Observations on the Construction System of the 18th Century Bastion Fortification in Timişoara

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The old medieval city of Timişoara was built in an area where the numerous intersections of the arms of the Rivers Timiş and Bega formed a wetland that was not very easily accessible. This natural advantage, together with geopolitical and economic factors, determined and marked in time the development of the city and its fortifications.[1]

Documentarily mentioned in 1177 (indirectly) and in 1266 (directly), the medieval city of Timişoara was probably built earlier than that.[2] It can be surmised that in the first phase, the "City of Timiş" was much smaller, its old perimeter being probably located between Hunyadi Castle and Liberty Square.[3] With the enthronement of King Charles Robert of Anjou, a new stage began in the urban and military development of Timişoara. Between 1307 and 1315, the Hungarian king built, south of the city, a castle which served as Hungary's royal residence for a period.

After the Ottoman conquest, Timişoara became the residence of the pasha; in military terms, the fortress ranked second after the city of Belgrade.[4] The famous Turkish traveler Evliya Çelebi (1611–1682), who visited Timişoara several times (between 1660 and 1664), described the city as a turtle lying in water. The enclosure wall of the city was made of tall oak and elm trunks, arranged in two rows, the space between the two rows being filled with a beaten mixture of cement, lime and clay, "fifty feet, and in some places even sixty feet"[5] wide (about 19 m and, respectively, 23 m). Without battlements and watchtowers, the wall had numerous openings for the 200 cannons that made up the city's artillery in the second half of the 17th century.[6] At the beginning of the 18th century, their number decreased by almost one quarter; at the onset of the 1716 siege, the Ottoman artillery park of Timişoara comprised 156 cannons of heterogeneous production.[7]

After the conquest of Timişoara by Eugene of Savoy, the ancient city walls were hastily repaired by the hydro-technician engineer André La Casse, and after that, a new fortification, of the bastion type, was designed.[8] The new fortress, whose construction began in 1723,[9] was considerably larger, covering an area of 138 hectares (if the glacis prohibited for constructions is also included).[10]

The canalization works started by the imperial administration[11] allowed the building of a new town and of modern fortifications, envisaged to represent a strategic

point of the Habsburg Empire. The Bega River was integrated into the defensive system of the city, becoming a natural barrier in front of the walls, in the eastern, southern and western parts of the city *(Plate I/1)*.

The new fortification had a star layout, of the Pagan type, being built of burnt brick[12] in several stages, between 1732 and 1790.[13] The fortification system of the town was composed of three belts of burnt brick walls. The enclosure wall of the city had nine bastions, each being protected by two rows of inter-connected star-shaped fortifications (counterguards), and three-meter deep moats, which, if necessary, could be filled with water from the Bega.[14] The defense system of the city was completed with mines buried in the ground, as emphasized by Count Teleki Domokos in his travel letters from 1794.[15] Timişoara was home to a garrison of 30,000 soldiers.[16]

The durability of the modern fortification was tested in 1849, when the Hungarian revolutionary troops besieged the Austrian imperial garrison. During the 114-day long siege, the city walls were seriously put to the test, Timişoara being on the verge of surrender.[17]

This huge military construction was largely demolished between 1892 and 1910[18] (or 1914).[19] A few fragments of the enclosure wall have been preserved in Mărăşti Square (the Botanical Park), the I. C. Brătianu Square (the Theresia Bastion II) and the 700 Timişoara Square (part of the Eugene of Savoy Bastion VII).[20]

The intense edilitary activity from the second half of the 20th century and the early 21st century has uncovered many traces of Timişoara's urban past.[21] Preventive archaeological research conducted in 2011 on the objectives City Business Center (Building D) and the 700 Square—"The 700 Square underground parking area"—brought particularly important information concerning the construction system of the 18th-century bastion fortification, in the area of Counterguards I and VII, which protected Bastion VII ("Eugene of Savoy"). The preserved height of the foundations in the archaeologically investigated sectors was between 1.10 m and 1.70 m.

Based on the archaeological research carried out so far, we can reconstruct the building stages of the 18th-century bastion citadel from the area of the future underground parking lot. The outer fortifications of the Eugene of Savoy Bastion VII (Counterguards I and VII) followed the letter "V" of the bastion tip, which is oriented to the west.

The fortification was built by accurately laying out the future moat, the soil excavated from it being deposited between the massive brick walls that surrounded Counterguard I, sealing the traces of the Palanca Mare suburb (Plate I/2). This is suggested by the presence of human skull fragments discovered in the filling of the cunette (lenses no. 51–52) in the moat of Counterguard VII, a sector built right on top of this necropolis. When the fortifications were torn down, the same soil from the filling was used to fill the cunettes and the moats.

The same system can be supposed to have been used in building Counterguard VII, its emplecton coming from the moat behind Counterguard I, whose rear slurry wall became the counterscarp of Counterguard VII. The depth of the moat around Counterguard I was around 1.20 m from the treading level existing at the time when the Palanca Mare suburb was abandoned as a housing area.

To prevent the crumbling of the exterior moat walls (the counterscarp of Counterguard I), a wall was built that respected the construction technique of the bastion fortifica-

tion. The brick structure of the counterscarp was built on massive wooden beams and had, at its base, a width of approximately 1.50 meters. The counterscarp foundation had straight walls, the parament toward Counterguard I starting 0.50 m from the base of the wooden substruction, leaning slightly toward the glacis. At this level, the wall had a thickness of approximately 1.35–1.40 m.

Under the brick wall, a wooden substructure was uncovered, which had the appearance of a railway network, consisting of longitudinal beams and girders placed perpendicularly upon them, at equal intervals (Plate I/3). The longitudinal beams did not have standardized measures, their length ranging from 5.90 m to 7.90 m. However, when the longitudinal beams were arranged in pairs at the basis of the foundation, they were grouped by equal lengths. The equal size of the beam pairs indicates that their length was adjusted on site. Like the girders, the longitudinal beams were placed head to tail, by trimming their ends.

The gaps created by combining the longitudinal beams with the girders had dimensions of approximately 1.20 by 0.70 m, being filled with bricks set on edge, directly on the live soil. Above the bricks set on edge there was a row of whole and fragmented bricks, bound with mortar *(Fig. 10)*. To ensure greater rigidity, thinner brick shards were used in the gaps. They were struck along the beams, towards the inside, as well as around the ends of wooden pillars, struck down vertically, which supported the wooden substruction of the brick wall. From this row of bricks up, the bricks which formed the wall scarp were laid.

Under the longitudinal beams, but also under the girders, pillars were struck in three parallel rows, their role being that of providing more stability to the brick wall foundation. This building technique, both of the counterscarp and of Counterguard I, has only been documented in the southern half of Counterguard I (the City Business Center research sector, Building D), an area in which, most likely, the land was swampier.

Before each of the counterguards there was a moat whose width was about 18 m. In the middle of the moats, there were arranged flooding cunettes which, in case of a siege,[22] were filled with water from the Bega *(Plate III/1)*. Communication between the cunettes was facilitated by the existence of connecting passageways, like that found in Precinct B, sectioned through the brick walls that enclosed the external fortifications of the city *(Plate III/2)*. To prevent access from one sector to another, these passageways were blocked by pillars beaten in clay that allowed only the passage of water *(Plate III/3)*. The traces of stagnant water in the moats were captured in all the profiles documented by preventive archaeological research. In the northern part of Counterguard I, the connecting passageway was protected by a brick structure leaning against it, in the shape of the letter "U," whose southern side also represented the closing wall of the counterguard. The walls of this structure flanked the connecting passageway between the cunettes.

At its base, Counterguard I was about 29 m wide (including the slurry); the width of the clay and beaten soil emplecton was about 26 m. The slightly tilted scarp was reinforced from the inside with somewhat regularly arranged buttresses, the distance varying between 4.50 m and 5.10 m.

Archaeological evidence only allows an estimate of the height of these walls. The emplecton piece of Redan II, preserved in the eastern profile of Precinct B, suggests a height that exceeded 3.20 m from the basis of the moat.

Unlike the southern sector of Counterguard I, where the wooden foundation footing was attached to poles thrust into the ground *(Plate IV/1)*, in the northern half, the wooden substruction of Counterguard I was deposited directly on clay *(Plate VI/2)*. It may well be that this construction difference was due to the different terrain, the groundwater level being probably higher on the southern side.

Differences can also be detected in the construction system of the buttresses. While on the southern side (City Business Center 4), the abutments were based on a wooden substructure over which the wall foundation was built (though without fixing pillars), on the northern side (The 700 Square underground parking), the buttresses were built directly on clay *(Plate IV)*. The buttresses leaning against the outer wall of Counterguard I and Redan II, of trapezoidal shape, had a rectangular basis, unlike the abutments of the wall that surrounded the rear of Counterguard I. Here, some of the abutments had a widened basis, shape like a footing.

The differences found in the building technique of the wooden substruction of Counterguard I are also noticeable in the mode of attaching the buttresses. On the wall surrounding the rear of Counterguard I and the scarp wall of Redan II, the abutments were combined organically with the wall substruction. In the northern half of the investigated fortification segment, the scarp wall buttresses of Counterguard I were attached after a part of the wall elevation was built, the connection to the wall being made at various heights. This lack of rigor may be explained either by the presence of two teams of workers that worked simultaneously (one on the wall, the other on the buttresses) or by the speeding up of the construction, which caused some deviations from the quality standard noticed in the southern half of the same fortification segment.

Represented on some maps as separate sectors, Redan II and Counterguard I were organically connected by the wooden substructure that supported the foundation. The only difference in the building technique was the brick threshold that marked the boundary between the straight wall of the foundation and tilted wall forming the scarp. While the scarps of Counterguards I and VII and of Redan II had a demarcation threshold consisting of a row of bricks arranged horizontally, with the width outward, the threshold of the slurry wall from the rear of Counterguard I and the walls flanking the connecting passageway between the cunettes consisted in a row of bricks that were laid on edge, with the width on the outside.

Particularly interesting from the point of view of the construction is the redan top found in the immediate vicinity of the north-east corner of Precinct B *(Plate VI/1)*.[23] As far as it was visible when the digging was done, the wooden structure was made of 0.22 m thick massive beams, trimmed at the joints. In the area of intersection, the ends of the longitudinal beams forming the wooden substructure of the redan exceeded the wall alignment by approximately 40 cm *(Plate VI/2)*.

Above the wooden structure, there appears to have been built a platform with a single row of bricks. The brick foundation with vertical walls, which was built over it, had a rounded tip.

Above the top of the brick foundation, at a height of about 0.80 m from the first row of bricks, the scarp elevation continues with three massive blocks of porous yellow sandstone.[24] The sandstone blocks were carefully hewn; the inner walls are straight, while

the outer walls are slightly oblique, respecting the slope of the scarp brick parament. The block that overlaps the redan tip was rounded, following the bend of the brick structure. The blocks have a length of 1.05 m, a width of 0.55 m and a thickness of 0.35 m.

After the dismantling of the fortification, some of the bricks from Redan II were recovered. The land was then leveled; in the filling of the scarp wall of the redan tip, there have been discovered fragments of porcelain ware (some marked), as well as vials from the early 20th century, from which substances have been sampled.

In the south-eastern corner of Precinct B, when the waterproofing concrete wall of the underground parking lot was built, the scarp of Counterguard VII was destroyed.[25] The rest of the wall has been preserved in the southern and eastern profiles, which marked the limits of the construction perimeter.

The few observations that have been conducted have revealed that the foundation of Counterguard VII was built directly on clay, without a wooden substructure. The scarp wall appears to have suffered considerable subsidence, which caused the fracturing of the bricks lengthwise. This subsidence was probably caused by the marshy land, as well as by some qualitative deviations from the building materials. This hypothesis is suggested by the presence of the half bricks in the construction, as well as by the poor quality mortar that enabled some of the bricks to be pulled off with bare hands. Another cause of the subsidence of the facade could be the "filling" of the scarp, which explains both the lack of unity in the brick layout and the distancing of the first row of bricks on the façade from the rest of the wall.

The scarp wall of Counterguard VII was dismantled in the process of recovering and reusing the bricks, as suggested by the flat level at which the ripping off of the bricks stopped. The demolition of the counterguard was abandoned at a depth of 2.60 m from the current treading level.

In the moat between Counterguards I and VII, there emerged the flooding cunette for sieges. The cunette was located 8.20 m behind the rear wall parament of Counterguard I, the distance to the scarp of Counterguard VII being slightly smaller (approximately 6 m). The cunette width was about 2 m, with a maximum depth of 0.66 m from the base of the moat. The blue clay which marks the trenching contour of the cunette unmistakably indicates, at least in this part of the moat, the permanent stagnation of the water.

When the fortification was dismantled, the cunette and the moat were filled with the emplecton of Counterguards I and VII.[26] In the profile carried out, there have been identified 73 lenses of clay and soil of different colors and consistencies, comprising pottery fragments from the 17th-18th centuries, animal bones and the skull fragments derived, undoubtedly, from the necropolis that was disturbed when the fortifications were built.[27]

Preventive archaeological research to be conducted when Building E of the City Business Center complex is erected will contribute substantially to the knowledge of the manner in which the last line of fortifications around the city of Timişoara and the Palanca Mare suburb was built, its traces being preserved sealed by the filling from the walls of the bastion fortification.

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Translated into English by Carmen-Veronica Borbely

Notes

1. Relevant for the strategic importance of the city is Ottendorf Henrik's account: "the Turks themselves say about Timişoara that he who took Buda acquired nothing but a town; however, he who took Timişoara, acquired an entire country." Ottendorf Henrik, *De la Viena la Timişoara, 1663. Von Wien auff Temeswar: 1663*; *Becstől Temesvárig: 1663*; *Od Beča do Temišvara: 1663* (Timişoara: Banatul-Artpress, 2006), 16.
2. Borovszky Samu, ed., *Magyarország Vármegyei és Városai. Temes vármegye* (Budapest, 1914), 1–2; Mihai Opriş, *Timişoara. Mică monografie urbanistică* (Bucharest: Editura Tehnică, 1987), 10; Ioan Munteanu, Rodica Munteanu, *Timişoara. Monografie* (Timişoara: Mirton, 2002), 37; Mihai Opriş, *Timişoara. Monografie urbanistică*, vol. I, *Descoperiri recente care au impus corectarea istoriei urbanisitice a Timişoarei* (Timişoara: Brumar, 2007), 25.
3. Opriş, *Monografie urbanistică*, 26 note 27.
4. Costin Feneşan, "Artileria cetăţii Timişoara la 1716: The Guns of the Fortress of Timişoara (Temesvar) in 1716," *Analele Banatului*, Serie Nouă, *Arheologie-Istorie* 20 (2012): 246.
5. M. M. Alexandrescu-Dersca Bulgaru, Mustafa Ali Mehmet, eds., *Călători străini despre Ţările Române*, vol. VI, (Bucharest: Editura Ştiinţifică şi Enciclopedică, 1976), 496–497.
6. Ibid., 497. The wall construction technique and the presence of the artillery were mentioned somewhat more succinctly by Henrik Ottendorf, a member of the delegation led by Baron von Goes (1663), who had the role of mediating a meeting with the Pasha in Belgrade, as well as of identifying the Turkish military objectives. Ottendorf, *De la Viena*, 12.
7. Feneşan "Artileria," 248. The inventory of the cannons in Timişoara city shows that the fortress artillery comprised mainly small caliber cannons (120 pieces).
8. Buruleanu Dan, Florin Medeleţ, *Timişoara: Povestea oraşelor sale. The Story of its Towns* (Timişoara: Mirton, 2004), 20. Over 2,000 people were mobilized for cleaning and restoring the city. Jancsó Árpád, *Istoricul podurilor din Timişoara* (Timişoara: Mirton, 2001), 27.
9. Feneşan, "Artileria," 252.
10. Buruleanu, Medeleţ, *Timişoara*, 20.
11. The first drainage and water-course regulation works occurred around Timişoara during the first decades of Austrian imperial administration. The considerations that led to this decision were both military and economic. By the year 1727, four channels had been dug, partially accomplishing the canalization of the Bega River, and millions of cubic meters of earth were brought on the remaining terrains, exposed by the receding waters. New spaces were thus created for both housing and industry. The canalization works were extended in the upper Bega area between 1727 and 1733. Zărnescu Alexandru, "Pagini din istoria alimentării cu apă a oraşului Timişoara," *Tibiscum* 3 (1974): 186; Kakucs Lajos, *Contribuţii la istoria agriculturii din Banat: sec. XVIII–XIX* (Timişoara: Mirton, 1998), 88; Jancsó, *Istoricul*, 27. According to other researchers, the canalization of the Bega was built between 1728 and 1732. Ibid., 24–25; Buruleanu, Medeleţ, *Timişoara*, 20.
12. The standard size of the bricks is 32 cm x 16 cm x 8 cm.
13. V. Capotescu, *Arhitectura militară bastionară în România*, vol. I, *Cetatea Timişoarei* (Timişoara: Bastion, 2008), 163.
14. Buruleanu, Medeleţ *Timişoara*, 20.
15. Teleki D., Éder Z., Tamás Zs., *Egynehány hazai utazások leírása* (Budapest: Ballassi Kiadó, 1993), 50.
16. Ibid.
17. Almost all the buildings in the City were damaged, 139 being completely destroyed (Munteanu, Munteanu, *Timişoara*, 79-80). Equally great destructions were recorded in the new suburbs of Timisoara, destroyed especially by the artillery of the city. Opriş, *Mică monografie*, 84.
18. Buruleanu, Medeleţ *Timişoara*, 20; Nicolae Ilieşiu mentions that "in 1891 the military authorities allowed the gates to be torn down to the ground." Nicolae Ilieşiu, *Timişoara. Monografie istorică* (Timişoara: Planetarium, 2003), 59.

19. Munteanu, Munteanu, *Timişoara*, 190-191.
20. The remains of the bastion fortifications of Timişoara have featured on the Historical Monuments list since 2010 (TM-I-s-A-06050; TM-II-a-A-06103; TM-II-m-A-06103.01; TM-II-m-A-06103.02; TM-II-m-A-06103.03).
21. Unfortunately, this edilitary activity, carried out in the name of progress rather than of culture, has most of the times vitiated preventive archaeological research.
22. The existence of the cunettes featuring on the military maps of Timişoara in the 18th -19th centuries has been archaeologically attested for the first time.
23. The redan tip was a singular discovery in Timişoara and was proposed for conservation and inclusion in the tourism circuit; however, through an irresponsible decision of the builder, the fragment of the historical monument was dislodged and deposited by the museum.
24. Two other large sandstone blocks have been ripped from the wall structure during the builder's unauthorized digging initiatives.
25. The destruction of the wall fragment that formed the scarp of counterguard VII was unfortunately authorized by the curator who, at that time, provided "archaeological expert assistance" from a distance. The Archives of the Banat Museum, Timişoara, note no. 1404 of 28.06.2011: Mircea Mare, Alexandru Szentmiklosi, *Raport de cercetare preventivă în situl "Timişoara-Piaţa 700." Fortificaţia bastionară de sec. XVIII*.
26. This archaeological evidence is reinforced by the historical sources. Geml József (1858–1929), royal notary and mayor of Timişoara (1914–1919), noted that the filling from the bastions was mostly used to fill the defensive moats (Borovszky, 1914, 125, *s.v.* Geml J.).
27. Alexandru Szentmiklosi, Andrei Bălărie, "Contribuţii la cunoaşterea evoluţiei oraşului Timişoara la sfârşitul evului mediu. Cercetările arheologice preventive din suburbia Palanca Mare" (Contributions to the Knowledge of the Evolution of the Town of Timişoara at the End of the Middle Ages. Archaeological Preventive Investigations within the Suburbs of Palanca Mare). *Analele Banatului*, Serie Nouă, Arheologie-Istorie 20 (2012): 214.

Abstract

Observations on the Construction System of the 18th Century Bastion Fortification in Timişoara

After the conquest of Timişoara by the Austrians, the new Habsburg administration started building a 138-hectare bastion fortification. he new Pagan-type fortification was built in several stages, between 1732 and 1790. This huge military construction was largely demolished between 1892 and 1910 (or 1914). Preventive archaeological research conducted in 2011 around the objectives City Business Center (Building D) and the 700 Square—"The 700 Square underground parking area"—brought particularly important information concerning the construction of the 18th-century bastion fortification system, in the area of Counterguards I and VII, which protected Bastion VII ("Eugene of Savoy"). Future research, which will be conducted when the construction of Building E in the City Business Center complex is carried out, will contribute substantially to the knowledge of the manner in which the last line of fortifications around the city of Timişoara and the Palanca Mare suburb was built: its traces are preserved, having been sealed by the filling from the bastion fortification walls.

Keywords

Timişoara, the 18th-century, fortification, building techniques, rescue archeology.

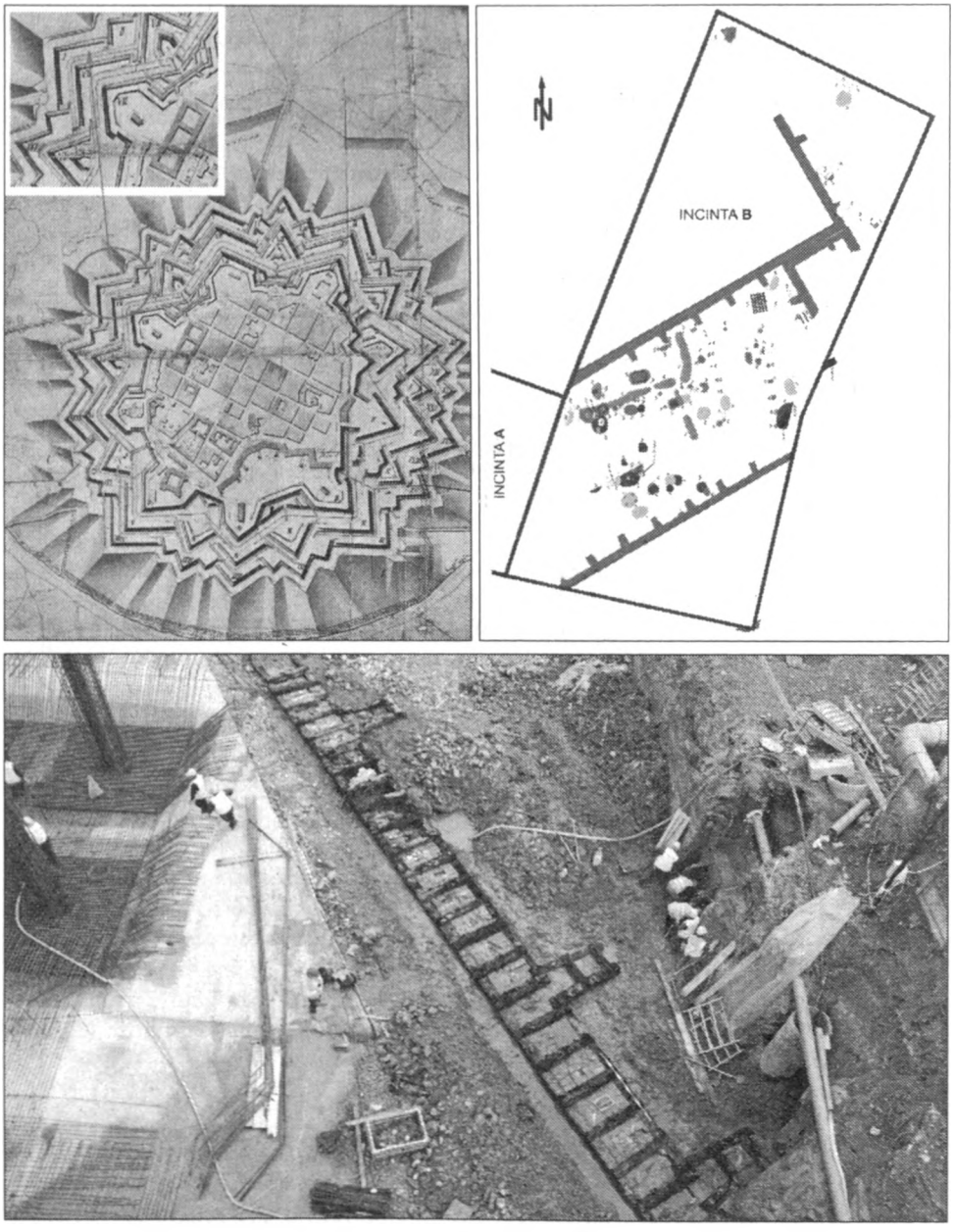
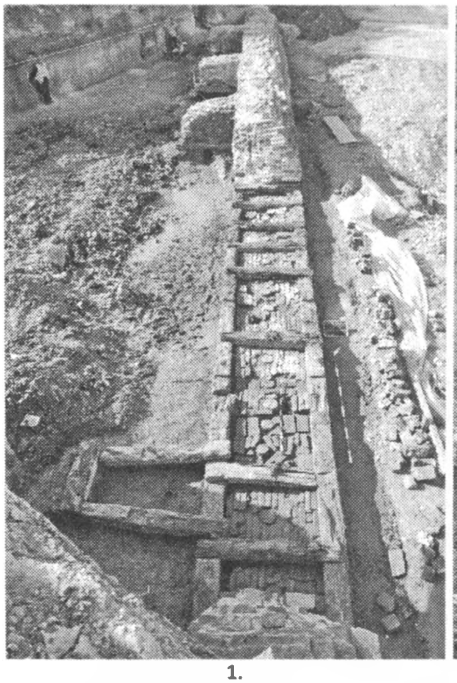


Plate I: 1 – The map of Timişoara city in 1808 (with detail. sector of Counterguard I and Redan II); 2 – Archaeological complexes belonging to the Palanca Mare suburb in the 700 Square underground parking area; 3 – The wooden substructure of the brick foundation from the counterscarp of Counterguard I.



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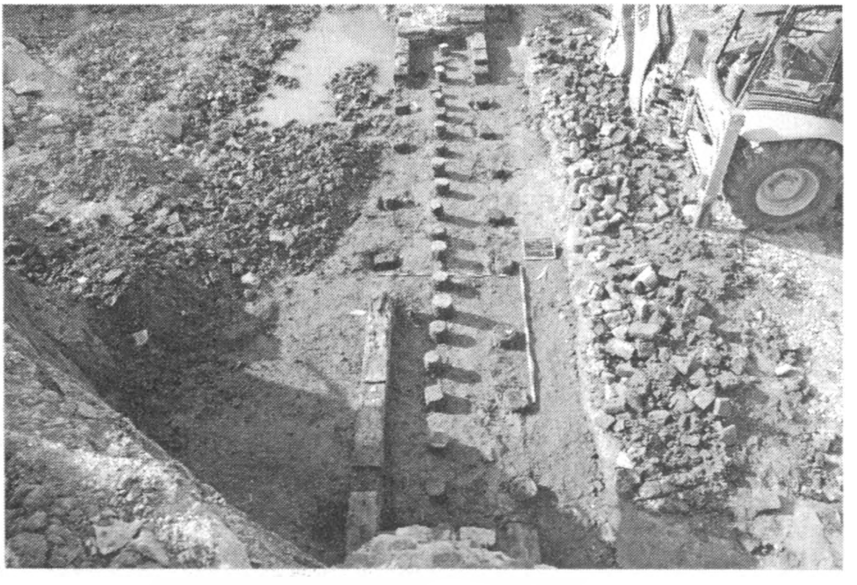

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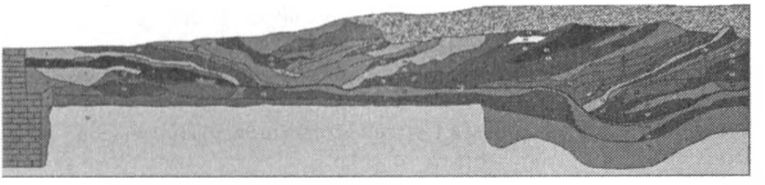
Plate II: 1 – The counterscarp of Counterguard I; 2 – The layout of the brick bed from the counterscarp foundation; 3 – The pillars supporting the wooden footing of the counterscarp foundation.



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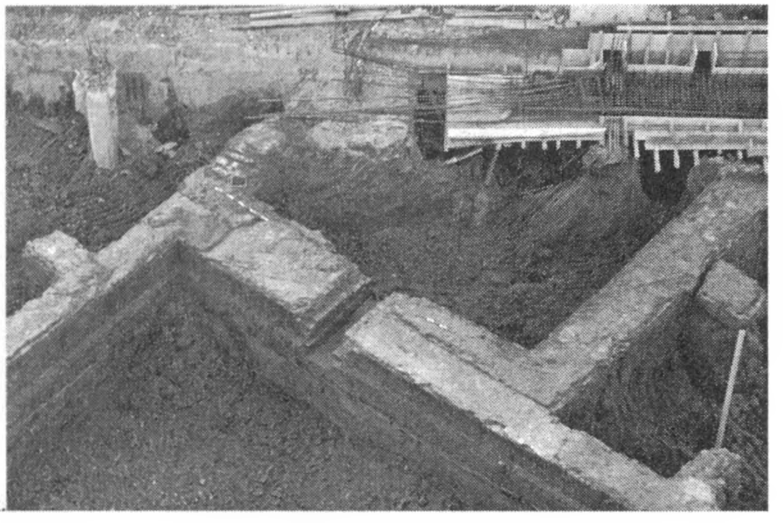

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Plate III: 1 – The digitized profile of the ditch defense in front of Counterguard I; 2 – The connection between Counterguard I and Redan II with the flooding channel of the defense moat; 3 – Detail of the pillars blocking the access through the canal.

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Plate IV: 1 – The wooden substructure mounted on pillars in the southern half of Counterguard I (City Business Center, Building D); 2 – The wooden substructure directly on the yellow clay, in the northern half of Counterguard I (The 700 Square underground parking area).

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PLATE V: 1 – The unitary construction concept of Counterguard I and Redan II; 2 – Fragment from the scarp of Counterguard VII, destroyed by the construction of the waterproofing wall for Precinct B (The 700 Square underground parking area).

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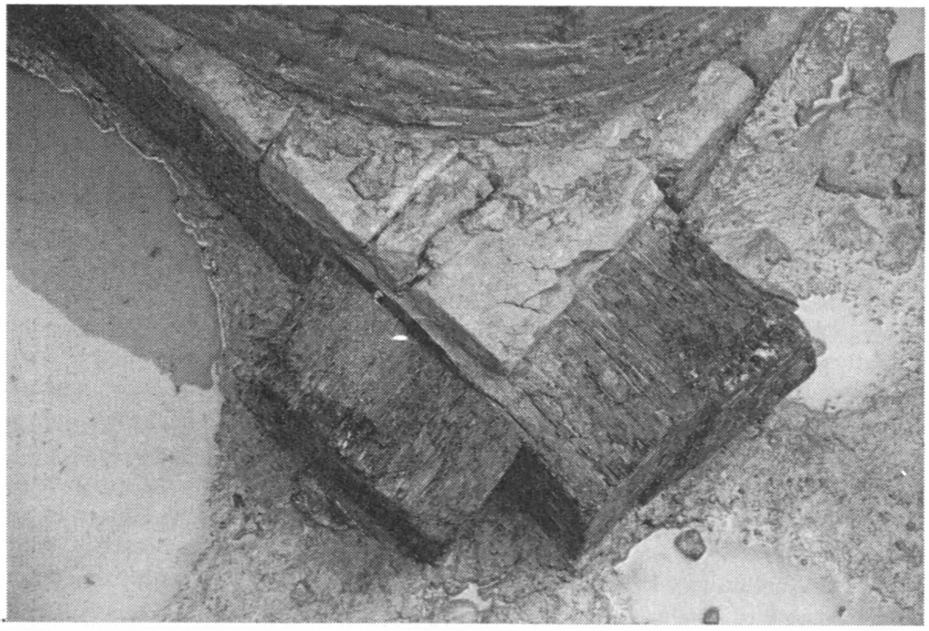

2.

Plate VI: 1 – The tip of Redan II, affected by the works of digging the foundation for a supporting pillar; 2 – Detail of the wooden structure underneath the foundation of the redan tip.