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The fortifications of the Upper Moesian Limes : topography, forms, garrison sizes

Światowit : rocznik poświęcony archeologii przeddziewowej i badaniom pierwotnej kultury polskiej i słowiańskiej 10 (51)/A, 31-57

2012

Artykuł został opracowany do udostępnienia w internecie przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego. Artykuł jest umieszczony w kolekcji cyfrowej bazhum.muzhp.pl, gromadzącej zawartość polskich czasopism humanistycznych i społecznych.

Tekst jest udostępniony do wykorzystania w ramach dozwolonego użytku.

EMIL JĘCZMIENOWSKI

THE FORTIFICATIONS OF THE UPPER MOESIAN LIMES. TOPOGRAPHY, FORMS, GARRISON SIZES

The purpose of this paper is to systematize various types of fortifications lying along the limes of the Roman province of Upper Moesia, and to discuss some aspects of their topography and form. The fortifications are divided into several groups, such as legionary fortresses and cities, auxiliary forts, fortlets, freestanding towers, and others, which do not fall into aforementioned categories. Each group will be discussed separately. The paper also

deals with unit types and size of garrisons stationed in particular groups of fortifications.¹

The area of later Upper Moesia (*Moesia superior*) was annexed to the Roman Empire at the turn of the eras. This province was established by Domitian in AD 86. Its northern border was marked by the Danube, which was also the border of the Empire until the conquest of Dacia at the beginning of the 2nd c. AD. After the Dacian wars of

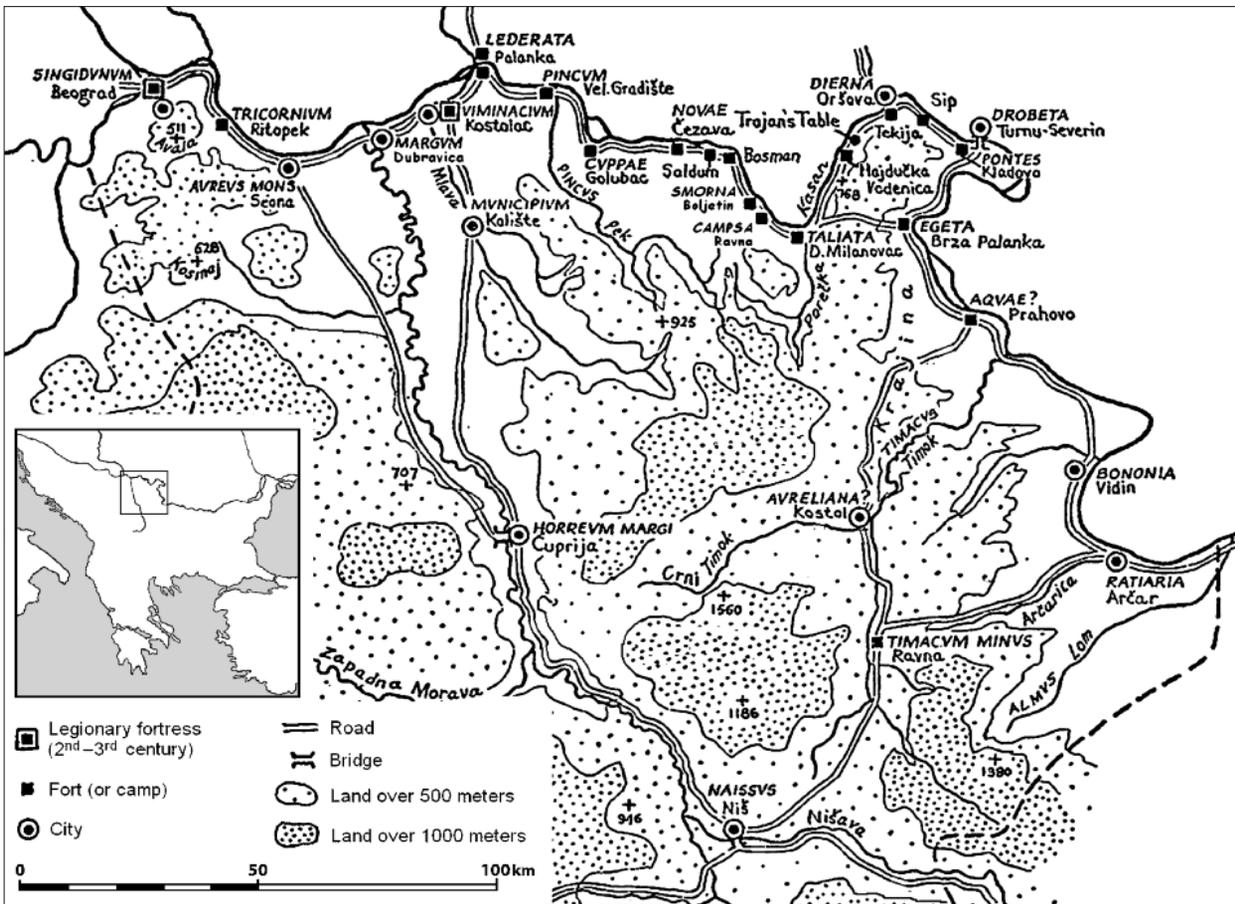


Fig. 1. Map of the Upper Moesian limes (E. Jęczmienowski, based on MÓCSY 1974: fig. 60).

Ryc. 1. Mapa limesu górnomezyjskiego.

¹ The present paper summarises [Br. Eng.] some of the results of my MA thesis prepared under the supervision of Prof. T. Sarnowski (Department of Archeology of Roman Provinces,

Institute of Archaeology, University of Warsaw) to whom I would like to express my thanks for his help and advice.

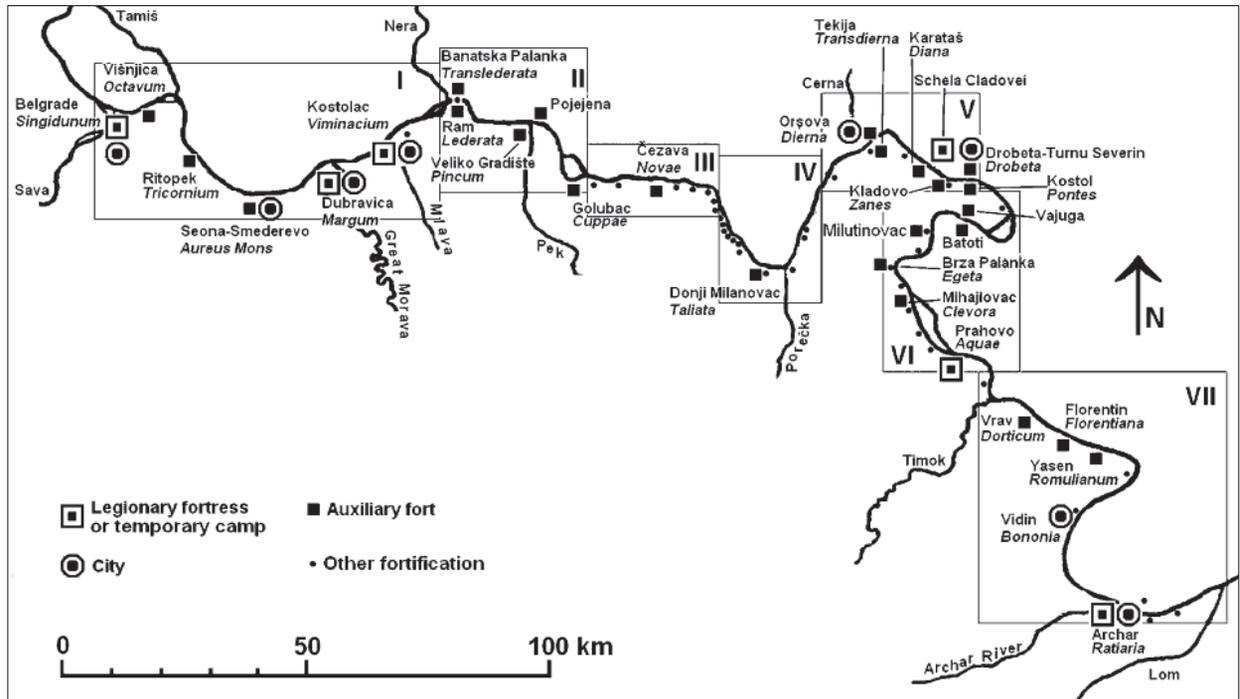


Fig. 2. The Upper Moesian limes. Sectors delimited for detailed mapping: Figs. 3–9 (E. Jęczmienowski).

Ryc. 2. Mapa limesu górnomezyjskiego. Sektory wyznaczone dla map szczegółowych: Ryc. 3–9.

Trajan (AD 101–106) the border of the Empire was moved to the north, yet, the Romans did not decide on the complete removal of garrisons in the section in question. There were several reasons behind this decision, such as the willingness to preserve the control of transport and trade on the Danube (GUDEA 2001: 44) and secure important mines lying in the interior of Upper Moesia, especially in the environs of the Kosmaj Mountain (MÓCSY 1974: 188). Another reason was connected with strategic location of the province, for troops garrisoned in Upper Moesia were a kind of strategic reserve, which could be sent into other fronts if needed (GUDEA 2001: 44). After the Roman withdrawal from Dacia ca. AD 270 the border was once more moved to the line of the Danube. It should be noted that after the division of the Empire into two parts, *Moesia prima*, the western part of former *Moesia superior*, which was now part of the Eastern Empire, was the border province between Western and Eastern Empires. In AD 441 the region was conquered by the Huns and the border ceased to function. It was not restored until the time of the reign of Anastasius and later, to a considerably larger extent, the reign of Justinian I. At that time many fortifications were repaired or built. The border was finally lost under the pressure of the Avars and Slavs at the turn of the 6th and 7th c. AD (SPASIĆ-DURIĆ 2002: 29).

In the present paper the term Upper Moesian limes will be used more in geographical rather than historical sense, for the province of Upper Moesia existed for about 200 years, while the time interval of my observations comprises the period of about 600 years, beginning with

the turn of the eras, and ending in the early 7th c. AD. Moreover, it has to be added that the borders of *Moesia superior*, while it existed under that name and when it was divided, also slightly changed. Consequently, in order to observe the continuity of the Roman military presence in a particular section of the Danube front during the period of 600 years, I decided to take rigid geographical frames. As the most appropriate ones I accepted those which lasted the longest as the limes of Upper Moesia, from the times of reign of Trajan until Aurelian. Thus, the territorial extent of the discussed section of the limes spreads from modern Belgrade in Serbia to the mouth of the River Lom in north-western Bulgaria (Figs. 1, 2). Most of the discussed sites lie on the right bank of the Danube, although in several cases sites lying on the left bank were included, because, as many sources show, they were under the jurisdiction of the governor of *Moesia superior* or provinces created from it after the Roman withdrawal from Dacia.

The archaeological investigations along the Upper Moesian limes are quite fragmentary. Our knowledge is based mostly on the works of modern travellers and scholars (Luigi Ferdinando Marsigli and Felix Kanitz) published in the 18th and 19th c., as well as on the results of excavations carried out in this area, with different intensity and precision up to the present day. Unfortunately, a considerable number of sites was not properly excavated, and the verification of the acquired data is impossible since many of them were sunk by the waters of the Danube due the construction of two dams in the 1960s and 1980s (cf. Figs. 4–8; sectors mapped here were inundated). The pace

Fig. 3. The Upper Moesian limes: Sector I (E. Jęczmienowski).

Ryc. 3. Mapa limesu górnomezyjskiego: sektor I.

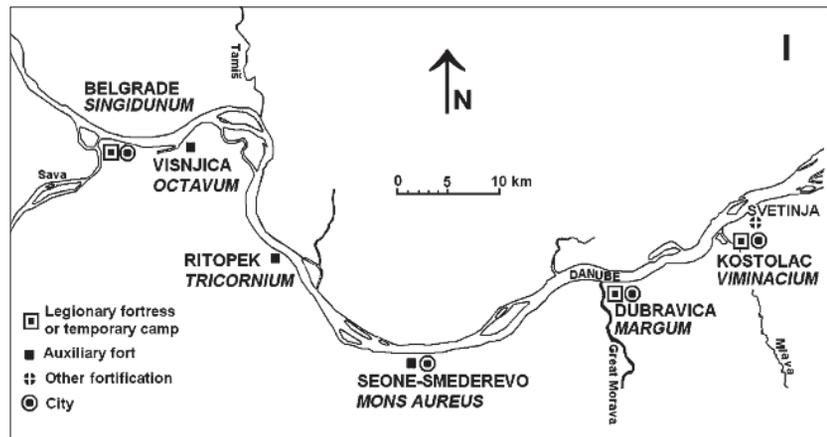


Fig. 4. The Upper Moesian limes: Sector II, before building of the Iron Gate I Hydroelectric Power Station (E. Jęczmienowski, based on "Starinar" XXXIII-XXXIV (1982-1983), 1984, map inserted between pages 28 and 29).

Ryc. 4. Mapa limesu górnomezyjskiego: sektor II, przed zbudowaniem elektrowni wodnej Żelazne Wrota I.

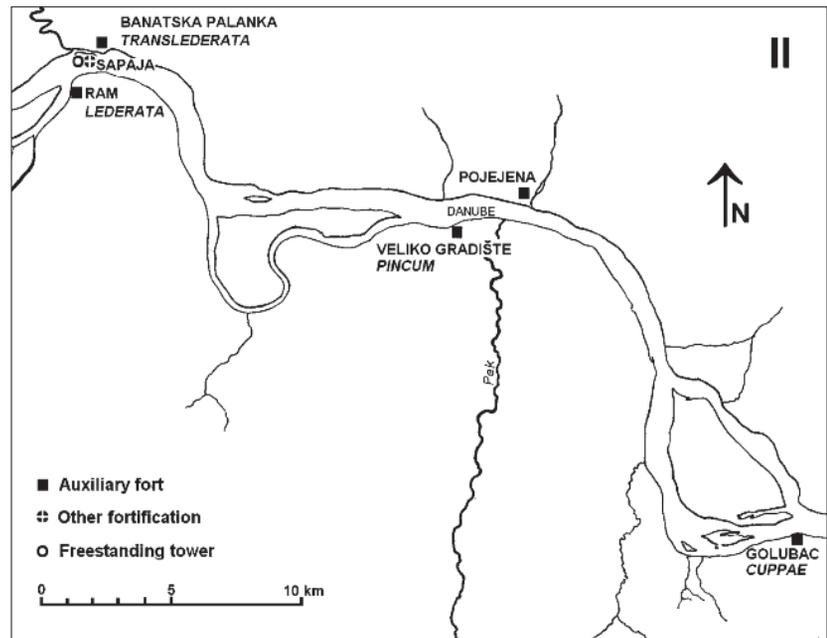
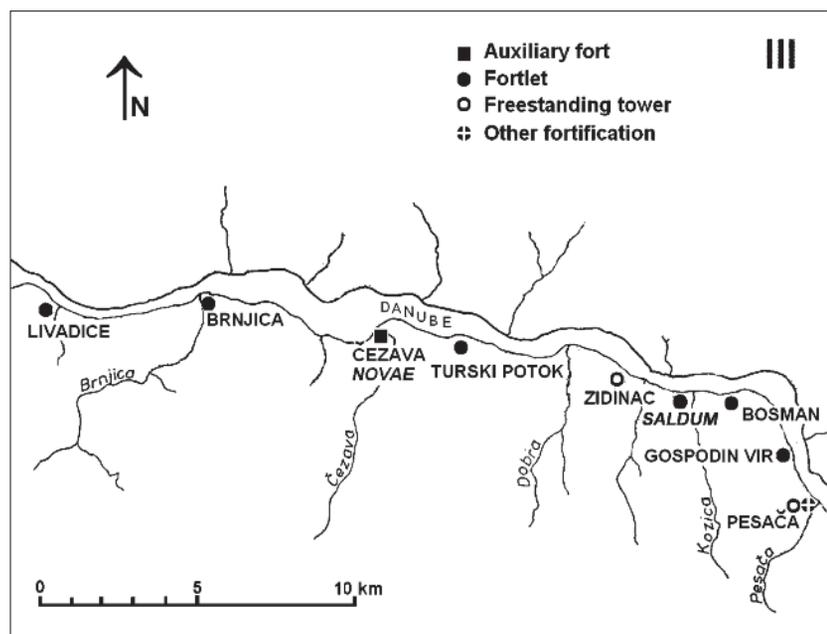


Fig. 5. The Upper Moesian limes: Sector III, before building of the Iron Gate I Hydroelectric Power Station (E. Jęczmienowski, based on "Starinar" XXXIII-XXXIV (1982-1983), 1984, map inserted between pages 64 and 65).

Ryc. 5. Mapa limesu górnomezyjskiego: sektor III, przed zbudowaniem elektrowni wodnej Żelazne Wrota I.



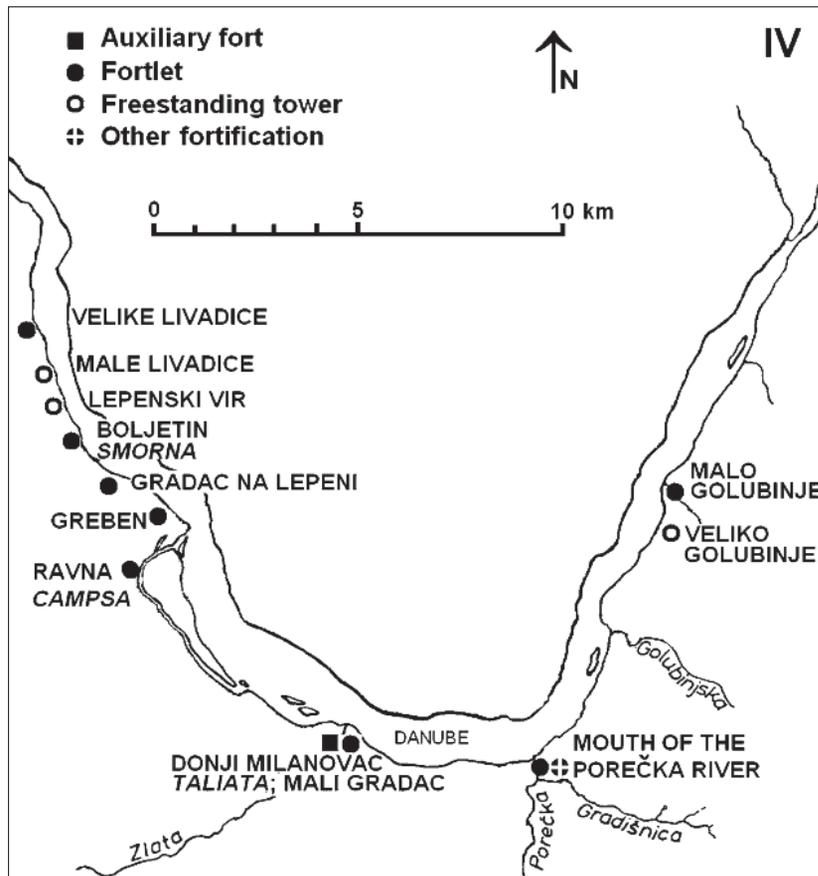


Fig. 6. The Upper Moesian limes: Sector IV, before building of the Iron Gate I Hydro-electric Power Station (E. Jęczmienowski, based on "Starinar" XXXIII–XXXIV (1982–1983), 1984, map inserted between pages 136 and 137).

Ryc. 6. Mapa limesu górnomozyjskiego: sektor IV, przed zbudowaniem elektrowni wodnej Żelazne Wrota I.

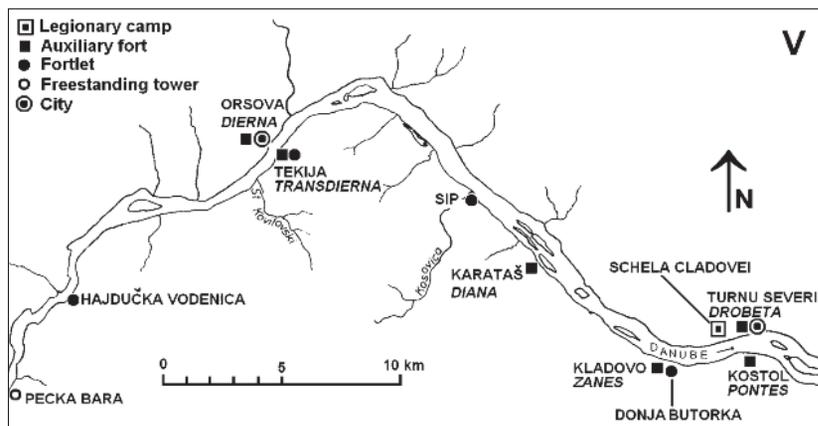


Fig. 7. The Upper Moesian limes: Sector V, before building of the Iron Gate I Hydro-electric Power Station (E. Jęczmienowski, based on "Starinar" XXXIII–XXXIV (1982–1983), 1984, map inserted between pages 304 and 305).

Ryc. 7. Mapa limesu górnomozyjskiego: sektor V, przed zbudowaniem elektrowni wodnej Żelazne Wrota I.

at which rescue excavations were conducted enabled at least their partial investigation, but also entailed its poorer precision. In many cases the quality of plans and photographs added to the reports is poor, but even so they make it possible for us to see the outline and size of the remains. Owing to that, it was possible to determine, mostly only hypothetically, types and number of the units which garrisoned there.

The results of the excavations carried out due to the construction of the dams were published mostly in periodicals. Sources connected with building the first one were published mostly in "Starinar," especially in volumes XXXIII–XXXIV published in Belgrade in 1984. Sources

connected with building the second dam were published in four issues of the journal dedicated to the excavations in this area, "Cahiers des Portes de Fer," published in the years 1980–1987. Some of the sites were described in separate monographs, like *Saldum* (JEREMIĆ 2009) and *Tekija/Transdierna* (CERMANOVIĆ-KUZMANOVIĆ 2004). Quite a comprehensive publication about the fortifications of Belgrade (M. POPOVIĆ 1982) contains some significant data about the fortifications of the Roman *Singidunum*, but because of modern urban development of Belgrade the data are very fragmentary. Unfortunately there are not many publications which treat the Upper Moesian limes as a whole. What is significant is that the only catalogue

Fig. 8. The Upper Moesian limes: Sector VI, before building of the Iron Gate II Hydroelectric Power Station (E. Jęczmienowski, based on "Cahiers des Portes de Fer" III, 1986, map inserted before the title page).

Ryc. 8. Mapa limesu górnomezyjskiego: sektor VI, przed zbudowaniem elektrowni wodnej Żelazne Wrota II.

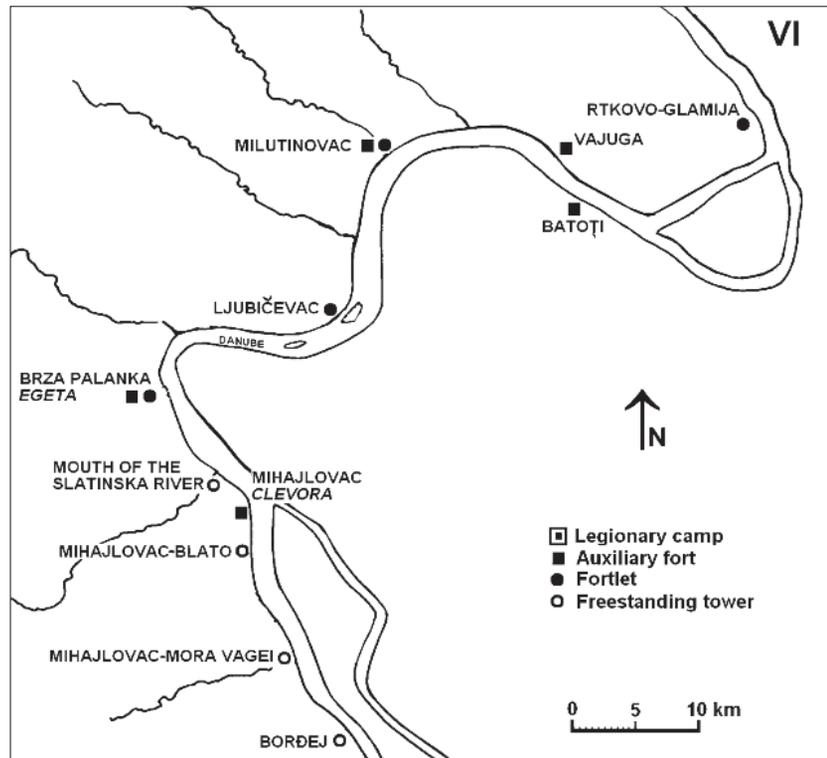
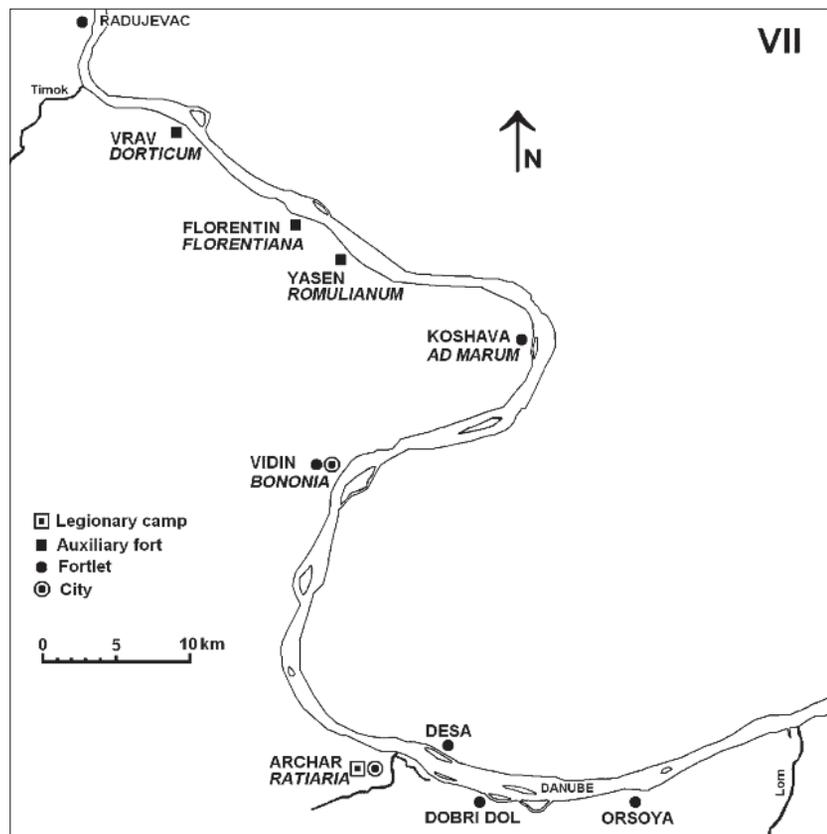


Fig. 9. The Upper Moesian limes: Sector VII (E. Jęczmienowski).

Ryc. 9. Mapa limesu górnomezyjskiego: sektor VII.



description which introduces certain taxonomy of the limes of this province, lying in areas of modern Serbia and Bulgaria, was published by the Romanian researcher, N. Gudea (2001).

On the maps (Figs. 2–9), the Upper Moesian limes were divided into 7 sections. This division is based on the division posted in two aforementioned journals, and is expanded with two sections, one in the west and one in the

east. This division is only technical, and its function is to make the presentation of the discussed area easier.²

Legionary fortresses and the cities

These two groups are analysed together, for places of permanent stationing of legions changed into cities with the passing of time. Unfortunately, fortifications of all sites of that type in the discussed area are, for various reasons, relatively poorly excavated.

Legionary fortresses and/or temporary camps (*castra legionum*) lying along the Upper Moesian sector of the Danube frontier were founded on flat terrains, mostly in the western part of the province, between Belgrade (*Singidunum*) and Golubac in Serbia, but also the terrains down the river from the vicinity of Drobeta-Turnu Severin. In these places strategical values could be connected with the required area, large enough to set up a legionary base. The idea was to find a space large enough for such a large unit as a legion to manoeuvre (GUDEA 2001: 33). Also the presence of the mouth of the river was conducive to the choice of the place. In case of *Singidunum* it was the River Sava, in *Viminacium* – the River Mlava, and in *Ratiaria* – the River Archar. These were fortresses of *legiones IIII Flavia* and *VII Claudia* since the 1st c. AD and of *legio XIII*

Gemina since the 270s AD, respectively. *Ratiaria* was probably founded in the 1st c. AD as a legionary fortress and was turned into a city at the beginning of the 2nd c. AD (MÓCSY 1974: 98).

Forms of legionary fortresses were highly unified in the whole Empire. A perfect fortress would be rectangular in shape with rounded corners, resembling the shape of a playing card. The length ratio of the short and long sides was approximately 2:3. However, there were differences in their shapes and they were caused by natural conditions. Their influence is clearly visible in *Singidunum* (Fig. 16:1), whose western wall was curved because of construction of the fortress near the mouth of the river, on Kalemegdan Hill (BOJOVIĆ 1996: 57). Dimensions of the fortresses (Tables 1, 2) are not completely certain, but it is confirmed that they are all similar: *Singidunum* measured about 330×570 m (BOJOVIĆ 1996: 57); *Viminacium* – about 385.6×442.7 m or 350×430 m (GUDEA 2001: 54); *Ratiaria* – about 284×426 m (GIORGETTI 1987: 42–44) or 300×450 m (R. IVANOV 1997: 540). Taking into consideration these dimensions the areas are as follows: almost 19 ha in *Singidunum*; 17 or 15 ha in *Viminacium*; 12 or 13.5 ha in *Ratiaria*. Along the Upper Moesian limes the remains of much larger earth-and-timber camps, dated probably to the 1st c. AD, have also been revealed. It is possible

Table 1. Legionary fortresses and temporary camps. Sizes and garrisons.
Tabela 1. Obozy legionowe. Wymiary i obsada.

Fortress	Dating and additional information	Size	Garrison
<i>Singidunum</i> (Belgrade)	1 st – 6 th c. Legionary fortress and later also the city.	ca. 330×570 m; 19 ha (BOJOVIĆ 1996: 57)	<i>Legio IIII Flavia</i>
<i>Margum</i> (Dubravica)	1 st c. Earth-and-timber fortress.	ca. 720×820 m; 59 ha (GUDEA 2001: 52)	Two or three legions?
<i>Viminacium</i> (Kostolac)	1 st – 6 th c. Legionary fortress and later also the city.	385.6×442.7 m or 350×430 m; 17 or 15 ha (GUDEA 2001: 54)	<i>Legio VII Claudia</i>
Schela Cladovei	1 st c. Earth-and-timber fortress.	ca. 650×576 m; 37.5 ha (GUDEA 2001: 81)	Two legions?
<i>Aquae</i> (Prahovo)	1 st c. Earth-and-timber fortress.	ca. 485×850 m; 41 ha (GUDEA 2001: 89)	Two legions?
<i>Ratiaria</i> (Archar)	1 st – 6 th c. Legionary fortress in the 1 st c.? City – since the early 2 nd c. Legionary base – since Aurelian.	ca. 284×426 m; 12 ha (GIORGETTI 1987: 42–44) or 300×450 m; 13.5 ha (R. IVANOV 1997: 540) Late 3 rd c.: 30–35 ha (DINCHEV 2002: 17)	2 nd half 1 st c.: <i>Legio IIII Flavia</i> ? since Aurelian: <i>Legio XIII Gemina</i>

² Unlike M. Lemke, who distinguished sections of *Moesia inferior* on the basis of geographical and military prerequisites (LEMKE

2011: 145–248). I would like to express my gratitude for sharing and agreeing on quoting his unpublished PhD.

Table 2. Cities. Sizes and garrisons.
Tabela 2. Miasta. Wymiary i garnizon.

City	Dating	Size	Garrison
<i>Singidunum</i> (Belgrade)	Early 2 nd – 6 th c.	?	?
<i>Aureus Mons</i> (Seone-Smederevo)	Mid 2 nd – 6 th c.	?	Late 4 th c.: – <i>Cun. eq. Dalm.</i> (ND Or. XLI 15)
<i>Margum</i> (Dubravica)	2 nd – 6 th c.	?	Late 4 th c.: – <i>Aux. Marg.</i> (ND Or. XLI 24) – <i>Cl. Strad. et Germ.</i> (ND Or. XLI 39)
<i>Viminacium</i> (Kostolac)	Early 2 nd – mid 5 th c.	?	Late 4 th c.: – <i>Cun. eq. prom.</i> (ND Or. XLI 16) – <i>Cl. Hist.</i> (ND Or. XLI 38)
<i>Viminacium</i> (Kostolac)	Early Byzantine city 6 th c.	160×130 m; 2 ha (MIRKOVIĆ 1999: 23)	?
<i>Dierna</i> (Orşova)	? – 6 th c.	?	Late 4 th c.: – <i>Vex. leg. XIII Gem.</i> (ND Or. XLII 29, 37)
<i>Drobeta</i> (Drobeta-Turnu Severin)	? – 6 th c.	?	Late 4 th c.: – <i>Cun. eq. Dalm. Divit.</i> (ND Or. XLII 16) – <i>Aux. prim. Dac.</i> (ND Or. XLII 24)
<i>Bononia</i> (Vidin)	4 th – 6 th c.	ca. 365×600 m; 20 ha (M. IVANOV 2003: 22)	Late 4 th c.: – <i>Cun. eq. Dalm. Fort.</i> (ND Or. XLII 13)
<i>Ratiaria</i> (Archar)	Early 2 nd – 6 th c.	ca. 284×426 m; 12 ha Since the late 3 rd c.: 25–35 ha (DINCHEV 2002: 17)	?

that they were founded during the Dacian wars of Domitian and Trajan. Distinct vestiges of such camps are reported for *Margum*, Schela Cladovei and *Aquae*. Their dimensions are respectively: 720×820 m (59 ha), 650×576 m (37.5 ha) and 485×850 m (41 ha) (GUDEA 2001: 52, 81, 89). The sizes are over two times larger than those of the previously mentioned fortresses, so it is possible that they accommodated two legions, and possibly some auxiliary troops. In *Margum* the size of the camp would have been even sufficient to accommodate three legions.

The legionary fortresses were entered by four gates, two in the middle of shorter sides (*porta praetoria* and *decumana*), and two in about 1/3 of the longer sides (*porta principalis sinistra* and *dextra*). Once again, *Singidunum* is an exception for gates in shorter sides were moved to the west. It is probable that it was caused by local topography – *Singidunum* was erected on the top of Kalemegdan Hill, to which the shape of the fortress must have been adjusted. Gates were flanked by two towers. In front of the walls, or ramparts in the earlier, earth-and-timber phase, a V- or U-shaped ditch was dug. In *Singidunum* some irregularity of the plan has been noticed. *Porta praetoria* and *porta decumana* were not founded in the middle of the shorter curtains, but were slightly moved to the west. Also the western wall was curved rather than straight so that the wall could be adjusted to the slightly higher situated terrain, on

which it was founded (BOJOVIĆ 1996: 56). In the fortifications of the same fortress it was also observed that from the northern corner a wall extended into the river. The purpose of this wall was to defend the harbour, and probably another wall extended from the western corner of the fortress (M. POPOVIĆ 1982: 28). Legionary fortresses were protected by towers, which flanked the gates and were located also in corners and along curtain walls between corners and gates. Initially, towers were built at the inner side of the wall, and were rectangular in shape. Starting from the 2nd c. they were gradually moved to the outer side of the walls. Also their form started to change, they were still rectangular towers, but rounded, heptagonal and probably other shapes were also registered, especially from the time of the Tetrarchy onwards.

In the vicinity of legionary fortresses civilian settlements were founded (*canabae legionis*), inhabited by families of soldiers and civilians who provided the army with many different kinds of services. Remains of such a settlement, turned into city with the passing of time, were located west from *Viminacium*. With the area of about 72 ha it was considerably larger than the legionary fortress (SPASIĆ-DURIĆ 2002: 35).

At a distance of approximately 1 *leuga* (ca. 2.222 km) from the legionary camp another settlement existed (ŽYROMSKI 1997: 14). Its status was different from that of

canabae because it was not erected in the area of direct military jurisdiction. Starting from the 2nd c. these settlements became cities (MÓCSY 1974: 139–140). In the 6th c. early Byzantine *Viminacium* was erected in the vicinity of the earlier fortress, abandoned in the mid 5th c. under the pressure of the Huns. It was significantly smaller than the earlier city and measured 160×130 m (MIRKOVIĆ 1999: 23). In *Ratiaria*, which became a Roman colony under Trajan, the total surface of the city was extended in the late 3rd c. from 12 to 25–35 ha (DINCHEV 2002: 17).

Bononia, initially a fortlet, was turned in the 4th c. into a mighty fortified city with total dimensions of about 365×600 m and with the surface of approximately 20 ha (M. IVANOV 2003: 22). Thus, the dimensions of that city are similar to the dimensions of legionary fortresses from the Principate era.

Along the limes there were also other cities, *Margum* (Dubravica) in the vicinity of the earlier large legionary camp and near auxiliary forts in *Aureus Mons* (Seone-Smederevo), *Dierna* (Orşova) or *Drobeta* (Drobeta-Turnu Severin). However, the data about their sizes are unknown and in the case of garrisons are based mostly on *Notitia dignitatum* (Table 2).

Auxiliary forts

This kind of fortifications was to a high extent a miniature of legionary fortresses. Like in the previous case, flat places lying near the mouth of a river were chosen. But unlike them, auxiliary forts, due to smaller areas required, could also be founded in less available places so they could be constructed even in the mountainous area of the Iron Gate gorge, between Golubac and Drobeta-Turnu Severin (Figs. 4–7). For instance, this happened in *Novae* or *Taliata*, which were founded near tributaries of the Danube. These places were suitable and flat, but surrounded by mostly mountainous areas. As in the case of legionary fortresses, civilian settlements (*vici*) must have existed near auxiliary forts. Auxiliary forts in this sector of the Danubian frontier were constructed in the 1st or at the beginning of the 2nd c. AD and then part of them lasted for centuries and part was abandoned after the conquest of Dacia.

The form of the fortifications was also very similar. They were built on a rectangular plan with rounded corners. But in this case the length ratio of the sides was not always 2:3, sometimes instead of being rectangular in shape

they resembled a square with rounded corners. The dimensions of these forts were different: the oldest fort in *Diana* had probably the dimensions of 95×110 m (ca. 1.05 ha), the younger fort was bigger, and had the area of 123×138 m, which is about 1.7 ha. The most common were forts of similar or slightly bigger size, like *Lederata* – 1.72 ha, *Novae* – 1.7 ha (Fig. 10:2), *Taliata* – 1.7 ha (Fig. 10:3) and *Drobeta* – 1.7 ha (Fig. 10:6). The surface of the above-mentioned forts was between 1.6 and 1.7 ha. Of course there were also bigger forts, like *Egeta* with the surface of about 1.95 or 2.1 ha and Pojejena (2.74 ha) (Fig. 10:1). The fort whose plan was the most similar to square was founded in *Pontes* (Fig. 10:7). With dimensions of 125×130 m it had the typical surface of 1.6 ha. Also interesting is the fort of *Taliata* for its plan was similar to a parallelogram. That shape was forced by the natural conditions (V. POPOVIĆ 1984: 265, 271).

The vast majority of all Upper Moesian auxiliary forts (Table 3) can be assigned to three, out of five (1–5), groups determined by A. Richardson in his paper on calculating the size of a fort's garrison on the basis of its surface (RICHARDSON 2002: 93–107). To put it simply, it can be assumed that for one cohort, in strength of 480 infantry, the erected fort should have a total surface of about 1.315 ha.³ In the case of auxiliary units with other numerical account or structure, the required surface was respectively bigger or smaller, for the cavalry needed more space. Among these forts, the dimensions of which are at least to a some degree known to us, most of them represent Group 2, which included forts with a surface of about 1.62 ha. These forts could accommodate 1.25 of the notional cohort, that is 600 people. Larger units had to be jammed but units such as *cohors quingenaria equitata*, *cohors milliaria peditata*, or even one *ala quingenaria* or two *cohortes quingenariae peditatae* could be stationed there. Three forts have been classified to Group 5 (about 2.63 ha), which included the biggest forts which could easily accommodate 2 notional cohorts. Units such as two *cohortes quingenariae peditatae* or one *ala quingenaria* could be stationed there without being jammed. Forts representing Group 3 (about 1.98 ha) are problematic due to their uncertain dimensions. These camps were designed for 1.53 of the notional cohort and could accommodate units like *cohors quingenaria equitata* or a slightly jammed *ala quingenaria*. I did not decide to include any fort in Group 4 (about 2.185 ha), even though some of the presumed dimensions of forts representing Group 3 are

³ Out of the total surface of an auxiliary fort about 77% was required to accommodate the unit, and the remaining surface was intended for the *intervallum*. For a notional cohort in strength of 480 infantry the most reliable surface was 8 *acti quadrati* (about 10080 m²). Forts designed for bigger units were respectively big-

ger. As A. Richardson calculated it was possible to allocate bigger units, or with other structure, in a smaller fort. In that case to allocate one notional cohort a sufficient area measured only 5 *acti quadrati* (about 6300 m²), and in the case of bigger units the surface was respectively bigger.

Table 3. Auxiliary forts. Sizes and garrisons. * As determined by Richardson (2002); see pp. 38, 40.
 Tabela 3. Forty wojsk pomocniczych. Wymiary i obsada. * Wg podziału Richardsons (2002); por. str. 38, 40.

Fort	Dating	Size	Accommodation capacity	Garrison
Višnjica (<i>Octavum</i>)	1 st c.	ca. 100×150 m or 180 m; 1.5 or 1.8 ha (GUDEA 2001: 51) Group 2*	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	?
Seone-Smederevo (<i>Aureus Mons</i>)	1 st c.	ca. 130 or 140×150 m; 2.05 or 2.1 ha (GUDEA 2001: 52) Group 3?	<i>cob. quin. eq.</i> <i>ala quin.</i>	Late 4 th c.: – <i>Cun. eq. Dalm.</i> (ND Or. XLI 15)
Ram (<i>Lederata</i>)	1 st /2 nd – 6 th c.	ca. 115×150 m; 1.7 ha (SIMIĆ, SIMIĆ 1984: 34) Group 2	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	Late 1 st c. – early 3 rd c.: – <i>Ala I Cl.</i> – <i>Ala I Pann.</i> – <i>Cob II Hisp.</i> Late 4 th c.: – <i>Cun. eq. sag.</i> (ND Or. XLI 17) – <i>Mil. Vinc.</i> (ND Or. XLI 36)
Pojejena	Earth-and-timber fort 2 nd half 1 st c.	142×179 m; 2.54 ha (GUDEA 2001: 59) Group 5	2 × <i>cob. quin. ped.</i> <i>ala quin.</i>	AD 75: – <i>Cob. V Gall.</i> Late 1 st c.: – <i>Ala I Tungr. Front.</i>
Pojejena	Stone fort Early 2 nd – 2 nd half 3 rd c.	148×185 m; 2.73 ha (GUDEA 2001: 60) Group 5	2 × <i>cob. quin. ped.</i> <i>ala quin.</i>	2 nd half 2 nd c.: – <i>Cob. V Gall. and Cob. III Camp.</i>
Golubac (<i>Cuppae</i>)	2 nd half 1 st c.	ca. 165×165 m; 2.7 ha (GUDEA 2001: 61–62) Group 5	2 × <i>cob. quin. ped.</i> <i>ala quin.</i>	1 st – 2 nd c.: – <i>Cob. I Fl. Hisp.</i> – <i>Cob. V Hisp.</i> Late 4 th c.: – <i>Cun. eq. Dalm.</i> (ND Or. XLI 19) – <i>Aux. Cupp.</i> (ND Or. XLI 25) – <i>Vex. leg. VII Cl.</i> (ND Or. XLI 31)
Brnjica-Gradac at the mouth of the River Čezava (<i>Novae</i>)	Early fort 1 st – 3 rd c.	140×120 m; 1.68 ha (VASIĆ 1984: 99) Group 2	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	– <i>Cob. I Mont.</i>
Brnjica-Gradac at the mouth of the River Čezava (<i>Novae</i>)	Late fort 4 th – 6 th c.	143×122 m; 1.74 ha (VASIĆ 1984: 101) Group 2	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	Late 4 th c.: – <i>Aux. Nov.</i> (ND Or. XLI 23) – <i>Mil. expl.</i> (ND Or. XLI 34)
Veliki Gradac near Donji Milanovac (<i>Taliata</i>)	1 st – 6 th c.	134×126 m; 1.69 ha (V. POPOVIĆ 1984: 279) Group 2	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	AD 75: – <i>Cob. I Raet.</i> AD 90: – <i>Cob. I Lus.</i> Late 4 th c.: – <i>Aux. Tal.</i> (ND Or. XLI 27) – <i>Mil. expl.</i> (ND Or. XLI 35)
Karataš (<i>Diana</i>)	Early fort 2 nd half 1 st c.	110×95 m; 1.04 ha (J. KONDIĆ 1996: 83)	<i>cob. quin. ped.?</i>	?
Karataš (<i>Diana</i>)	Late fort 2 nd – 6 th c.	123×138 m; 1.7 ha (GUDEA 2001: 76) Group 2	<i>cob. quin. eq.</i> <i>cob. mil. ped.</i> <i>ala quin.</i> 2 × <i>cob. quin. ped.</i>	– <i>Cob. V Gall. Ant.</i> – <i>Cob. VI Thrac.</i>

Fort	Dating	Size	Accommodation capacity	Garrison
Kostol (<i>Pontes</i>)	1 st /2 nd c. – 6 th c.	125×130 m; 1.62 ha (GARAŠANIN, VASIĆ 1987: 80) Group 2	<i>coh. quin. eq.</i> <i>coh. mil. ped.</i> <i>ala quin.</i> 2 × <i>coh. quin. ped.</i>	Late 1 st c.: – <i>Coh. III Britt.</i> Late 4 th c.: – <i>Vex. leg. XIII Gem.</i> (ND Or. XLII 35)
Drobeta-Turnu Severin (<i>Drobeta</i>)	1 st – 6 th c.	123×137.5 m; 1.69 ha (GUDEA 2001: 83) Group 2	<i>coh. quin. eq.</i> <i>coh. mil. ped.</i> <i>ala quin.</i> 2 × <i>coh. quin. ped.</i>	2 nd c.: – <i>Coh. I Antioch.</i> – <i>Coh. III Camp.</i> – until AD 150 Late 4 th c.: – <i>Cun. eq. Dalm. Divit.</i> (ND Or. XLII 16) – <i>Aux. prim. Dac.</i> (ND Or. XLII 24)
Milutinovac	1 st c.	ca. 130×150 m; 1.95 ha (GUDEA 2001: 87) Group 3?	<i>coh. quin. eq.</i> <i>ala quin.</i>	?
Brza Palanka (<i>Egeta</i>)	1 st – 4 th /6 th c.?	ca. 130 or 140×150 m; 1.95 ha or 2.1 ha (GUDEA 2001: 87) Group 3?	<i>coh. quin. eq.</i> <i>ala quin.</i>	2 nd half 1 st c.: – <i>Coh. I Cret.</i> Late 4 th c.: – <i>Cun. eq. sag.</i> (ND Or. XLII 20) – <i>Vex. leg. XIII Gem.</i> (ND Or. XLII 34) – <i>Cl. Hist.</i> (ND Or. XLII 42)
Vrav (<i>Dorticum</i>)	1 st – 6 th c.	ca. 140 or 160×50 or 60 m; 0.7 ha or 0.96 ha (IVANOV 2003: 17)	<i>coh. quin. ped.?</i>	1 st half 1 st c.: – <i>Coh. I Cret.</i> Late 4 th c.: – <i>Cun. eq. Divit.</i> (ND Or. XLII 14)

middle values between these two groups. In these cases I decided to round the value down. The correct classification would require the accurate knowledge about their dimensions. Anyway, forts representing this group were designed for 1.66 of the notional cohort, and *cohors milliaria peditata* or jammed *cohors milliaria equitata* could station there. No fort was classified to Group 1 (about 1.315 ha), which included the smallest forts in which one notional cohort could station, which corresponds to *cohors quingenaria peditata*. It should be noted that the earliest phase of the fort in *Diana* (Fig. 10:4), had a surface of only about 1.04 ha. This gives only 0.79 of the notional cohort, which equals to about 379 infantrymen. However, it seems probable that *cohors quingenaria peditata* could be a little jammed to fit both of them. In the case of *Dorticum* (Vrav) the situation is quite similar, but the surface of this fort is uncertain. It was probably 0.7 or 0.96 ha, which gives 254 or 350 infantrymen.

Unlike the province of *Britannia*, on the basis of which A. Richardson made his classification, the most significant thing is that along the Upper Moesian limes the most numerous are forts classified as Group 2, whereas there are no forts representing Group 1, and probably Group 4. Other groups are represented by few examples,

while in *Britannia* all groups are relatively frequently represented, the most numerous being forts from Group 1 and 2. The situation looks very similar in the case of the limes of the neighbouring province of *Moesia inferior*, which because of the similar geographical and political situation gives better comparison. In this case all groups are also well-represented, the only difference being in the number of forts; forts that could be assigned to Group 1, where infantry units stationed were twice as numerous.⁴ For some reason these forts were not built along the Upper Moesian limes. Instead, forts representing Group 2, where mixed units could station, were erected most frequently. But it has to be noted that if we had better data on the dimensions of all forts, the proportions could be different.

Defensive components of these forts were analogical like in the case of legionary fortresses, but of course, due to smaller dimensions, there were less towers between corners and gates. Similarly, like in the case of legionary fortresses, the form and location of the towers varied with the passing of time. Initially towers were built at the inner side of the wall, and were rectangular. With time the towers gradually started to be moved to the outer side of the walls. Also their form started to change, there were still rectangular

⁴ On the basis of the catalogue of fortifications of the limes of Lower Moesia (LEMKE 2011: Catalogue: 1–193).

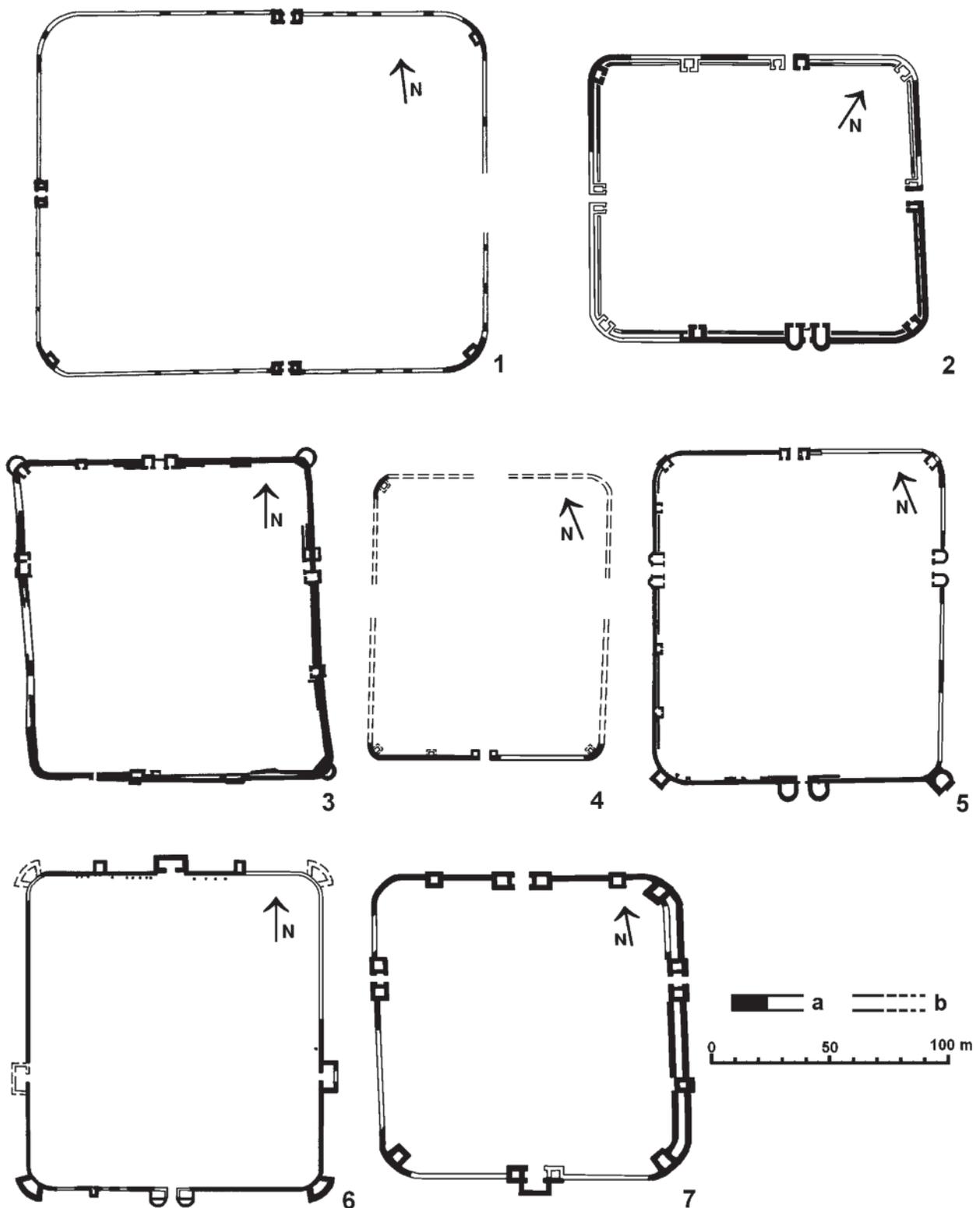


Fig. 10. Auxiliary forts. Plans (a – certain course of walls; b – supposed course of walls): 1 – Pojejena; 2 – Brnjica-Gradac at the mouth of the River Čezava (*Novae*); 3 – Donji Milanovac (*Taliata*); 4 – Karataš (*Diana*) – 1st c. AD; 5 – Karataš (*Diana*) – early 4th c. AD; 6 – Drobeta-Turnu Severin (*Drobeta*); 7 – Kostol (*Pontes*) (E. Jęzczmienowski, based on: 1 – GUDEA, BOZU 1979: fig. 1; 2 – Vasić 1984: fig. 7; 3 – V. POPOVIĆ 1984: fig. 1; 4 – J. KONDIĆ 1996: fig. 1; 5 – J. KONDIĆ 1996: fig. 1; 6 – ZAHARIADE 1997: fig. 1; 7 – GARAŠANIN, VASIĆ 1987: plan I).

Ryc. 10. Forty wojsk pomocniczych. Plany (a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Pojejena; 2 – Brnjica-Gradac u ujścia rzeki Čezava (*Novae*); 3 – Donji Milanovac (*Taliata*); 4 – Karataš (*Diana*) – I w. n.e.; 5 – Karataš (*Diana*) – początek IV w. n.e.; 6 – Drobeta-Turnu Severin (*Drobeta*); 7 – Kostol (*Pontes*).

towers, but also rounded, horseshoe-shaped, U-shaped, longitudinal with an apse in the short end, and hand-fan shaped towers are recorded. Gates were flanked by two towers which were similar to each other. Considering auxiliary forts, irregularity has been observed in the location of the gates, mostly in *Taliata*. In *Drobeta*, like *Singidunum*, walls protecting the harbour have been found. The walls extended from southern corners and aimed to the Danube.

Fortlets

This kind of fortifications includes numerous small forts, which were possible to found in less accessible places than previously mentioned types. Many of them were constructed in the mountainous area of the Iron Gate gorge. Obviously, they used to be located near river mouths and on the relatively flat area, but there are also cases where chosen places were of more defensive character. Such location became more important in the later period, with Fort No. 2 in *Egeta* as an example of it. It was founded near the mouth of a stream, on the hill that dominated over the surroundings and had steep slopes from three sides (PETROVIĆ 1984c: 157). A similar situation is observed in Rtkovo-Glamija I, where fortlets have been built on a highest elevation in the neighbourhood (GABRIČEVIĆ 1986: 74).

In comparison with the two aforementioned types, fortifications of that kind are more diverse when it comes to their forms. This is connected with the fact that they were erected from scratch, both in earlier and later periods when trends in architecture changed, while bigger fortifications were erected mostly in the early period, and they lasted, with some modifications, for several centuries. Like in the case of bigger fortifications, they were protected by towers, yet in this case they were most often found only in the corners. In this case towers were almost always at the outer side of the wall of the later fortlets. In earlier fortlets towers were not registered. Plans of towers are similar to these occurring in larger fortifications, but the most common are square and rounded ones. Sometimes the gate, which was located in the middle of one of the curtains, could be protected by one central tower.

The fortlet in *Smorna* (Fig. 11:4), more precisely its southeastern half, which to a large extent preserved its original form, is a good example of the shape of the fortifications from the earlier period. Like in previous types of fortifications rounded corners have been registered, and their shape was most probably similar to an elongated rectangle. The dimensions of this fortlet were about 50×60 m (ca. 0.3 ha). Towers protecting it have not been registered (ZOTOVIĆ 1984: 220). From the early period partly visible

are also remains from Saldum near Golubac, and it is interesting that the preserved corner was not rounded but formed an angle (JEREMIĆ 2009: 31). Some remains were also registered in Donji Milanovac (Mali Gradac) (about 50×40 m, that is 0.2 ha) or Velike Livadice (about 40×40 m, that is 0.16 ha). N. Gudea mentions in his catalogue numerous fortlets from this period, but they were not excavated or were sounded only to a small extent (GUDEA 2001: 47–96).

What is characteristic of later fortlets is that their corners were not rounded. Most of them are square or similar to a square. Their dimensions were also quite similar, in *Campsia* it was 42×40 m and about 0.17 ha (internal dimensions – about 34×35.5 m and 0.12 ha) (Fig. 12:5), in Donja Butorka 46×45 m (about 0.21 ha) (Fig. 12:2), and at the mouth of the Slatinska river in Serbia 61×48.8 m and about 0.3 ha (internal dimensions – about 55×44.5 m and 0.245 ha). The fortlet in *Smorna* underwent several modifications, which partially adjusted it to later fortifications (ZOTOVIĆ 1984: 219–225). Their northwestern half was built almost completely from scratch and with corners with right angles. Apart from that all corners were, including second half rounded corners, strengthened by towers.

Fortlets with shapes more or less different from typical ones have also been recorded. In *Transdierna*, on the right bank of the Tekija stream, the fortlet was in the form of a rhomboid with dimensions of 32×25 m (about 0.08 ha) (Fig. 11:3). Fort No. II in *Egeta* was in the shape of a heavily elongated rectangle with dimensions of 84×33 m (about 0.28 ha) (Fig. 11:1). A similar, slightly elongated fortlet measuring 43.5×31.2 m (about 0.13 ha) was founded in *Saldum* (Fig. 12:6). Another fortlet with a completely different shape was registered in Bosman (Fig. 12:7). Its shape was similar to the equilateral triangle, yet its eastern curtain was a little concave, so that it was possible to adjust its shape to the terrain configuration. The fortlet measured 45.5 by 45.5 by 46 m (about 0.09 ha). Fort No. III in *Egeta* was probably of a similar triangular shape (PETROVIĆ 1984c:159).

On the basis of the method used to determine garrisons of auxiliary forts it was possible to determine the approximate numerical strength of the garrisons in fortlets (Table 4). The results of a vast majority of them, after rounding, seem to indicate that the strength of the garrison was close to one centuria. But it has to be noted that due to small sizes of these fortlets, the building period of many of them, and a different purpose (instead of being only a garrison they were also fortified strongholds), sometimes this formula may not be accurate. Furthermore, many of these military installations were *quadriburgia* dated to the late Roman period (late 3rd – 6th c. AD).⁵ M. Gichon tried to

⁵ *Quadriburgia* were included in the fortlets category due to their similar sizes.

Table 4. Fortlets. Sizes and garrisons.
Tabela 4. Male forty. Wymiary i obsada.

Fortlet	Dating and fortlet type	Size	Estimated number of men if all infantry according to A. Richardson's formula	Garrison
Ram (<i>Lederata</i>)	3 rd /4 th c. <i>quadriburgium</i>	ca. 50×50 m; 0.25 ha (JOVANOVIĆ 1996: 70)	91 (or ca. 50, according to M. Gichon)	?
<i>Saldum</i> (<i>Gratiana</i> or <i>Cantabaza</i> ?)	6 th c. <i>quadriburgium</i>	43.5×31.2 m; 0.13 ha (JEREMIĆ 2009: 35)	51	Late 4 th c.: – <i>Aux. Grat.</i> (ND Or. XLI 26)?
Bosman (<i>Ad Scrofulos</i> ?)	6 th c. triangular plan	Sides – 45.5; 45.5; 46 m; 0.09 ha (V. KONDIĆ 1984a: 139)	34	?
Velike Livadice	1 st c.	ca. 40×40 m or 32×32 m; 0.16 ha or 0.1 ha (PILETIĆ 1984: 191)	58 or 37	?
Boljetin (<i>Smorna</i>)	1 st – 6 th c.	ca. 50×60 m; 0.3 ha (GUDEA 2001: 69)	81 (1 <i>centuria</i> ?)	1 st half 1 st c.: – <i>Vex. leg. IIII Scyth.</i> or <i>V Mac.</i> 2 nd half 1 st c. – 1 st half 2 nd c.: – <i>Vex. leg. IIII Fl.</i> 2 nd half 3 rd c.: – <i>Vex. leg. VII Cl.</i> Late 4 th c.: – <i>Mil. expl.</i> (ND Or. XLI 37)
Ravna (<i>Camps</i>)	4 th – 6 th c. <i>quadriburgium</i>	42×40 m; 0.17 ha (inner – 34×35.5 m; 0.12 ha) (V. KONDIĆ 1984b: 235)	44	?
Mali Gradac near Donji Milanovac	1 st c.	ca. 40×40 m; 0.16 ha (GUDEA 2001: 72)	58	?
Mouth of the River Porečka	Late 3 rd c. <i>quadriburgium</i>	60×60 m; 0.36 ha (PETROVIĆ 1984b: 286)	130 (or ca. 50, according to M. Gichon)	?
Hajdučka Vodenica	6 th c. <i>quadriburgium</i>	50×70 m; 0.35 ha (inner – 43×41m; 0.18 ha) (JOVANOVIĆ 1984: 319)	62 (or ca. 50, according to M. Gichon)	?
Tekija (<i>Transdierna</i>)	4 th – 6 th c. <i>quadriburgium</i>	32×25 m; 0.08 ha (CERMANOVIĆ-KUZMANOVIĆ 1984: 338)	29	Late 4 th c.: – <i>Mil. expl.</i> (ND Or. XLII 29)
Sip	6 th c. <i>quadriburgium</i>	31×29.95 m; 0.09 ha (MILOŠEVIĆ 1984: 357)	34	?
Donja Butorka near Kladovo	6 th c. <i>quadriburgium</i>	46×45 m; 0.2 ha (CERMANOVIĆ-KUZMANOVIĆ 1979: 127)	72 (or ca. 50, according to M. Gichon)	?
Rtkovo-Glamija I	6 th c. <i>quadriburgium</i>	55×51 m; 0.28 ha (inner – ca. 49×52 m; 0.25 ha) (GABRIČEVIĆ 1986: 74)	91 (or ca. 50, according to M. Gichon)	?
Milutinovac	6 th c. <i>quadriburgium</i>	51.8 – 53.3×57.8 m; 0.3 ha (inner – ca. 49.5×54 m; 0.27 ha) (MILOŠEVIĆ, JEREMIĆ 1986: 251)	98 (or ca. 50, according to M. Gichon)	?
Ljubičevac	6 th c. <i>quadriburgium</i>	55.5×55.6 m; 0.31 ha (inner – ca. 51×51 m; 0.26 ha) (KORAĆ 1996: 105)	96 (or ca. 50, according to M. Gichon)	?
Brza Palanka (<i>Egeta</i> ?) Fort No. II	4 th c.	84×33 m; 0.28 ha (PETROVIĆ 1984c: 157)	101	?
Mouth of the River Slatinska	6 th c. <i>quadriburgium</i>	61×48.8 m; 0.3 ha (inner – ca. 55×44.5 m; 0.245 ha) (JOVANOVIĆ, KORAĆ 1984: 191)	89 (or ca. 50, according to M. Gichon)	?
Dobri Dol	1 st c.?	ca. 57×57 m; 0.32 ha) (GUDEA 2001: 94)	116	?

estimate the numerical strength of garrisons in fortlets of that type using the example of the fortlet of En Boqeq in the Negev Desert. He came to the conclusion that such fortlets, with dimensions of about 50×50 m, should have about 50 men (GICHON 1989: 121–142). This number

seems to be sufficient when it comes to defending the walls in case of danger. The question of the size of garrisons in these fortlets requires further studies, but the aforementioned numbers seem to constitute a good beginning for further works.

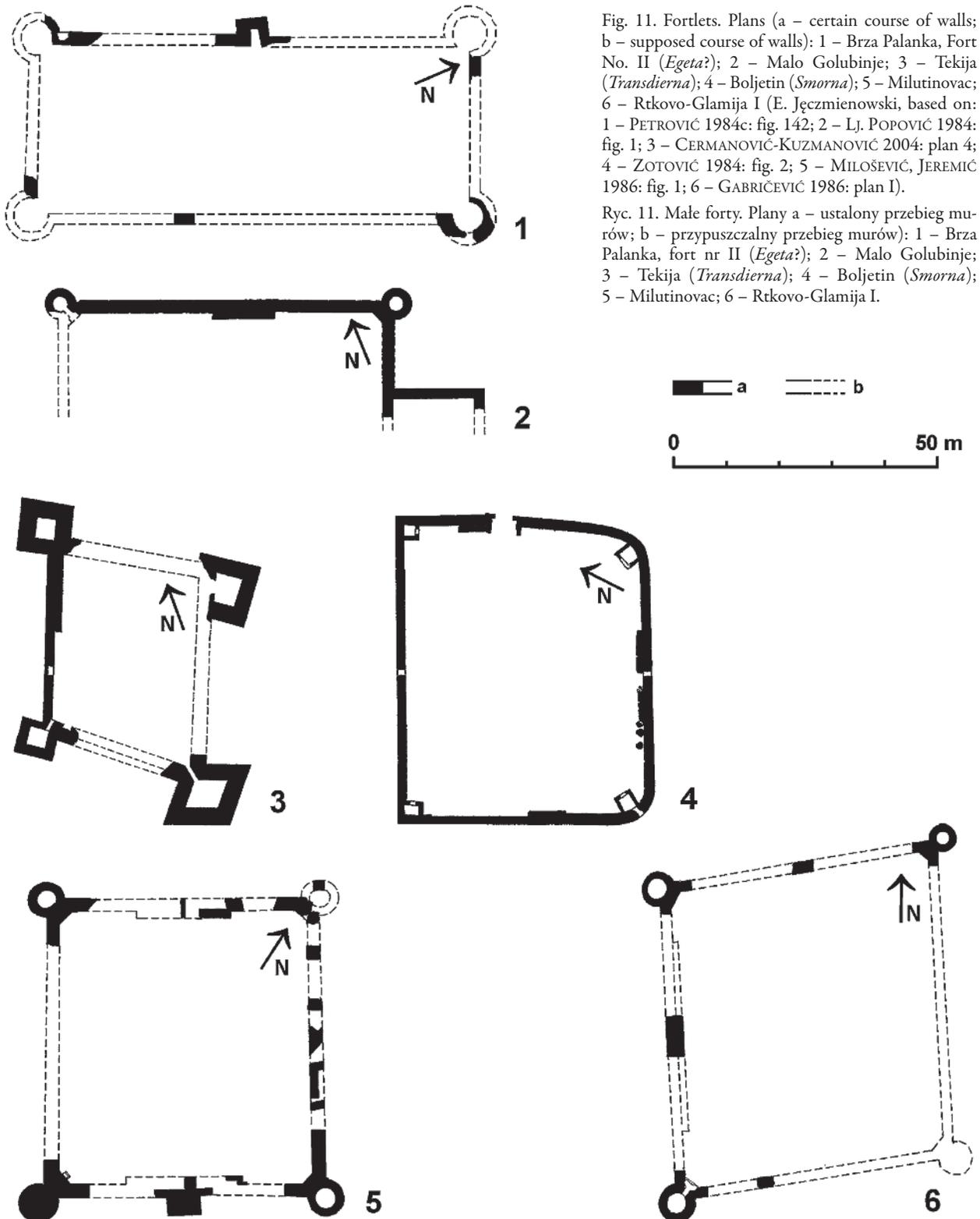


Fig. 11. Fortlets. Plans (a – certain course of walls; b – supposed course of walls): 1 – Brza Palanka, Fort No. II (*Egeta?*); 2 – Malo Golubinjje; 3 – Tekija (*Transdierna*); 4 – Boljetin (*Smorna*); 5 – Milutinovac; 6 – Rtkovo-Glamija I (E. Jęczmienowski, based on: 1 – PETROVIĆ 1984c: fig. 142; 2 – LJ. POPOVIĆ 1984: fig. 1; 3 – CERMANOVIĆ-KUZMANOVIĆ 2004: plan 4; 4 – ZOTOVIĆ 1984: fig. 2; 5 – MILOŠEVIĆ, JEREMIĆ 1986: fig. 1; 6 – GABRIČEVIĆ 1986: plan I).

Ryc. 11. Małe forty. Plany a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Brza Palanka, fort nr II (*Egeta?*); 2 – Malo Golubinjje; 3 – Tekija (*Transdierna*); 4 – Boljetin (*Smorna*); 5 – Milutinovac; 6 – Rtkovo-Glamija I.

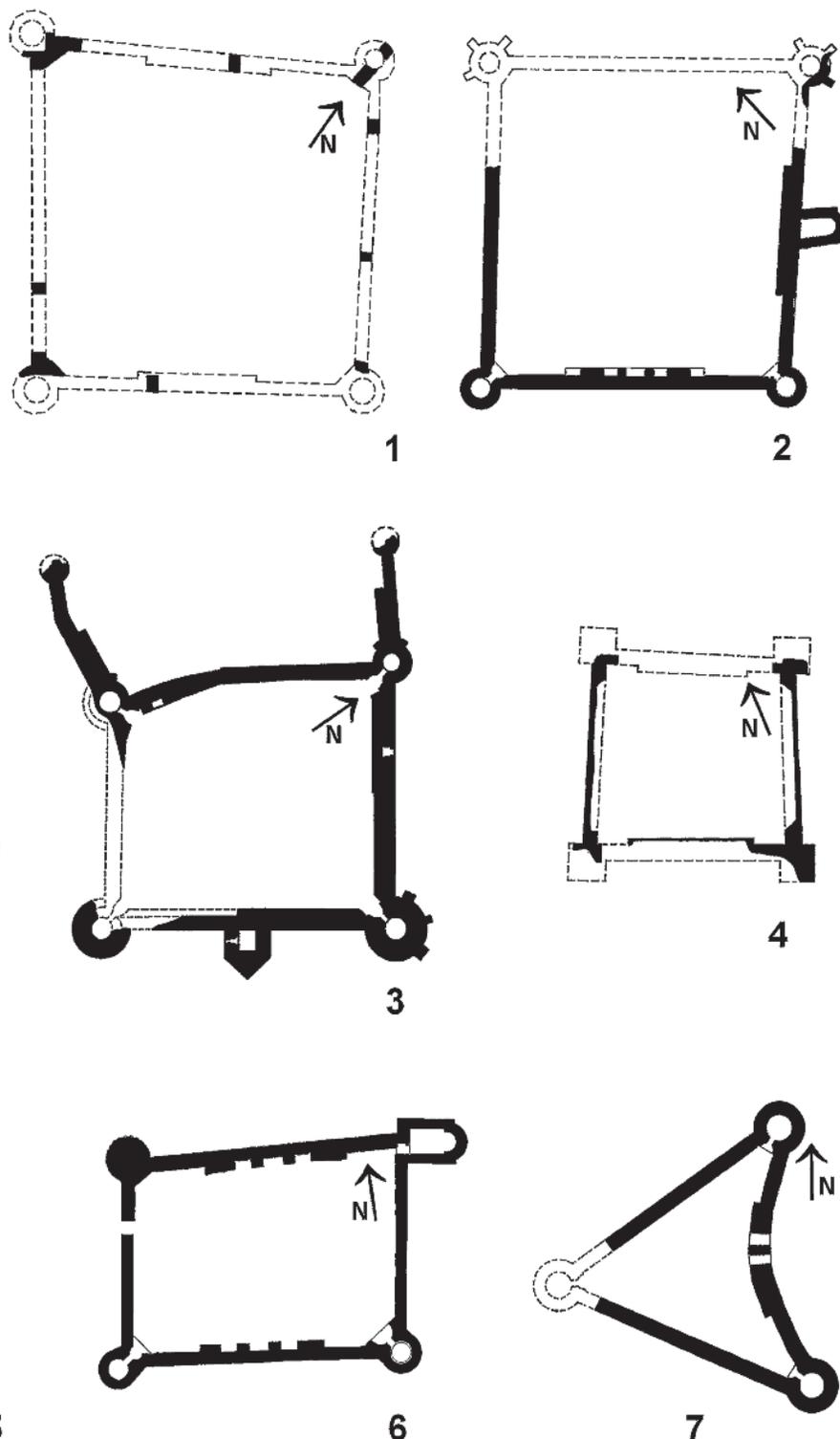
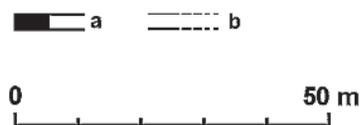
Some late fortlets were erected around earlier free-standing towers and both existed simultaneously (Fig. 15). This has been observed in Hajdučka Vodenica, Donja Butorka, Rtkovo-Glamija I and Ljubičevac, all near Kladovo in Serbia.

Extensions of walls have also been found, the

purpose of which was to defend the river harbour. This has been archaeologically proved in Hajdučka Vodenica. The situation looked slightly different at the mouth of the River Porečka in Serbia, where the fortlet was built next to a probably already existing enclosure wall of the harbour (PETROVIĆ 1984b: 290).

Fig. 12. Fortlets. Plans, continued (a – certain course of walls; b – supposed course of walls): 1 – Ljubičevac; 2 – Donja Butorka; 3 – Hajdučka Vodenica; 4 – Sip; 5 – Ravna (*Campsā*); 6 – *Saldum* (*Gratiana* or *Cantabaza?*); 7 – Bosman (*Ad Scrofulos?*) (E. Jęczmienowski, based on: 1 – KORAĆ 1996: fig. 3; 2 – CERMANOVIĆ-KUZMANOVIĆ 1979: fig. 1; 3 – JOVANOVIĆ 1984: fig. 1; 4 – MILOŠEVIĆ 1984: fig. 1; 5 – V. KONDIĆ 1984b: fig. 2; 6 – JEREMIĆ 2009: fig. 19; 7 – V. KONDIĆ 1984a: fig. 1).

Ryc. 12. Małe forty. Plany, c.d. (a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Ljubičevac; 2 – Donja Butorka; 3 – Hajdučka Vodenica; 4 – Sip; 5 – Ravna (*Campsā*); 6 – *Saldum* (*Gratiana* lub *Cantabaza?*); 7 – Bosman (*Ad Scrofulos?*).



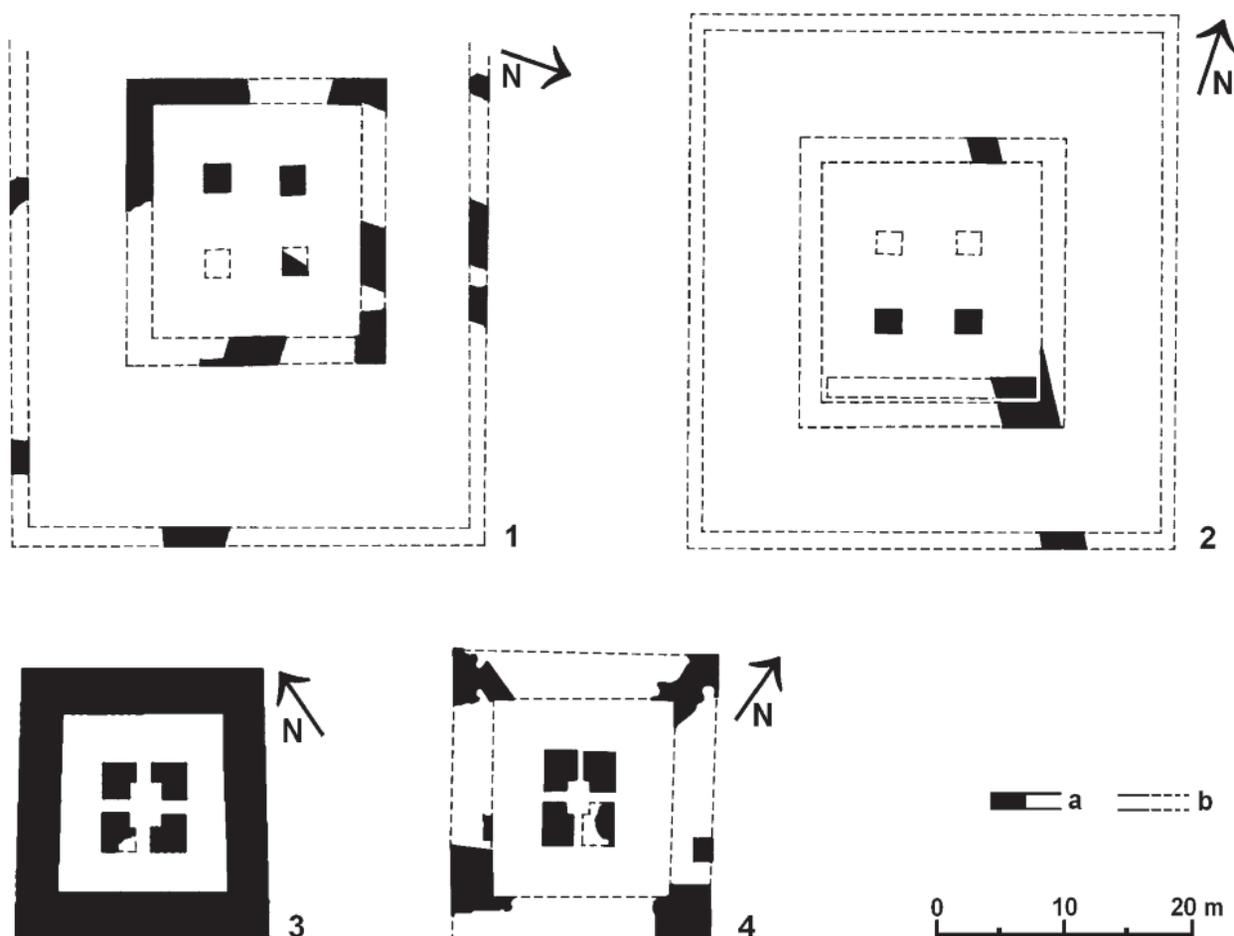


Fig. 13. Freestanding towers. Plans (a – certain course of walls; b – supposed course of walls): 1 – Mihajlovac-Blato; 2 – Bordej; 3 – Donja Butorka; 4 – Ljubičevac (E. Jęczmienowski, based on: 1 – TOMOVIĆ 1986: fig. 1; 2 – CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1984: fig. 208; 3 – CERMANOVIĆ-KUZMANOVIĆ 1979: fig. 1; 4 – KORAC 1996: fig. 3).

Ryc. 13. Wieże wolnostojące. Plany (a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Mihajlovac-Blato; 2 – Bordej; 3 – Donja Butorka; 4 – Ljubičevac.

Freestanding towers

Smaller military installations represented another type of fortifications, namely freestanding towers. Their function was different than that of previous types, some were just late small fortifications with towers (*burgi*), while others were intended to serve as watchtowers or sentry posts.⁶ Because they were smaller than the rest, it was possible to erect them in less accessible places but, as it was observed before, sometimes also fortlets were erected in the

same places (Fig. 15). Towers were founded both on flat terraces, like in Lepenski Vir near Donji Milanovac in Serbia and in small valleys surrounded from three sides with steep hills, like in Hajdučka Vodenica. They were also located in places of a more defensive character, like in Bordej near Negotin in Serbia or Rtkovo-Glamija I, where the hills dominated over the surroundings. It is worth noting that towers were often erected at some distance from larger fortifications, which were to be warned in case of danger. As an example let us mention towers in Male

⁶ The accurate distinction between the towers on the basis of their function is problematic because of the lack of data. G. Jeremić

classified Upper Moesian freestanding towers as watchtowers and signal towers (JEREMIĆ 2007: 305–314).

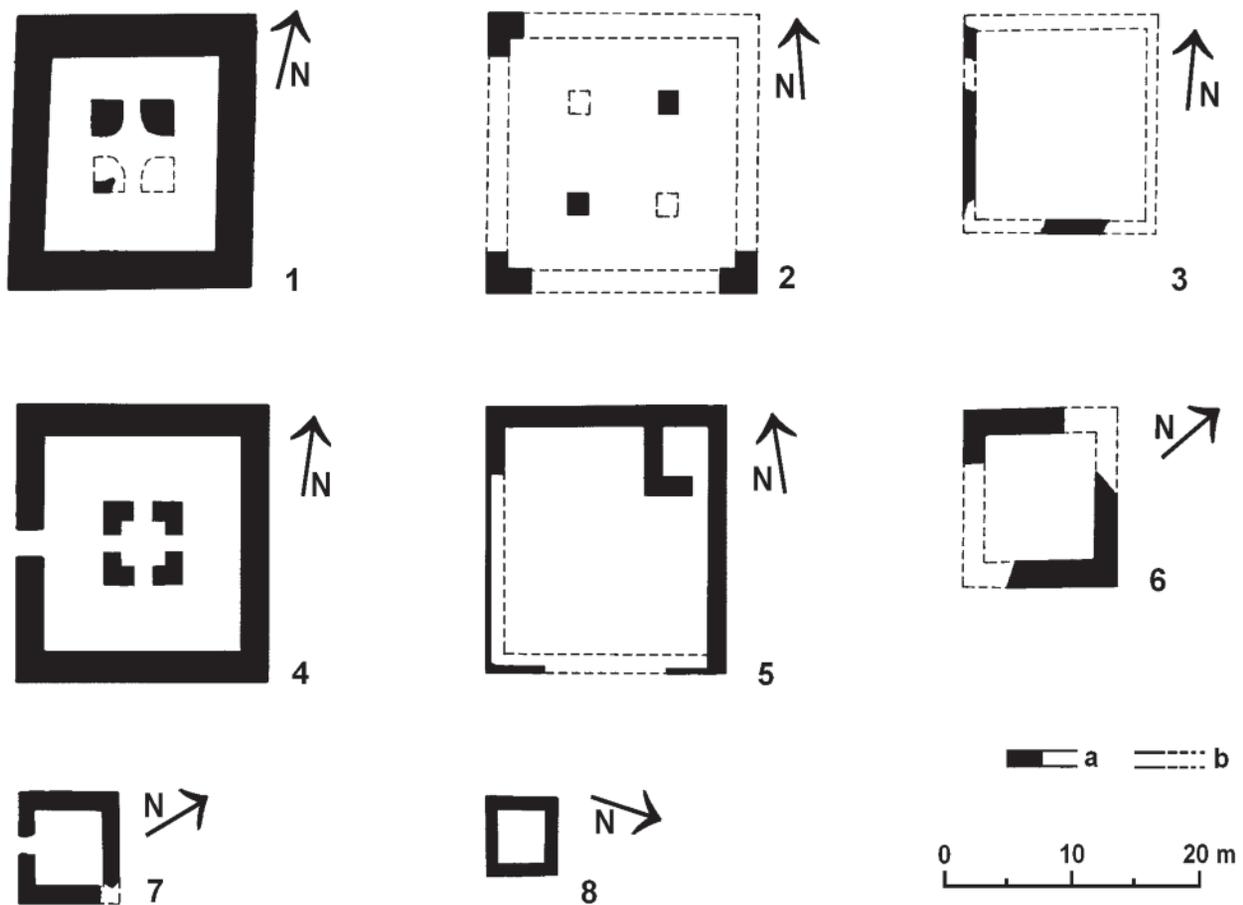


Fig. 14. Freestanding towers. Plans, c.d. (a – certain course of walls; b – supposed course of walls): 1 – Rtkovo-Glamija I; 2 – Mouth of the Slatinska river; 3 – Mora Vagei (earlier tower); 4 – Mora Vagei (later tower); 5 – Zidinac; 6 – Hajdučka Vodenica; 7 – Pesača; 8 – Lepenski Vir (E. Jęczmienowski, based on: 1 – GABRIČEVIĆ 1986: plan I; 2 – JOVANOVIĆ, KORAC, JANKOVIĆ 1986: fig. 7; 3, 4 – CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1986: fig. 1; 5 – PETROVIĆ 1984a: fig. 1; 6 – JOVANOVIĆ 1984: fig. 1; 7 – MINIĆ 1984: fig. 1; 8 – SREJJOVIĆ 1984: fig. 1).

Fig. 14. Wieże wolnostojące. Plany, c.d. (a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Rtkovo-Glamija I; 2 – Ujście rzeki Slatinska; 3 – Mora Vagei (starsza wieża); 4 – Mora Vagei (młodsza wieża); 5 – Zidinac; 6 – Hajdučka Vodenica; 7 – Pesača; 8 – Lepenski Vir.

Livadice and Veliko Golubinjje near Donji Milanovac in Serbia (LJ. POPOVIĆ 1984: 297–299). Towers were protected by ditches. Two lines of them were registered around the tower from Mora Vagei, while the presence of a single ditch was noted around the tower in Ljubičevac near Kladovo in Serbia.

The dimensions of towers discussed in the previous section vary between 5.1×4.9 m and 19.8×19.8 m, but the most common ones are bigger (Table 5). Towers were square or of a similar shape. In Male Livadice remains of a very poorly preserved tower from the 1st c. AD, measuring 20×17.5 m, were found. The tower probably had rounded corners (PILETIĆ 1984: 187). In other towers, early and late, such feature does not occur. Typical of later towers are large dimensions and the presence of 4 pillars in the middle. These features occur in most of the late *burgi*; almost all of them were erected during the reign of Valens and Valentinian.

In few cases it was stated that the tower was surrounded by an external wall. This can be observed in Bordej (Fig. 13:2), where the tower with dimensions of 19.6×19.6 m was surrounded by an enclosure wall with dimensions of 36×36 m (CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1984: 217).

An interesting tower was found in Zidinac (Fig. 14:5) near Golubac in Serbia. It measured about 6×5.5 m and was erected in the northeastern corner of fortifications with total dimensions of 17.5×17.5 m (PETROVIĆ 1984a: 127).

To determine how many soldiers were manning the freestanding towers, it is helpful to use analogies for towers and so-called “milecastles” from Hadrian’s Wall in Britain. It seems probable that the crew of the smallest towers, with dimensions of about 7×7 m, was not more numerous than 8 men, which equals to one *contubernium*. Towers with larger surface, approximately 300 m², had

Table 5. Freestanding towers. Sizes and garrisons.
Tabela 5. Wieże wolnostojące. Wymiary i obsada.

Tower	Dating and additional information	Size	Estimated number of men
Sapaja	1 st c.	ca. 7×7 m; 49 m ² (DIMITRIJEVIĆ 1984: fig. 3)	8 (1 <i>contubernium</i>)
Zidinac	3 rd /4 th c. Tower in the NE corner of the enclosure wall	ca. 6×5.5 m and 17.5×17.5 m; 306 m ² (PETROVIĆ 1984a: 127)	8–16 (1–2 <i>contubernia</i>)
Pesača	Mid 3 rd c.	7.5×7.5 m; 56 m ² (MINIĆ 1984: 171)	8 (1 <i>contubernium</i>)
Lepenski Vir	3 rd c.?	5.1×4.9 m; 25 m ² (SREJOVIĆ 1984: 197)	8 (1 <i>contubernium</i>)
Male Livadice	Late 1 st c.	ca. 20×17.5 m or 12×12m; 350 or 144 m ² (PILETIĆ 1984: 187)	8–32 (1–4 <i>contubernia</i>)
Veliko Golubinje	4 th – 6 th c.	ca. 8.5×8.5 m; 72 m ² (LJ. POPOVIĆ 1984: 297)	8 (1 <i>contubernium</i>)
Hajdučka Vodnica	2 nd half 4 th c. – 1 st half 5 th c.	12.5×11.8 m; 147 m ² (JOVANOVIĆ 1984: 319)	8–16 (1–2 <i>contubernia</i>)
Donja Butorka near Kladovo	Late 3 rd c.	19.5×19 m; 360 m ² (CERMANOVIĆ-KUZMANOVIĆ 1979: 129)	16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać)
Rtkovo-Glamija I	2 nd half 4 th c.	18.5×18.5 m; 342 m ² (GABRIČEVIĆ 1986: 74)	16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać)
Ljubičevac	Late 3 rd c.	19.8×19.8 m; 392 m ² (KORAĆ 1996: 106)	16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać)
Mouth of the River Slatinska	2 nd half 4 th c.	19×18.4 m; 351 m ² (JOVANOVIĆ, KORAĆ, JANKOVIĆ 1986: 380)	16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać)
Mihajlovac-Blato	2 nd half 4 th c. Tower with enclosure wall	19.32×19.54 m and ca. 36×40 m?; 377 and 1440 m ² (TOMOVIĆ 1986: 413–414)	32–40 (4–5 <i>contubernia</i>)
Mihajlovac-Mora Vagei	1 st c. Early tower	ca. 15×15 m; 225 m ² (CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1986: fig. 1)	8–32 (1–4 <i>contubernia</i>)
Mihajlovac-Mora Vagei	Late 3 rd c. Late tower	18.5×18.5 m; 342 m ² (CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1986: 456)	16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać)
Borđej	2 nd half 4 th c. – Tower 6 th c. – Enclosure wall	19.6×19.6 m and 36×36 m; 384 and 1296 m ² (CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1984: 217)	2 nd half 4 th c.: – 16–24 (2–3 <i>contubernia</i>) (20 men, according to M. Korać) 6 th c.: – 32–40 (4–5 <i>contubernia</i>)

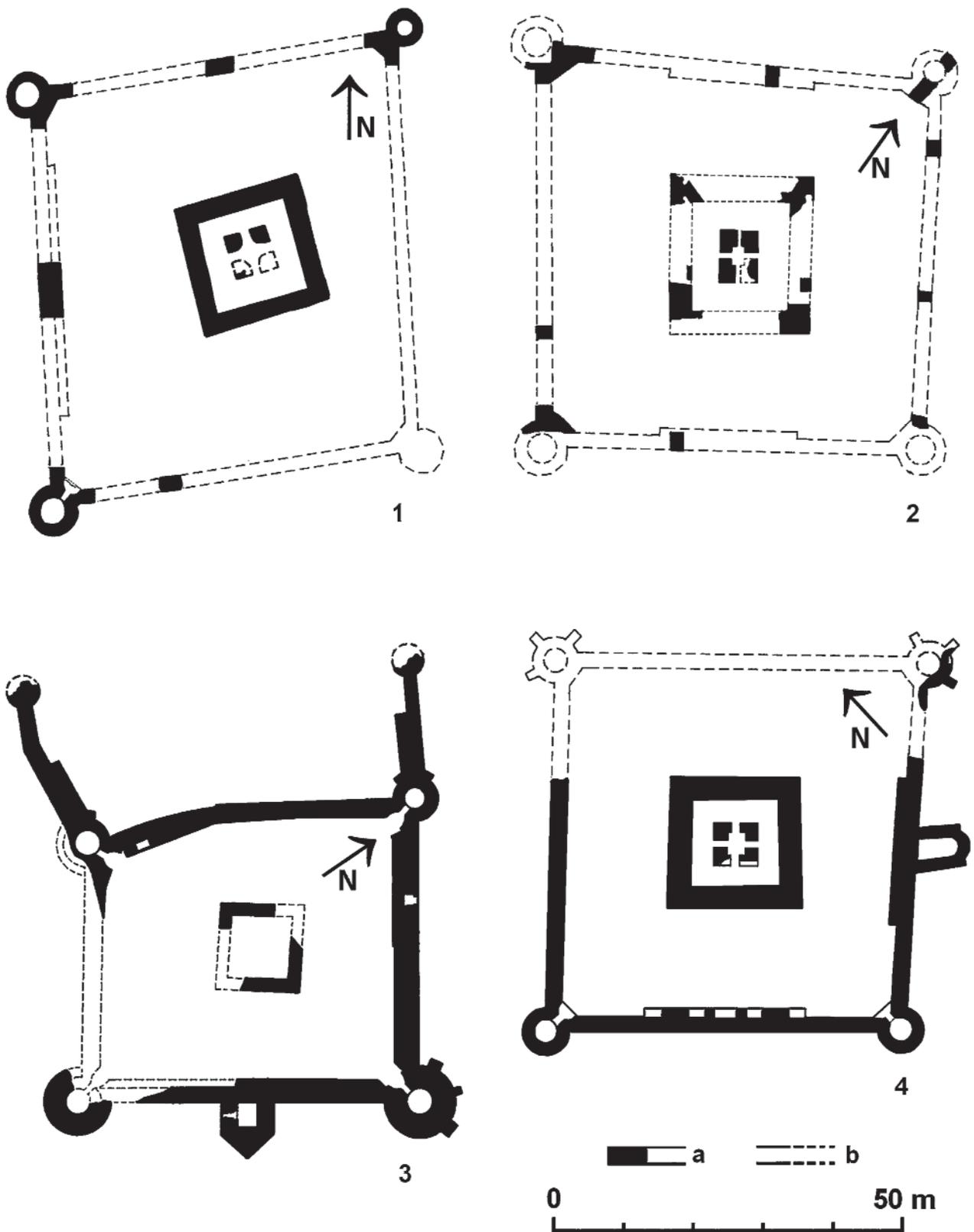


Fig. 15. Fortlets built around earlier freestanding towers. Plans (a – certain course of walls; b – supposed course of walls): 1 – Rtkovo-Glamija; 2 – Ljubičevac; 3 – Hajdučka Vodenica; 4 – Donja Butorka (E. Jęczmienowski, based on: 1 – GABRIČEVIĆ 1986: plan I; 2 – KORAC 1996: fig. 3; 3 – JOVANOVIĆ 1984: fig. 1; 4 – CERMANOVIĆ-KUZMANOVIĆ 1979: fig. 1).

Ryc. 15. Małe forty wzniesione dookoła starszych wież wolnostojących. Plany (a – ustalony przebieg murów; b – przypuszczalny przebieg murów): 1 – Rtkovo-Glamija; 2 – Ljubičevac; 3 – Hajdučka Vodenica; 4 – Donja Butorka.

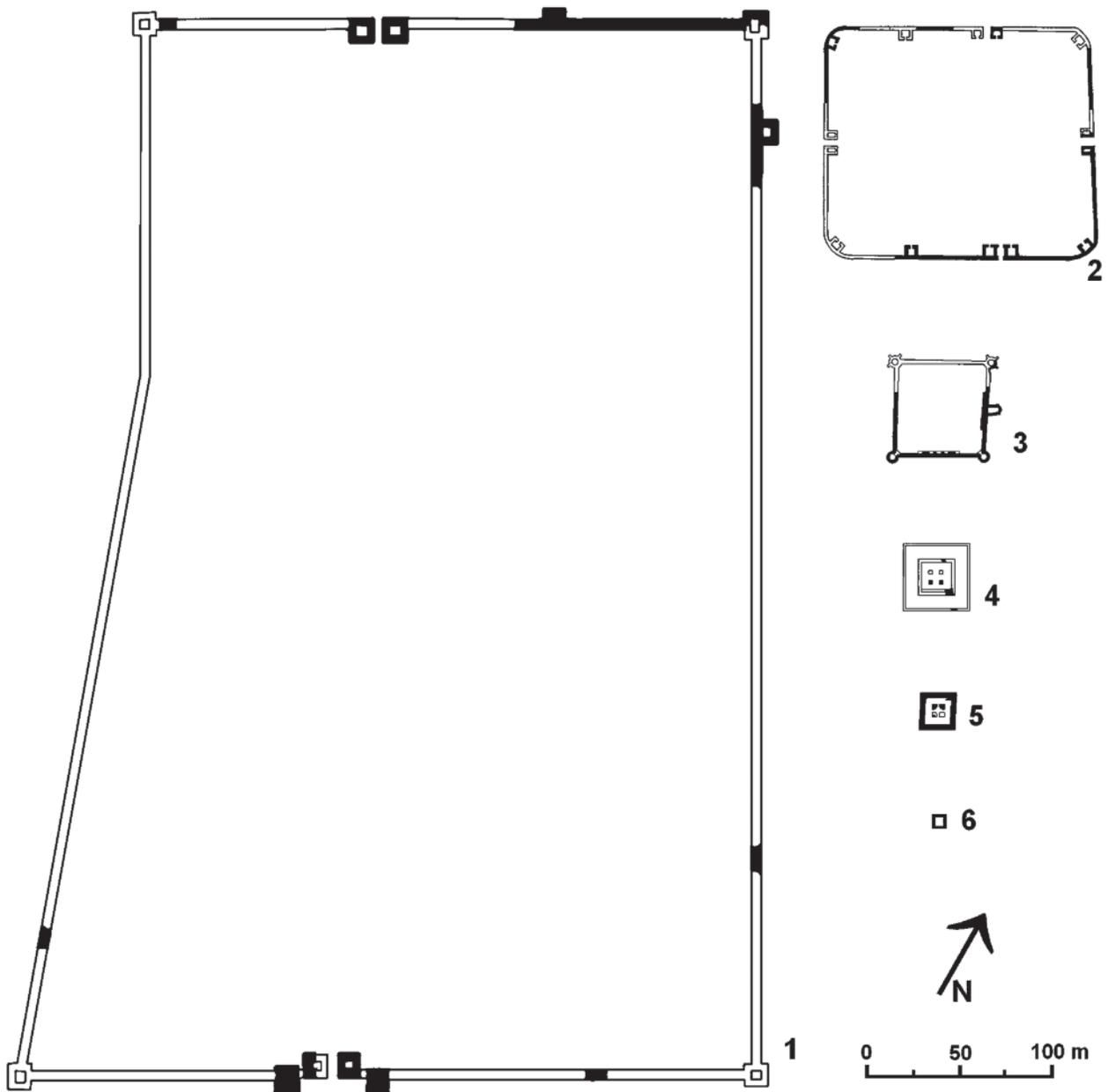


Fig. 16. Various types of fortifications. Comparison of size: 1 – Legionary fortress, ca. 330×570 m, Belgrade (*Singidunum*); 2 – Auxiliary fort, 140×120 m, Brnjica-Gradac at the mouth of the Čezava river (*Novae*); 3 – Fortlet, 46×45 m (58×57 m with towers), Donja Butorka near Kladovo; 4 – Freestanding tower with enclosure wall, 36×36 m, Borđej; 5 – Freestanding tower, 18.5×18.5 m, Rtkovo-Glamija I; 6 – Freestanding tower, 5.1×4.9 m, Lepenski Vir (E. Jęczmienowski, based on: 1 – BOJOVIĆ 1996: fig. 1; 2 – VASIĆ 1984: fig. 6; 3 – CERMANOVIĆ-KUZMANOVIĆ 1979: fig. 1; 4 – CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1984: fig. 208; 5 – GABRIČEVIĆ 1986: plan I; 6 – SREJOVIĆ 1984: fig. 1).

Ryc. 16. Różne typy umocnień. Porównanie wielkości: 1 – obóz legionowy, około 330×570 m, Belgrad (*Singidunum*); 2 – obóz wojsk pomocniczych, 140×120 m, Brnjica-Gradac u ujścia rzeki Čezava (*Novae*); 3 – mały fort, 46×45 m (58×57 m z wieżami), Donja Butorka w pobliżu Kladova; 4 – wieża wolnostojąca z zewnętrznym murem, 36×36 m, Borđej; 5 – wieża wolnostojąca, 18,5×18,5 m, Rtkovo-Glamija I; 6 – wieża wolnostojąca, 5,1×4,9 m, Lepenski Vir.

a stronger garrison, with the numerical strength similar to that of “milecastles.” Their garrison was estimated at between 8 and 32 men, which equals to 1–4 *contubernia* (FIELDS 2003: 15). It has to be noted that this category includes almost only late towers, without external walls. The garrison of these towers has been estimated at about

20 men (KORAC 1996: 107). An illustrative example is the late tower in Mora Vagei, which was built at the turn of the 3rd and 4th c. AD, and had dimensions of 18.5×18.5 m (Fig. 14:3). The total surface of this tower is similar to that of the tower found at the site Kazatzkaya in Crimea, the garrison of which was estimated, depending on the cir-

cumstances, at between 8 and 16 men, which is equal to 1 or 2 *contubernia* (SARNOWSKI, SAVELJA, KARASIEWICZ-SZCZYPIORSKI 2009: 65–66). At Kazatzkaya the latter number seemed sufficient to man the enclosure wall, the total length of which was about 55 m. The total surface of the tower from Mora Vagei is almost half as big again as the one from Kazatzkaya. Thus, the garrison was probably accordingly stronger, which would be equal to about 20 men or 2–3 *contubernia* (16–24 men).

As regards large towers in Bordej (Fig. 13:2) and Mihajlovac-Blato (Fig. 13:1), which were surrounded by an external wall, it seems that the sufficient garrison necessary for the protection of the walls, whose total length measured 144 m and over 150 m respectively, is about 32–40 men (4–5 *contubernia*). In the case of Bordej it has to be noted that the external wall was constructed during the reign of Justinian I (CERMANOVIĆ-KUZMANOVIĆ, STANKOVIĆ 1984: 217–218). It cannot be ruled out that a similar situation occurred also in Mihajlovac-Blato.

Other fortifications

Several sites could not be attributed to the groups analyzed above, which was mainly due to their function. One of such sites is Svetinja near Kostolac in Serbia, where remains of what may have been a harbour, were discovered at some distance from early Byzantine *Viminacium*. They were remains of a wall strengthened with two towers, stretching between two old riverbeds of the Danube and the Mlava. Also, at the inner side of this curtain remains of a perpendicular wall were discovered. It is probable that it was a later wall, which has never been completed (M. POPOVIĆ 1988: 1–37).

A similar situation was observed near the mouth of the River Porečka. The fort was probably built next to already existing walls which protected the river harbor. This was done during the reign of Diocletian or Constantine I. The fortifications continued to exist even when the fort was abandoned. It was a long wall which stretched along

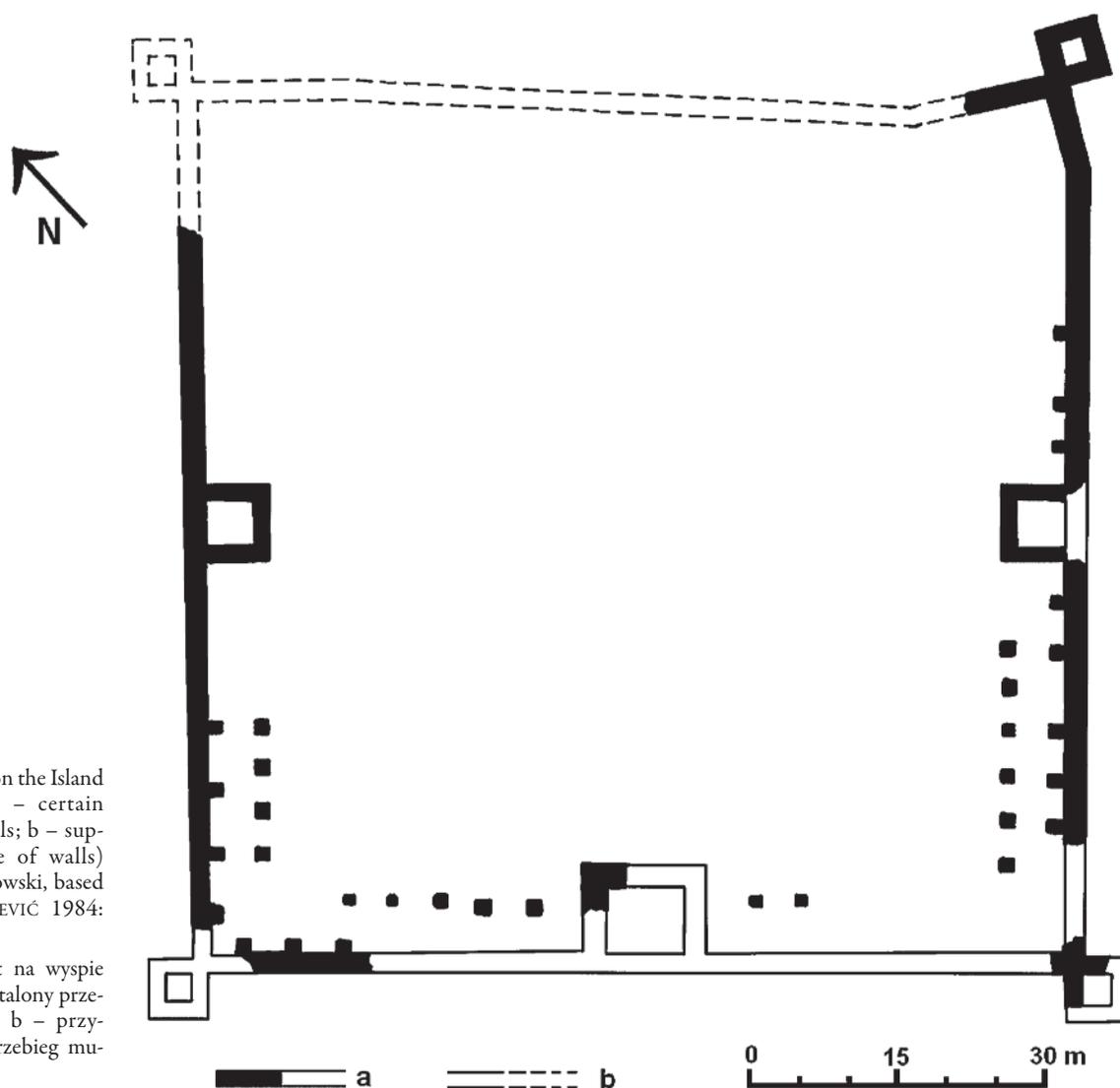


Fig. 17. Fort on the Island of Sapaja (a – certain course of walls; b – supposed course of walls) (E. Jęczmienowski, based on DIMITRIJEVIĆ 1984: fig. 3).

Ryc. 17. Fort na wyspie Sapaja (a – ustalony przebieg murów; b – przypuszczalny przebieg murów).

both banks of the River Porečka. The part cutting across the river was probably connected with some kind of a bridge. This wall separated quite a spacious area from the interior of the province (PETROVIĆ 1984b: 285–286).

Another interesting site is the fort in Sapaja Island near Veliko Gradište in Serbia which was constructed in the times of Constantine I (Fig. 17). Its form was very similar to that of late fortlets, but in comparison with them it was two or three times bigger occupying an area of about 0.86 ha. Its four sides measured ca. 92.5 m each (DIMITRIJEVIĆ 1984: 36). Using the formula applied to determine the size of garrisons of auxiliary forts we get the result indicating that there should have stationed 0.65 notional cohort, which gives a number of about 312 soldiers. It is possible that some kind of *numerus* stationed there.

Initially, in Pesača near Veliko Gradište in Serbia a freestanding tower was erected with dimensions of 7.5×7.5 m. It was later included in a larger enclosure measuring about 36.4×34 m (MINIĆ 1984: 171), in its north-western curtain, near the western corner. These walls enclosed some kind of a household courtyard. Other towers have not been registered. The shape of the whole military installation was similar to the tower in Zidinac, but it was four times bigger and it was not built at the same time. Determining the numerical strength of the garrison is problematic; the tower was probably garrisoned by 8 men (1 *contubernium*), yet we have a problem with determining the other number. The purpose of this whole complex is unknown, but it seems that the number of soldiers sufficient for its protection would be about 40 men, which equals 5 *contubernia*.

Conclusion

In times of the Principate, large fortifications were popular, which reflected actual trends in the military doctrine. These large rectangle fortifications, defended by inner towers, with rounded corners were not highly fortified fortresses designed to resist sieges. They were garrisons from which, in case of danger, forces set off to face the invaders. Large legionary fortresses were garrisoned with about 5000–6000 men. Sizes of auxiliary forts were various, and so were numbers of soldiers. This type of units was also significant because cavalry required more space. In the case of the infantry, the number of soldiers varied between about 500 and 1000 men. For some reason, probably conditioned by the strategic favours, the most numerous are forts assigned to Group 2, where mixed units could station. Unlike the neighbouring limes of *Moesia inferior*, where the most frequently occurring were forts that could be assigned to Group 1, where probably infantry units

stationed. But it has to be noted that if we had better data on the dimensions of all forts, the proportions could be different.

Smaller kinds of fortifications such as fortlets and freestanding towers were also erected along the Upper Moesian limes. Because they were smaller than previous types they could be constructed in less accessible places, and many of them were constructed in the mountainous area of the Iron Gate gorge. The function of fortlets was to defend these places while freestanding towers served mostly as watchtowers and sentry posts. Their garrisons were much smaller, when it comes to fortlets it was several dozen men, and in the case of freestanding towers the most probable number was 8 men (1 *contubernium*) or more, depending on the size.

Since times of the Tetrarchy, when the Roman army was reorganised because of the establishment of *limitanei* and *comitatenses*, important changes in the defensive architecture took place. Since that time many of the fortifications were small, but they were highly fortified fortlets, protected with the outer, corner towers, initially square in shape, but later mostly rounded, and freestanding towers. Thanks to that, fortifications of the Upper Moesian limes, which earlier were mostly garrisons, became highly fortified fortresses, which, with the passing of time became more visible. The process reached its climax in the 6th c., mostly in times of Justinian I, when the border on the Danube had to be manned once again after a several-decades interval connected with the devastating invasion of the Huns. Crews of the late antique fortlets, from which most were of the *quadriburgium* type, counted several dozen men, most probably about 50.

In this article different types of fortifications, their topography, form and garrisons, were discussed. Effort has been made to determine the numerical strength of units stationed in various places. However, the systematised review of the fortifications of the Upper Moesian limes is just a first step to a more detailed analysis of the aspects such as character, function, importance of the aforementioned limes, and reconstruction of the garrisons stationed there in various times. Further studies should compare periodised archaeological data with the information acquired from various military diplomas, inscriptions and stamps on roof tiles and bricks. All of the data could give a more precise overview of the military units stationed there.

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Abbreviations

ND – *Notitia dignitatum, accedunt Notitia urbis Constantinopolitanae et Laterculi provinciarum*, O. Seeck (ed.), Berlin 1876.
RLMLDanube – *Roman Limes on the Middle and Lower Danube*, P. Petrović (ed.), Beograd 1996.

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FORTYFIKACJE LIMESU RZYMSKIEJ PROWINCJI MEZJA GÓRNA. TOPOGRAFIA, FORMY, WIELKOŚĆ GARNIZONÓW

W artykule przedstawione zostały trzy wybrane zagadnienia dotyczące fortyfikacji limesu rzymskiej prowincji Mezja Górna oraz prowincji powstałych po jej podziale w ostatnim ćwierćwieczu III stulecia n.e. Górno-mezyjski limes pokrywa się z biegiem Dunaju na odcinku od Belgradu w Serbii na zachodzie do ujścia rzeki Łom w północno-zachodniej Bułgarii na wschodzie (Ryc. 1–9). Większość z omawianych umocnień została wzniesiona na prawym brzegu Dunaju, aczkolwiek część została ufundowana również na lewym. Długi okres rzymskiej obecności na tym terenie obejmował niemal 600 lat, poczynając od I w. n.e. a kończąc na przełomie VI i VII wieku. Przez większość tego czasu północna granica tej prowincji była również granicą cesarstwa. Od początku II w. n.e. aż do opuszczenia Dacji około 270 roku limes górno-mezyjski był wewnętrzną granicą państwa, ale mimo to nie zdecydowano się na całkowite zniesienie stacjonującej tam obsady wojskowej.

Umocnienia wzniesione wzdłuż limesu podzielono na kilka kategorii, a mianowicie: obozy legionowe i miasta, obozy wojsk pomocniczych, małe forty, wieże wolnostojące oraz inne. Podjęto próbę określenia prawdopodobnych rodzajów jednostek oraz liczebności garnizonów stacjonujących w wymienionych obiektach.

Pierwsza kategoria obejmuje największe założenia, których wymiary najczęściej wynoszą około 300×500 m a powierzchnia jest zbliżona do 20 ha (Tab. 1, 2). Obozy legionowe (Ryc. 16:1) oraz miasta zostały potraktowane łącznie, gdyż z biegiem czasu te pierwsze bywały „wchłaniane” przez ufortyfikowane ośrodki miejskie. Stałe siedziby dwóch górno-mezyjskich legionów okresu pryncypatu (*III Flavia* i *VII Claudia*) początkowo znajdowały się w *Singidunum* (Belgrad) i *Viminacium* (Kostolac). W obozach legionowych tego okresu stacjonowało około 5000–6000 tysięcy żołnierzy. Po ewakuacji Dacji przez Aureliana obsada wojskowa rozpatrywanego odcinka dunajskiej granicy została wzmocniona nowym legionem (*XIII Gemina*). Po reformach administracyjnych i wojskowych Dioklecjana i Konstancyntyna tamtejsze legiony, podzielone na mniejsze oddziały, stacjonowały nie tylko w *Singidunum* i *Viminacium*, ale także w *Cuppae*, *Egeta*, *Pontes*, *Burgus Novus* (?), *Dierna* i *Ratiaria*. Ta ostatnia miejscowość była już od czasów Trajana rzymskim miastem o statusie kolonii. Zarówno miasta na limesie, jak i siedziby legionów, były lokowane na rozległych równinach, w pobliżu ujścia rzeki. W IV w. n.e. również mały fort w *Bononia* (Vidin) został wchłonięty przez silnie ufortyfikowane miasto, którego powierzchnia była zbliżona do obozów legionowych z okresu pryncypatu.