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FORTIFICATIONS MADE OF WOOD AND EARTH IN LATE MEDIEVAL CASTLES OF THE SUDETY MOUNTAINS

INTRODUCTION

The existence of wood and earth forms of castles for some time is pointed out in the literature (Guerquin 1957, Kajzer 1993, Boguszewicz 1996, Jaworski 1996). The issue of use of wood and earth elements in the late Middle Ages is associated with many interesting research directions: the transformation of early medieval strongholds into masonry Gothic castles, problems of motte-type foundations, attempts to reconstruct non-existent elements of castles of mixed building technique. Therefore, it is quite surprising that earthworks such as earthen ramparts, mounds and ditches at numerous sites are often unnoticed, or referred to only with a short notice without longer comment. Sometimes they are associated with outdated, early medieval fortifications, or referred to as temporary defences, built shortly before having been replaced by masonry walls. Unfortunately, most of available literature focuses on particular sites and particular problems, which is not helpful for the purposes of comparing sites and does not provide a synthetic view.

The subject of this analysis is a group of sites with fortifications built or rebuilt in the 13th, 14th and 15th centuries, located in the area of the Sudety Mountains in the borderland of Silesia and Bohemia.

The aim of this paper is, first of all, to identify elements of the defensive system – wood and earth walls, ditches, platforms, palisades, etc., which can be found in different types of castles. This insight will attempt to present their various applications, in particular as the element of a given stronghold's defensive system, to organise the matter and to pose some questions.

The argument chronologically follows the evolution of Silesian castles as described by Artur Boguszewicz (1998, hereafter A. B.) and Roland Mruczek (2003, hereafter R. M.): the first residential period (before 1241 R. M.; 1172–1241 A. B), the transitional period (1241–1290 R. M.; 1241–1280 A. B.), the dukes' classic investments period (1290–1327/92 R. M.; 1280–1325 A. B.), and the period when private investments became widespread (1327/92–1526 R M.). For the purpose of ordering of discussed objects with regard to their function, layout and origin the most universal outline by Jerzy Rozpędowski (1978) is applied: the division into towerless castles, castles with residential towers and castles with last defence tower (bergfried tower).

I. FIRST (FEUDAL) RESIDENCES

Until the beginning of the 13th century stone or wood and earth based ramparts in the wall system were practically the only method of fortifying settlements in the region. Various traditions of building fortifications can be found in early medieval period. Details of constructions reveal both foreign and regional influences, such as in the case of stone elements of breastworks.

Chronologically, the oldest ramparts, erected according to earlier standards were then used as parts of newer complexes. Sometimes the modernisation process of early medieval fortifications is extended

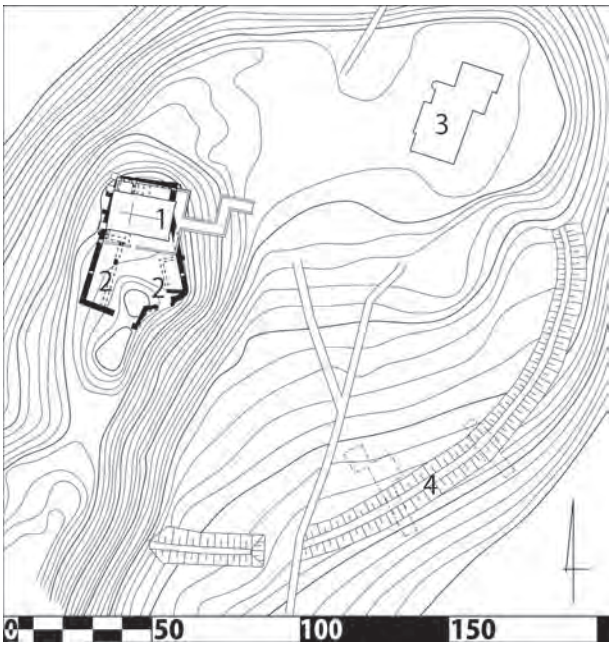

Fig.1. Summit of Ślęża, Wrocław District: 1 – church (1702, 1852); 2 – castle walls (14th cent.); 3 – shelter-home (1906); 4 – stone rampart (10th cent.?). (after Kaźmierczyk 1978)

over time and thus it is difficult to determine the moment of the transformation into a feudal masonry castle.

Legnica is indicated as one of the first of "model" wooden strongholds which underwent the process of transformation into the feudal castle: a chapel was erected at the two-segment site, together with two free-standing cylindrical towers, the northern gate tower and a Romanesque residential pallatium. It referred to imperial Pfalzes, as reflected by the building form of the pallatium. Before 1241 wood and earth ramparts began to be replaced by stone walls. This issue was first researched by Jerzy Rozpędowski (1965), who dated this change to the beginning of the 13th century. A new ring of castle fortifications followed the old system. Construction of the outer walls was kept at the inner edge of the rampart, so that the wall did not stand on the old embankments, but left them outside. The exact layout of the wooden fortifications is not exactly known, since it was determined only by test excavations and drilling. Noteworthy is the fact that the new foundation covered the entire large area of the castle.

A similar situation can be observed in the case of Opole. The stone castle took over the whole area of the early medieval town. The peripheral wall, erected in 1228 (Kozaczewski 1957), was drawn along the inner edge of the rampart, with only the west wall being built directly on the embankment.

The peak of Ślęża Mountain (Fig. 1) is a different case. At the turn of the 9th and 10th century it became the location of a settlement (Kaźmierczyk 1978), after which there remained a 200 metres section of massive stone mound surrounding a vast area of over 1 ha. In 1148 a church, and in 1242 a castellan

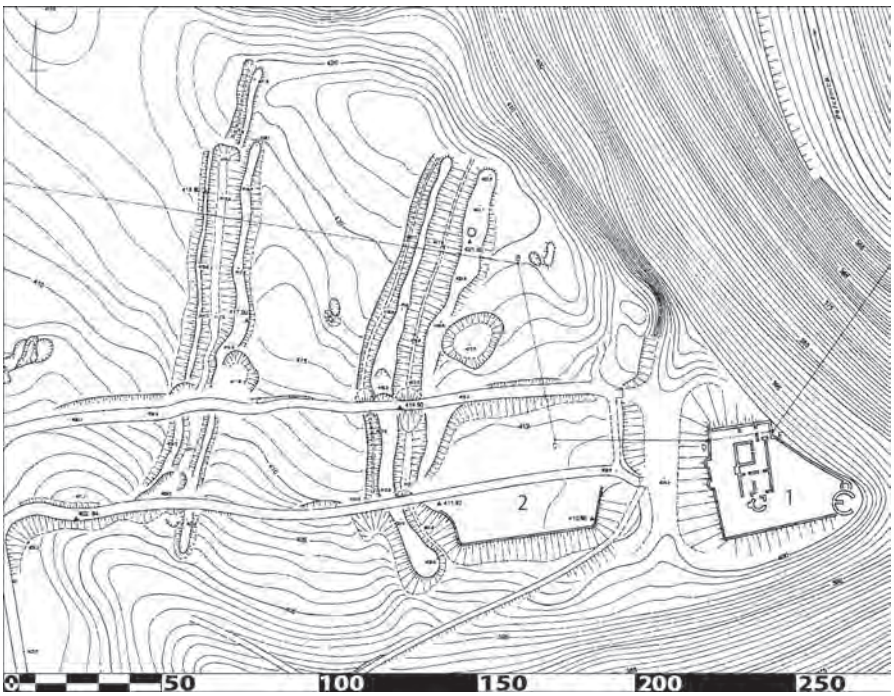

Fig. 2. Stronghold of Stary Książ, Wałbrzych District: 1 – castle walls (end of 13th cent. or beginning of 14th cent., rebuilt in 1794–97); 2 – representative courtyard (1800). (after Jaworski 2005)

stronghold were mentioned there. Probably after 1300 a stone castle was built in the area of a rocky culmination, occupying a far smaller area. It is not clear whether the settlements within the embankment existed continuously or inhabitants of the area surrounding the castle were resettled. It is known that in 1428 a 200-strong group of Hussite horsemen stationed there – and at least temporarily occupied the fortified peak's plateau. Later in that year the castle was besieged and partially destroyed.

At the Stary Książ (Fig. 2) castle the partial use of the former stronghold area can also be found. The fortress, functioning since the beginning of the 10th century (Jaworski 1996, 2005), had two segments separated by a doubled rampart built of stone. It occupied an area of c. 1.5 ha. Approximately in the year 1300 at the end of the promontory a new castle was built, separating the plateau from the rest with a moat cut deep into the rock. It is most likely that simultaneously an extensive lower castle functioned there – as indicated by surface finds, and by the significant rank of this seat, as an important ducal domain.

Yet another example of a similar adaptation is perhaps the site on Krzywousty Hill in Jelenia Góra. According to the study from 1959, in the 12th century a sickle-shaped section of a massive earthen rampart was built there, enclosing an area of 1 ha. The culmination of the hill was built-up a few times: according to recent research, a small wood and earth fort was erected in the mid–13th century. Later on it burnt down and was rebuilt on a stone foundation around the mid–14th century (Firszt 1998). However, a dating of the rampart as early medieval one has not been explicitly verified.

Archaic fortifications, constructed in accordance with the reality of warfare of the earlier period and another way of living (relatively big settlements, combining administrative and residential functions), were treated differently with the development of feudal structures:

1. They were modernised through a gradual rebuilding or replacement of older structures, usually leaving them in the foreground (Legnica, Opole),
2. They underwent reduction: a small section was marked off within their areas, while the remains could be used temporarily, or could function as bailey (for example Ślęża, Stary Książ, perhaps Jelenia Góra, Wleń),
3. In some cases, near a declining (or already abandoned) stronghold a new castle was erected (Wielisławka, Bardo),
4. Remains of deserted fortifications were sometimes used again as a base for new fortifications (Gromnik).

II. TRANSITIONAL PERIOD

The issue of a transitional type of castles is one of the recent problems of Silesian castle research. Earlier archaeological works focused on distinguishing strongholds dating back at least to the mid–13th century, while subsequent attempts to identify settlements were based on written sources, which rarely mentioned small peripheral castles.

The concept of a transition type of castles was introduced by T. Durdik (1978), as a result of his observation of the Angerbach castle near Kožlan, Hlavačov near Rakownik, Tachov in western Bohemia and Týnec on Sázava. On the basis of recent research he published a catalogue of dozens of objects (Durdik 2007), which he included in this group. They had the following formal features in common: a wood and earth construction technique, multiple sections, an oval plan and, relatively often, duplicated walls. They were erected (on both sides of the Sudety) in circumstances of intense colonisation, as new branches of new administrative and military networks. They required a small outlay, using the contribution of the population. According to A. Boguszewicz (1998), this form of castle was inspired by mottes, popular in 12th century Western Europe.

As R. Mruczek (2003) rightly notes, the uniqueness of these types of castles consisted first of all in particular circumstances of their construction in the period of political changes (rather than in construction and layout issues, such as the oval plan). It is possible to determine the locations connected to settlement-period castles, though they bear slightly different characteristics, an example of which could be the one-part Bradlo castle – quite extensive, with a polygonal perimeter, made of stones laid on clay (Durdík 2005).

The stronghold in Pieszyce (Fig. 3) is referred to as the model settlement of the transitional period (Boguszewicz 2000). Its construction is dated to the second half of the 13th century. It was founded on a rocky culmination, surrounded by a double string of ramparts. Below, on levelled thirty metres wide platforms, two segments of the bailey were built, also surrounded by a double string of ramparts.

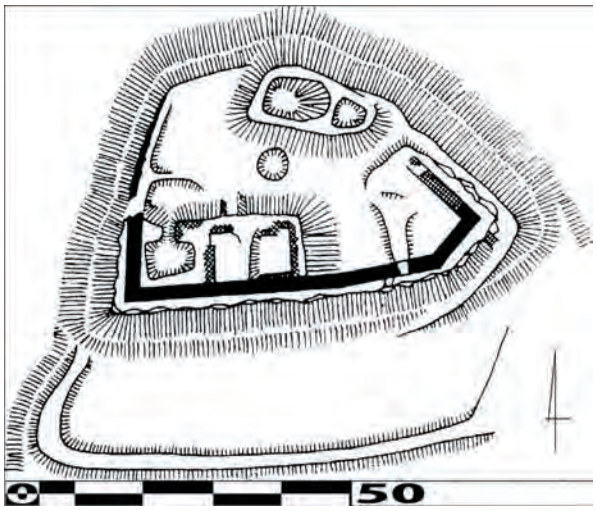

Fig. 3. Pieszyce, Dzierżoniów District (second half of 13th cent.)

A cross-section of the earthworks of the castle culmination was made during excavations. On the edge of the top plateau there was a stone wall on clay, while at the foot of the slope, just 20 metres away stood a rampart in the box construction. The ditch before the outer rampart was cut in solid rock, forming the flat bottom of the moat. Probably the access road went that way.

In the middle between the inner and outer line of defences, on the steep slope, another trace of earthen wall was found. Such a dual circuit seems to be typical for many late medieval castles: the inner line of defences on the edge of the slope and the outer at the foot of it. So perhaps in the case of other unexcavated objects, which will be discussed below, the obstacles on the slope below the inner wall may be expected.

II. 1 "COAT WALL" CASTLES

This is kind of a towerless castle, whose main defence element is a solid stone wall. This wall has a thickness generally bigger than 2 metres and a considerable height (probably more than 8 metres). All castle buildings are located peripherally and hidden behind the "coat wall." Sometimes gate towers can also be found. These castles are mostly of round or polygonal layout. Such sites appear in Dolní Morava, Rakucich in the 2nd half of the 13th century. The first of these could be Svojanov founded by Přemysl Otakar II c. 1265 (Durdik 2005).

Castles of Pustohrad, Szczerba, Lanšperk (Fig. 4, 5) depict some variations of the coexistence of earthen walls with a "coat wall" (the main work of the defence). Pustohrad has embankments around all the perimeter. They occupy a considerable area, several times larger than the area within the walls of the courtyard. The length of the outer line of fortifications is significantly greater than the length of the wall.

In the castle of Szczerba the section of the earthwork and moat existed on one side only – on the one easiest to access, playing a minor role in the defence of the castle. More important for the defence was the fact that it was located on a rocky ridge and cut off by crosswise trenches. At Lanšperk the rampart plays an even lesser role, as it is located below a great rocky wall – most likely covering the entry way. In the aforementioned settlements the rampart probably did not serve as the basis for fighting positions, but facilitated firing at the enemy from the moat wall above, forming an additional obstacle for the attackers. This is indicated by the width of the crown rampart, rather too small to organise the defence. Moreover, in castles guarded by a crew of a dozen or so it was difficult to expect defenders to scatter on the inner and the outer defence line.

In towerless castles of a relatively simple plan, where the entire attack is focused on the walls, we can observe an arrangement of escarpment and foreground, corresponding only to the route of the walls in rocky terrain.

III. THE DUKES' CLASSICAL INVESTMENT PERIOD

The castles built of stone and brick became popular in Silesia around 1280. As a result of successful colonisation, the economic development advanced. The development of towns and demesne was supported by dukes. At the same time, political fragmentation proceeded; from the existing duchies the new ones were formed (in 1274, 1281 and 1290). Bolko I, Duke of Świdnica and Jawor, as well as his son Bolko II, are considered to be the greatest "castle builders." The building of new fortifications in the Duchy of Jawor and Świdnica was also as intense as the development of brick or stone building throughout Silesia at the end of the 13th century.

The form of every castle was defined by the structure of defence ring as well as the relation between the tower (towers) and the residential buildings. One

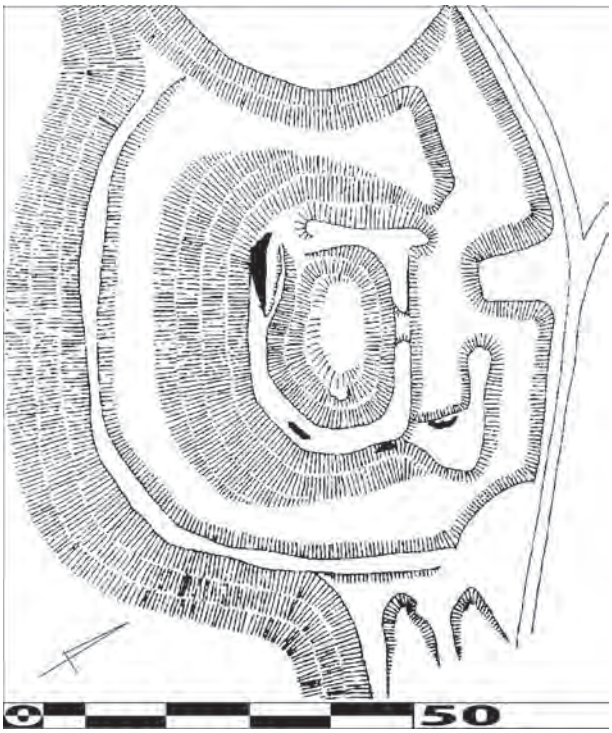

Fig. 4. Lanšperk, Ústi nad Orlici District (built before 1285)

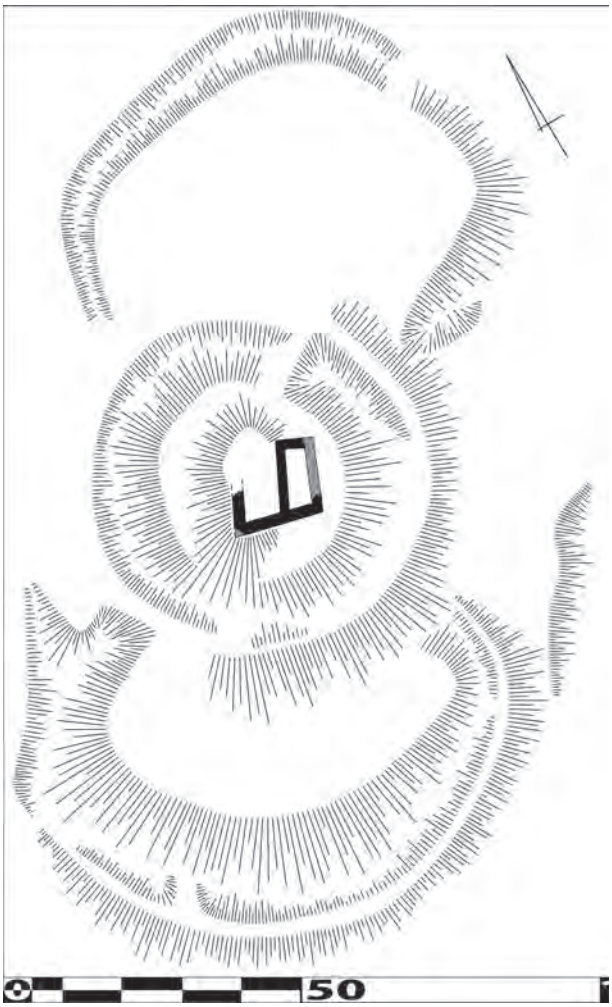

Fig. 5. Pustohrad, Jičin District (second half of 13th cent.)

of the "inventions" of warfare techniques popularised around that time was a castle with the main tower used strictly for military purposes. Those were first used much earlier in Rhineland and they were popularised in Silesia due to Bohemian and German influence (Mruczek 2005). Bergfried castles (with bergfried disposition) can be characterised by a single bailey arrangement where the bergfried tower is situated at the front, usually in the neighbourhood of the gatehouse, where the residential area was situated on the safer side (Durdik 2005). Simultaneously, the objects with a residential tower as the main part of the fortress as well as mixed layouts were developed.

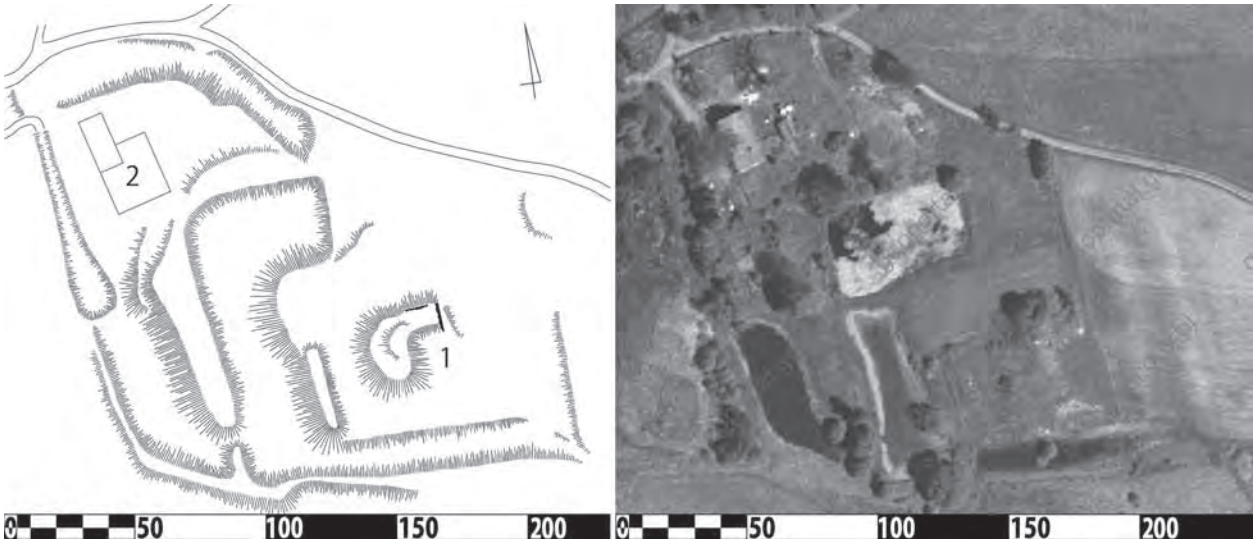

Fig. 6. Grzędy, Kamienna Góra District (beginning of 14th cent.): 1 – remains of castle; 2 – farm with fish ponds (20th cent.). Lowland, regular ducal castle. Outline of filled up moat is visible on the aerial photograph (after www.geoportal.gov.pl)

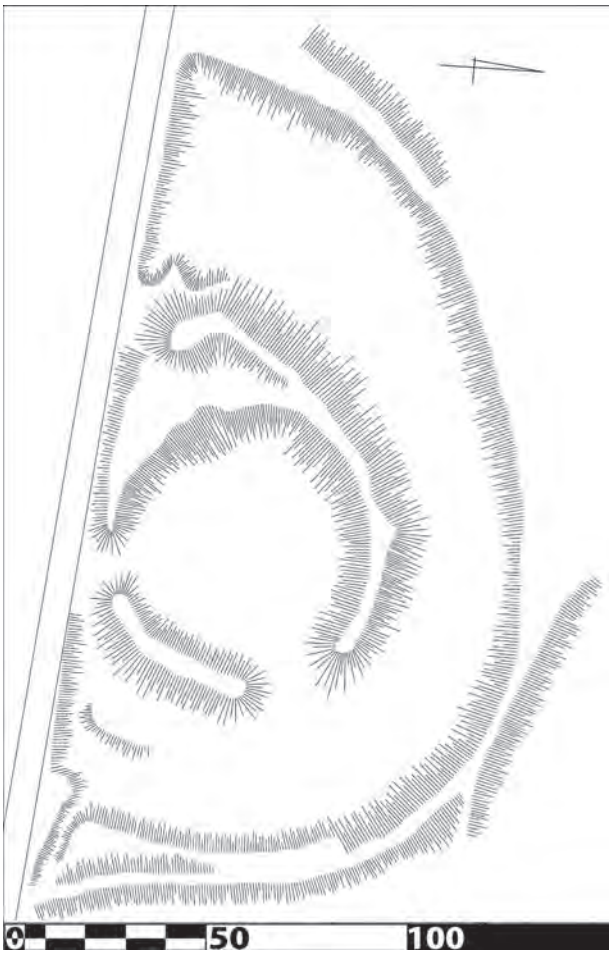

Fig. 7. Chałupki, Nysa District (built before 1295). Lowland ducal castle, originally with tower. Greater width of moat from the west is most likely related to its localisation

The Radosno castle (Fig. 8), built at the end of the 13th century, is one of many castles with a bergfried tower. It was erected in the border belt at the height of 779 metres above mean sea level on a steep rocky promontory. The erection of the castle was related to the protection of the land that originally belonged to the Benedictines from Broumov against the aggression of the Piasts (Boguszewicz 1996). In the mid–14th century it was a property comprising the centre of a dominion that consisted of 12 villages.

The castle can be described as a model object with a bergfried disposition. The tower is situated in a place that enables to protect the east side of the castle, from the side of the extension of the ridge. At the distance of 30 metres from the tower a deep moat was carved in the rock. The bridge over the moat probably led to the entranceway. The defence wall encircles the tower and the residential area from the western side (Kastek *et al.* 1996).

The cylindrical tower, around which the defence ring with lighter construction functioned, was set up as the first element of the object (Rozpędowski 1960). Then a stone defence ring was built – as suggested by

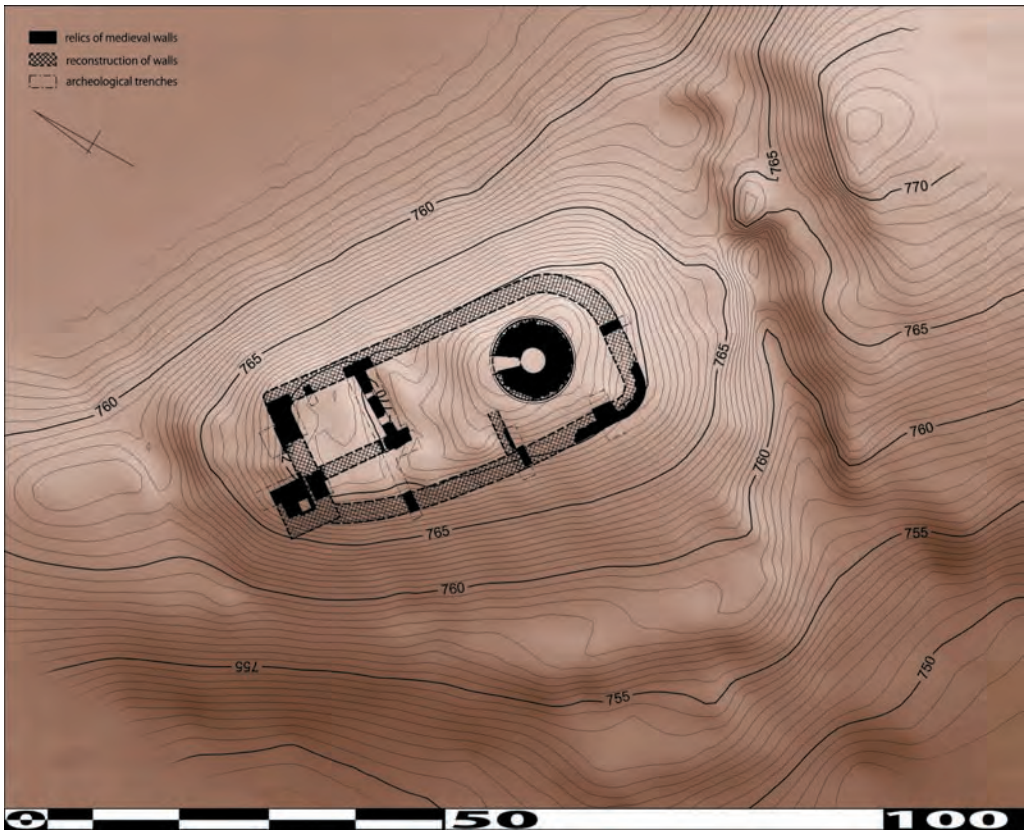

Fig. 8. Radosno, Wałbrzych District (end of 13th cent.). Measurements: P. Rajski, Ł. Świercz

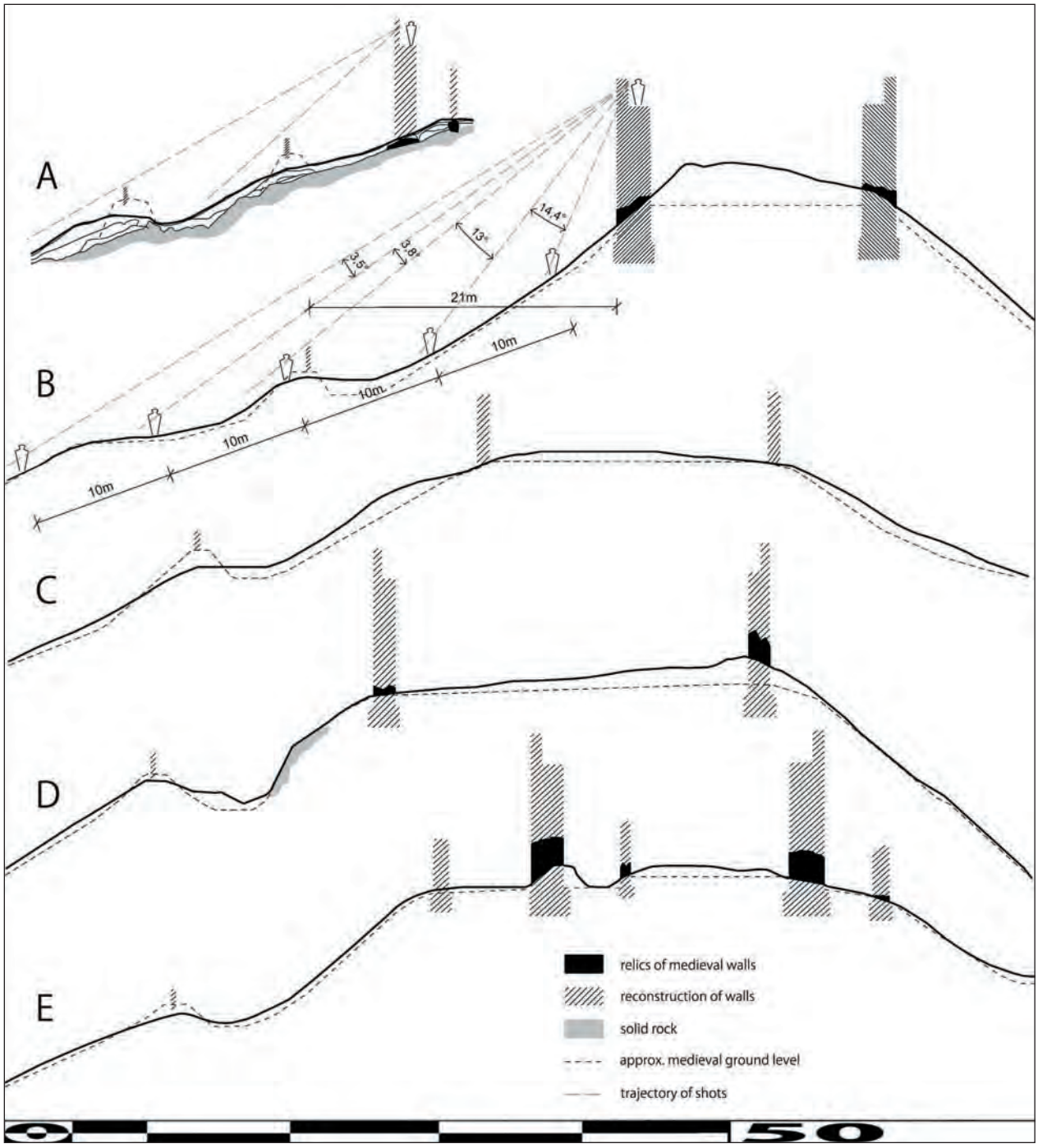

Fig. 9. Comparison of fortification sections: A – Pieszyce, western slope of central mound (after Boguszewicz 2000); B – Radosno, illustration of the role of rampart for defence; C – Sokolec, back ward with its rampart on the eastern slope; D – Wielisławka, high castle with southern embankments; E – Karpień, high castle with northern embankments

the difference in plasters used for building the walls. The turret is a later addition. Considering its rather small size, at the time of its destruction the Radosno castle had quite developed defence capabilities.

The layout which is similar to the one in the Radosno castle can be seen in another border stronghold – Grodziszcze. It is a promontory-based object with a bergfried, strengthened by lines of fortifications parallel to the slope and separated from the extended ridge with a carved moat. Its erection is dated back to the beginning of the second half of the 13th century (Boguszewicz, Krukiewicz 1993). The structure of the castle could be similar to the Radosno castle in its older phase of functioning. The stone tower was surrounded by wooden buildings and fortifications.

The outer line was connected functionally with the inner wall in order to improve the defence of the inner walls. In such sites it seems doubtful, however,

whether the purpose of the outer line was the direct defence – few defenders would be scattered, and possible escape behind the inner wall would be very difficult.

The attached layout (Fig. 9, B) illustrates the role of the fortifications at the foot of the escarpment. The site where an outer obstruction was formed was a sign of certain optimisation: an approach of the enemy makes it necessary to slightly adjust the shot trajectory. When the aggressor crosses the fortification line, the adjustment of shot trajectory is a dozen or so degrees every 10 metres. In case of a mass fire, building an earth embankment ensures more dense and effective fire from the walls at the line of the embankment, as opposed to firing at scattered aggressors and allowing them directly to the foot of the wall – into the dead ground, where defence using such arms as bows and crossbows was virtually impossible.

It is worth mentioning that the examination of fortification profiles, a field of fire, a distance relation between particular defence elements comprises a pointer regarding the type of weapon the defenders used. Moreover, experimental archaeologists can show off their talents in this area.

The Sokolec castle (Fig. 10) was preserved only in a fragmentary form. Small portions of the walls as well as the outline of the ring wall can be seen. In the surrounding area, however, traces of earthen walls can be noticed, suggesting greater extent of the object than the stone centre. The examination of rocky outcrops that surround the castle provides an opportunity to examine the original layout of the buildings. Traces of once rock-adjacent buildings, also outside the walls, are visible (Chorowska *et al*. 2006, p. 205).

The Wielisławka castle (Fig. 11) was not recorded in written sources. Indirectly, the character of that settlement network bears on the chronology of the castle. The network was formed as a result of relatively early colonisation – the first half of the 13th century, which seems to be supported by numerous churches with Late Romanesque features (Sędziszowa, Nowy Kościół, Kondratów).

The object consists of a number of parts – the higher castle, enclosed by quadrangular wall, a high wall of stone construction and at least two extensive sections of lower castle. A whole sequence of objects can be observed there – at the top of a neighbouring hill, at a distance of a hundred or so metres, traces of a ring-work that thrived in the 12th and 13th century can be seen (Chorowska *et al.* 2006, p. 230).

Wielisławka is an example of an object where wood and earth based elements played a crucial role. The construction of the castle on the southern top of Wielisławka seems to be related to the supervision

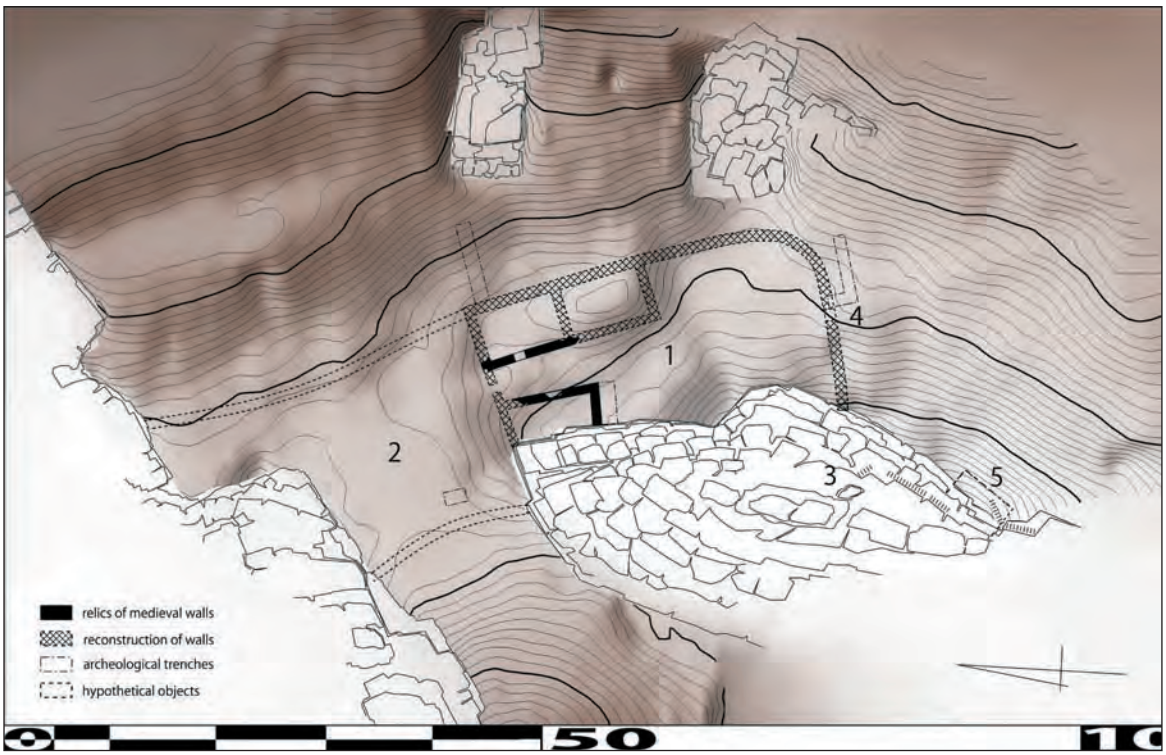

Fig. 10. Sokolec, Jelenia Góra District (14th cent.): 1 – main ward; 2 – back ward; 3 – cistern in rocky culmination; 4 – gate; 5 – tower (?). Measurements: P. Rajski, T. Sokołowski

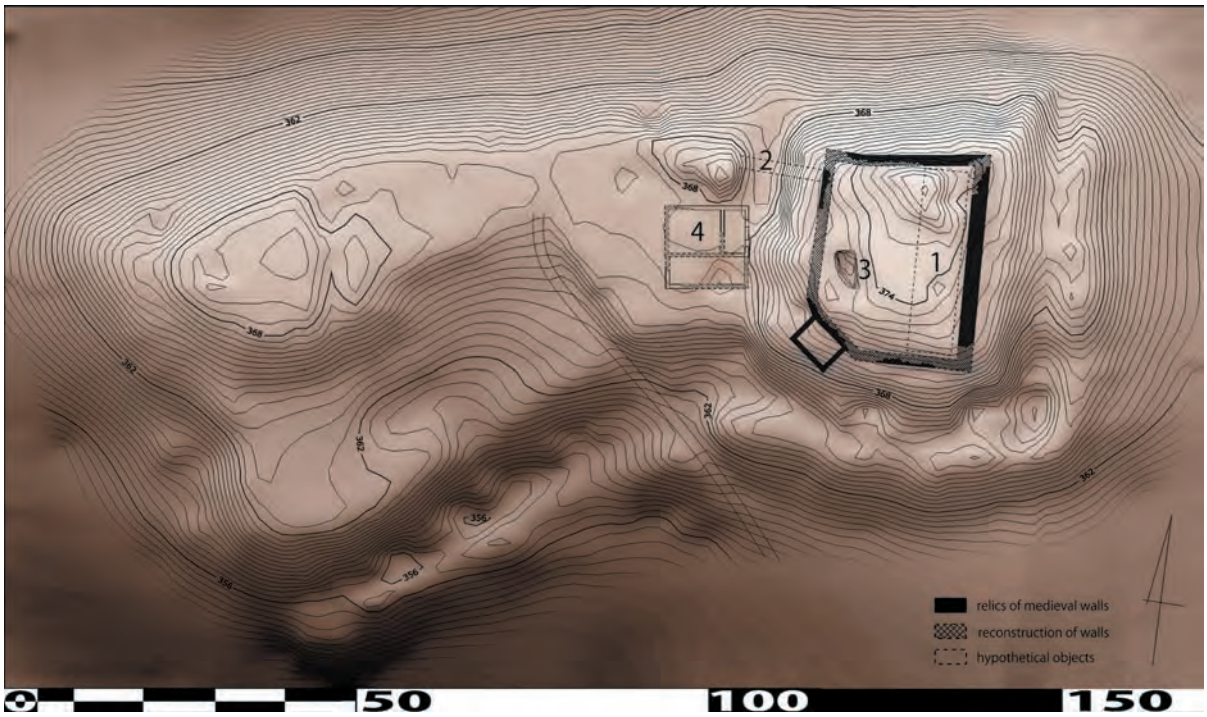

Fig. 11. Wielisławka, Jelenia Góra District (end of 13th cent. or beginning of 14th cent.): 1 – hypothetical localisation of manor-house; 2 – hypothetical entrance through bridge over moat; 3 – shaft (cistern?); 4 – ruins of inn (1837). Measurements: L. Marek, P. Rajski, J. Serafin

of the 13th century colonisation, as well as to the abandonment of the older fort that took place around that time.

Strengthened in this area, the layout of the lower castle provokes questions regarding its chronology. Was it set up at a particular time of the castle's functioning, when it was already a developed section, or was it created at the same time when the first object was erected? In what form?

This problem also occurs with many other two-section objects. In the case of Bardo, there is a separate small oval fort. During the excavations it was ascertained that both elements had been used simultaneously (Francke, Lodowski 1991).

The example of Krasny Buk**,** built at the end of the 13th century, illustrates an extreme disproportion between the stone-built centre buildings and the structures of the lower ward – in the upper area only a tower and a small building were erected, whereas all other functional buildings were situated in the much bigger and lower area (Durdik 2005). Functional relation seems to suggest simultaneous creation and functioning of both sections.

The following spatial and chronological situations can be listed:

a) It seems probable that from the beginning in the majority of cases, apart from developing the centre, a supply base existed, as a result of topographical features. Flat space situated beneath the castle seems to support that. It can be assumed that already at the time of the construction of the castle it was a loosely built-up area surrounded by a wall with a palisade,

b) The second possibility is to found the lower castle "on the raw ground," while the buildings of the centre are already being used, which delimits the space encircled by the fortifications,

c) Another possible option is the existence of outer buildings or crofts from the beginning, from which a strengthened bailey evolved as another section of the castle,

d) The last possibility is the existence of a lower castle with no distinct borders either in chronological or in spatial terms; incidentally, the space that usually was situated at the gate entry to the castle, was used as a storage, a corral, a place to erect temporary residential buildings, etc. The extent of these buildings could expand or decrease depending on the needs (perhaps this was the case of Radosno or Grodziszcze).

Despite the fact that the above enumeration comes down to hypotheses, it seems that they exhaust the possibilities that can be expected. They can be supported by surface examination as well as the examination of the changes that the higher castles undergo.

IV. ADVANTAGE OF THE PRIVATE INVESTMENT PERIOD

Antoni Pawłowski undertook a challenge to collect and catalogue all known objects from Silesia, that Polish scholars call "motte stronghold" or "manor on mound" – as a reference to Western European mottes or "motte and baileys." Thanks to his work they are listed along with residential towers, showing their location, number (377 objects), layout, and approximate dating. In summary, he comes to the point that in the first half of the 14th century their use was most widespread, so they became very common in the Silesian landscape (Pawłowski 1984). The popularisation of mottes is related to the process of densification of the settlement network, which R. Mruczek (2003) identified as "internal colonisation" that took place in still existing settlement gaps.

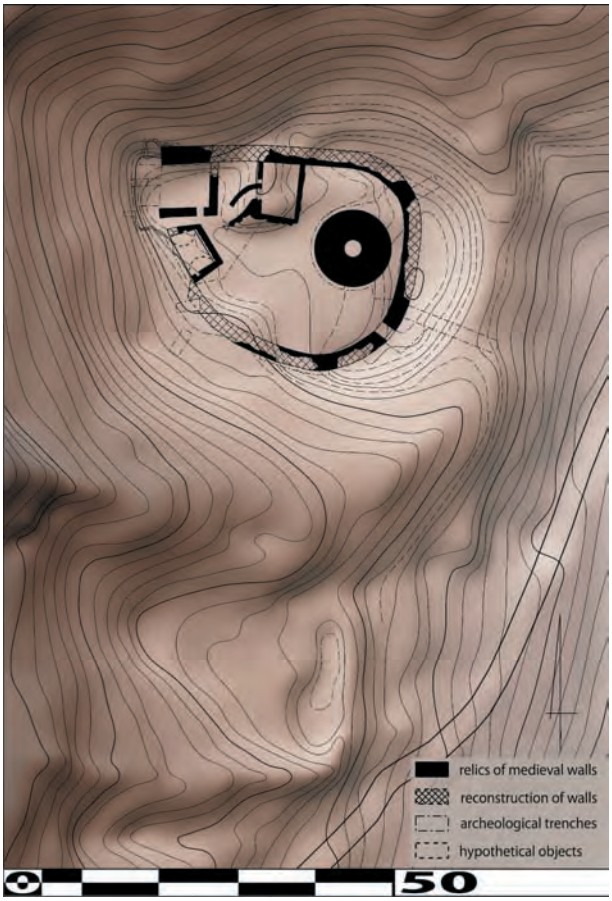

Fig. 12. Bardo, Ząbkowice Śląskie District (about 1300)

It does not seem probable that listing these forts and settlements of similar formal features could lead to distinguishing any groups or regularities. It could be illustrated on the examples of Milęcice, Laskówka, Rokitki and Żeliszów (Fig. 13): despite the very similar, quadrangular layout, there is a diversified chronology of these settlements, their location, and the apparent great diversification of a wide variety of fortifications' profiles.

In order to describe this group, Pawłowski used the term "rural fortified residences" – which is a more fortunate designation, emphasising the local extent of their impact, and the "countryside" peripheral character. This helps to distinguish them from other defensive facilities, sometimes taking a similar form (e.g. castles of the transitional period). The form and construction techniques of the analysed objects is of lesser importance. A rural manor is inseparably connected with countryside estates, establishing the centre of a small agricultural and manufacturing environment.

Unfortunately, the origin of Silesian mottes was not explained. Also, much can be done regarding the documentation and basic research of known objects. There has not yet been any synthetic account, which is caused by the existence of a large variety of settlements, that often do not have the earthen mound at all, or any other explicit characteristics in common.

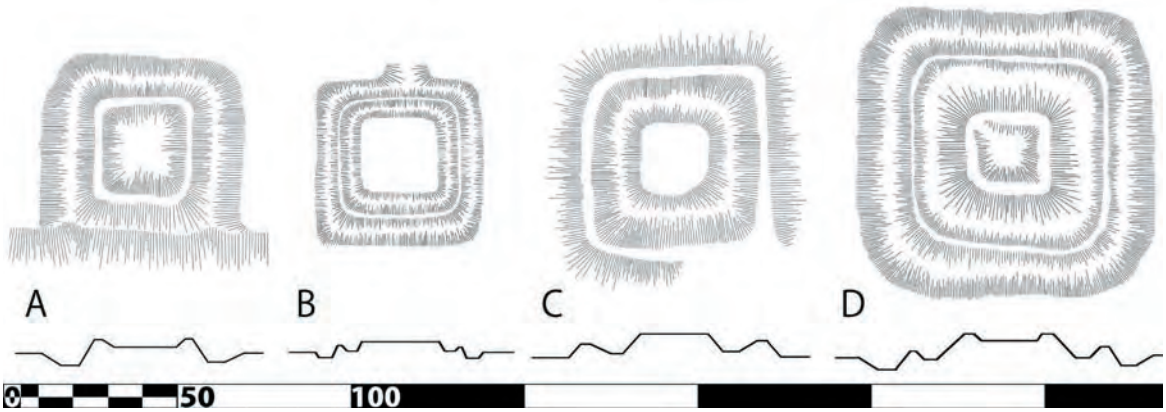

Fig. 13. Comparison of selected motte layouts: A – Laskówka (14th cent.?); B – Ustronie (beginning of 14th cent.); C – Milęcice (14th cent.?); D – Żeliszów (before 1300)

One of the imposing problems is the question of the origin of patterns for a small, towered castle, to what extent models were derived from the ducal leading investment and what was an expression of local (or maybe interregional) traditions.

The role of the tower in such a small fortalice has not been determined. Next to the examples indicating both residential and defensive nature of the tower on a hill (Hinz 1981), evidences also abound to the popularity of a small tower on mound as the final place of refuge – an Italian variant is offered by Peter Crestentis in his 14th century treatise: *"Should affluence not blemish it, one needs a place or a mound embanked in one's court on top of which a turret or a tower is built, to where one with one's possessions and retinue could escape in a time of violence and danger."* (after Jakimowicz 1979).

It is possible to assume that the functional and spatial layouts of wood and earth based small fortresses fit into the scheme of three types of castles: towerless castle, donjon castle and a castle with the last-defence tower.

V. 15TH CENTURY

Numerous conflicts and social changes of the 15th century were a test of usefulness of the frontier forts. The spread of firearms, economic and political rise of towns at the expense of aristocratic estates were most often mentioned as the factors responsible for the evolution of castles, whereas the Hussite campaign between 1428 and 1437 was indicated as the direct condition for their collapse or survival. Actions of citizens of Wrocław and Świdnica against rival landlords – called raubritters for propaganda reasons (Boguszewicz 2010) between 1433 and 1443 became another test. The list of destroyed and damaged strongholds reaches dozens. In consequence of the conflicts, a number of forts were destroyed (both in Silesia and Bohemia), while few underwent repairs or expansion.

Several examples of the functioning strings of earthen and wooden embankments and moats during the 15th century may be cited. The rock castle of Břecštejn near Trutnov was strengthened by a double string of embankments in the first half of the 15th century. Fortifications surrounded the rock carrying a massive "coat wall" on the culmination (Durdik 2005). The castle in Ujazd was destroyed in result of the conflict between Bishop Przecław of Pogorzela and Duke Bolesław III. During the archaeological research it was possible to notice the fact of clearing and deepening of the double embankments and moats surrounding the stone castle. Destroyed after the year 1370, it was rebuilt at the end of the 14th or early 15th century in brick. The total absence of stone rubble from destruction of the old castle in moats, and only traces of the older pottery is an evidence of the renovation of the fortifications (Romanow 2005).

According to the researchers, an often undertaken development process was the strengthening of the gate area (which sometimes grew to a large fortified ward), and strengthening the defence rings either by building enough turrets or another artillery positions, or by constructing a line of external walls. The latter were often superstructures on older embankments (Edelštejn, Kumburk).

"In some lands where people are impoverished or impending danger calls for rush, they build huge rampart. They strengthen it with a construction of crossed beams and pride themselves on carrying out the work well. However, I will not write about this because warriors themselves know well how to do it. Moreover, those who are in a state of war will learn it easily. Since those earthy constructions are no longer needed, they are left and no one cares for them."

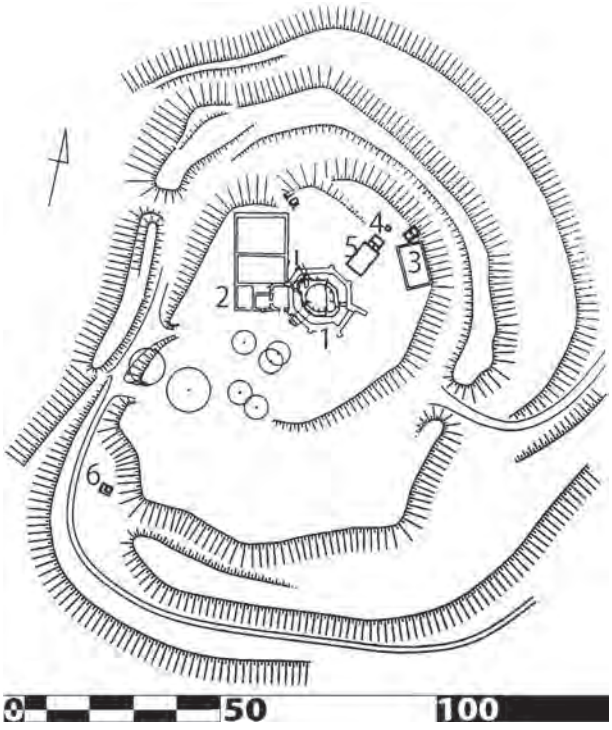

Fig. 14. Gromnik, Strzelin District: 1 – donjon (about 1440); 2 – ruins of inn (19th cent.); 3 – household building (19th cent.); 4,5,6 – infrastructure objects (20th cent.)

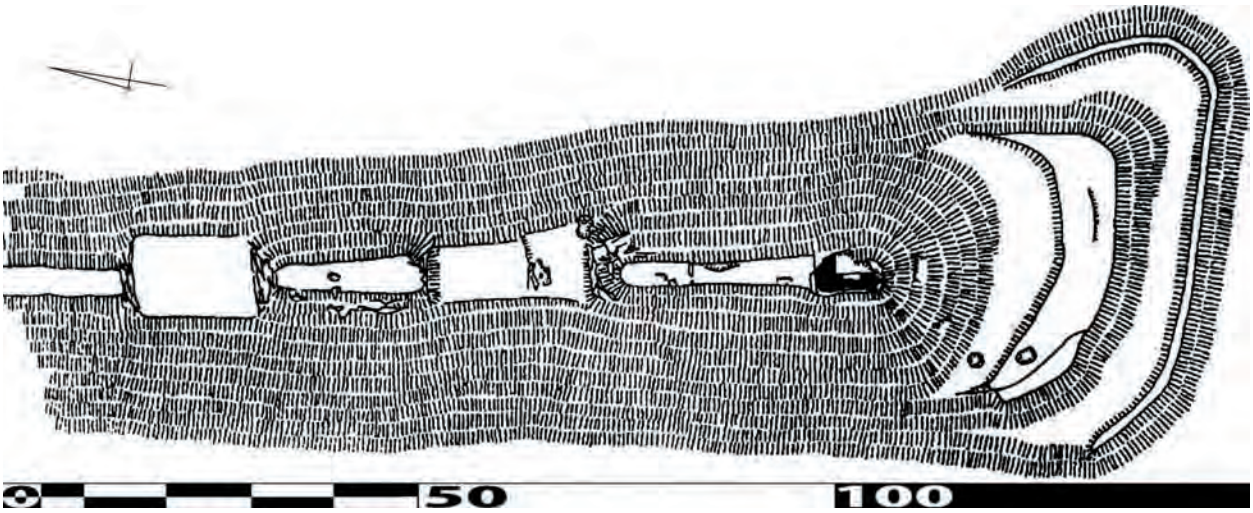

Fig. 15. Vlčinec, Náchod District (about 1350)

These words, written by Albrecht Dürer in the year 1527, probably also reflect the state of affairs a few decades earlier (Broniewski 1975). Pushing the abilities of constructing earthen fortifications to the margins of the fortification art, regarded as common knowledge, did not lead to realisations based on theoretical considerations. This makes one expect to encounter varying local solutions and building traditions.

Settlement on the peak of Gromnik Mountain dates back to the 9th century, as do medieval remains of the stronghold according to archaeological research which has been done since 2005 (Jaworski, Pankiewicz, 2007). From the period between the 10th and 14th century, no signs of settlement were recorded. In 1439, brothers Hayn and Opitz von Czirn received a permission to erect a castle there. On the central culmination a stone keep was erected.

Still surviving fragments of the fortification support the belief that the seat had at least a double ring of fortifications, and originally, perhaps no stone enforcements. Remains of an old rampart were used as a base for higher embankments and palisades. The Gromnik example shows the use of very archaic remains, especially taking the late date of the castle into account.

Ambitious plans of the Czirn brothers, efforts to extend their influence, attempts to create a strong defensive point on the hill in a short time (the castle was besieged four years after obtaining a construction permit), played an important role in making the decision to build a castle in the aforementioned form.

The Kalich castle stretching between two rocky culminations, having a cylindrical tower (side entry) and a donjon (at the rear), was built during the 14th century. It was surrounded by two defence lines, the outer of which was built earlier in the outer shaft (Durdik 2005). In 1421 this stronghold, was chosen by Jan Žižka for the place of his titular seat. The castle was an important point of resistance during the Hussite campaign; it was besieged in 1437, and served rather as a military garrison than a place of living.

Perhaps as late as the 1420s, a semicircular terrace, about a dozen metres wide, was erected on the northern extension of the castle ridge. It was an earthen mound, surrounded by a small rampart, enclosing it on three sides. It was connected to a stronghold with a long neck, providing a roofed passage. Advanced for approximately 70 metres, this defensive position allowed to control the vast area of foregrounds. Such a solution, implemented before the introduction of artillery bastions, was a highly innovative phenomenon.

Numerous sources referring to 15th century field fortifications, adapted to firearms and artillery, and built during wartime, are a promising direction of research. Wooden earthworks called "bollwerks," erected after the siege of Malbork in 1413–1414 (Domańska 1975), artillery "terraces" known from the Bohemian Hussite wars, earthen bastions, trenches and constructions erected on battlefields – for example during preparations for the siege of Wrocław in 1476, and Głogów in 1488 (Goliński 1995) – prove the high diversity and universality of such structures.

VI. SUMMARY

An overview of the use of wooden and earthen fortifications, their origins and functions is not complete without reference to changes in castles' evolution. Different forms of wooden and earthen fortifications (mainly frontal earthen walls) accompanied any type of strongholds throughout the Middle Ages: from the first ducal residences, through the settlements of the transitional period, to mature castles with tower systems. We find numerous manors and fortresses made of wood and earth, and bearing solutions adapted to artillery fire.

According to the examples above, it is possible to conclude that between the 13th and 15th century the fortifications in many cases originated from a combination of different construction techniques. One can attempt to compile a most frequent use of earthen and wooden elements:

– reusing early medieval ramparts by repeating the outline or the construction of reduced developments within the town, less frequently in its vicinity,
– small defensive wood and earth manors and castles, sometimes located on an artificial mound (rural manors and castles of the transitional period)
– frontal ramparts, parallel to inner defence rings,
– strengthened platforms of baileys (with its ramparts and moats)
– artillery positions built of wood and earth,

Examples of the use of sections of earthen walls on the developed, stone fortresses are so numerous that their presence in late medieval castles can be taken as a rule, though not always applied. They are perfectly visible in some mountain castles of untransformed fortification profile (Rychleby, Karpień, Szczerba). Earthen enforcements that repeat the shape of kernel walls can be found inter alia at Grodziec, Chałupki, Grodziszcze, Radosno, Bardo, Sokolec, Czarny Bór**,** Rokitnica, and many sites rarely mentioned in literature – e.g., Quingenburg in the Sowie Mountains or Pokrzywna. An inspection of the well-studied group of highland castles, in the Bohemian part of Silesia confirm the presence of ramparts at most sites: Cvilin, Leuchtenstejn, Fulstejn, Pusty Zamek, Freundenstejn, Prerovec, Koberstejn, Vartnov (Kouřil, Prix, Vichoda 2000). Similar ones were also built at rich, less provincial castles, such as Drazice, Zviretice, as well as around baileys (Cisy, Edelstejn).

Construction of earthen fortifications, even of large size, was a relatively small effort in comparison to expensive masonry work. That is why their existence may be expected at sites where the surrounding areas were changed by subsequent reconstructions and expansions;that was especially the case of the lowlands, where shaping the vicinity of a castle was easier, and a lack of natural obstacles supported additional efforts in making the access more difficult (Grzędy). Unless no other means were taken to ensure the security of the access to the fortress (e.g. stone "fences"), the construction of the outer ramparts and digging moats was a natural continuation of the proper enclosing of a castle.

The above examples allow to characterise the most common form of the outer line of the rampart. It was located at a distance of about 20 metres away from the inner wall, and in the case of mountain castles, about 10 metres below the foundation wall. Their size was relatively small – their basis was about 5 metres wide, and the height usually did not exceed 3 metres. Such placement of a rampart – typically on a gentle slope – allowed to stop the aggressors at the place most convenient to the defenders' fire.

In terms of techniques for building this type of fortification, we can guess the frequent use of simple earthen embankment (due to often noticed self-levelling). Some excavations recorded the use of clay on the slopes of the mantle (Grodziszcze), while in the case of Pieszyce it was used to offset the land for the construction of the box rampart. At the typical mountain terrain, such as Karpień, the ease in obtaining the stone allows to expect it to have been used to strengthen the embankment – as in the case of strengthening of the slope of the earthworks at Bardo, or partially destroyed stone embankments at Wielisławka. As it comes to the use of wooden structures, due to the lack of research one can only refer to analogies – box ramparts, interleaf, fascine constructions strengthening earthen banks etc., found in the examined castles and manors from the 14th century outside the region of the interest of this paper.

In the uplands it is rather impossible not to notice the problem of adjusting to the topographic conditions: unique irregular layouts make the researcher treat each and every castle individually, as the effect of a compromise between work-consuming transformation of the surroundings and the necessary adjustment of the buildings to it. Earthen fortifications, depending on the needs and conditions complement and shape the defences of a castle. An extreme case of adaptation to the environment is the location of the castle of Vlčinec, on an unusually long and narrow ridge only 4–5 metres wide. In this case, the closed circuit of walls had never been built, and the

development was conceded with a crescent-shaped segment of the rampart. In such original situations it proves to be very difficult to characterise, compare, an indicate typical practices and patterns.

These observations ought to be summarised with a conclusion about the need to pay attention to the surroundings of sites. Due to the significant role played by the foregrounds in functioning and defence of a castle it was necessary to analyse both the centre and the vicinity outside the walls. In practice basic field studies are still needed: surveying, identifying and documenting the remains, extending the planigraphy to the vicinity within a few hundred metres around, as well as height measurements.

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ABBREVIATIONS

IAUWr – Institute of Archeology of the University of Wrocław

IHSiTPWr – Institute of History of Architecture, Art and Technique of the Technical University of Wrocław

PNIHSiTPWr – Prace Naukowe Instytutu Historii Architektury, Sztuki i Techniki Politechniki Wrocławskiej, Wrocław

ZNPWr – Zeszyty Naukowe Politechniki Wrocławskiej, Wrocław

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