values is measured by the number of influences of individual points to the rest of the space.

An *isovist* is a geometrically limited part of a space, which is directly visible from one position with respect to the obstacles and communications. Through the category of *isovist*, areas of vision (isovist areas) are defined in which it is possible to achieve several different views.[93]

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[86] In earlier archaeological considerations, it was assumed that in addition to the cohort, some part of the legion IIII Flavia was present, based on the fact that in 1977 a small fragment of brick with "four vertical lines" was found. In none of the campaigns that followed, bricks with the seal of the legion IV Flavia were found. However, it should be noted that two bricks with the seal of this legion were discovered in a circular monumental building, located in a settlement north of the imperial palace in nearby Gamzigrad, and dated to the last quarter of the 3rd century (terminus ante quem is Diocletian's administrative reform in 294), which testifies to the engagement of some parts of the legion of IV Flavia in the area of today's eastern Serbia. This information was pointed out by PhD Sofija Petković, whom the author kindly thanks. According to the author, the "four lines" by themselves are not sufficiently reliable data that would indicate the engagement of the second legion, because such lines could be freely derived shapes created by fingerprints on the surface of bricks.

[87] The dating is based on chronologically indicative findings, and not on the entire discovered archaeological material, and should be understood as a preliminary dating. This information was pointed out by PhD Sofija Petković, whom the author kindly thanks. Also, according to previous knowledge, the civil settlement of Timacum Minus, outside the castrum walls, existed from the middle of the 2nd to the last quarter of the 4th century – Petković, Ilijić 2012.

[88] Hillier 2007, 40–41.

[89] Turner 2002, 487.

[90] Turner et al. 2001, 104.

[91] Al Sayed 2014, 30.

[92] Varoudis 2014, 298.

[93] Benedict 1979, 47.

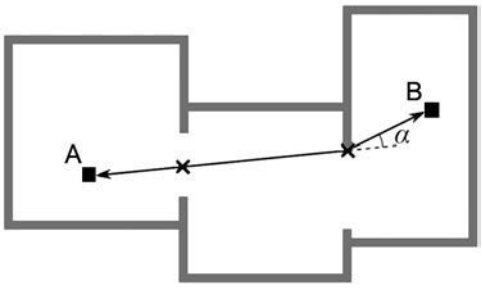

Fig. 8. Visual Mean Shortest Path between points A and B defined by a black solid line (according to Behbahani et al. 2017, Fig. 1)

Сл. 8. Визуелно ӣлавна најкраћа ӣуӣања (Visual Mean Shortest Path) између ӣачака A и B, одређена црном ӣуном линијом (ӣрема: Behbahani et al. 2017, Fig. 1)

Connectivity represents the number of direct connections that individual points in space have with each other. This value directly indicates the availability of information that the user receives when moving from one space to another. Less information implies a slower user movement when he moves to the next part of the space because he has to visually look for new information before moving again to the target room. In this case, the amount of information that the user will receive in the next radius of action is limited. Within the circular plans of a space (for example semicircular apses), there is less loss of information concerning other parts of the room, while when moving from one rectangular shape to another there is more loss of information, due to the visual obstruction of certain parts of the space (e.g. corners).

Visual integration determines how well the spaces are visually interconnected.[94]

Visual Mean Shortest Path (Fig. 8) is defined by the ratio of the number of steps that one needs to cover the entire space to achieve visual accessibility of each location with respect to other spaces in the building. Visual Mean Shortest Path is directly proportional to the number of changes (i.e. the number of combinations) of directions of action (e.g. movements), and the steps are proportional to the depth of view.[95]

The described categories were tested through the DepthmapX software in the case of actions within the bath space in Timacum Minus (Figs. 9 and 10, Table 1). In doing so, two phases of the use of the building were considered: before the addition of the apodyterium and praefurnium 2 (phase I) and after (phase II). The detour movement of users in the older phase I was considered, together with the improvement of the specific social interrelationship among the users of the bath achieved by adding a larger room in the eastern part of the building in phase II.

In the first phase, the most important spaces in terms of connectivity were rooms 2 and 3 (Fig. 9). The directness of the DepthMapX software platform is already obvious in this step, as small values are read in the obstruct corners in terms of *connectivity* values. Due to the small difference in the traces of the walls between rooms 2 and 7 and between rooms 3 and 8/10, better *visual integration* occurs in room 2 than in room 3, although in both rooms it is significantly better than in the starting room room 8/10 and ending room 7. The low values of this category show that the last two rooms were poorly visually connected with the rest of the bath surface, which affected greater privacy in these rooms. Also, the possibility of a longer stay of individual users in the solitude of the bath is certainly greater. From a position where the values of *visual integration* are very high, the user is in a better position to see the space and further communicate in it. At the same time, these positions are attractive to other users, as a result of which they have the greatest opportunity to meet. Very low values for the *Visual Mean Shortest Path* were found in rooms 2 and 3, which indicate the unfavourable impact of such a space on direct communication.

After the addition of the eastern room 9/11, in phase II, the communication becomes more complex (Fig. 10). The size of this room means that the highest *connectivity* value is achieved at the entrance between it and the next room, while on the way to the caldarium this value loses its significance in respect to the extended part. The size of room 9/11 also means that *connectivity* within it has much higher values than in any other room of the older western part.

The *Visual Integration* value of phase II indicates that a strong communication route is formed in the direction from the southern doorpost between rooms 9/11 and room 8/10 to the northern doorpost between

[94] Rohloff et al. 2009, Ref. 094: 03–05

[95] Varoudis 2014, 298; Turner 2003, 663.

Fig. 9. Graph of Connectivity, Visual Integration, and Visual Mean Shortest Path of the first phase of the Roman bath in Timacum Minus

Сл. 9. Графикон повезаности, визуелне интеграције и визуелно главне најкраће путање за прву фазу римског купатила у Тимакум Минусу

Fig. 10. Graph of Connectivity, Visual Integration, and Visual Mean Shortest Path of the second phase of the Roman bath in Timacum Minus

Сл. 10. Графикон повезаности, визуелне интеграције и визуелно главне најкраће путање за другу фазу римског купатила у Тимакум Минусу

Scenario		*Node Count*	*Isovist areas*	*Connectivity*	*Visual integration*	*Visual Mean Shortes Path*
Phase I	Min	8709	38723	385	5.69243	0.177216
	Aver.		304402	3041.31	12.7979	0.642961
	Max		476249	4655	21.2936	1.852
Phase II	Min	15103	38723	385	4.89504	0.264558
	Aver.		499210	4989.83	11.1056	0.70025
	Max		820569	8207	20.1978	2.33818

Table 1. Overview of DepthMapX values of space impacts on social behaviour

Табела 1. Преглед DepthMapX вредности утицаја простора на друштвено деловање

rooms 2 and 3. Reducing the communication to this route indicates that the *visual integration*, that is, the visibility between the individual spaces in this phase is much smaller than the previous one, which can be seen through the values given in Table 1. This route is also the direction in which the low values of the *Visual Mean Shortest Path* are distributed because along it a shorter movement time is needed to achieve visual communication with the rest of the space. At the same time, the privacy in the caldarium (room 7) is much higher in phase II than before.

The quantitative values of this analysis indicate that the internal space of the bath became less visually connected with the extension of the bath by room 9/11. The block arrangement previously dictated the privacy of its users, but with the eastern addition on the building, the privacy in the block part only became more increased. The only part of the bath that could

have served the greater socialization of its users, in general, is room 9/11, which explains the higher degree of decoration (the presence of frescoes and glazed windows). Many authors have pointed out the greater degree of decorative elements in apodyteria in smaller Roman baths.[96] In this respect, the results of the analysis fit with the identification of the apodyterium at that position in the bath.

All qualitative data expressed here from the quantitative analyses of the DepthMapX software platform affect the conclusion that the integration of individual spaces in the block arrangement was very low. As a result, the degree of user socialization in the Roman bath in Timacum Minus had to be very small.

Classification of the Roman bath in Timcum Minus, analogies and the origin of the architectural concept

The ancient Roman bath on the left bank of the Beli Timok River, northeast of the Timacum Minus fortress, with its area of 240 m², belongs to the Roman baths of smaller dimensions. According to the widely accepted terminology, it could be primarily defined as a balneum[97].

Previous computer analyses indicate that the interior arrangement of this building did not significantly contribute to the social relationships, which is characteristic of *thermae*. Architectural and archaeological remains indicate that this building was not characterised by pronounced luxury, but, following its proportions, was more modestly equipped. Other details observed at this facility also correspond to the characteristics of a balneum. Based on all the above-mentioned, a balneum such as ours at Timacum Minus is characterised by the characteristics of military balneae and the context in which they were erected. According to Campbell's assessment, balneae were rarely erected inside the castrum walls, because due to the constant need for pronounced thermal changes inside these buildings, there was a danger of fire and its spread to the interior of the camp.[98] This is why Roman baths of this type were more often near the castrum. The process of bathing in military balneae was mostly reduced to maintaining hygiene: oiling, sweating, and washing in cold and hot pools.

It was a different case with the legionary baths that were part of larger fortifications. The number of facilities, the large rooms, and the luxury of the legionary military baths were similar to those in the city's civilian baths in Italy, which directly affected the different social connections of their users.[99] In large baths, the bathing process, in addition to the activities already described, included maintaining physical condition and maintenance in the gym, swimming in larger pools, sunbathing in solariums, exposure to dry and wet sweating, education and refreshments of food and drink, which led to many meetings of their users and better social cohesion.[100]

Smaller in size and with a restricted number of activities, the military balneae of the castra were characterised by less pronounced social connections among their users. This was exactly the case with our example, as previous analyses of the influence of the spatial organisation on the social behaviour of users have shown.

The military balneae of the castra were, to some extent, open to other sections of the population, especially when there were no other baths near the castrum. The openness of the smaller military balneae was also valid for women, so it is not surprising that items like earrings or glass bracelets have been found among the remains of the balneae in Timacum Minus.[101] There are many examples of epigraphic inscriptions that con-

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[96] In the case of Roman baths on the territory of Moesia Superior, see Kuzmanović-Novović 2019, 30 (with references).

[97] In some cases, the difference between a *balnea*e and a *thermae* is unclear. DeLaine pointed out certain shortcomings of the theory of I. Nielsen regarding her division into private and public baths (DeLaine 1993, 348–349). Yegül warned that from the user's point of view, the use of the terms of the *thermae* and *balnea* had no rigid rules for the Romans. According to him, balneae as well as well as thermae were public in the sense they were open to all (Yegül 1992, 43). Recently, Marechal has been dealing with the problems of the terminology of *thermae* and *balneae*, as well as separate rooms within those objects (Maréchal 2015, 140, with references). The general currently accepted standpoint in archaeology is that the *balneae* were small-sized baths, equipped more modestly, with a small number of rooms and facilities. As such, they served, more often, smaller communities, while *thermae* serviced larger populations.

[98] Cambell 2009, 52.

[99] Revell 2007, 231–235.

[100] Revell 2007, 235; Yegül 1992, 33–40.

[101] According to Fagan, there is evidence that in some Roman baths the regime of use was divided into periods during the day (Fagan 1999, 4), although in many cases the joint bathing of men and women was a matter of personal choice (Fagan 1999, 34). Nielsen also points to certain situations when women and men bathed together, according to ancient writers (Nielsen 1993, 195–203). Whitmore devoted a chapter in her dissertation to the findings that testify to the presence of women in military baths (Whitmore 2013, 242–244).

firm that the term *balneum* is used for the type of objects with the above-mentioned characteristics. Their distribution has been traced throughout the Roman Empire.[102] Their context of erection (the period and the position of the building toward the castrum) is the same as in Timacum Minus. There is also written evidence of the use of the term balneum in ancient times for smaller thermal facilities near military fortifications, regardless of whether they had a block or line type of room arrangement. Most of the testimonies have been preserved in the form of epigraphic inscriptions about the restoration of the balneae themselves throughout the empire.[103] In our territory, findings of such epigraphic inscriptions are rare.[104]

However, in most of the mentioned examples of balneae, apart from the position relative to the castra and the size of the baths themselves, there are certain differences in the architectural structure concerning the bath in Timacum Minus. There is a difference in the spatial relationship between the individual rooms, the communication paths, then the number, shape, and position of the bathtubs, as well as the number and position of the furnaces. The stated details within the reduced solutions of the block type of baths rarely exist in examples of Roman baths of castra. Therefore, the question arises of the origin of details in the architectural layout of the military balneum in Timacum Minus.

The answer to this question cannot be found in chronologically or territorially close analogies.[105] On the territory of Moesia Superior, there are no discovered balneae to date that have been identified as Roman military baths of the reduced block-type. Analogies of block-type thermal baths in the area of Moesia Superior are very rare, especially when it comes to reduced types of solutions. There are only a few smaller baths whose affiliation could be attributed to the block-type, and these are primarily balneae in Guberevac – Pruten, Žujinci, and in Porečka Reka.[106] However, according to the context of construction, spatial organisation, and the communication paths between individual rooms, the listed thermal objects differ from the object analyzed in this paper. At the same time, the buildings in Žujinci and Porečka reka are younger than the building in Timacum Minus and belong to the 4th century.[107] The thermal facility in Timacum Minus is a rare example of a reduced block-type, whose construction is reliably dated to the period before the end of the 3rd century. From this period, there are no reliably dated balneae on the territory of Moesia Superior with which our balneum can be compared. Therefore, the analysis of the architectural origin of the balneum in Timacum Minus must inevitably spread beyond the territory of Moesia Superior.

The analysis of the spatial structure and the presence of certain forms in the plan in other military balneae on the territory of Southeast Europe show that the situation is very similar. For example, on the territory of today's Romania, in addition to a large number of researched military baths next to castles, there are several examples that, according to the plan, have similarities with the balneum in Timacum Minus, but the differences in the above-mentioned details are greater.[108] The closest analogy to the spatial structure and applied shapes in the plan of the building is located at the site of Cumidava – Râșnov (Brașov), but the relative position of this balneum and the castrum is different from the bath in Timacum Minus (Fig. 11).[109]

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[102] Petrova 2012, 317.

[103] Examples are represented by castra of similar size on the territory of present-day Britain (Risingham, Bowes, Cliburn Church, Bearsden), Germany (Neckarburgen, Jagsthausen, Walldürn), Romania (Micia near Vetel), and Libya (Thenadassa near Ain Wif). Campbell 2009, 53–56; Revell 2007, 231, 235.

[104] The cause of the small number of preserved epigraphic inscriptions that testify to balneae on the territory of Serbia primarily lies in the general state of research of military fortifications and the small number of explored military balneae. Among the most famous are the inscriptions from Viminacium and Diana, and they were also recorded in Smederevo and at the Episcopal Church in Singdinum (?) – Јеремић, Гојгић 2012, 22 (with older literature); Kuzmanović-Novović et al. 2019, 26 (with older literature). In the area, the mention of the balneum was recorded in Domavija (near today's Srebrenica, BiH) and in today's Zvornik (BiH). Radimsky 1892, 15, 16.

[105] Janković 2012, 29.

[106] Величковић 1958, sl. 3; Bulatović, Kapuran 2008, sl. 2; Petrović 1982–1983, 288–289, sl. 6; Јеремић, Гојгић 2012, 22–26; Janković 2012, Figs. 4 , 5 and 7.

[107] Firstly, the communication paths towards the warm and hot rooms and their relation to the space of the frigidarium are different. In Guberevci–Pruten and Žujinci, the length of the apodyterium room was equal as the sum of the widths of the individual rooms that were exposed to heating, while the frigidarium was often reduced only to the pool area. This way of determining the plan of the balneum was otherwise common on the territory of Moesia Superior (Јеремић, Гојгић 2012, 22–26). In contrast, the block plan of the balneum in Timacum Minus implied that the rooms were created by dividing one rectangular surface with two or three walls into a plan with four rooms.

[108] Inlăceni, Hargita; Drajna de Sus, Prahova; Pietroasele, Buzău (Tentea, Burkhardt 2017, 25, 51, 53).

[109] In addition to the fact that the function of the building has not been confirmed with any certainty, the example in Cumidava was built inside the castle walls. Ţentea, Burkhardt 2017, 35.

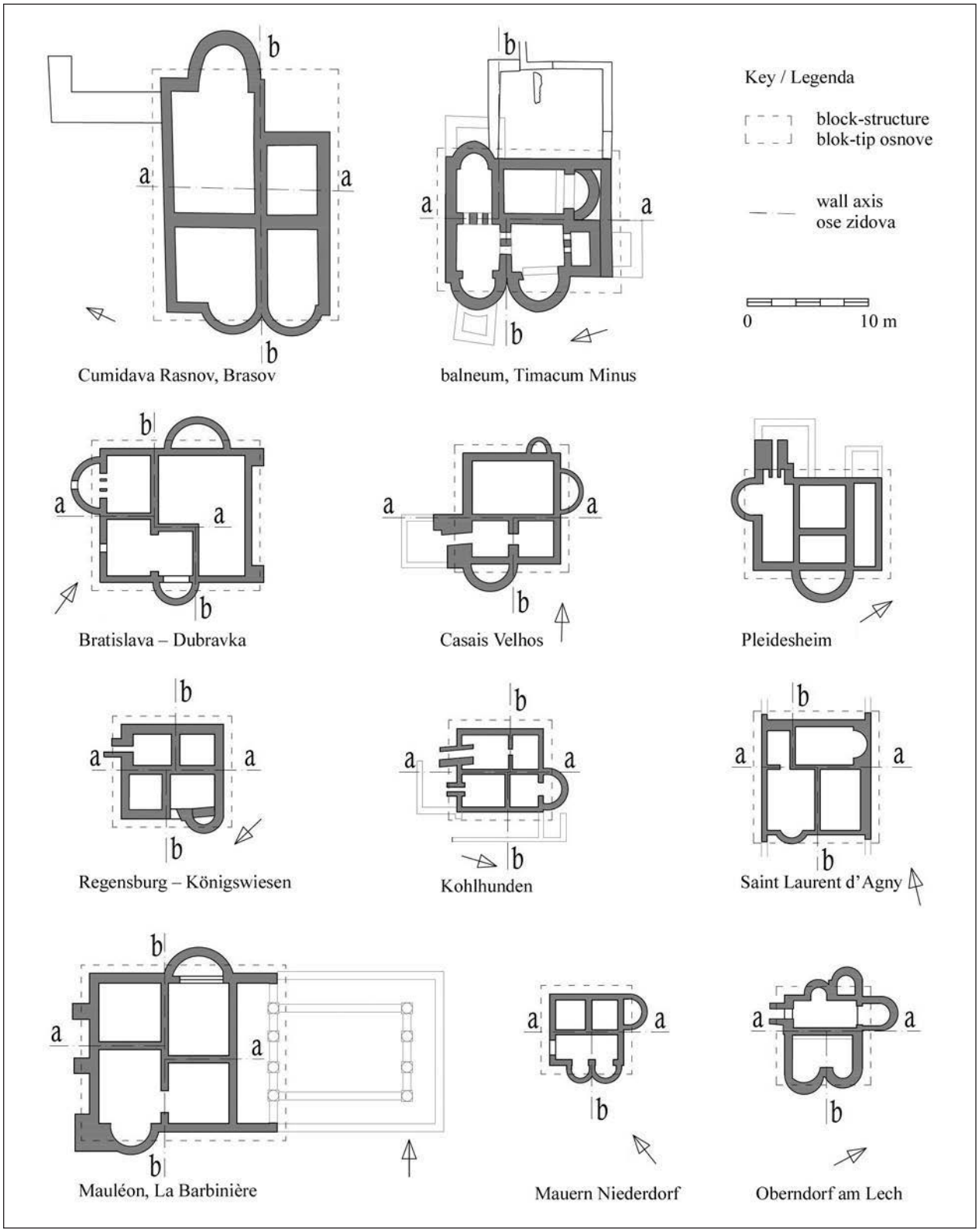

Fig. 11. Examples of block-type balneae plans closest to the plan of the Roman balneum in Timacum Minus (according to Ţentea, Burkhardt 2017, 35; Sedlmayer 2017, Abb. 1, Abb. 2)

Сл. 11. Примери блоковског типа решења балнеума најближих плану римског балнеума у Тимакум Минусу (према: Ţentea, Burkhardt 2017, 35; Sedlmayer 2017, Abb. 1, Abb. 2)

On the territory of the European part of the Roman Empire, there are several examples of reduced block-type balneae, most of which belong to *villae rusticae* from the sites of Pleideshaim (Retia, 2nd–3rd century), Casais Velhos (Lusitania, 2nd–3rd century), and Bratislava – Dúbravka (Pannonia, 2nd–3rd century) (Fig. 11). These examples are similar to the arrangement in Timacum Minus, but in some details there are quite different shapes and different positions of the rooms and tubs intended for cold, warm and hot bathing. The solutions of these details are specific for certain provinces and periods.[110]

The greatest similarity between the block-type baths with the balneum in Timacum Minus exists on the border of the Upper Rhine and the Danube (the southern part of the province of Germania Superior and western Raetia). Here, reduced block balneae are regionally and chronologically specific. Their resemblance to the balneum in Timacum Minus in the solutions of certain details is remarkable. The tubs in these examples are usually semicircular in their plan. Two semicircular tubs along one side of the building are present on the plans of the reduced solutions of block types of baths in the area of the province of Raetia (e.g. at the Mauern Niederdorf site (end of the 2nd century and the beginning of the 3rd century) and the Oberndorf am Lech site (1st–2nd century). The existence of the semicircular tubs of this type within most of the small number of rooms of the balneum caused apses of these buildings to be arranged along two or three facades, as is the case with the balneum in Timacum Minus. These examples of block-type balneae also belong to *villae rusticae*.[111]

According to Sedlmayer, the differentiation of individual block-type balneae throughout the provinces of the Roman Empire was also performed according to the position of the walls.[112] Within some examples of these baths, the inner transverse and longitudinal walls retain their directions along their entire route. However, several examples of baths have been observed where one or both inner walls have shifted directions (directions a–a and b–b, in Fig. 11). The type of balneum in Timacum Minus belongs to solutions where one inner wall retains a continuous direction (a–a), while the route of the other is shifted at contact with the first wall (b–b). Such examples are found at sites in Raetia: Regensburg-Königswiesen (2nd–3rd century), Bondorf (last quarter of the 2nd century), Kohlunden (2nd–3rd century), and in Gaul, Saint-Laurent d'Agny (1st century), Mauléon – La Barbinière (1st–3rd century) (Fig. 11). These balneae belong to rustic villas.

The individual spaces in the above examples are usually obtained by dividing the unique space of the block plan using the routes of the inner walls into a smaller number of rooms (three to four rooms). The details like forms of bathtubs in the rooms, then apses arranged along two or three facades, and the shifted routes of the inner walls are also common with the Roman bath in Timacum Minus. According to the above, this balneum shares many common features with the Roman baths located in the area of southern Germania Superior and western Raetia. The absence of similar solutions on the territory of Moesia Superior and in its surroundings, as well as all previous observations, indicate the possibility that the creator of the balneum plan in Timacum Minus could have come from these areas.[113]

Conclusion

Although among the researched Roman baths on the territory of Serbia there are examples that belong to the block type, there is no reduced spatial arrangement among them such as there is inside the building in Timacum Minus. Therefore, on our territory, this balneum represents, for now, an exceptional appearance of a reduced solution of the block-type, as well as one of the oldest examples of Roman baths in our area.[114]

With the inner walls of a transverse and longitudinal direction, the block plan is divided into four rooms. Among these rooms, only one was used for cold bathing, while the others were supplied with hypocausts, bathtubs, and hot water heating systems. The frigidarium (room 8/10) and caldarium (room 7) have been

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[110] For example, according to Traxler and Kastler, reduced solutions of block types of baths with square shaped tubs (without semicircular apses) are mostly present in the province of Noricum, regardless of whether it is bathing in cold or hot water. On the territory of Norikum, semicircular tubs either do not exist or are combined with a rectangular one. Traxler, Kastler 2012, 325–327; Sedlmayer 2017, 358.

[111] Sedlmayer 2017, 363.

[112] Sedlmayer 2017, 365.

[113] Details regarding the construction of the balneum in Timacum Minus point to the conclusion that most of the masons were of local origin, due to the similarities observed with the manner of construction in Roman baths on the territory of Moesia Superior and in its immediate surroundings.

[114] For the dating of this bath in respect to the other examples of balneae see Janković 2012, 29.

reliably identified. Although rooms 2 and 3 served as warm rooms to accustom users in the transition from the frigidarium to the caldarium, their precise function could have been somewhat different in the first and second phases of the use of bath. This circumstance was caused by the termination of the eastern praefurnium 3 and the establishment of the new western praefurnium 2. The interventions performed in the second phase indicate that the new builder tried with the new solutions to suppress the poor functioning of the balneum in the first phase. The termination of the old and the building of the new praefurnium affected the degree of heating in the warm rooms so that the user could gradually adapt their body to the different temperature. A change in the floor level was also registered in the frigidarium pool, which was previously at the level of the hot pool in the adjacent caldarium.

After some time, the block arrangement was expanded by adding room 9/11. Inside room 9/11 there are no remains of bathtubs or systems intended for floor or wall heating. Due to the size, spatial relationship to the rest of the building plan, and the manner of internal decoration and, above all, due to the access to the older block complex, this room certainly served as an apodyterium.

With a reduced size and arrangement, and a restricted number of activities, the architecture of military balneae directly influenced different social phenomena within castrum such as Timacum Minus, than the baths of larger fortifications. The analysis of social behaviour in the block-type military balneum in Timacum Minus indicates a small degree of user interaction. The small social interaction within the part of the block arrangement of the balneum, which was established in the first phase of functioning, was additionally reduced in that part by the addition of the apodyterium in the second phase. Somewhat greater social interaction was provided inside the apodyterium room.

The balneae of a reduced block-type arrangement are a rarity in Southeast Europe. Among the examples from the region, the balneum from Timacum Minus has the closest analogy at the site of Cumidava – Râșnov (Brașov) in Romania. On the other hand, block-type examples of Roman baths occur more often in Central Europe, some of which have great similarities with the balneum in Timacum Minus.

Reduced block-type arrangements of Roman baths are generally very rare in Europe, except in the area of the Upper Rhine and the Upper Danube. A great similarity can be found, above all, among the block-type baths from the area of southern Germania Superior and western Raetia with the one in Timacum Minus. At the same time, most of the listed examples from Central Europe date from the period from the middle of the 1st to the middle of the 3rd century. These baths could be an older model for the architecture of the somewhat younger or contemporary balneum in Timacum Minus. That is why the territory of the Upper Rhine and the Upper Danube is proposed as one of the possible places of the origin of the Roman chief builder of this balneum.

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Block-type Military Balneum in Timacum Minus (145–172)

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БЛОК-ТИП ВОЈНОГ БАЛНЕУМА У *TIMACUM MINUS*-у

Кључне речи. – римска купатила, блок-тип балнеума, Timacum Minus

Приликом археолошких истраживања у периоду 1975–1980. откривени су остаци римског купатила на око сто метара североисточно од кастела. Према концепцији просторног плана објекта, јасно се издвајају два дела – источни и западни. Анализом конструктивних елемената тих делова утврђено је да западни део представља старију фазу а источни део млађу фазу римског купатила.

Западни део купатила подељен је унутрашњим попречним и подужним зидом на четири просторије које су опремљене кадама за купање. Три просторије имале су хипокаусте, а у четвртој нису постојале инсталације за грејање. Та последња просторија имала је функцију фригидаријума, док су преостале три имале функцију топлих просторија (калдаријума, тепидаријума и, извесно, лаконикума).

Источни део купатила састоји се од једне веће просторије у којој није било када за купање или инсталација за грејање. У њеним остацима затечено је више фрагмената фресака, стакла, кровног покривача и изгорелих дрвених конструкција. Према просторном односу између ове просторије и старијег западног дела утврђено је да је она морала имати функцију аподитеријума.

Софтверском анализом унутрашњег просторног склопа римског купатила испитиван је утицај архитектуре на социјално понашање корисника. Посебно су анализиране визуре, повезаност, визуелна интеграција и могућност визуелног дефинисања најкраћег директног пута при комуницирању између појединачних просторија. Утицај ових категорија на непосредну физичку и визуелну комуникацију указује на то да се овај објекат у свом западном делу одликовао ниском вредношћу социјалне повезаности. Источни део римског купатила (аподитеријум) карактерише већи утицај на социјализацију корисника. Генерално, степен интеграције појединачних простора у целину јако је мали, што упућује на то да је и степен социјализације унутар римског купатила на Timacum Minus-у био веома низак.

Просторни однос између појединачних просторија у старијем западном делу одређује припадност плана првобитног решења типу блоковског склопа римских купатила. Према површини коју заузима, степену унутрашње декоративности и социјалне интеракције коју простор објекта дефинише, римско купатило у Timacum Minus-у дефинише се као балнеум. Просторна концепција овог римског купатила јединствена је на територији Србије према специфичној сажетости решења блоковског склопа. На тлу југоисточне Европе постоји мали број сличних решења, у којима се могу препознати и извесне разлике у архитектонским детаљима. Највећи број сличних решења блоковског типа балнеума регистрован је код вила рустика на подручју горње Рајне и горњег Дунава (тј. античке Германије Супериор и Западне Реције).