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A CONSTRUCTION FORTLET AT BĂNEASA

Eugen S. TEODOR
National History Museum of Romania,
Bucharest, Romania
eusteo@gmail.com

Daniela CRISTEA-STAN
Horia Hulubei National Institute for Research and Development in Physics and Nuclear Engineering, Măgurele, Romania
daniela@nipne.ro

Abstract: Recent diggings at Băneasa (Teleorman County) dealt for the first time with the fortlet. In a surprise for everybody (us included), it was not made prior to the main fort and it is was not synchronous with it either; it is a temporary garrison for the builders of the main fort, between the first and the second phase, sometimes before 230 AD.
A second surprise is the construction system, with a wall erected with crude lime-bricks, as a substitute for turf.
After a short presentation of the artefacts discovered in 2024 (including coins), we are disclosing the X–Ray Fluorescence (XRF) measurements on the samples taken from the lime-bricks (and other building materials), including a statistical analysis.
The closing part of the paper is dealing with the 'two forts' theory, affecting *Limes Transalutanus*.

Keywords: *Roman Dacia, Limes Transalutanus, temporary fort, XRF analyses, building materials*

A NECESSARY UPDATE

One of the few reasons to take pride, as a Romanian archaeologist, is the relatively recent UNESCO documentation for the *Dacian limes*, the longest in Europe, stretching over 1000 km.[1] This paper is about one of the hundreds of Roman historical sites.

Băneasa is a village in southern Romania, about 20 km apart from Danube and Olt River, included in the seventh sector of the *limes*.[2] The Roman site is located between the village and the National Route, at the half way between the towns Roșiorii de Vede (northward) and Turnu Măgurele (southward, near Danube). The main fort is squared, 139 m between the precincts, being the largest fort on *Limes Transalutanus*,[3] although, obviously, not quite 'large'.[4] A second fort lays more than 200 m north-east, usually named in the Romanian

[1] FRE-D-AN (Annexes), FRE-D-MP (maps and plans), FRE-D-ND (nomination document).
[2] FRE-D-MP, page 501 (not numbered), included in the so-called cluster 7.14. Valul lui Traian.
[3] Taking the figures, the fort at Traian (former Flămânda or Poiana, in literature) is the largest (FRE-D-NT, 89), measuring 390 × 350 m. Unfortunately, we do not know much about its chronology. The information provided by the authors that 'the Danube is responsible for the destruction of the Trajanic fort' (FRE-D-NT, 161) is just the short version, as in fact the major responsibility goes to the communist regime from 1960's, when they decided to rise a defensive dam with soil taken from the camp (BOGDAN CĂTĂNICIU 1997, 42). We do not know the information that the place was ploughed; it was and it still is a forest, for most of its area. The fort is compromised for over 95% of its area. The adjective 'Trajanic' is bizarre and we will not try to understand it.
[4] Except Traian (former Flămânda), the other 'large' forts on *Limes Transalutanus* are Jidova (132 × 99 m), Râșnov (124 × 118 m), Urlueni (117 × 108 m), and Săpata (117 × 91 m). All others have surfaces lower than one hectare.

archaeology 'the small fort', but due to its dimensions it is rather a *fortlet*.

The mentioned UNESCO documentation contains errors which should be amended, in order to understand the current paper. First of all – the chronology.

The limited archaeological research favored the emergence of the theory of the late origin of this border sector, built only during the reign of Septimius Severus. The organization of the eastern border of Dacia Inferior takes place, more likely, at the time of the creation of the province, in the context of the abandonment of the auxiliary camps in Muntenia, the ones from Drajna de Sus, Mălăeşti, Târgşor and Pietroasele (FRE-D-ND, 116).

Such a statement has astounded us, as no argument has been delivered, other than a 'historical vision'. The only archaeologist who is preaching such a theory is Ioana Bogdan Cătăniciu.[5] We are not going to render here arguments, as we already did it.[6] There is at least one expert opinion pushing the date of *Limes Transalutanus* well into the third century, in the mid of the second decade, on Caracalla's time.[7] We will keep our older judgements, based not on historical speculations, but on numismatic discoveries from our own, dating the beginning of this *limes* at the threshold of the third century.[8]

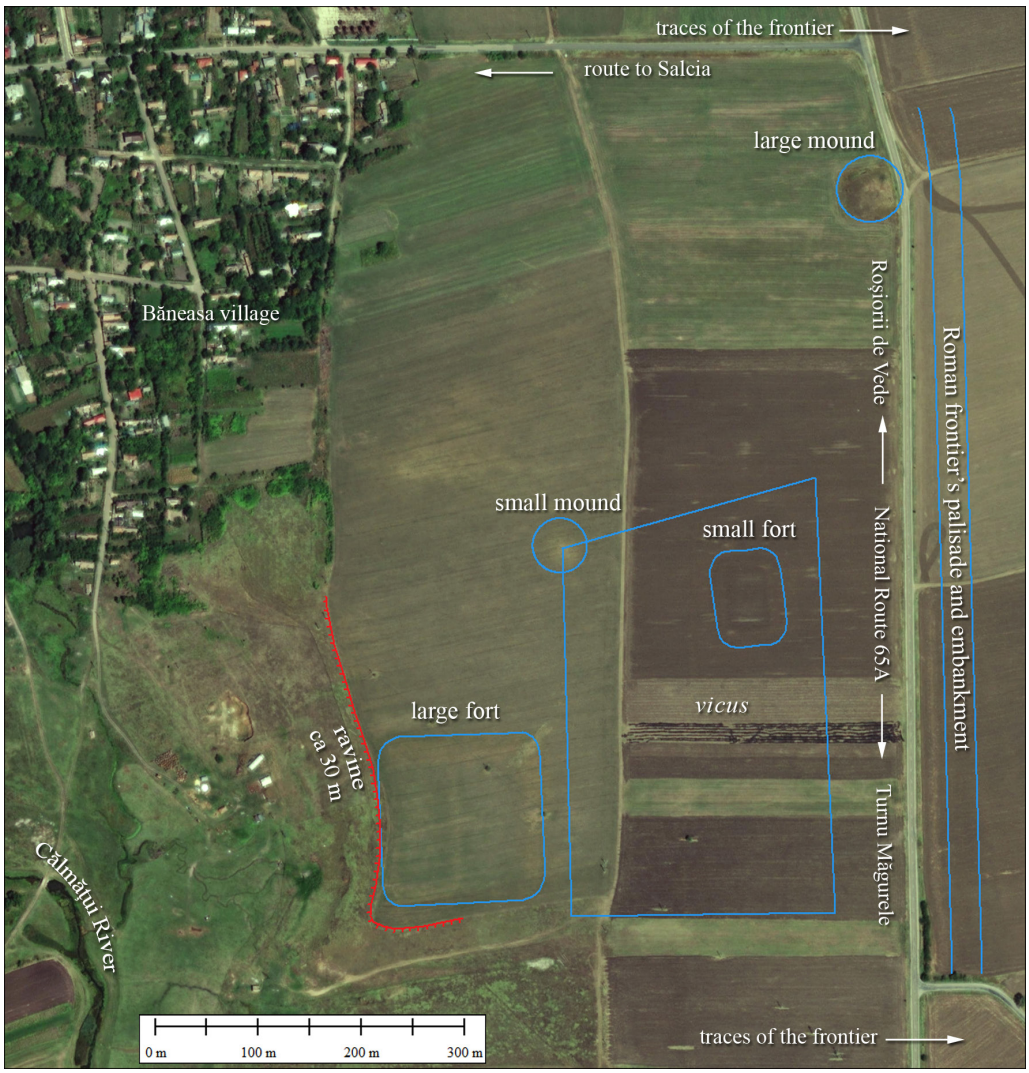

Fig. 1. Known archaeological compounds at Băneasa. Blue lines – a kmz file sent to the Limes Commission in June 2022. Google Earth background.

Another problem with the mentioned documentation is that although it is mentioning the civilian settlement from Băneasa, it is not depicting them on the map, the 'property' being drawn tightly around the forts.[9] As probably everybody knows, a steady fort, active for a lengthy time, always has a *vicus*, and its absence is rather odd,[10] and in fact we documented all of them, south of the Argeș River, except for a few.[11]

A third problem is, more or less, a detail. The redactors of FRE-D are writing that the (main) fort at Băneasa, '*after a fire, it was rebuilt in stone in the same place, but on a smaller scale*'.[12]

[5] BOGDAN CĂTĂNICIU 1997, 91, 106 along with note 51, giving the only argument of a flat coin minted during the reign of Antoninus Pius. We found one of the same on the surface, at Băneasa, which doesn't prove anything.

[6] TEODOR 2017A, 887; TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 91.

[7] PETOLESCU 2005; PETOLESCU 2010, 166.

[8] TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 91–92. Being the largest fort on *Limes Transalutanus*, Băneasa certainly played a command role (TEODOR 2017A, 892–897), at least for the southern end, and should date the initial phase of construction.

[9] FRE-D-MP, 7.14.3.

[10] An incomplete archaeological evidence always drives to snappy conclusions, as has happened with Dumitru Tudor, which new no civilian settlements within *Limes Transalutanus*, therefore he was asking himself if that frontier was a 'real one', or just a 'double frontier' (a concept totally made up), i.e. a sort of an advanced line of the main frontier (TUDOR 1978, 234, 253–256), which was laying on the right bank of the Olt River (*Limes Alutanus*).

[11] Albota, with a fortlet located in a forest, and Gresia, with a fortlet located in the middle of the village from our time. Izbășești is also located in a forest, but we were able to find traces of a civilian settlement of the opposite side of the (small) valley, although the bulk of it is hidden into the woods. As for the all others – there is data (including geographical one) published from over ten years (TEODOR 2015A). Another exception to be added is what FRE-D names Traian (previously known as Flămânda fort), the area being completely wiped out by works made for the dam near Danube in 1960s. The data published in 2015 was not yet in detail, but de Limes Commission received several complete data between 2020 and 2022 (for instance 12 June 2022, kmz file). Several *vici* were published with more details, as Urlueni, (TEODOR 2017B, 16, Fig. 1), Săpata ('Mârțești' in FRE-D) (TEODOR 2017B, 18, Fig. 2).

[12] FRE-D-ND, 89. Our first report about the rebuilding of the fort has been published in *Cercetări Arheologice* (an 'in house' publication of the team) in 2023, but the earliest report dates from December 2021 and it was published in May 2022 (TEODOR/MIREA/DUMITRAȘCU 2022). That early report made it clear that 'both bricks and stones are rare on the site'. As a matter of fact, FRE-D is officially dated 'January 2023', but in the summer

This is a hapax, as it has never been reported before.[13] Note that there is no available stone 100 km around, except on the opposite side of the Danube.

The proper fort has been briefly (but extensively) investigated within the Second World War time, with no useful outcome yet.[14] The diggings have been resumed in 2016, by a team lead by E.S. Teodor, with a poor budget,[15] made especially on the (large) fort.[16] The 2023 campaign was the first excavation outside the main fort. In order to explain that, we need to render here the main parts of the archaeological site (Fig. 1): a fort located at the edge of the terrace towards Călmățui River, 400 m west of the frontier palisade; a fortlet, located about 200 m east-northeast of the main fort, and about 160 m west of the frontier; the 'small mound' (30 m diameter, 2 m in height), located ca. 160 m north-northeast of the fort[17], and 125 m west-northwest of the fortlet; the 'large mound' (65 m in diameter, 6 m tall), located 340 m north-northeast of the fortlet, and very close to the frontier embankment. Although it was never archaeologically explored, the last is obviously connected with the Roman layout, the frontier line being bent on it; it is relevant for the Roman landscape and should be on display, in any situation plan. Due to its height, it was a perfect watching post, even without a tower, having a generous view for many kilometres around, the plain being almost perfectly flat.

Obviously, both mounds were erected in Prehistoric times. Nevertheless, a magnetometry performed on the Small Mound in late 2022 proved very interesting facts, like about 10 strongly burned contexts, relatively large (the largest having nearly 10 sq. m), with a geometric design, strung on a half circle, at about half of the mound's height.[18] As those diggings are not finished and published, we cannot give here much of a detail, but only some necessary elements needed for this paper: the trench was 25 × 5.5 m large, from the top towards east, and superposed two of those 10 burned contexts, the largest one and the next towards south. The later proved to be a bread oven, of an usual type, not of interest here; the former was an interesting object: a lime kiln, pretty large with an ovoid plan, 2.20 × 1.60 m, with a 0.6 m long tunnel, and an 2.5 long access pit (or more) and 1.6 m wide.[19] The reducing chamber is conserved on 1 m high, probably close to its functioning time (Fig. 2).

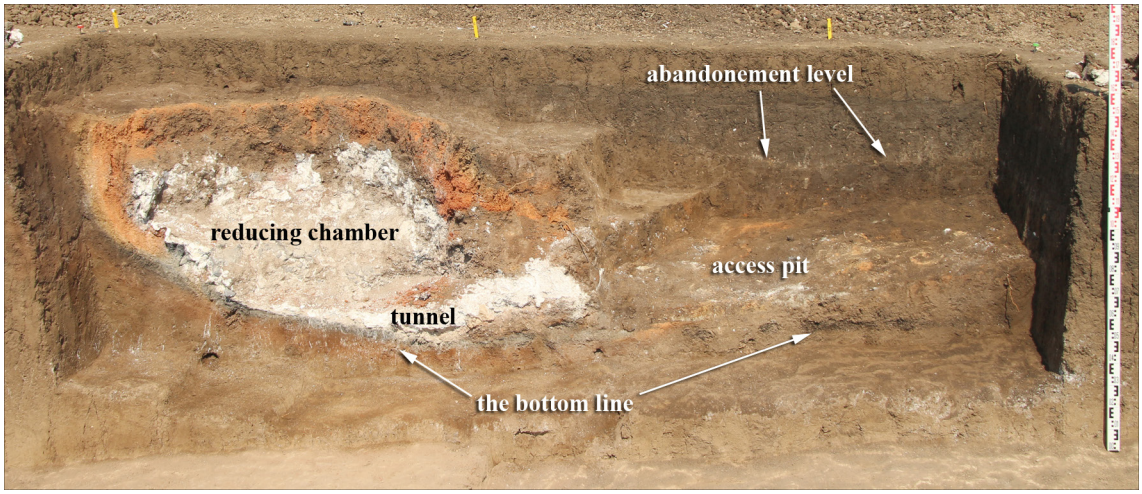

Fig. 2. Longitudinal section through a lime kiln, August 2023.

The discovery of the lime kiln raised some questions. Its position of the middle height of the mound, although not usual,[20] is rational, as kilns or ovens are easier to dig on a ramp. More, the location is at the fringe of the civilian settlement, as it ought to be; other option would be at the ridge of the terrace, 230 m westward, a little too far. The real question was very simple: why? In six previous archaeological campaigns we found little evidence of using lime-based products, mainly plaster, but in small quantities; for what, then? The next problem was the logistics. There are no limestones around and they had to carry it from the opposite bank of the Danube, crossing the river and 25 km of road. There were no forests in the area, and most probably the wood had to be also carried from about 20 km north.[21] Why importing it from the neighbouring military units from across the Danube? It was cheaper to carry all those things from afar? Some of those questions got an answer in the next year.

of the same year it was still 'under review'. It came up to the public in late 2024 (sic!).

[13] Cantacuzino thought that the battlements were made of bricks, but no stone, see below.

[14] CANTACUZINO 1945. The author failed to acknowledge a Bronze Age settlement, although in some areas (especially near the ravine) the prehistoric contexts are delivering almost half of the archaeological inventory. The facts reported for the Roman fort are a collection of weird statements; for instance, the defensive wall has been done from 'burned clay', but its battlements would have been made of... bricks (CANTACUZINO 1945, 463). Only the battlements! Note that on the site there are almost no bricks and the 'burned clay' is all due to a large fire which ended the first phase (see TEODOR/DUMITRAȘCU 2019).

[15] About 10,000 Euros per year (yes, no missing zero).

[16] TEODOR 2016; TEODOR/DUMITRAȘCU/ȘTEFAN 2017; TEODOR/DUMITRAȘCU 2018; TEODOR/DUMITRAȘCU 2019; TEODOR/DUMITRAȘCU 2023.

[17] Note that the outlines of the both forts are drawn at the external limits, i.e. on the ditches, as the interest than was to protect the monuments in their integrity. The figures on the precinct line (as usual, speaking of Roman forts) are given in the text above.

[18] Work done by our friend, Dan Ștefan.

[19] One of the largest we found in literature was discovered in Nil's delta, for Roman age (COULSON/WILKIE 1984, 68–69, Fig. 1). The lime kiln has been made of bricks, has a similar ovoid shape, but it is larger than Băneasa case; the authors did not provide dimensions, calculated by us from the picture to have about 3 × 2 m. For a useful paper regarding the technology and history of lime based products see ARTIOLI/SECCO/ADDIS 2019.

[20] We do not know any analogies for Roman time, but recently have heard about such a kiln in Prahova County, dug in a mound, for ninth or tenth century AD (FRÎNCULEASA *et alii* 2017, 25, pottery kiln).

[21] For environmental issues in the area, see TEODOR 2018.

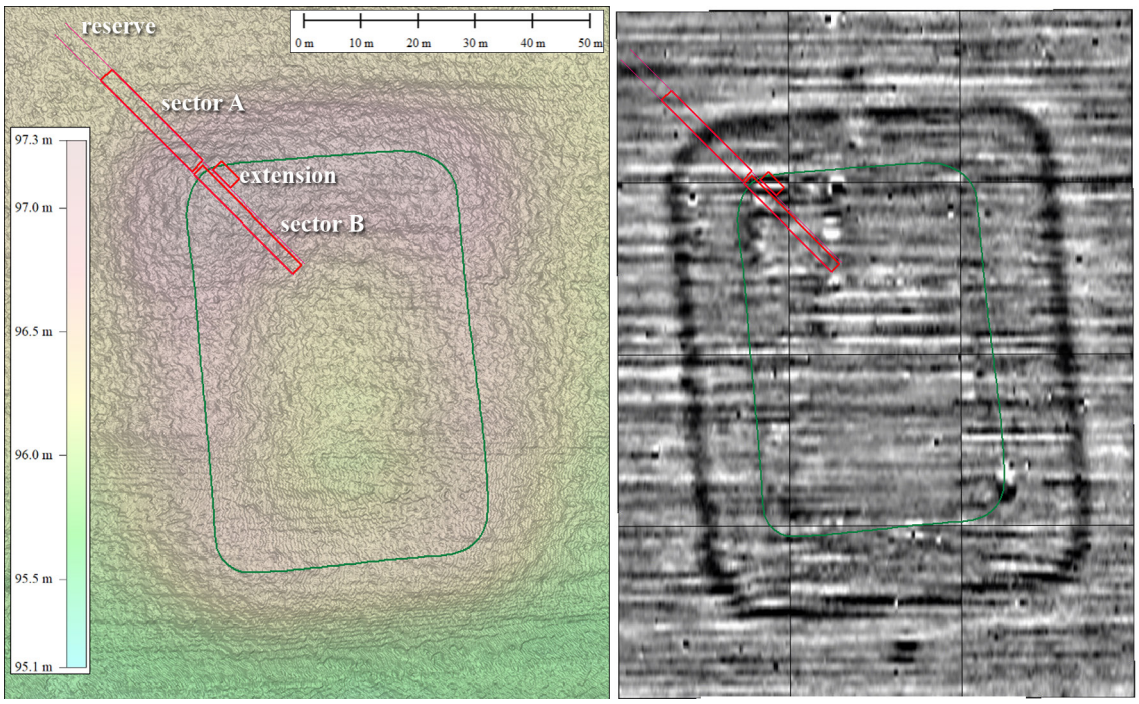

Fig. 3. Băneasa, fortlet, 2024, archaeological trenches. High resolution terrain model (left) and magnetometric depiction (right).

In the summer of 2024 the Small Mound was not available, due to a cornfield with a late autumn crop.[22] We took that as an opportunity to dig on the fortlet, never investigated, with uncertain function and chronology. This will make to main subject of this paper.

DIGGINS ON THE FORTLET

We chose to make a trench crossing the north-western corner of the fortlet as, most likely, it is the best preserved area (Fig. 3). We marked a 52 m trench, along an imaginary grid with a pace of 2 m. The first 10 m from northwest were meant to be a reserve; therefore it was dug beginning with the 6th grid. There are two sectors: A (northwest), 20 m long and 2.5 m wide; and B (southeast), 21.5 m, on 2 m wide.[23] On the north-eastern side of the Sector B has been made an extension, 4 × 2 m, in order to understand better the construction system of the precinct.

The first meters of the Sector A were almost devoid of any artefacts, something to remember when speaking about the civilian settlement[24]. The ditch appeared were expected (see again Fig. 3, magnetometry), it is typical (V shape, regular) but it is rather small: 4.09 m wide and 2.14 m deep.[25] Its stratigraphy proves a very short functional time (Fig. 4, orange layer), with just a few artefacts collected, as a couple of sherds and – of interest later – a chunk of crude lime (not used, clean, very white). The only place to collect some artefacts[26] was within the grids 11–12, where two postholes have been also found (one in the middle of the trench, one cut by the section), descending from a layer that post-date the

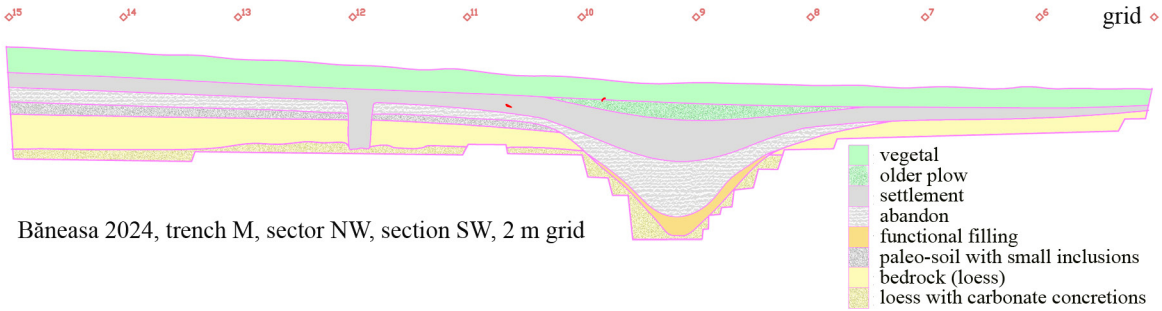

Fig. 4. Băneasa, July 2024, trench M, sector A, south-western section (see also Fig. 3).

[22] In the same autumn, the Labour Law has changed, modifying the pension threshold. On the former law, an archaeologist could pick his retirement anytime between 65 and 70 of age. With the new law, that is the call of the management, which decided for the head of the diggings in Băneasa to retire immediately. At this time, a continuation at the Small Mound is unlikely.

[23] The A sector is wider, in order to reach easier the bottom of the ditch.

[24] In several (few) cases when a *vicus* has been fully investigated (SOMMER 2008, 227), the settlements are relatively compact, aligned to the main road, with narrow street fronts, but long plots. In Băneasa case, we were not able to say where that street would be, although thousands of aerial photos have been taken. Our best guess today is the Roman main road is superimposed by the mud-road of our time, crossing between the two forts (see again Figure 1).

[25] To be compared with 6.25 × 2.85 m (main fort, first phase, TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 86–87, Fig. 4) or 5.13 × 2.07 m (main fort, second phase, TEODOR/DUMITRAȘCU 2023, 693–694, Fig. 3).

[26] About 10 potshards, a bronze pendant, a rivet.

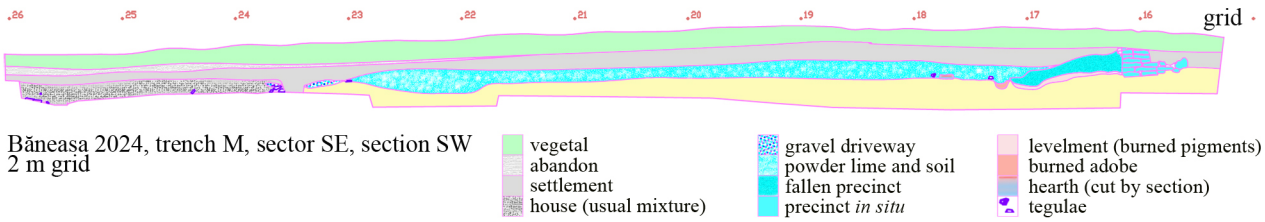

Fig. 5. Băneasa, July 2024, trench M, sector B, south-western section (see also Fig. 3).

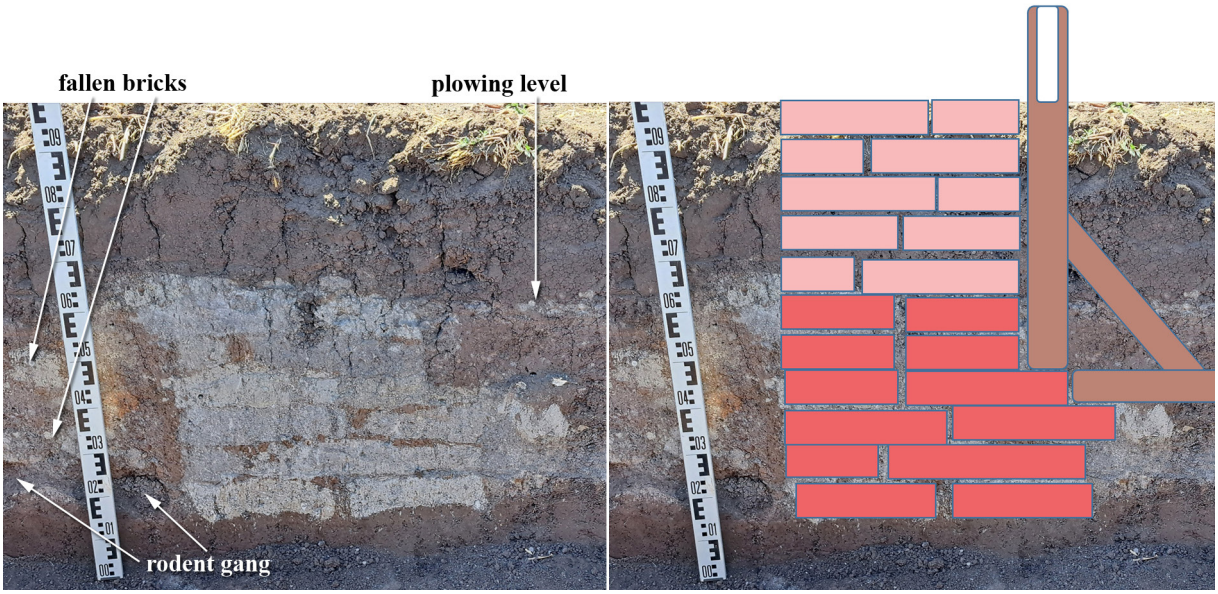

Fig. 6. Băneasa, July 2024, trench M, sector B, south-western section, precinct wall made of lime-bricks: snapshot (left) and proposed rendition (right).

fortlet. Amazingly, the rest of the trench (grids 13–15) brought almost nothing, with dull stratigraphy.

The only special thing here is the length of the berm: 10.5 m,[27] which excludes to see the bottom of the ditch from the battlements, no matter how high would be; and they are not!

Progressing to the Sector B of the trench, inside the fortlet (Fig. 5): we finally found the precinct: no postholes, no foundation ditch, but a wall of crude bricks! Well, not exactly as Middle East ones, because these are made of mud mixed with lime! The mixture is not exactly the same for each of them; therefore almost every brick has its own shade of colour (Fig. 6).[28] On the inner side of the precinct we found the fallen part of the wall, with the same colour and composition, yet missing regular shapes of the bricks, turned back into dust (Fig. 5, grid 17). The rain and defrost made the rest, washing the debris and carrying powdered lime down the slope, towards southeast, forming a new layer of soil turning slightly whitish (Fig. 5, grids 18–23, 'powdered lime and soil').

Why no debris rolled from the wall has been found on the outside? Because that side was protected by wooden boards, remaining in place long enough to outlive the crude brick precinct. How tall were the battlements? Probably taller than our sketch suggests, but not much taller, as the volume of debris, measured along the section of the trench, does not recommend much more. We could try a calculation, as follows: the standing wall is 0.26 sq. m (viewed in section); the fallen part of the wall is 0.48 sq. m, but the composition is less compact, coming at best 70% from the wall, therefore around 0.3-0.33 sq. m; the layer or washed debris is far larger (3 sq. m.), but its composition contains 10% lime, at most, therefore, only other 0.3 sq. m. As the conserved wall is standing 0.49 m (with 10 cm below the ground level), the brick wall had initially 1.5 m in height (or less), the wooden battlements rising above.

Behind the precinct we found a reddish levelment, 2 m wide, standing directly on the clayish bedrock, taking its colour from tiny bits of burned adobe; in another environment, it would be pebbles or broken tiles, in order to prevent the mud. Here, at Băneasa, the most ordinary artefact is burned adobe (available in huge quantities on the main fort), and they used what was handy. It is a sentry walk running along the precinct, ending in a small draining ditch, only 30 cm wide and relatively shallow, filled with burned adobe drained from the sentry walk.

Immediately behind that small ditch we found a hearth, simple, 1.2 m in diameter, used only for a short time, made directly on the bedrock, noted below as Hearth 1. This is not usual, mainly being so close of the precinct (less than 2.5 m). From positions above the hearth two coins have

[27] TEODOR 2006, 226, Fig. 5b, for Răcari fort, having a berm less than 2 m for the second phase (with a palisade circuit) and 4 m long for the third phase (wall circuit).

[28] The absence of standardisation is speaking rather of an improvisation, than a usual procedure.

been recovered, in separate circumstances, but within the same layer ('powder lime and soil' at the Fig. 5); both were lost probably in the period of occupation of the fort, near the precinct.

Near the end of the archaeological trench, beginning with the grid 23, the layer made from a mixture of soil and lime is cut, firstly by a narrow gravel alley, then by what should be a house, giving the dimensions, 4.2 m wide. The place is typical for a living area, with organic content, filled with bones, broken tiles, pottery, including fragmentary amphorae. The tiles were not used for a roof, being too broken; more likely they 'armed' the adobe walls of the house. Near the end of the trench fragments from the outer wall have been found carefully trimmed and covered in lime plaster, and adorned with pieces of chalk. We already have seen this, in another campaign, at a barrack near the north-eastern corner of the main fort (phase I), where the outer side was embellished, in the same way, but nothing similar could be noted for the inner side.[29]

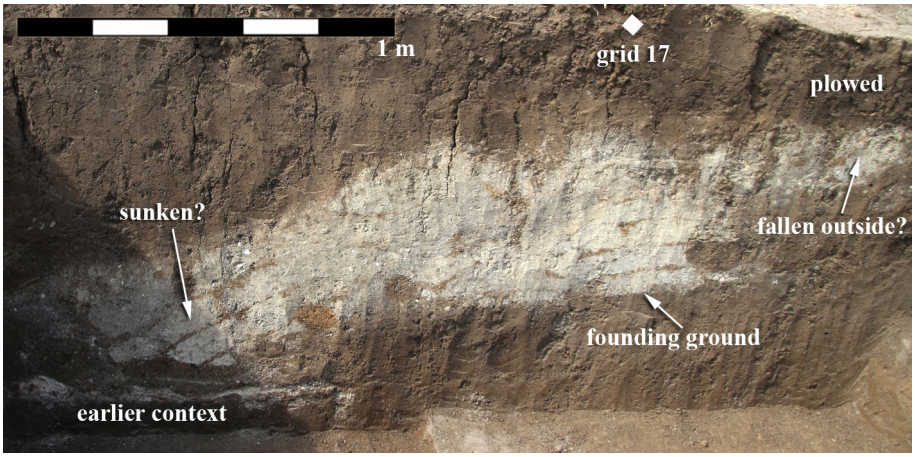

Fig. 7. Băneasa, July 2024, trench M, sector B, extension, south-western section, precinct wall made of lime-bricks.

In the abandon layer above the house a third coin have been found, detailed later.

The most interesting issue in our digging is, undoubtedly, the unburned brick wall. On the opposite side of the same trench there was a similar situation, not that clear yet, with whitish bricks put almost vertically, in the inner side. This made us opening that 'extension', 4 × 2 m, paralleling the main trench in the grids 17–18. The conservation is less than one could ask, but we got a useful picture nevertheless (Fig. 7). The outer face of the wall is visible, on five rows of bricks, but the inner face is collapsed. Farther inside one can see three large bricks slanted, possibly sunken in the pit of an earlier context; they are yet too far to be part of the wall,[30] and possibly were intended to facilitate the access to the battlements.

In the same corner of the Extension (the eastern one) we found an interesting and clear situation: part of a second hearth, visible only on a few cm, oriented towards the inner side of the fortlet (where its ashes are displayed), covered by a layer of debris, the usual one, of soil mixed with lime, marking the end of the military occupation (Fig. 8). Immediately below it – a small oven, more or less round, 30 cm in diameter, with fuel opening towards northwest. His actual height, 33 cm, seems complete, as no large chunks from it were found around or inside. His bottom is taken by a thick layer of ashes, from the latest use. Towards west it has been preserved a service pit, developed only on the right hand of the user, at the same level with the mouth, the entire area being paved in ash. Here and there – red spots, as usual when hot recipients are put on the ground. Although no tools have been found, it is obviously a metallurgic oven, for recycling discarded parts.

The small oven described above is obviously older than the hearth above it. Although no dateable artefacts in sight, the stratigraphy is helpful: the hearth is made exactly above it, with no interval. The small oven was crafted digging a small, round pit, and a larger pit aside, to charge to woods. The upper part of the oven is giving the ground level when dug, which, in our case, is the same level on which a hearth was done. Therefore, the oven foregoes the hearth, but not much.

Concluding this, we have proved that the area has been used, in Roman times, *before* the fortlet was done. The hypothesis of a dating it in early second century, as the primary use in occupation, falls apart.

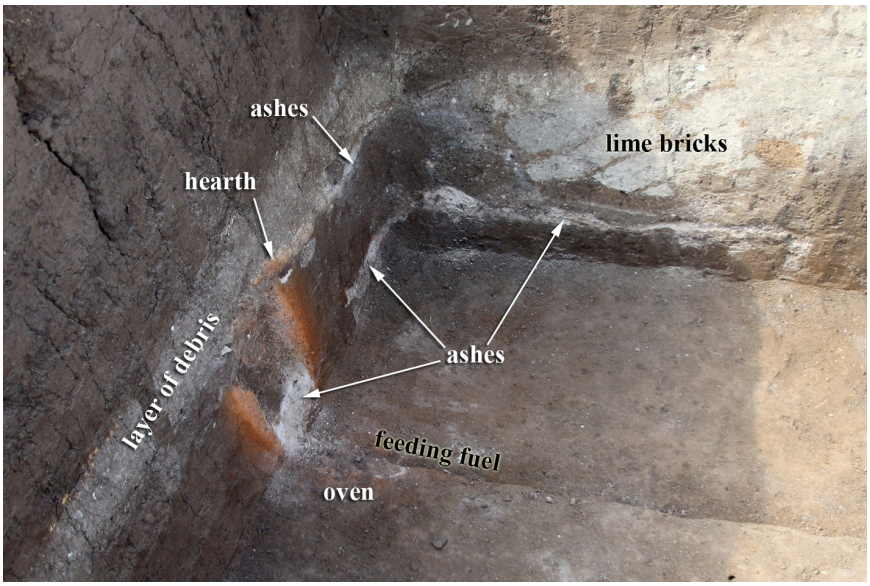

Fig. 8. Băneasa, July 2024, trench M, sector B, extension, view towards the eastern corner.

Putting together data about those 4 sections through the

[29] TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 90–91, where a similar combination occurred: a wall plaster combining mud and lime, decorated with chunks of chalk.

[30] Not as far that the image is suggesting, because the trench is not perpendicular on the wall (as intended...), but is intersecting at 40°, not 90°.

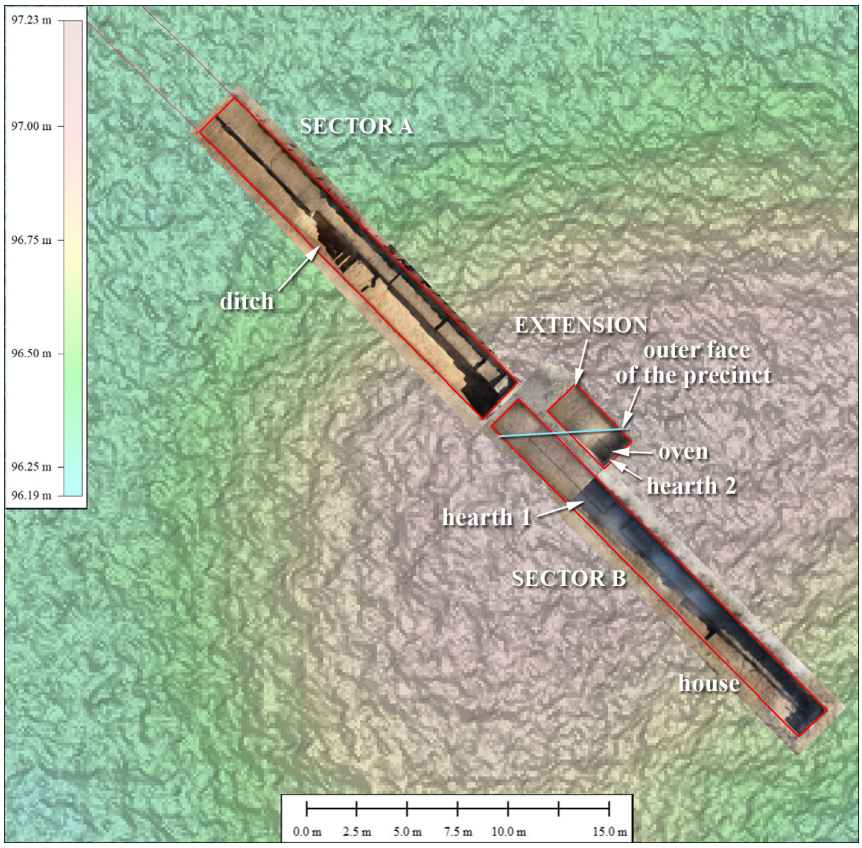

Fig. 9. Băneasa, trench M, overview of the main traits. High resolution terrain model and photogrammetry.

precinct, they are drawing a straight line, heading almost perfect east, which is the orientation known for the northern side the fortlet (Fig. 9). We failed to cross the precinct at the corner, as intended, because it is located not before the top of the rampart, as expected,[31] but rather behind it, due to its building system. The dimensions of the fortlet along the precinct would be then not 63 × 42 m, as deducted from the altimetry, but around 61 × 40 m. Measurements made on the magnetometric data, between the ditches (on axes), are 85.4 × 62 m (Fig. 3, right side). The only visible (partial?) interruption of the ditch is on the middle of the northern side, where a gate is expected.

THE ARTEFACTS

We will deal further with a short presentation of the archaeological inventory collected on site. As a general assessment – it is poor, several times less than previously seen on diggings performed on the main fort (with phases of occupation of 20 years); the only places with some collected artefacts are in the grids 11–12 (where, most likely, there was a shed), and the house from the grids 23–26, the only place where people lived for a longer time. Both mentioned places are stratigraphically ascribed to the civilian settlement, after the fortlet was deserted.

Despite the small number of the artefacts collected, we were lucky enough to find three coins:[32]

- 23[33], Julia Mamaea, denarius, emitted in 222, 2.37 g; grid 18, -0.7 m, in the layer covering Hearth 1
- 29, Caracalla, denarius (fourée), emitted 216 or later,[34] 2.81 g; grid 19, -0.65 m, in the layer covering Hearth 1
- 34, Septimius Severus, denarius, 196/197; 3.57 g,[35] grid 25, -0.33 m, in the abandon layer above the House

The earliest coin (34) had appeared in the latest context, near the final abandonment of the site, some four decades after its mint, but this is archaeology! Interesting, the coin is worn, but still legible (Fig. 10/34). The latest coin – as date when it was struck (23) – is in a similar condition, although being 25 years younger (Fig. 10/23). The Caracalla fake denarius is made of bronze (a bad one) covered with a thin silver foil, mostly lost (especially on the obverse, Fig. 10/29). Such piece could be an 'official counterfeit', made later than the copied model.[36]

There are several small finds that are worth mentioning. So would be the iron hinge (26.1 × 14.6 × 2.3 mm), probably from a door, preserved about half (with only a nail hole), found at the place where a shed has been stated (grid 11). About in the same place came up a bronze pendant (Fig. 11/1), 61.4 × 12.5 × 1.7 mm, with enlarged ends, for which we not found exact match, but of a similar type and size known for harness.[37] Such a pendant could be also a belt terminal,[38] but because it has been found in a shed we will stick on the first hypothesis.

Another interesting artefact is a broken strap holder (?, see Fig. 11/2), 38.5 × 20 × 2.2 mm, made of bronze, strongly bent, relevant parts of its morphology missing, as the rivets' holes or the hanging method. The slot is only 14.5 × 3.3 mm wide and could accommodate also a girth hoop fastening a body armour.[39] The artefact was found near the metallurgic oven from the 'extension ', and could be a scrap-metal meant for melting.

The absence of the large construction nails is no surprise, as they generally miss at Băneasa.[40] The largest nail is less

[31] As previously seen in Răcari fort, in 4 different trenches (for Trench 1 see TEODOR 2006, 226, Fig. 5; for Trench 3 – idem, 228, Fig. 7).

[32] Partly due to our colleague from Alexandria, Pavel Mirea, which paid us several visits on the site, handling a metal detector.

[33] Identification number for 2024 campaign, counting all inventory collected on the site.

[34] Could be an 'official forgery', made years after the emperor's life.

[35] All data from our steady collaborator, Mihai Dima. We are grateful. A full numismatic presentation is expected from the same expert for all our findings from Băneasa.

[36] The crisis of cash drove the provincial authorities to make them (personal communication, Mihai Dima).

[37] BISHOP/COULDSTON 2006, 191, Fig. 124/12–16.

[38] As in BISHOP/COULDSTON 2006, 109, Fig. 63,

[39] BISHOP/COULDSTON 2006, 140, Fig. 85/9–10.

[40] The only exception to mention was at the Eastern Gate, where many large nails occurred. Those where of a special type, coined then as 'ornamental nails', as they were meant to keep the large gate together. Proper 'construction nails' (longer than 16 cm) are absent, and very likely they used instead wooden nails, even for larger buildings, like the barracks (TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 96; TEODOR/DUMITRAȘCU 2019, 110–112, figs. 8, 9; 116–17, Fig. 15; 122 – for the rarity of the usual building nails; TEODOR/DUMITRAȘCU 2023, 707).

Fig. 10. The coins from the 2024 campaign. Numbers following the main artefact registry. The obverse of 29 before restauration (more legible than after).

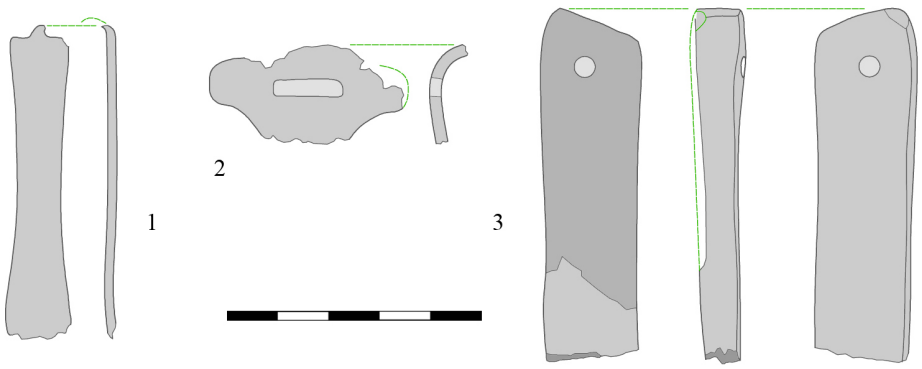

Fig. 11. Selection of small finds: 1 (04) – (cavalry?) pendant, bronze; 2 (57) – strap holder (?), bronze; 3 (79) – whetstone.

than 6 cm long, although fully conserved, used for a plank with the thickness of 4 cm. The location of the find, near the threshold of the grids 21 and 22, cannot be related with a specific building activity. The depth where it popped up, 75 cm, is suggesting an early stage of occupation. It could be taken from a disassembled board of the precinct.

We have only a second iron nail, of similar size, 5 cm long (with missing tip), with a distinctive rhomboidal head, used and bent at only 2.5 cm below the head, therefore used for a relatively thin board.

We have collected, instead, no less than 13 shoe nails, all used, with typical shape and size,[41] most of them in or around the house from the grids 24–26. Their presence here illustrates the strong connection between the fort and its 'civilian' settlement.

Other interesting finds connected with the house are a pink-grey fragment of granite (33 × 32 × 16.3 mm), looking quite exotic in this flat plain with no natural stones (a *porte-bonheur* from other geography?). A second foreign stone is a whetstone, with the tip broken and missing, conserved on 68.9 × 18.9 × 6.7 mm, with one side almost complete cleaved (Fig. 11/3). The sandstone is very fine and on its conserved face one can see discrete tracks of use, and obviously it was not intended for heavy arms or tools, as daggers or kitchen knives. Its width – less than 2 cm – is suggesting a sanitary device, for delicate women' tools, as a toilet knife (or similar). In its upper part it has a perfectly round hole for suspension, with a diameter of 4 mm, in order to be hanged on the belt.

It has been collected 199 pot shards, of which 5% remain of undetermined fabrication and functionality, being either too small or too burned. The criteria of classification followed are those described in 2018.[42] There are basically four classes of the finesse of the prepared clay, in pairs, 'very

[41] See the notes from a campaign in which there have been collected 22 of them (TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 95). That is a factual evidence that our work was very attentive. Of course, much of the success was granted by the metal detector, now or in 2017.
[42] TEODOR, DUMITRAȘCU 2018, 120–127.

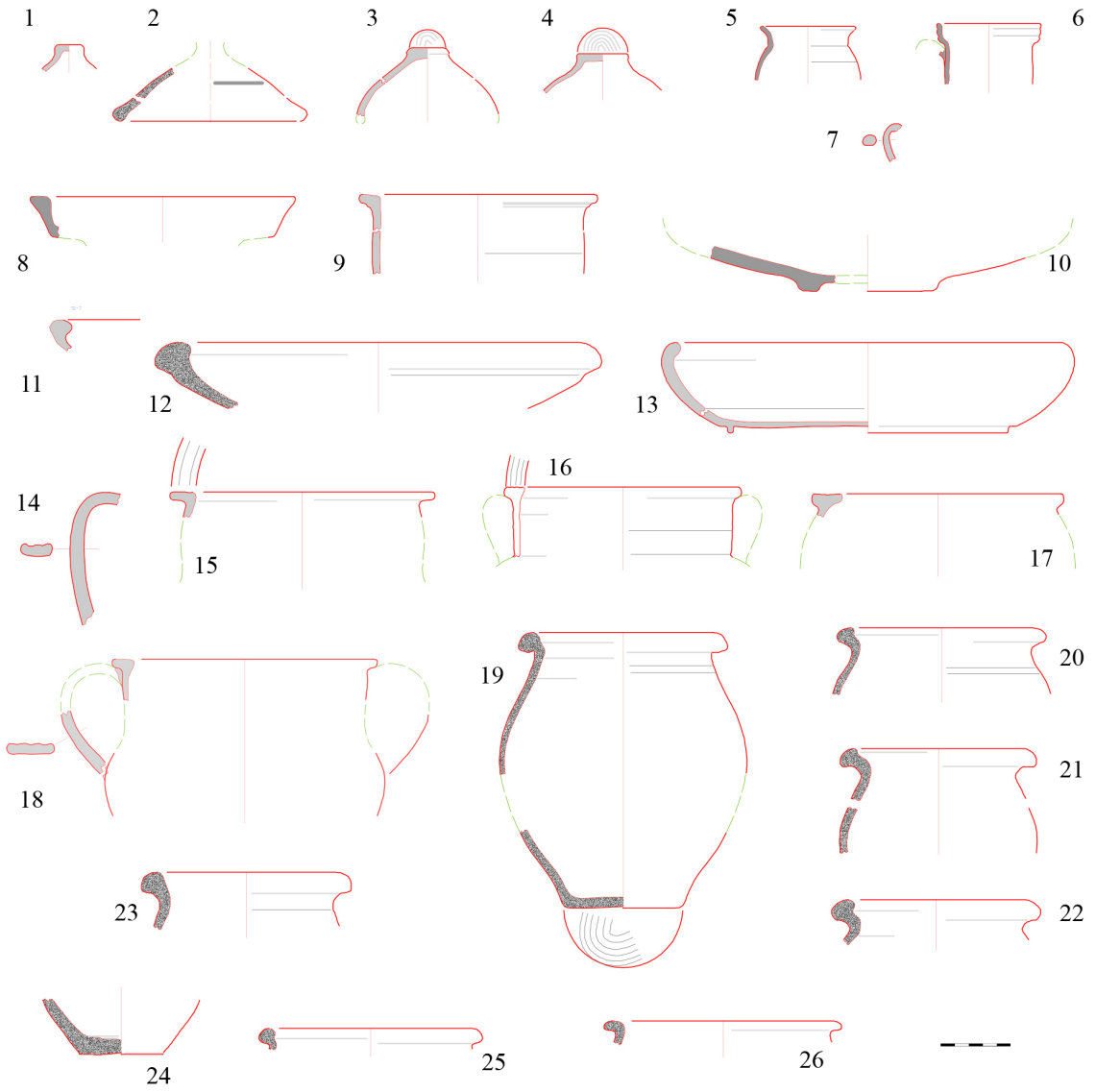

Fig. 12. Pottery: lids (1-4), cups (5-7), bowls (8-10), dishes (11-13), two-handles pots (14-18), kitchen pots (19-26); fabrication: white section – kaolin; light-grey – oxidized; darker – reduced; flat shade – fine; noise added – coarse fabric.

fine' or 'fine', and 'half-coarse' or 'coarse'. If the differences between the pairs are very clear, those inside the pairs are floating. The differences between the first two are slipperiness: the 'very-fine' has visible inclusions around 0.1 mm (measured on microscope), whilst the 'fine' type could vary around 0.2-0.3 mm. Including one shard or another to one of the classes depends also on other factors, as the frequency (generally low, 5–10%), the quality of the slip (if any, because very fine paste usually do not need a slip),[43] and the touch, smoother or rougher. The last, obviously, cannot be quantified.

The 'coarse' fabrics have usually inclusions around or over 1 mm,[44] with 'half-coarse' fabric around that figure. Proper 'coarse' paste is rare, with inclusions between 2 and 3 mm. The frequency of the inclusions could range between 25–50%, and the upper range could push a certain sherd to the 'coarse' class. Important to note: there is no 'bad' pottery, or clay, all being homogenous and well cooked. The 'coarse' fabrication is simply adequate to different jobs, which ask sturdy bodies, resistant to fire or mechanical shocks. The 'half-coarse' pottery is more frequent. From such 'modest' paste are done all kitchenware, all very resembling as look, with visible inclusions protruding from the slip,[45] and almost as shade also, dark-grey with brown touches. They have also common shape patterns, as a bent and enlarged lip (in order to prevent breakage), and a groove on the inside (Fig. 12, 19–26), to accommodate a lid. The decoration is simple and repetitive: one or two incisions on the shoulder, if any.

[43] It could be finer of coarser than the paste.

[44] There is an obvious gap in data, pottery with inclusions between 0.3 and 1 mm being extremely rare (therefore 'accidents'). As the mechanical separation of the ingredients between 0.3 and 1 mm is very difficult to perform, it is more likely that there were used different sources of clay, 'fine' or 'coarse', which meant little work to do.

[45] There is a popular misconception between the Romanian archaeologists, that kitchenware does not have a slip. True enough, it is difficult to be seen, mainly due to the dull colour. The difference between the main body clay and the surface covered by a slip is still visible on a microscope, as the slip covers (and hides) the smallest inclusions from the composition, comparing the faces and the broken part. The native porosity of the coarse clay, much more developed than in a 'fine clay' case, has to be solved by a diluted slip, in order to close the pores. The density of the pores is another 'diagnostic' tool for stating a slip.

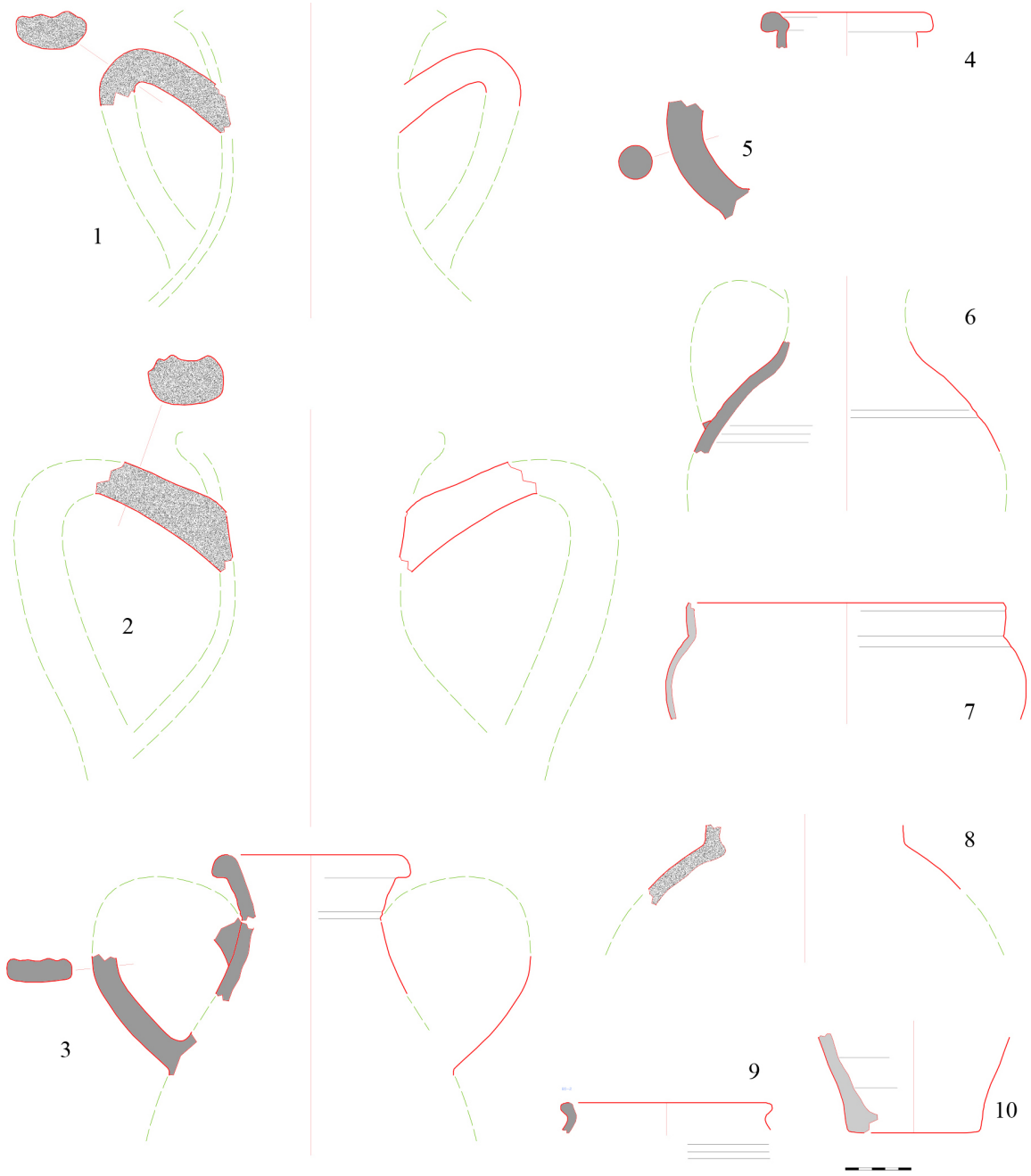

Fig. 13. Pottery (continuation): amphorae (1-3), large jugs (4-6), storing recipients (7-10); fabrication – see also **Fig. 12.**

The coarse fabrication isn't exclusive only for kitchenware, but could accidentally occur on other shapes and functions, as lids (Fig. 12/2), dishes (Fig. 12/12), amphorae (Fig. 13/1–2), or storage recipients (Fig. 13/8).

The lids are not intended exclusively for cooking, as the majority was made from fine clays (Fig. 12/1, 3–4). There are present two basic shapes: a truncated one (Fig. 12/2) and a globular one (Fig. 12/3).

The bowls from this lot are all from finer fabrics,[46] showing two groups of shapes: a shallow one (Fig. 12/8) and a deeper one (Fig. 12/9).

The exclusivity of the fine fabrics goes for small cups (Fig. 12/5–7)[47] and two handles jars (Fig. 12/14–18). Although none of them conserved two handles, most likely they would have two of them, fact which is supported by both analogies[48] and functional reckoning. From practical reasons, jars weighing more than 2 kg (its own weight plus the content) are difficult to secure with only one hand,[49] therefore they need two handles. This kind of two handled jars are also suggested by flat rims, extruded outside, frequently with decorated upper side, also by a tall neck, with many analogies on better preserved items.

[46] All bowls studied for 2017 campaign (several dozens) are also made out from fine pastes (TEODOR/DUMITRAȘCU 2018, 156–162).

[47] True also for larger lots, as TEODOR/DUMITRAȘCU 2018, 149, Figure 4, 15 items.

[48] Included previously into 'storage jars' (TEODOR/DUMITRAȘCU 2018, 135, Fig. 2, esp. 4, 6–12), due to their large dimensions and the most likely function. This kind of jar is also frequent at Răcari (not published data).

[49] For two handled pots see POPILIAN 1965, 91–94, especially types 2–4, Plate XXXIX. For pots with one handle see POPILIAN 1976, 90, Plate XXXVII. These last type are all small, grey ware, with coarse fabric. Most of them have been discovered in cemeteries (POPILIAN 1976, 182). They are very rare in forts (as Răcari and Băneasa), being possibly a 'funerary production'.

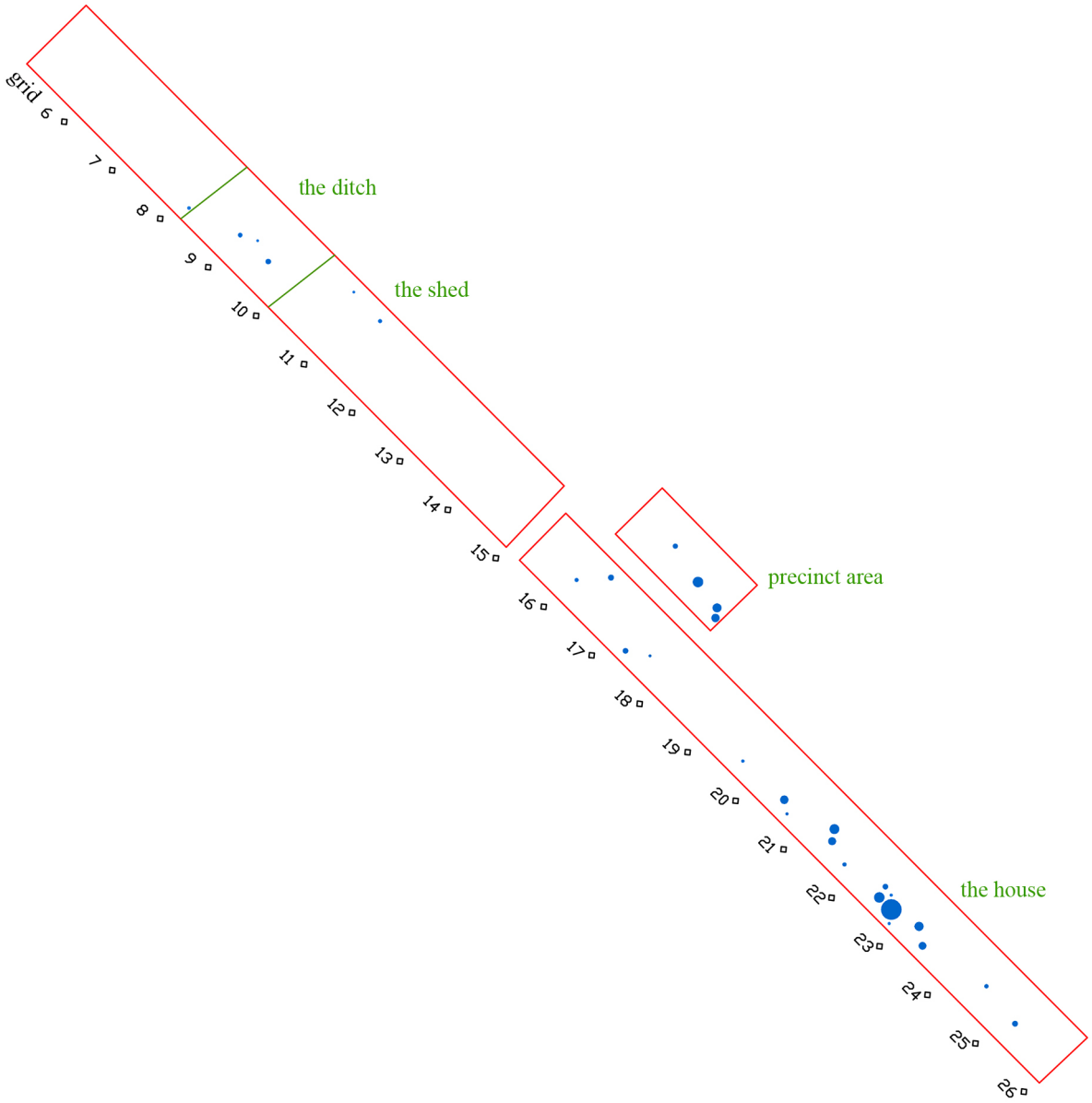

Fig. 14. Archaeological trenches on the north-western corner of the fortlet, sketch of the main landmarks, and distribution of the pottery (blue circles with proportional size of findings).

Proper storage pots have short necks, simpler rounded rims, larger diameters, and bulky walls, and could have any of the available fabrications (Fig. 13/7–10). A special category of the sort would be the large jugs (Fig. 13/4–6), usually made of fine reduced fabrication.

A few shards are parts from amphorae, discovered in some expected places: at the bottom of the ditch, one in the shed (grid 11) and another one rolled on the slope, towards the (already filled) ditch; near the house and inside it (no less than 6 fragments). Their distribution is a fair depiction of the frequency of the pottery within the diggings, amphora parts missing only in the area of the precinct (Fig. 14). All illustrated shards (Fig. 13/1–3) are coming from the house. The first two from the Fig. 13 are probably from Kapitän 2 class, and this is contiguous with previous discoveries in Băneasa, where this class is dominant.[50] The third one is a 'white elephant', reduced and with a fine fabric, rare and of uncertain origin.

We tried to see if any lessons could be drawn from three separate analyses, from 2017 campaign (a barrack in the north-eastern corner of the large fort, from the first phase), 2021–22 campaign (the eastern gate, end of the second phase) and this lot from the fortlet. Well aware from the difference of size of the comparative lots,[51] as well of some differences in methodology,[52] we gathered some results (Table 1).

[50] TEODOR/DUMITRAȘCU 2018, 130, Fig. 1/5–8, 11–12. See there also the Table 5, for astounding diversity of fabrication, yet most of them go in the same general class 'half-coarse', as the artefacts from 2024.

[51] Over 2000 shards for 2017, almost 100 for 2021–22, and almost 200 shards for this lot.

[52] For 2017 the shards were weighted, the percent being reported to the total weight, a slower procedure. For the small lots studied further we considered them not worth such a supplementary effort. Of course, reporting the results to the weight, and not to the number of shards, is the right thing to do.

Table 1. Comparative data for Băneasa pottery.

fineness	firing	2017 campaign	2024 campaign	2021–22 campaign
fine	oxidized	22.9%	18.59%	28.13%
fine	reduced	28.8%	12.06%	43.75%
coarse	oxidized	17.9%	6.03%	7.29%
coarse	reduced	29.8%	23.12%	18.75%
kaolin[53]	oxidised	0.6%	2.01%	2.08%

In the Table 1 the three columns are ordered on their chronological relationships, as discussed further in detail. There is no easy solution, as no clear 'evolution' can be revealed. The time range from first to last is 20 years, possibly less, and the first two columns (2017 and 2024) are very close related in time. The only lesson to be learned here is that if chronology counts, the archaeological contexts counts even more. The three spots on the field have not the same function or meaning. First is a barrack, the place where the soldiers live most of the time, along years. The second place is – most of it – a civilian settlement. The third place is not just 'a gate'; it is the house of guards, the second most important place in a fort, after *principia*. This is not a proper place to cook (see the low rate of the cooking pots); this is the place for using higher praised pottery, as the fine grey recipients would be,[54] which probably explain better the uneven figures from the second line.

ARCHAEOMETRY ON LIME-BRICKS

Those bricks from the precinct wall, all whitish that the local soils and clays, have been from the first sight supposed to be a mixture of local soils and lime. Nevertheless, proving that was an obvious target. When the digging work was done, we took samples from the trench wall, in order to test them in a lab. We add in this comparison lot two samples of lime from the previous campaign, taken from the kiln discovered at the Small Mound.

All the samples analysed (see Table 2) are from Băneasa, campaign 2023 (marked by the prefix T) and 2024 (with only the numeric code). Most of the samples from 2024 have also photos (Fig. 15).

As a side note, it is interesting to tell that in the process of collecting the samples (using a trowel), we could sense that the lime bricks are consistent, difficult to breach, obviously

Table 2. Samples for XRF

code	XRF-code	nature, location	comment
T21	V-T21	lime from the kiln	taken from the bottom of the kiln, no photo
T84	V-T84	lime from the kiln	taken from the tunnel of the kiln, no photo
11	Sar–11	grid 14, below the anthropic layers	whitish, powdery substance drained through the cracks of the soil, of unknown origin, usually occurring below the anthropic layers, at Băneasa; fertilizer?[55]
17	V–17	lime, defensive ditch	chunk of lime, taken from the bottom of the ditch (therefore from the early days of the fort)
32	Arg–32	fragment of oven, grid 18	a split of the metallurgic oven (burned soil), taken as a sample of the local paleo-soil (ground layer of the antiquity); no photo
90	Cre–90	chalk from the house (grid 24)	a good quality chalk (one can draw with it), with a shape alike a river stone; casually present before on diggings at Băneasa (for instance in a military barrack); its presence within the contexts has not been cleared (decoration on the outer wall?)
92a[56]	T–92a	plaster from the house (grid 26)	plaster from the outer wall of the house; the walls are always made of adobe, in Băneasa; this chunk has a relatively thick plaster on the face
92b	Bri–92b	lime-brick	sample taken from the wall of the precinct; this is the mid-shade of colour (see Fig. 15)
93	Bri–93	lime-brick (-)	sample taken from the wall of the precinct; this is the darker shade of colour
94	Bri–94	lime-brick (+)	sample taken from the wall of the precinct; this is the lighter shade of colour
97	Ca–97	calcareous concretion	natural formation, on the lower layers of the bedrock (larger ones, like this, are usually found deep, around 3 m), from the side of the tip of the ditch
98	Arg–98	clay, geologic layer	native clay, as comparative term (taken from below the anthropic layer) for other compositions

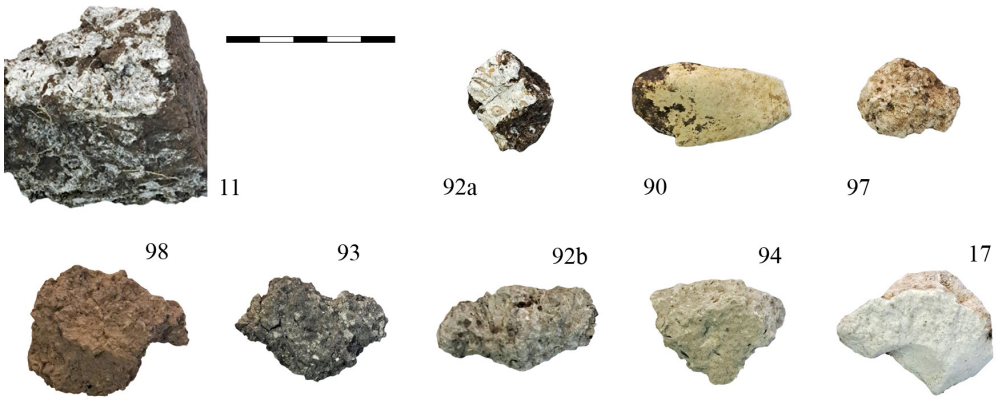

Fig. 15. Colour and texture for some samples within the Table 2 (for numbers see column 'code').

[53] Pots made out of kaolin (or a mixture) have usually a good sorting, but on the lower range, as quality. Of course, there is some variability, not of interest here on such low occurrence.

[54] We brought some arguments in this respect, analysing a post-roman context from the late third century (TEODOR/BĂDESCU/HAITĂ 2015, 128) trying to explain the shift in Roman pottery towards a preference for shiny grey pots, obvious for the fourth century, but never studied for the third century.

[55] Within the main analysis presented below, samples were powdered, therefore it is to be taken as a soil sample for grinded samples, as the mass of the whitish coat was tiny.

[56] There are two samples '92' in this set, due to a mistake on the field. The two has no connection and have been later separated with an added letter.

tougher that other matters from the list, as local clays and soils. This could enlighten the reason behind such a mixture.

The main comparative terms are the next: 3 samples of crude lime (not mixed); 3 samples from the lime-bricks, of three different shades, a lighter one, a darker one, and a middle one; 3 samples of matters related to limestone: a chalk brought from abroad, a chunk of calcareous concretion (local), and a plaster from the house; 3 samples of local clay (or other local soil).

The study was performed at IFIN-HH,[57] near Bucharest, using a Bruker TRACER 5^{i}, a handheld portable spectrometer whose operating principle is based on X–Ray Fluorescence and energy dispersion (EDXRF), offers high analysis speed and sensitivity, making it ideal for elemental analysis. Designed specifically for method development in research and complex material analysis, the TRACER 5^{i} instrument analyses chemical elements from magnesium to uranium. Its excitation source is an X–ray tube with a Rh anode installed behind a beryllium window, with the voltage used during analyses ranging from 6 to 50 kV and a current intensity of 5 to 500 microA. The collimation of the X–ray beam for an angle of approximately 53° relative to the control panel surface is selectable, with a focal spot size of 3 or 8 mm[58]. The detector is a solid-state Silicon Drift Detector (SDD) with an area of 40 mm^2. The resolution (FWHM) for X–ray fluorescence detection in the SDD variant is 190 eV ±5 eV. For small-sized samples (as in this case), the spectrometer can analyze in a vertical position. The analyses were performed in air, with no filter, using the included software in three variants: Limestone (acquisition time: 300 seconds), GeoExploration (90 seconds), and Mudrock (75 seconds).

Working with lump-type samples (as they were collected) was challenging because the material in question is not homogeneous (see Fig. 15 again, especially 98, 93, and 92b). The first round of measurements was conducted on lump-type samples, attempting to analyze different sides of the object separately (primarily for samples 11 and 92a). The second round of readings was performed on grinded samples[59], which provided the most valuable data. All data presented below was acquired in Limestone mode.

From the original data have been excluded all columns addressing error limits, because the original table would not fit the available with of the page.[60]

A relevant observation one could make before any automated statistics: the table is split in two equal parts, separating from the start the 'lime' area (yellow) from the rest; note that any of the columns have mixed ranges on the two halves. The most relevant column is, of course, calcium carbonate (CaCO3), so defining for lime. The upper half is in the range 87.77%–96.6%. On the lower half, there are two samples of lime bricks isolated between the upper range, and the lower range below (11.78%–48.4%), with figures like 54.22% and 62.77%; these two samples are obvious mixtures of clay (soil) and lime. Looking back to the Fig. 15, we see that those two (92b and 94) are the samples with a lighter shade. The third sample of brick (93) has a lower content of calcium carbonate, at the same level as one of the 'clay' sample (32, not illustrated; see 98). Why would be that?

Table 3. XRF data, grinded samples, *Limestone* mode – values in weight percent (wt %).

group	sample	MgCO3	Al2O3	SiO2	SO3	K2O	CaCO3	TiO2	MnO	Fe2O3
lime	V-T84	1.36	0.12	0.55	0.19	0.04	96.60	0.09	0.05	1.01
lime	V-T21	5.65	0.17	0.11	0.20	0.01	93.55	0.04	0.02	0.26
lime	V–17	3.14	0.12	0.02[61]	0.11	0.03	96.32	0.04	0.03	0.21
chalk	Cre–90	7.81	0.27	2.01	0.22	0.25	87.77	0.09	0.09	1.49
concret[62]	Ca–97	3.26	0.21	2.47	0.18	0.43	91.33	0.26	0.03	1.83
plaster	T–92a	4.70	0.17	0.68	0.16	0.18	92.96	0.12	0.03	1.00
brick	Bri–92b	8.41	0.93	12.96	0.63	1.92	62.77	1.42	0.26	10.71
brick	Bri–94	9.03	1.26	17.13	0.49	2.35	54.22	1.86	0.24	13.42
clay	Arg–98	17.04	3.37	34.77	0.69	5.73	11.78	3.60	1.02	22.00
clay	Arg–32	13.67	1.32	19.01	0.47	2.74	48.40	2.03	0.36	12.00
brick	Bri–93	13.14	1.38	18.42	0.58	2.84	48.30	2.00	0.37	12.98
paleosoil	Sar–11	19.98	2.76	31.88	1.03	5.23	13.21	3.37	0.91	21.63

It is the right time to say that the description provided so far for the 'lime-bricks', as a mixture of lime and clay, is oversimplified; in reality, the lime has been mixt with whatever came out from the ditch, and this is the real reason behind the shade differences. Digging the ditch and rising the wall were simultaneous actions; therefore, in the earlier stages of digging, the extracted matter was rather a vegetal, relatively organic layer of soil. This is what made sample 93 colour so dark. It is, obviously, not a thorough mixture, as bits of lime are visible on the surface.[63] Interesting to note, sample 32 (burned clay) has also a high figure for CaCO3, which is more difficult to explain[64]. The layer in which the oven has been carved (below the foot level) could contain some calcium carbonate (compare with the sample Ca–97).

Another interesting fact is that the plaster (T–92a, from the outer wall of the house) is pure lime, with almost no additives. A consequence would be that in the area there were other lime kilns, because the house has been made (years) later than the fortlet.

Proceeding to the automated statistics, we will use for the start with the dataset provided by the mode *GeoExploration*,

[57] Horia Hulubei National Institute for Research and Development in Physics and Nuclear Engineering, Măgurele.

[58] The last has been used in our application.

[59] Contained in small transparent plastic boxes, known as 'mylar sheets' (125 micron thickness).

[60] Nevertheless, all original data will be provided as 'supplementary files'.

[61] Under the limit of detection (yet one need figures for statistics). The detection limit is here 0.3.

[62] Abbreviation for 'calcareous concretion' (not 'concrete').

[63] The vegetal soil at Băneasa is very good (typical for chernozem area) and of a dark shade, with no pebbles.

[64] Yet not impossible. That bulk of 'clay' comes from the small kiln's wall. Chalk or bones are usually used in metallurgical kilns as fondants, lowering the melting point. The process could rise the level of calcium carbonate in the mixture.

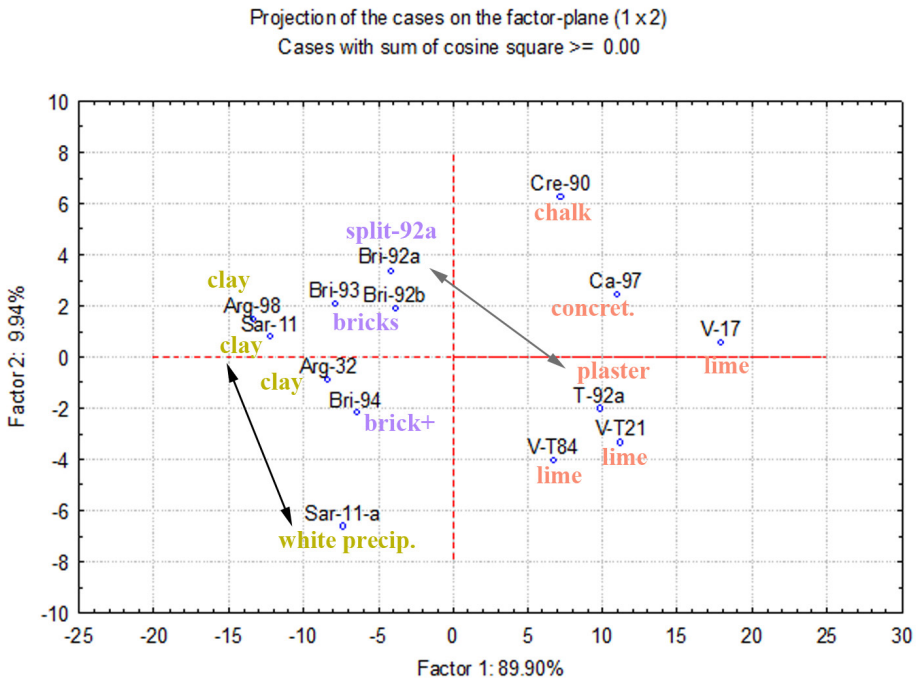

Fig. 16. Principal Component Analysis (covariances) for PC1 and PC2, for samples within the Table 2, data acquired in *GeoExploration* mode.

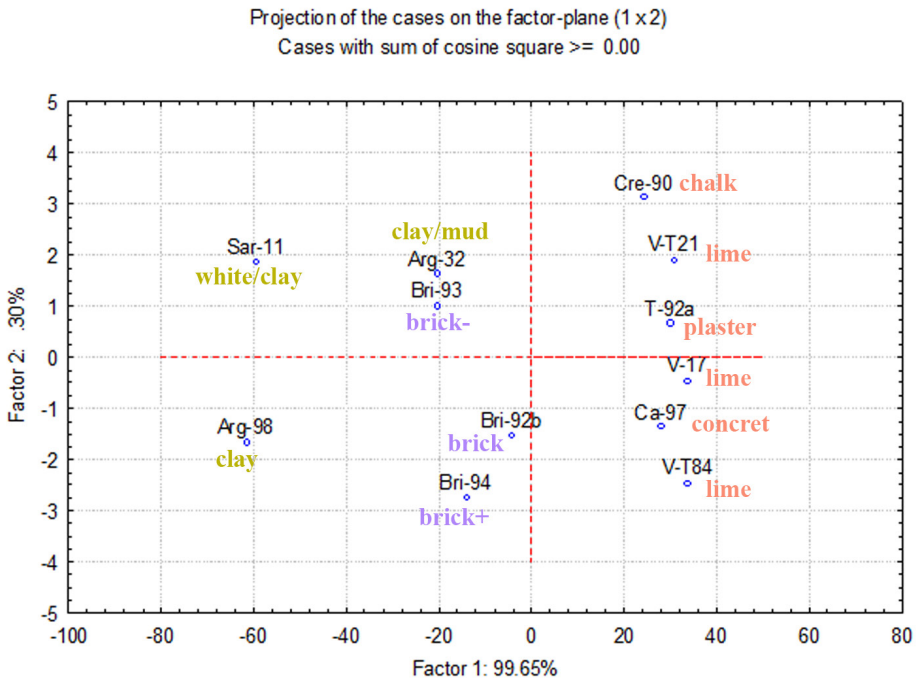

Fig. 17. Principal Component Analysis (covariances) for PC1 and PC2, for grinded samples within the Table 2, data acquired in *Limestone* mode.

with readings made on samples before grinding them. Data processing showed in the Fig. 16 is Principal Component Analysis (PCA), which provided a clear separation between limestone-based compositions (lime, plaster, chalk, calcareous concretions) and soil based mixtures (all the left side of the graph). Some samples required readings on two different faces, as they were uneven; so was the plaster (T–92a) and its muddy support (noted Bri–92a, see the arrow), but also a second pair – Sar–11-a (whitish precipitate) and Sar–11 (a clay based layer). On the left size of the graph (with negative values on X axis), one can see two groups of samples, one in violet-blue, mainly lime-bricks, and the other in mustard-yellow, which are basically clays (soils).

The next graph (Fig. 17) is also a PCA test, made on grinded samples, with data collected in *Limestone* mode. We have there, again, a clear separation of the limestone-based matters (all the right side), and the rest of the samples on the left side. It is interesting to note here that the lighter shades of lime-bricks (noted *brick+* and *brick*) have their own 'quarter' in the centre, near the vertical axis, at the half way

Table 4. Variable contribution, based on covariances (data from *Limestone* mode).

Factor	1	2	3	4	5	6	7	8	9
$MgCO_3$	0.02518	**0.74828**	0.02016	0.06454	0.01332	0.00291	0.01195	0.00180	0.11186
Al_2O_3	0.00090	0.00070	0.04680	**0.23445**	0.47158	0.00030	0.04360	0.06201	0.13966
SiO_2	**0.12651**	0.09881	**0.25880**	**0.35427**	0.00855	0.01212	0.02157	0.00001	0.11937
SO3	0.00006	0.00003	0.00970	0.02475	0.24387	0.33745	0.01884	0.18615	0.17916
K_2O	0.00327	0.00138	0.04187	**0.16254**	0.14395	0.25171	0.28195	0.00041	0.11292
$CaCO_3$	**0.78872**	0.00566	0.00003	0.07056	0.00773	0.00117	0.01228	0.00125	0.11261
TiO_2	0.00139	0.00170	0.00042	0.00976	0.07765	0.22495	0.58643	0.02296	0.07472
MnO	0.00009	0.00000	0.00764	0.07060	0.00034	0.16037	0.00105	0.71841	0.04150
Fe_2O_3	0.05388	**0.14344**	**0.61459**	0.00853	0.03302	0.00903	0.02233	0.00699	0.10821

between 'clay' and 'lime'. The third one, which has the darkest shade, noted *brick-*, is next to the sample taken from the oven,[65] showing their close relationship.

We paid attention to the variable contribution, based on covariance, in order to understand which of the compounds are relevant for the automated classification (Table 4).

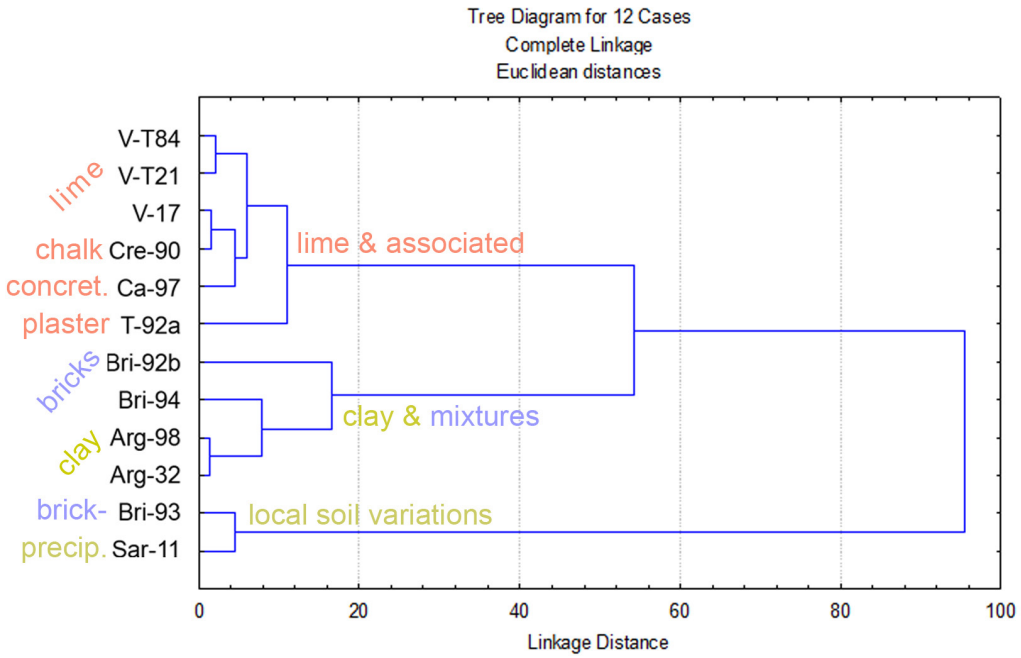

Fig. 18. Cluster analysis for the same batch of data as in the **Fig. 17.**

In the Table 4 we have highlighted relevant data for first 4 factors, as they drove results for the main PC tests (PC1+PC2 and PC3+PC4), resulting that the key components are, in order, calcium carbonate (CaCO3), silica (SiO2), magnesium carbonate (MgCO3), ferric oxide (Fe2O3), aluminium oxide (Al2O3) and potassium oxide (K2O). Using these highlights, we understand better why, for instance, the samples Arg–32 and Bri–93 are so similar, even if such a 'kinship' has not been anticipated.[66]

The same set of data has been tested on a Cluster Analysis (Fig. 18). The results are just another view of the same reality: all limestone-based matters are closely associated, in the upper side of the graph; the lighter shaded brick samples are closely associated with the local clay, suggesting that the amount of clay has been larger than the amount of lime; the two samples from below stand together, but far away from all others. One of them is the darkest shade brick sample (noted *brick-*), the other is the mysterious whitish precipitate, not really clarified as composition and nature.[67]

Although we do not know any exact analogy for the lime-bricks, the combination is unlikely to be completely unknown. For instance, describing his diggings at the fort Săpata, from 1929–1930, Vasile Christescu wrote the next (about a wall from the inner side, translation):

...the bricks were not bound with mortar, but with a sort of dark clay, mixed here and there with lime-dust (Rom. 'praf de var').[68]

SOME OUTCOMES

The lime-bricks came as a real chance for better understanding the building system of the precinct. As shape they are highly similar to slices of turf (lat. *caespites*) mentioned by many reports, especially for Britain,[69] but not only.[70] Such walls usually do not need a foundation[71] or poles

[65] The oven has been carved starting from the foot ground, which is a vegetal, organic layer, therefore similar to a lime-brick mixed with mud.

[66] We will not provide here the graph for PC3+PC4, as it is not bringing relevant news.

[67] This is a riddle as old as the diggings in Băneasa: whitish substances precipitated along the soil cracks, visible below the anthropic layers. Seeing the cluster analysis one thing crosses our minds: within the rain water draining through the cracks goes down not only that soluble matter crystalizing later, but also mud from above, explaining so the similitude between Sar–11 and Bri–93.

[68] CHRISTESCU 1937, 151.

[69] The literature is huge, but see a recent and elaborated paper by ROMANKIEWICZ *et alii* 2022.

[70] For instance MORILLO CERDÁN/GARCÍA MARCOS 2009, about the Roman camp from Léon, Spain. See especially 393, Fig. 2, with a beautiful picture of a turf (?) wall.

[71] Antonine Wall has a shallow foundation, made of one row of boulders (BREEZE, 2004, 10, see the photo from left-up), having as the main purpose to provide a horizontal line and a stable ground base. In comparison with

(wooden structure anchored into the ground), standing on their own weight. In order to prevent them sliding away, some measures were yet taken; for instance, at the Antonine Wall, the inner rows of turf had another orientation than the faces ('cheeks').[72] A similar purpose could have the large boards from the outer face, at Băneasa, keeping the brick wall aligned.

Defensive walls made of turf are occasionally mentioned in archaeological literature from Romania, yet a clear evidence is scarce: Bumbești, where a *murus caespiticius* is attested epigraphically, but also some certain archaeological discoveries of the sort – as Mălăești and Bumbești.[73] Note that all three are located far northern, at the foot of the mountains, in much colder and wet conditions, therefore such claims are veridic.

The reasons for doing such a wall are obvious: first of all, the wood was a rare commodity in the area, difficult to provide, mainly in a short period of time. On the other hand, within the conditions from lower Wallachia, with harsh winters and hot, dry summers, the grass is poor even in late springtime; therefore 'turf' was not a great idea. A mixture of local soils and lime could provide the building material, especially in midsummer, at high temperature, to dry them up. We never heard such a thing, like lime-bricks, but it might not be a 'first'.[74] Was it 'an improvisation'? Very likely, but was not the only one. Antonine Wall was itself planned one way (in stone), and turn out completely different (in turf).[75] Turf was easier to provide in large quantities, even in Scotland...

The lime-brick wall gives an opportunity to reassess some of the conclusions from the previous campaigns at Băneasa, as some patterns became obvious, all connected with the defensive system. For instance, the unusual length of the berm, 11 m for the fortlet, but similar at the large fort (phase 1), about 10 m.[76] Another striking coincidence is the very modest size of the rampart, not taller than 0.4-0.5 m, which is true for all places where we intersected it.[77] We will add here the 'strange' observation made at the north-eastern corner of the fort, and quote: 'this small "*agger*" (strengthening the palisade's poles) contains no clay, but vegetal soil removed from the upper layer of the defensive ditch'.[78] This could be now understood differently, as a rampart made of turf, yet not preserving visible traits. Such a turn could explain better other fact that bothered us for years: 'where is the palisade?' There was none! Pole pits have been found here and there,[79] missing the expected density, diameter, and depth, to possibly being ascribed to a palisade. Large pole pits are not missing, but occur only at the tower-gates,[80] with impressive dimensions (diameters around 35 cm,[81] depths around 1 m, measured from the antique ground).[82] Those small poles, irregularly aligned with the line of the defences, are just buttresses aimed to keep the turf wall together, and very likely supporting wooded battlements.

The outcome is that the building system was very similar for both phases of the main fort, but for the fortlet also. This is strongly suggesting that the military unit that made the works is the same. After the disastrous end of the phase 1 of the fort (139 × 139 m between the precincts, completely burned, all around),[83] just some minor part of the garrison survived, moving in the new fortlet (61 × 40 m), but only temporary, as long as needed for building the new precinct of the fort, restrained to a (strange) 139 × 65 m. Although proportions are just indicative, the second phase has a surface of only 47% or the first phase, and the fortlet – only 13%. That could be very well the relative sizes of the garrison, for each stage.

There is no doubt that the fortlet has to be dated between the two phases of the fort. The area of the fortlet has been used before, as seen with the metallurgic small oven, just a short while before. The same area has been used after, as documented with the house and the shed.

But what is the general chronology? Did the Romans housed in from 'Trajanic times', as some still believe? As previously stated, a numismatic study is now necessary, but the archaeologists should have the right of an opinion, aren't they? Let's take a look at the data (Table 5).

This is all we have from the site. Note that the finds of C. Bolliac, from 1869, match almost very well the structure of our finds. The numismatic evidence cannot be linked to the history of the second century AD. We have still a problem documenting the second phase of the fort, for which there are available only two coins from Julia Domna, found in

the fortlet at Băneasa, that was a very large and heavy construction. Note that the outer side had large boards, making the battlements (BREEZE 2004, 14), as well as in Băneasa case.

[72] Running in diagonal (45°) of the outer faces (ROMANKIEWICZ *et alii* 2022, 115, illus. 5).

[73] BOGDAN CĂTĂNICIU 1981, 40. We could add here Oratea, where we recently dug. That was a particular situation, on which the turf cannot be seen on stratigraphy, but it was deduced contextually: a rampart made apparently in clay, although no source of clay in sight (just stone), therefore they might have used turf instead (that was plenty around, the site being located around 900 m high, see TEODOR 2022A, 164–66, esp. Figs. 10 and 12).

[74] These lime-bricks suggest some experience in building with dry bricks, somewhere in Orient or North Africa.

[75] HODGSON 2020, asking himself 'why in turf?'

[76] See TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 96, which does not stand for the second phase of the fort, where between the defences and *via sagularis* there are 5 m (TEODOR/DUMITRAȘCU 2023, 692 with the Fig. 2)

[77] TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 89 with Fig. 6, for the north-eastern corner of the fort; TEODOR/DUMITRAȘCU 2019, 109 with Fig. 6, for the eastern gate, phase 1; TEODOR/DUMITRAȘCU 2023, 694 with Fig. 3, for the eastern gate, phase 2. The south-western corner of the fort (campaign 2016) is affected by erosion, therefore is not a fit term of comparison.

[78] TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 88.

[79] TEODOR/DUMITRAȘCU/ȘTEFAN 2017, 88 with Fig. 5, for the north-eastern corner; TEODOR/DUMITRAȘCU 2019, 106 with Fig. 3, for the eastern gate, phase 1; TEODOR/DUMITRAȘCU 2023, 692 with Fig. 2.

[80] Such gates, missing the flanking towers, are well documented in Britain (REDHEAD 1989, 32, see type Ic), being a single portal structure, having from three to seven pairs of posts, with the road driving through; ten such free standing fortlets from Britain have such type of gate.

[81] Diameter given for the poles, not for the pits, following traces of (burned) wood. The pits are obviously larger.

[82] With only one notable exception, at the south-western corner (TEODOR 2016, 112–113 with Figs. 4 and 6), with a very large and strongly burned pole, as well as at the eastern gate (phase 1). We were not able to find at least a pair of it, but the area was strongly deranged by the diggings made within the Second World War. The existence of the corner towers is not clear at all: at the opposite corner of the fort, the north-eastern, there is no place left for a tower, as there is no *intervalum* and the barrack comes next to the edge of the fort. Note that we found no clue for a corner tower at the fortlet as well.

[83] For a very good aerial photo illustrating the fact see TEODOR 2015A, 103, Fig. 4.

Table 5. Coins found at Băneasa.

issued by	type	date	campaign	comment
A. Pius to Caracalla	both		1869	Bolliac, 'several coins from'[84]
Antoninus Pius	sestertius	153–156	2008	stray find, fully worn (flat)
Septimius Severus	denarius	196/7	2024	
Septimius Severus	denarius	208	2016	moderate worn
Julia Domna	denarius	193–211	2022	moderately worn, but burned; the second phase of the fort
Julia Domna	denarius, fourré	post 211	2022	burned, poor conservation; could date any time before 240; the second phase of the fort
Julia Domna	denarius, fourré	post 211	2017	relatively worn, legible
Caracalla	denarius	213	2019	good estate, slightly worn
Caracalla	denarius, fourré	216+	2024	low quality, very poor conservation
Julia Mamaea	denarius	222	2024	moderately worn
Severus Alexander	denarius	222	2017	new, fine conservation
Severus Alexander	denarius	222 or 223	2017	billon, partially burned, poor conservation
Severus Alexander	denarius	223	2017	new, fine conservation

2022. One of the reasons would be the relatively limited diggings in the western side of the fort; another – the troublesome monetary circulation from the second half of the reign of Severus Alexander (dead in 235).

When the second phase of the fort at Băneasa was made? Any time after 225 (or so), because the latest mint found in the barrack is 223. We have no argument to say that the construction of the smaller second phase fort would take one or five years. What we know is that all three fortifications were made in the same manner,[85] and very likely by the same military unit. The remnants of the defeated unit, in that terrible fire, were moved in a provisory fort (named here 'fortlet'), and that one functioned a very short time. How short? There are no signs of barracks inside, so they lived in tents,[86] probably avoiding the harsh winter, therefore very likely only several months. This is the most likely hypothesis.

Some questions remain; for instance: if the builders were the same, why did they use lime-bricks for the fortlet, but just turf for the second phase of the main fort? One answer could be the length of the precincts, twice as long as the main fort (second phase, 408 m vs 202 m) and the difficulties to provide necessary raw material (limestone or lime) in a limited time (summer to early autumn).

A thing is anyway clear: there is no 'double' fort at Băneasa; we have only the main fort, with two building phases, and a temporary fortlet.

EXCURSUS: 'DOUBLE FORTS'

The concept could be found in the Romanian literature for a long span of time,[87] and it is always about *Limes Transalutanus*. Nobody bothered to give a definition for the 'double forts' (Rom. *castre duble*), but the rational model seems to refer to some situations encountered along the Antoninus Wall, where to the main forts there have been added 'annexes', enlarging the garrison capacity. In order to have a comparison term, we made a sketch of the situation from Golden Hill – Duntocher (Fig. 19).[88] What do we have there? The older fortlet ('mile-castle' type), the new

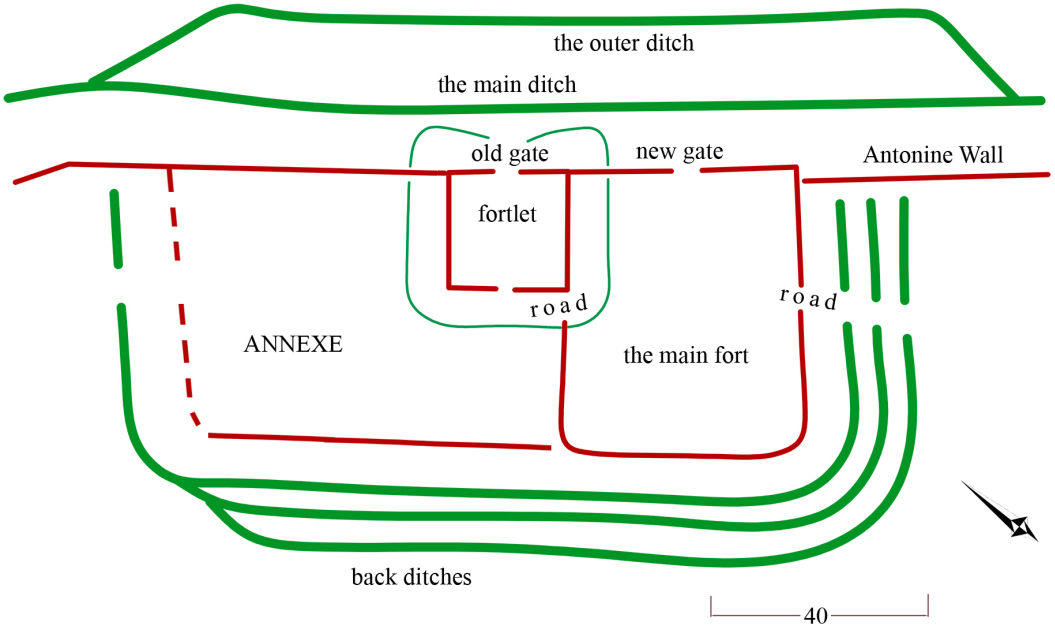

Fig. 19. Sketch of the fort Golden Hill – Duntocher (after Breeze 2004).

[84] CANTACUZINO 1945, 446–447. All lost and not proper identified.

[85] Including the one-tower gate, with the road crossing the tower. For those we know some analogies on... Antoninus Wall (BREEZE 2004, 12, 13, 19), which is pushing us back in the never-ending-story. One-tower gate (or 'a single portal gate') is yet know from other places in Britain, with other chronologies, as Castelshow (near Manchester, REDHEAD 1989, 29–31). Such gates are documented from the conquest time, but are typical for second century and later, both for fortlets or forts (REDHEAD 1989, 32–33). There is no 'anchor' for Antoninus time.

[86] The fortlet is really small, yet following calculations with Hyginus directions (CAMPBELL 2018, 17), inside it could be temporarily housed (in tents, of course) 5 *centuriae*, including a small command section (because a sixth 'century' could fit also).

[87] CHRISTESCU 1937, 126; PETOLESCU 1981, 5; BOGDAN CĂTĂNICIU 1997, 95; BEJAN 1998, 42. Interesting to note, the Nomination avoids the old fashion 'double forts' for much cautious 'nearly adjacent fortifications' (FRE-D-ND, 86).

[88] BREEZE 2004, 12 (Rough Castle), 19 (Beardsden); 45 (Mumrills). As the

main fort, crossed by a road running along the Wall, and the Annexe, also aligned to the Wall, using also a side of the main fort, with no ditch between (therefore added immediately). Any of the annexes at the Antonine Wall share similar traits, and we brought it here as a comparison.

Along *Limes Transalutanus* there are several places of interest for our discussion; from north towards south, they are the next: Râșnov (*Cumidava*), Jidova, Săpata de Jos, Urlueni, Băneasa, and Flămânda (Fig. 20).

About the small fort from Râșnov we found out recently, due to geophysical works.[89] Near the eastern corner of the main fort, magnetometry revealed a fortlet, 65.5 × 45.2 m (inside the ditch). The fortlet's ditch is cut by the later main fort's ditch; therefore, obviously, they did not functioned together.

The fortlet from Jidova[90] is located 300 m south of the main fort near Câmpulung, on the same western bank of the *Râul Târgului*, theoretically marking the frontier. The distance between the two, as well as a ravine located in between, are excluding any possible military cooperation (Fig. 21). The northern fort, much larger (1.3 ha), is very likely a third century garrison (and not earlier), and have been researched for many decades.[91] The fortlet from south has far less research and its situation is far less certain.[92] Most likely, it is an early second century earth and timber building, measuring 65 × 60 m (as the last report gave) or 80 × 57 m, as the LiDAR documentation suggests.

The forts from Săpata (renamed recently Mârțești) are made on a narrow terrace near Cotmeana Valley, flanked on three sides by steep ravines. The fort has taken most of the terrace, the fortlet being cramped on a small corner at the tip of the terrace. The fort (121.7 × 91.3 m) have a large ditch (unusual large, about 25 m),[93] shared on a corner and half of the southern side

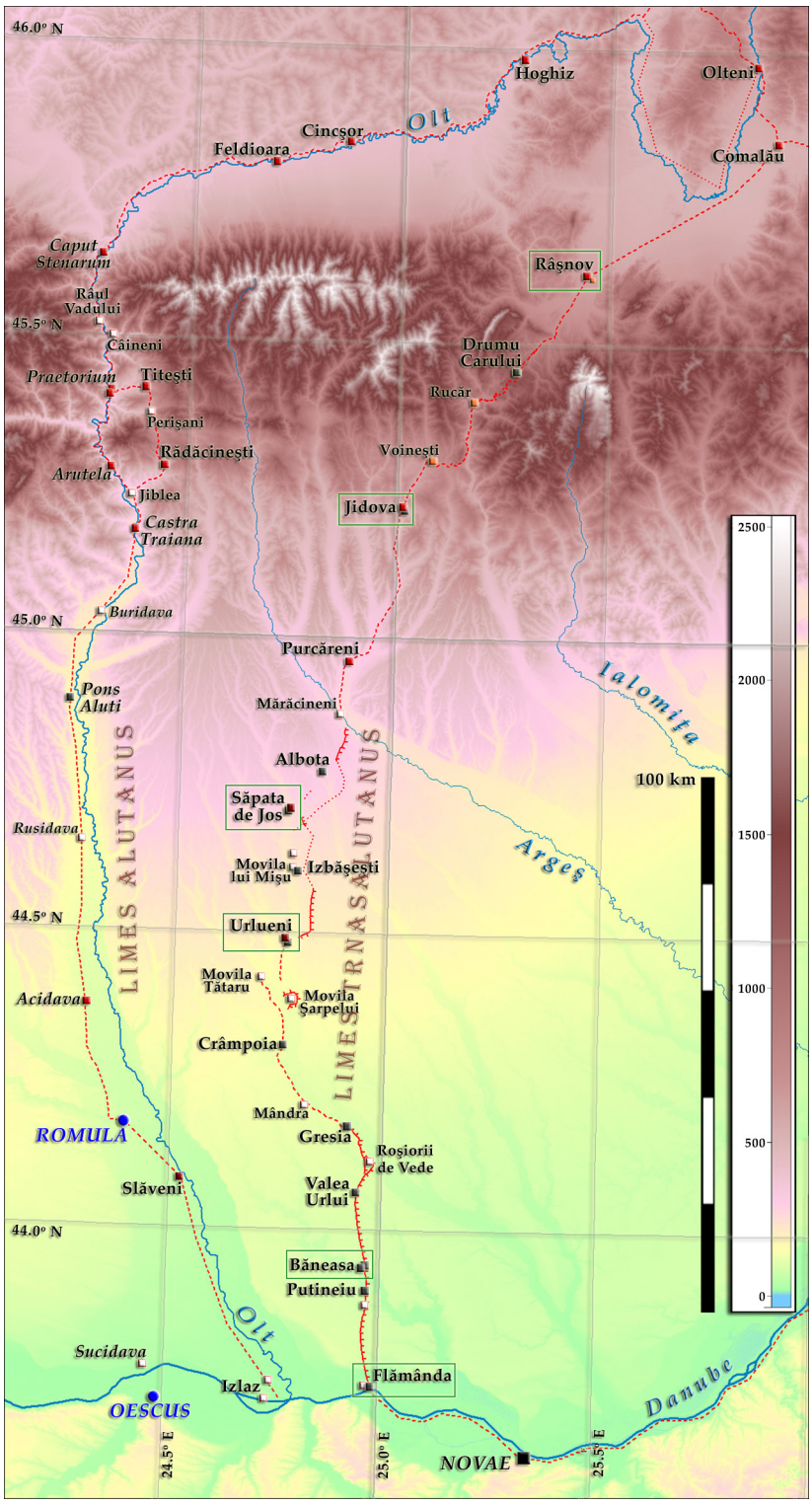

Fig. 20. Map of the southern Romania, rendering *Limes Alutanus* and *Limes Transalutanus* (own map).

with the fortlet (45 × 45 m), a fact rendered differently by different authors. The first plan, published by Tocilescu in 1900, proved to be the most resilient,[94] if not the best; it shows a small interruption of the fort's ditch on its southern side, although the only archaeologist ever dug there did

published image has not the best resolution, we made a simplified sketch, with the main compounds. A general presentation of the Antoninus Wall can be found on https://scarf.scot/thematic/theantoninewall/, portal of the Scottish Archaeological Research Framework (SCARF), including one section dedicated to the 'annexes' (3.7). The plan for Golden Hill – Duntocher has been downloaded from SCARF.

[89] ȚENTEA/POPA/PETOLESCU 2017, esp. 147 with the Fig. 4. For more comments of my own see TEODOR 2022B, 301–303.

[90] Mentioned also with the place names *Biserica Jidovilor* or *Pescăreasa*.

[91] See the last paper (PETOLESCU/MATEI-POPESCU/DUMITRESCU 2021) for an overview.

[92] For an overview see TEODOR 2022B, 290–291.

[93] On the very same page (CHRISTESCU 1938, 434, Fig. 2) the author of the only digging at Săpata shows in the plan of the fort two ditches going around (including the fortlet), but also an altimetric section through it (noted 'Fig. 2 a'), showing one single ditch, even if very wide (25 m or more). Which is right? The second one. We understand that the width of the ditch could suggest a double ditch, yet on the field we can see only one. Note that no digging has been made outside the defensive wall (pretended to be a brick-wall, with no mortar, yet). Facts written by Christescu has been mixed in FRE-D-ND, 88, where one can read the next: "The enclosure was surrounded by two defence ditches, each with an opening of 25 m".

[94] TOCILESCU 1900, 133, Fig. 76. The same plan, but copied after TUDOR 1978, 299, Fig. 86, repainted, has been used by FRE-D-AN, 7.10. Săpata /sic, not 'Mârțești'/, Fig. 4, in order to 'prove' the same thing.

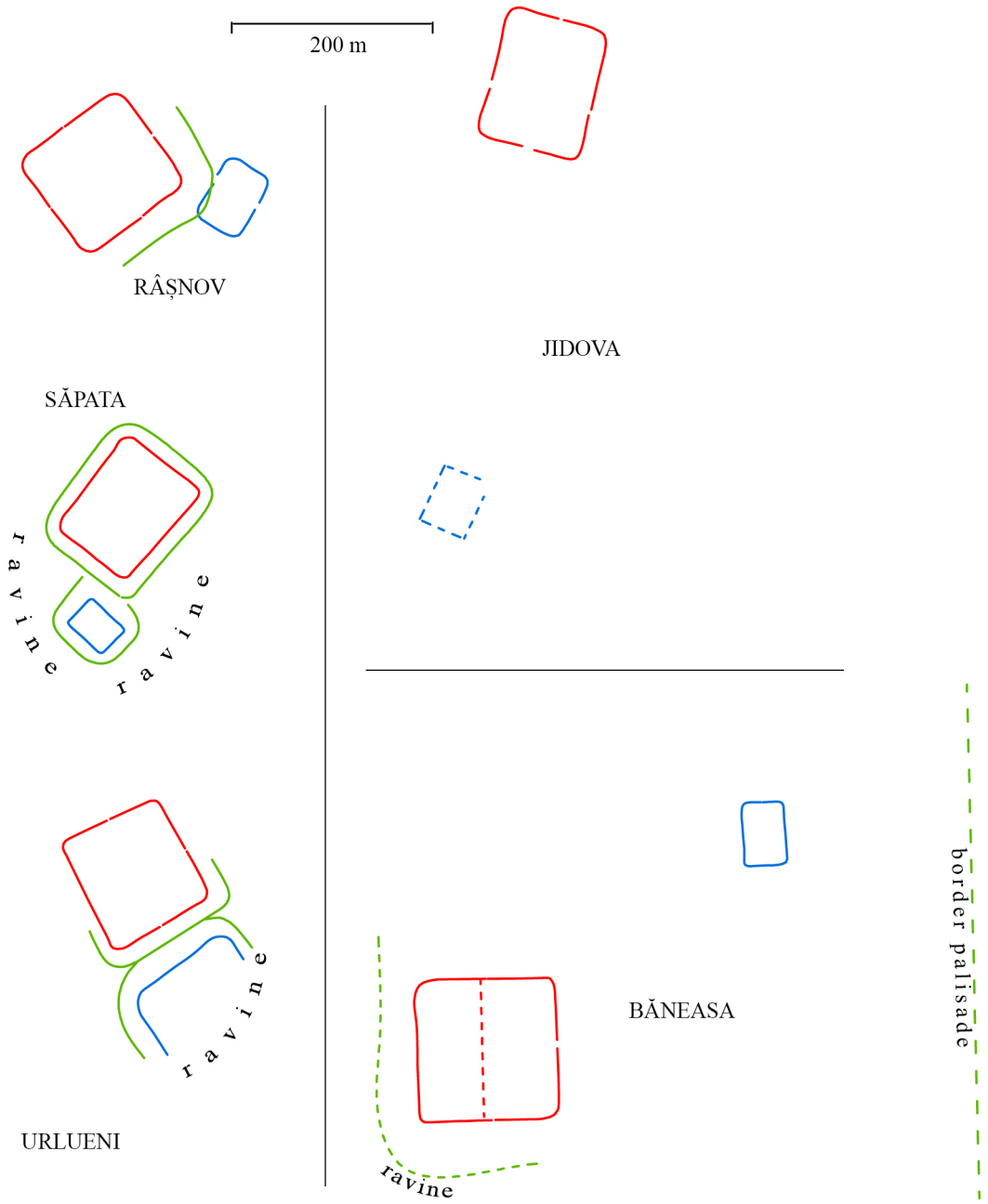

Fig. 21. Essential layout for the 'double forts' along *Limes Transalutanus*, at the same scale.

not.[95] Not only that the gate is not there,[96] but exactly there the ditch is the deepest, because the fortlet has been built later, cleaning and deepening the older ditch. This will last as a contending issue over years...[97] If so (a fact we still believe), than the fortlet has been made *after* the fort ceased to exist.

Urlueni is the only place where one could find a pair of forts of similar sizes. The larger one is 117 × 108.4 m (measured on a terrain-model), the smaller one conserves today only one complete side, 115.6 m long; Pamfil Polonic seen it before the collapse or the terrace, in late 19th century, giving for the opposite side 85.5 m. Those two forts are sharing the ditch from between (huge! 37 m wide), and are almost aligned (see again Fig. 21),[98] being the closest example for the forts and their annexes from Antoninus Wall. The

[95] CHRISTESCU 1938, 436, Fig. 2, drawn continuous ditches, with no suggested gates. FRE-D-ND (88) takes for granted Christescu's allegations about the two ditches around both fortifications.

[96] It is driving into a ravine. The most likely place to find a gate is on the northern side, where the access route is.

[97] We made a full demonstration of the fact, but not in a 'traditional' publishing format. It is yet still there, on the web-site of the *Limes Transalutanus* Project, on an illustrated database for Roman sites (south of Argeș River). Try it at http://breviary.limes-transalutanus.ro/, then use the 'search' line, for 'Săpata, Roman forts', see figures 4 (Pamfil Polonic's plan), 5 (plan of the forts as rendered on a high resolution model), and 6 (altimetric sections for that contentious area).

[98] Other sources for Urlueni plan: TEODOR 2015B, 61, Fig. 22 (vectorisation of the sketch made by Pamfil Polonic, late 19th century), depicting the small fort *in integrum*; FRE-D-AN, 7.12. Urlueni, Fig. 3 and 4.

situation is not clear at all. For instance: there is no frontier wall here; towards east we have a deep ravine, towards Cotmeana River, which made the frontier.

From the two, the larger fort at Urlueni is better known from archaeological diggings;[99] we know, for instance, the shape and orientation of *principia*, towards south-east, that is toward the smaller fort.[100] From a military point of view, there are good news, and bad news; the good news is that *porta praetoria* is looking towards the enemy, south-east; the bad news is that the gate drives into a large ditch, than to the small fort defences, and beyond those – a 20 m precipice! What could be more absurd than that? Briefly: doesn't matter here which was the first and which the second; the fact is that the two forts could *not* function in the same time. Our best guess is that the smaller fort is later.

As we have just seen, the fortlet at Băneasa is not strictly contemporary with the main fort; its use is restricted between the two phases of the fort.

A question still stands: why then pair forts appear only along *Limes Transalutanus*? The attempted answer about the late date of the frontier cannot be good enough, when along 45 years of evolution have been adopted different solutions, on different sections of the Dacian frontier. In the beginning of the third century forts like Slăveni, Bumbești or Răcari changed their palisade circuits on stone walls,[101] when – very likely – *Limes Transalutanus* was already in place, or at least under construction. As we see the facts, it is more likely to be connected on regional military style planning. Small differences of planning the defence has been spotted for 'military districts' commanded by larger forts from *Limes Transalutanus* (Băneasa, Urlueni and Săpata), identifying specific patterns for each. For instance, the distance from the fort to the frontier; existence/absence of a continuous frontier obstacles; density of the towers; preference for natural defended position; presence/absence of a fountain inside the circuit.[102] This feature of the new forts made near the old forts (and not overlapping them) could be a signature of the 'commanding style' along *Limes Transalutanus*.

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