# DISSERTATIONES ARCHAEOLOGICAE



ex Instituto Archaeologico Universitatis de Rolando Eötvös nominatae



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## The fort of *Ad Mures* (Ács, Komárom-Esztergom County, Hungary)

## New investigations on the northern section of the *ripa Pannonica*

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**Abstract:** The Roman auxiliary fort of *Ad Mures* (Ács-Bumbumkút, Komárom-Esztergom County, Hungary) has recently been studied intensively using geophysical surveys and a planned excavation by the team of the Institute of Archaeological Sciences of the Eötvös Loránd University. The paper presents the preliminary results of these investigations, focused

on the layout of the fort and the relative chronology of the site, based on the data collected during the 2023 excavation. Results indicate several analogies with the fort of *Ad Statuas* (Ács-Vaspuszta).

Keywords: ripa Pannonica, auxiliary fort, Ad Mures, geophysical survey, Roman building techniques

#### Location and research history of the site

The Roman auxiliary fort of *Ad Mures* (Ács-Bumbumkút) is located on the lowest alluvial terrace of the Győr–Tata terrace region, on a bluff of the Danube, 1 km west of the estuary of the Concó Stream. The neighbouring military camps are the fort of *Ad Statuas* (Ács-Vaspuszta), less than 6 km to the west, and the legionary fortress of *Brigetio* (Komárom-Szőny), 15.5 km to the east (Fig. 1).



Fig. 1. Part of the northern section of the *ripa Pannonica* with permanent Roman garrisons and roads (map by B. Simon)

No intensive research has been carried out on the site of the fort since it was identified in the 19th century. M. Berkovics-Borota, R. Gyulai, L. Barkóczi and D. Gabler tried to determine the extent of the fort through field surveys,<sup>1</sup> while Zs. Visy attempted the same using archival aerial reconnaissance photos.<sup>2</sup> The only documented excavation on the site was carried out by S. Petényi in 1989, but the results have not yet been published. During this campaign, some wall sections of the rectangular early and the fan-shaped late Roman towers were unearthed in the south-eastern corner of the fort. Besides, Petényi excavated 70–80 cm high wall remains from the phases when the fort was built in stone and also some earthen walls of the earliest earth-and-timber fort and opened trenches cutting through the surrounding ditches (*fossae*) belonging to different periods.<sup>3</sup>

#### Brief description of the results of the geophysical surveys

In 2022 and 2023, a team of the Institute of Archaeological Sciences of the Eötvös Loránd University conducted magnetometer and ground penetrating radar (GPR) surveys on the territory of the fort.<sup>4</sup> The GPR survey was carried out in three sessions on 29 March 2022 and 2 and 16 March 2023, cover-

1 For a summary of the work of M. Berkovics-Borota and R. Gyulai, see FRÖHLICH 1887; for an overview of the work of D. Gabler and L. Barkóczi, see FITZ 1976, 28–29.

- 3 Archaeological documentation by S. Petényi, stored in the repository of Kuny Domokos Museum (Tata, Hungary): 2013-5 Ács, Bumbumkút 1989.
- 4 The detailed results and the methods of the geophysical survey and the topographic investigations of the fort are planned to be published in another article.

<sup>2</sup> VISY 2000, 27.

ing a total area of 4,200 m<sup>2</sup>. Focus areas within the site were selected to obtain as much information as possible about the fort's topography with reduced cost and time investment.<sup>5</sup>

The results of the GPR survey provided enough data for planning an excavation. We succeeded in identifying the early and late Roman north-western corner towers, the western (*porta principalis sinistra*), southern (*porta decumana*) and northern (*porta praetoria*) gates, the walls of the fort, and some building remains inside the fort. Our goal was to reconstruct the layout of the stone fort and collect new data regarding the inner buildings (Fig. 2). Not only could the extent of the fort be determined, but the late Roman ditch (*fossa*) also became visible through the photogrammetric processing of the analysed military reconnaissance photos.<sup>6</sup>



Fig. 2. Reconstructed extents of the stone fort of *Ad Mures* on a digital elevation model based on the results of the 2022–2023 GPR surveys (map by B. Simon)

#### Circumstances and layout of the 2023 excavation

The excavation, led by Bence Simon, was carried out by the team of the Institute of Archaeological Sciences of the Eötvös Loránd University, Department of Classical and Roman Archaeology. Field-work focused on the western part of the auxiliary fort, especially the north-western corner towers and the western gate. Six trenches were laid out based on the results of the GPR survey in the hope

- 5 GPR data were processed by Zsombor Klembala. A MALA GX GPR equipped with a 450MHz antenna was used for GPR mapping the target areas. Survey data were collected in a rectilinear grid with a 0.5 (x) and a 1 m (y) spacing, respectively, every 2.5 cm along the line of direction. The maximum penetration depth was around 3 m.
- 6 Photos were downloaded from: https://www.fentrol.hu/en/search/tag/1975-0015; Lechner Nonprofit Kft. (last access: 01. 05. 2023).

that their excavation would help clarify the chronology and the condition of the site and, besides, shed light on the history and connections of the troops stationed there. The trenches were numbered in ascending order from north to south. Trench 1 ( $7.5 \times 5$  m) was opened at the north-western corner of the fort, while Trench 2 ( $15 \times 2$  m) covered some building remains detected south of the corner (Fig. 3). The northern tower and the entrance of the western gate were investigated in Trenches 3 ( $8 \times 1.5$  m) and 4 ( $5 \times 1.5$  m). Trench 4 was expanded 3 m to the west during excavation. The linear anomaly in the foreground of the fort wall was studied in Trench 5 ( $3 \times 1.5$  m), while the wall itself in Trench 6 ( $5 \times 1.5$  m; Fig. 4).

Preceding the actual fieldwork, which started on 14 April 2023, the topsoil was removed with a backhoe loader.<sup>7</sup> The top of the archaeological layers in Trenches 1 and 2 appeared at a general depth of 80–100 cm, while the remains of the fort's wall became visible only 50–60 cm below the surface. In Trench 2, the expected walls in the eastern part were also found at a depth of 70 cm. The topsoil was the thinnest in Trench 6, where only a 20 cm thick layer covered the wall remains.

Altogether, 158 stratigraphic units (SUs) were recorded in the area of the fort, of which 134 were excavated. Most unearthed features could be dated to the Roman Period, while some Late Bronze Age (Urnfield culture) layers were also discerned (it is possible that upon cleaning the prehistoric findings collected there, some may prove to be of Early Iron Age origin). On the last day of the excavation, a backhoe loader filled the trenches, and the field was returned to the owners.



Fig. 3. Excavation trenches marked out based on the results of GPR survey in the area of the north-western corner towers (by B. Simon)

7 Every two days, metal detectorists working with the Kuny Domokos Museum attended the excavation, ensuring that all possible metal items were collected.



Fig. 4. Excavation trenches marked out based on the results of GPR survey in the area of the western gate (map by B. Simon)

#### Prehistory

Prehistoric features were detected in Trenches 2, 4, and 6; besides, stray finds were found in the fill of several features in Trenches 3 and 5. Trench 6 contained a burnt, ashy layer with daub that was also visible in the eastern profile. This layer also contained a rectangular posthole and a smaller, round stake hole. The edges of the feature have been discerned in the trench, which did not cover it fully. In Trench 4, the Roman road leading into the fort ran over a rectangular Late Bronze Age semi-sunken building filled with pottery, daub, and bigger, rounded river rocks possibly used for grinding corn (Fig. 5). A burnt, red layer on top of the building's fill indicated a younger feature, probably a fireplace. The longer side of the building extended to about 200 cm; its north-western corner was found near the northern profile of Trench 4.

A dark-brown, yellow-patchy layer in a sondage in Trench 2 was also cut through. It yielded some black, slightly glossy Urnfield-style pottery dec-



**Fig. 5.** Semi-sunken Bronze Age building in Trench 4 (photo by R. Olasz)



**Fig. 6.** Orthophotos of the excavation on the GPR survey image with interpretation. The area of the north-western corner of the fort (by B. Simon)



Fig. 7. Orthophotos of the excavation on the GPR survey image with interpretation. The western gate of the fort (map by B. Simon)

orated with indented dots. The extent of the feature could not be determined. The fill of the ditch accompanying the Roman road in Trench 4, the earlier *fossa* of the stone fort in Trench 5, and the ditches of the dismantled walls of the northern gate tower contained a mix of Roman and Prehistoric pottery fragments.

#### Roman Period

#### **Buildings**

The earliest Roman features were two earthen walls, probably belonging to the buildings of the earth-and-timber fort (Figs 6–7); they were cut by the stone walls of the younger fort and the trenches opened to quarry their stone material. Based on the GPR survey, the 50 cm wide main northern wall of a building with multiple rooms was identified in Trench 2 (Fig. 8). It was unearthed in the eastern two-thirds of the trench. While the rising wall, made from flat stones set into clay, could only be observed in a small section, its foundations could be discerned at more points. The 50-55 cm deep foundation comprised four layers, the lowermost of which was made from rounded river rocks embedded in clay, with a row of yellow mud-bricks on top, followed by another layer of river rocks, and, finally, topped by another row of mud-bricks (Fig. 9). Unfortunately, the floor of the building could not be identified.

A quite similar wall foundation and the corner of a building came to light in the eastern part of Trench 3; they were cut by the foundation of the wall of the northern gate tower of *porta principalis sinistra*. While the foundation of this wall, made from flat stones embedded into clay, was dismantled down to the bottom course of stones, it appeared quite high in the eastern profile. Based on the GPR image, this wall continues at least another 5 m north parallel to the fort wall.

The corner of a building with walls built from flat stones embedded in yellow clay was identified above the mud wall's foundation in the eastern part of Trench 2. The feature probably belongs to the younger building period of the stone fort (Fig. 10). The internal face of the 40 cm high, 55 cm wide wall was plastered with a thin layer of yellow clay (no traces of such finish could be



Fig. 8. Wall foundation of a building of the earthand-timber fort in Trench 2 (photo by B. Simon)



**Fig. 9.** Profile of the wall foundation of a building from the earth-and-timber fort in Trench 2 (photo by D. Hümpfner)



Fig. 10. Corner of a building of the stone fort above the remains of the earlier fort in Trench 2 (photo by B. Simon)







Fig. 12. External face of the fort's wall in Trench 1 (photo by B. Simon)



Fig. 13. The fort's wall and the remains of the Bronze Age features right of it in Trench 6 (photo by B. Simon)

observed on the other face). The floor of this building could not be identified either. A mixed dark brown and red fill layer was detected west of the north-south branch of this wall. It contained the most beautiful findings of the excavation: brooches, a lamp fragment, and a glass vessel. The northsouth wall, built from unworked stones, bricks, and river stones, ran parallel to the eastern side of the wall mentioned above. As it was found 25 cm higher than the wall section north of it and they did not connect, this wall probably belongs to a younger building phase (Fig. 11). No floor remains were detected next to this wall either.

#### Fortifications and the road

The fortifications of the first stone fort could be identified in all trenches. Its remains were in rather good condition in Trench 1, where the fort's wall gradually turned to the south. A 70 cm high part of the rising wall was preserved only in the north-eastern corner of the trench. The average width of the foundation and the slightly thinner rising wall was 120 cm. Both were made of a mixture of mortar and coarse gravel (*opus caementitium*), while a layer built from rectangular stone blocks laid in horizontal courses fortified the outer side of the rising wall (Fig. 12). Although the bottom of the foundations was not reached in Trench 1, its total thickness (130 cm) could be measured in Trench 6. The fort wall section in Trench 2 was dismantled for building material. A 60 cm long eastern section branched off the wall in Trench 6; its function has remained unclear (Fig. 13).



**Fig. 14.** Walls from different building phases in Trench 1. The wall in the top left corner could not be assigned to any identified building phase with certainty (photo by B. Simon)

The rectangular, north-western, inner corner tower from the first building phase of the stone fort (in Trench 1) was erected at the same time as the wall. The tower's white, chalky mortar floor has been destroyed almost completely: only a palm-sized part remained in place on the level at the top of the wall foundation beside the eastern profile of the excavation trench. A new 130 cm wide concrete wall was built on the eastern side of the earlier tower wall, probably in the Late Roman Period; the function of the new wall could not be determined (Fig. 14).



Fig. 15. Profile of the fort's earlier fossa in Trench 2 (photo by B. Simon)

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Trench 3 was opened to investigate the northern tower of the western gate; however, only the 120 cm wide wall foundations (but no floor or rising walls) were found there under the bottom of the trenches opened to quarry stone from the walls. The foundation of the entrance between the two towers was also dismantled, and the fill of the foundation trench contained a huge carved stone slab with a straight side. West of the entrance, the gravel and yellow clay layers of the Roman road and a shallow 'V'-profile ditch accompanying it in the north were identified.



**Fig. 16.** External face of the wall of the Late Roman tower in Trench 1 (photo by B. Simon)

Sections of the ditch (*fossa*) of the first stone fort period were observed in Trenches 2 and 5. A section of a roughly V-profile ditch was unearthed only 3 m west of the fort's dismantled wall in Trench 2. The upper layer of the fill of this ditch consisted of regular stone blocks, stones, and mortar, while under it, a separate layer of brown, sandy, loose soil was discovered (Fig. 15). The trench was about 2.5 m wide and 220 cm deep from the present surface. Its outline could not be discerned on the surface in Trench 5, but its V-shaped profile was clearly outlined in the southern profile wall at the subsoil level. Its fill also contained several stones, mortar debris, and some prehistoric pottery fragments (as mentioned above). The bottom of the *fossa* was 150 cm below the present surface.

In the Late Roman Period, a fan-shaped tower was built at the north-western corner of the fort; its entrance was unearthed in Trench 1. Later, a pit was dug into this part of the tower, almost completely destroying the Roman Period destruction layers. While removing the topsoil layer above the pit, a 1699 silver *Kreuzer* of Leopold I was found there; however, it does not necessarily date the feature, as the fill of that yielded no other early modern finding. The rising walls of the tower were built with a similar technique to the fort, with a row of rectangular carved stone blocks on the outer side, three courses of which have been preserved in the northern wall (Fig. 16).



Fig. 17. Timber construction in the northern wall of the Late Roman fan-shaped tower (photo and drawing by B. Simon)



Fig. 18. The hole left by one of the wooden beams that reinforced the wall of the Late Roman tower in Trench 1 (the south-eastern view, photo by Á. Müller)



Fig. 20. Organic residue in the filling of the beam hole after its opening in Trench 1 (photo by B. Simon)



Fig. 19. Imprint of a tree's growth rings at the end of the northern beam-hole in Trench 1 (photo by B. Simon)



Fig. 21. Depression under the southern wall of the Late Roman tower in Trench 1 (photo by Á. Müller).



**Fig. 22.** The Late Roman tower's destruction layer in the north-western corner of Trench 1 (photo by Á. Müller)

A hybrid construction was uncovered there: the four-Roman-feet- (118.5 cm) wide wall was reinforced by a pair of large wooden beams set parallel at the thirds of its width and fastened together with at least one crossbeam. No such structure is known from any other late Roman fortification in Pannonia. The pair of beams extended 30-40 cm onto the previously built fort wall, where they were joined by a crossbeam (Fig. 17). Based on the shape of the holes left behind by the decaying wood, the beams were rectangular, about 12 cm wide and 6 cm high (Fig. 18). The mortar at the eastern end of the northern beam preserved the imprint of the tree's growth rings; this was removed successfully for further analysis (Fig. 19). During excavation, only the eastern ends of the grooves were discovered first; after documenting them, the mixture of mortar and stones covering them was carefully removed to collect samples for further scientific analyses and understand the structure of the construction. Thus, the timber structure became visible in the whole area of the trench, and the brown residue of the decayed wood could be collected (Fig. 20). The beams provided horizontal reinforcement, which could prevent the wall from moving vertically. The reason why the builders applied this mixed technique has not yet been fully understood but is probably connected with the structure of the subsoil: where the bottom of the pit (mentioned above) reached the base of the wall foundation, the sand under the wall had sunk 30-40 cm, forming a depression that continued for at least 3 m to the west (Fig. 21). A similar depression was detected under the fort wall in Trench 6.



**Fig. 23**. *Imbrex* with the stamp of the *legio X Gemina* recovered from the destruction layer of the Late Roman tower (photo by R. Olasz)



Fig. 24. Skeleton of a child in Trench 1 (photo by R. Olasz)

A chalky, relatively hard layer, probably the floor of the tower, was identified on the inner side of the wall where the pit had not destroyed the original layers. That was covered, in line with the projection of the magnetometer survey, by a dark brown layer with charcoal and a pile of debris of broken roof tiles in the north-western corner (Fig. 22). A coin of Gratian (AD 375–383) was found amongst the *imbrices* and *tegulae*. Judging from the debris, the fan-shaped tower of *Ad Mures* at the time of its destruction was covered, like the fortress of *Ad Statuas* (Ács-Vaspuszta),<sup>8</sup> with tiles bearing the stamp of the *legio X Gemina*, stationed in *Vindobona* (Fig. 23).

The skeleton of a child, laid to rest stretched on its back without any grave goods, was discovered in the southern part of Trench 1, at the junction of the early tower and the fortress wall (Fig. 24).

## Summary of results

Although the western part of the fortress survived in relatively good condition, the lack of floors and the considerable disturbance (which may not necessarily be related to modern activity) were obvious. The planned excavation has achieved its goal, as at least three construction periods have been identified in Trenches 1 and 2, even if their absolute chronology remains untangled. Another important finding concerning the history of the fort and the borders of the provinces is the discovery of roof tiles bearing the stamp of the *legio X Gemina* in a similar archaeological context to the ones in *Ad Statuas* (Ács-Vaspuszta). In addition, the excavation confirmed all features expected from the geophysical prospection.

Thanks to the geophysical prospection and the excavation, the precise layout of *Ad Mures* could be reconstructed for the first time. According to the results, the north-south and east-west dimensions of the fort were  $123.5 \times 106.5$  m, which can also best be compared to the fort of *Ad Statuas* ( $112 \times 106$  m).<sup>9</sup>

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