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Paweł Kocańda[1], Michał Pisz[2],
Bernadetta Rajchel[3], Michał Filipowicz[4]

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[1] Institute of Archaeology, Rzeszów University, Moniuszki 10, 35-015 Rzeszów, Poland;
e-mail: kocanda.pawel90@gmail.com; ORCID: 0000-0003-4215-5775
[2] Chair for Hydrogeology and Geophysics, Faculty of Geology, University of Warsaw, St. Żwirki i Wigury 93, 02-089 Warszawa, Poland;
email: michal.pisz@uw.edu.pl; ORCID: 0000-0002-7163-6351
[3] Polytechnic Institute, Department of Environmental Engineering and Mining, Stanisław Pigoń State Higher Vocational School
in Krosno, St. Dmochowskiego 12, 38-400 Krosno; e-mail: bernadeta.rajchel@pwsz.krosno.pl; ORCID: 0000-0001-9210-2546
[4] e-mail: michalfilipowicz@onet.eu; ORCID: 0000-0002-6481-093X

The Castle Hill in Biecz and fortified stronghold in Kobylanka. The results of interdisciplinary research from 2019

Abstract

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In 2019, new research was initiated at two archaeological sites located on the Ropa River, in Gorlice County, in the south-eastern part of Małopolska Province. The first site was the Castle Hill in Biecz, and the second one was the fortified stronghold in Kobylanka. The research consisted of three stages. Firstly, extensive archival and library queries were conducted in order to gather basic information about both sites. Secondly, surface research was performed in order to collect any movable monuments. During the third stage, a reconnaissance by means of GPR, electrical resistivity imaging and geo-magnetic survey was carried out. These provided plenty of new valuable information on the spatial layout of both sites. In the case of the Castle Hill, the analysis of the discovered anomalies allowed for the interpretation of some of the finds as remnants of the brick elements of the castle, e.g. the tower, which corresponds with the plan from 1877. The results of the analyses of the anomalies from the fortified stronghold in Kobylanka, with its ramparts made of stone and earth as well as inner circular housing, were far more ambiguous. Its chronology may date back to the early Middle Ages.

Key words: castle, medieval archaeology, archaeological geophysics, ground-penetrating radar, magnetometry, stronghold.

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1. Introduction

Non-invasive archaeological research involving modern methods of prospection (ground-penetrating radar, LiDAR, geophysical research) is becoming increasingly popular. Among the significant number of researchers who utilize such technologies are an increasing number of medieval archaeologists, who investigate remains dating back to the Middle Ages and the early modern period (see: Bewley *et al*. 2005, 636–647; Pilszyk and Szmyd 2017, 169–176; Leguta-Pintal 2013, 209–223; Ostrowski *et al*. 2014, 307–314; Zapłata 2013). Such popularity is evident primarily in the number of recent discoveries and the growing number of publications. In order to validate the above thesis, we refer to a handful of randomly selected yet spectacular discoveries. As such, it is crucial to mention the location of the medieval town founded in 1424 by Władysław Jagiełło in Kujawy (Stępień 2015, 81–116; Wroniecki and Jaworski 2015, 167–199), the discovery of the settlement complex in Dzwonów in Wielkopolskie (i.e. *Greater Poland*) province, which turned out to be one of the residences belonging to the Nałęcz family (Bogacki 2017, 141–147; Wroniecki 2017, 178–193), as well as the uncovering of the long-lost castle in Żelechów, which belonged to the Ciołek family (Bis *et al*. 2018, 351–359), or the new findings associated with the Teutonic Knights' castles in

Starogród, Unisław and Lipienko (Wiewióra *et al*. 2016, 109–111).Within the Podkarpacie Province, it is necessary to mention the discoveries of field fortifications connected with the Bar confederates in Izby, Łupków, Roztoki and Muszynka (Filipowicz 2018, in print). The results obtained in the course of such research are complementary to other historical items, including written and cartographic sources, as well as archaeological and architectural surveys. The following interdisciplinary research will serve as an example of such a situation.

The aim of the present article is to discuss the historical and geophysical research as well as the surface surveys conducted on two sites by the Ropa River in Gorlice county, namely Góra Zamkowa (the Castle Hill) in Biecz and the fortified stronghold in Kobylanka. Such works were the very first of their kind on both sites and for this reason the reported findings are somewhat innovative, as they provide plenty of valuable information concerning both features. The paper has been divided into several parts, which describe particular elements of the research, i.e. historical and surface surveys, as well as the results obtained via ground-penetrating radar, electrical resistivity imaging and geomagnetic surveying. It is worth mentioning that the presented results constitute a contribution to the subsequent research, aimed at performing comprehensive archaeological explorations.

2. Location

Biecz and Kobylanka are two towns located in southern Poland, more specifically, in Lesser Poland Province, Gorlice County. The first is a small town, with just over four thousand inhabitants and a long medieval tradition going back to the mid-13th century. The second one, on the other hand, is a large village, whose origins date back to the first half of the 14th century. From the taxonomical perspective, both are located in the valley of the Ropa River, in the area of the Gorlice Depression, which in turn, is a part of the Central Beskidian Piedmont (Fig. 1; Kondracki 1998, 336–337, 341–342). Pursuing this further, the Gorlice Depression is located between the Ciężkowice Piedmont in the north and the Low Beskids in the south. By all appearances, it was formed as the result of denudation processes within the poorly resistant layers made of Carpathian flysch (Kondracki 1998, 341).

The non-invasive exploration described in this article was carried out in the area of two archaeological sites. The first one was Góra Zamkowa (literally *the Castle Hill*, Fig. 2) in Biecz, also known as Góra Królowej Jadwigi (*Queen Jadwiga's Hill*) (or Salomonowa Góra, i.e. *Solomon's Hill*), which is situated south-west of the center of the Old Town, approximately 660 meters in a straight line from the town square. The said elevation (about 291 meters above sea level) resembles an oval cone, with a truncated flattened peak measuring 20×42 meters. Moreover, its south-eastern hillside includes a semicircular, small flat area. In archaeological nomenclature, it is marked as the site No. 2/2 in Biecz – an ancient, early medieval stronghold and a brick castle built in the 14th–16th century, located in the AZP 109–69 area.

The second site is a newly discovered, supposed stronghold with an unknown chronology that has not yet been recorded in the register of monuments in the Lesser Poland province. The said stronghold is located in the western part of Kobylanka, about 1.8 km northwest of the village center (Fig. 3). More specifically, it is situated on the right bank of the Ropa River, on a promontory that remains separated by natural ravines from the north, south, and southeast. The only convenient access to the area leads through meadows from the east. Furthermore, the site has been partially destroyed on the north-western side by a landslide. The whole area is covered with forest, with the prevalence of deciduous trees.

3. The history of the features and the state of research

The research was preceded by both archival and historical query, as well as the analysis of the literature and records from the previous excavations. The queries were carried out in the Regional Historical Monuments Conservation Office in Cracow and in the delegation of the same office located in Nowy Sącz, as well as in the Regional Museum in Rzeszów, the Museum of the Biecko Land and the National Archives in Cracow. The basic historical data about Biecz and Kobylanka have been collected through the following entries: Biecz, Biecz – stronghold, castle and starostwo (literally *eldership*), Biecz – castellan, Biecz – county land and Kobylanka Dolna and Kobylanka Górna, published in individual volumes of the Historical and Geographical Dictionary of the Kraków Province compiled by F. Sikora (1980, 72–88) and J. Kurtyka (1993, 626–637). Meanwhile, the primary literature consists of monographs devoted to both towns (see Głowacka-Grądalska 2014; Kaleta 1963a), which discuss the history of the settlement, spatial development, social topography, culture, ownership changes, economy and trade. The more detailed stud-

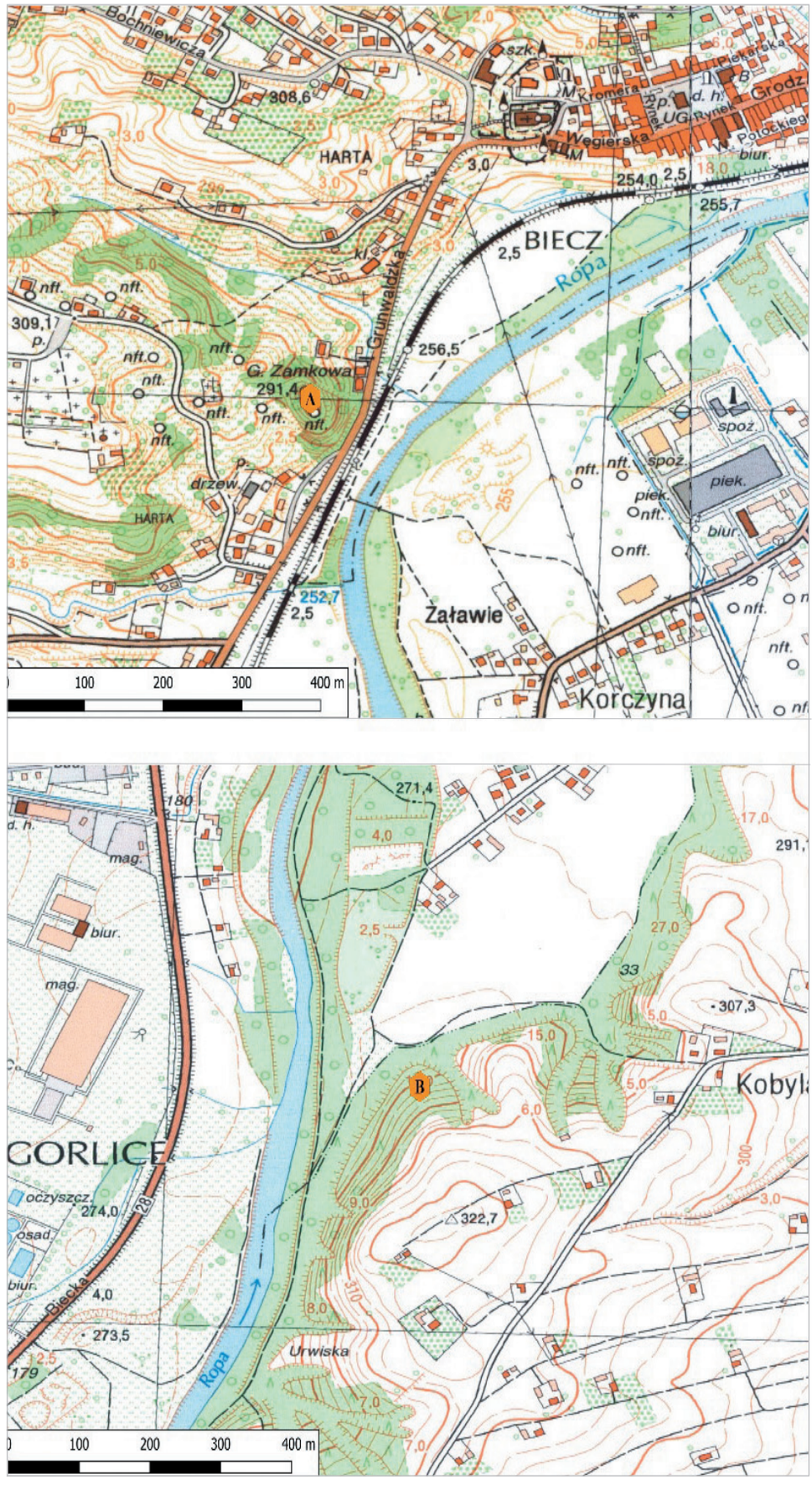

Fig. 1. Location of both sites: A – the Castle Hill in Biecz; B – Stronghold in Kobylanka

Fig. 2. the Castle Hill in Biecz, view from the east (photo taken by P. Kocańda, 2019)

Fig. 3. Fortified stronghold in Kobylanka, view from the south (photo taken by P. Kocańda, 2019)

ies by F. Kiryk (1968, 93–119; 1985, 33–45), J. Bogdanowski (1966, 602–606), A. Kunysz (1963, 64–81; 1968a, 39–60), B. Krasnowolski (2004, 13–19), T. Ślawski (2002) and J. Widawski (1973, 90–100) also constitute a valuable source of information. What should also be mentioned is the exceptional, albeit unpublished and, in some respects, obsolete urban study of Biecz by J. Barut (1959). Some issues related to the castle on the Castle Hill in Biecz have been discussed by R. Kaleta (1963b, 82–115), B. Guerquin (1974, 90) and the authors of the Lexicon of Castles in Poland (Kajzer *et al.* 2010, 92). The available information pertaining to the status and the history of the foregoing archaeological and architectural explorations were compiled and summarized by Paweł Kocańda (2018, 1–22).

3.1 Biecz and Góra Zamkowa (the Castle Hill)

The first credible written mention of Biecz can be found in a document issued in 1184 by Gedka, the Bishop of Cracow, in which he granted the collegiate church of St. Florian in Krakow a tithe from the Biecz region. However, in the light of historians' findings, it can be assumed that the beginnings of the urban settlement in Biecz date back to the second half of the 13th century, namely the reign of Bolesław the Chaste, the Duke of Krakow–Sandomierz. Unfortunately, it remains unknown when the document granting German law to the settlement was issued, since it has not been preserved to our times. In 1363, King Casimir III the Great confirmed the Magdeburg law to the town by awarding it numerous privileges (Kiryk 1985, 33–36; Krasnowolski 2004, 13–19). The Castle Hill in Biecz is an extremely important element in various considerations pertaining to the beginnings of the settlements, both within the city and the whole region. The archaeological research that was conducted there in the 1960s led to the discovery of the remains of houses associated with Lusatian culture (Kunysz 1963,72–76; see Kocańda 2018a, 10–11). Moreover, the site is also related to the functioning of the castellan stronghold, dating back to the 11th–13th century (Kunysz 1963, 72–74; Żaki 1963, 53–63). Unfortunately, no relics of it have been found to date. The reason for this lies in the construction of a brick castle at the turn of the 13th and 14th centuries, which replaced the older wooden-earth fortress, whose remains were thereby destroyed. The stone structure was founded by Wenceslaus II of the Přemyslid dynasty, who bestowed the castle upon the Bishop of Krakow, Jan Muscat, in 1303 (Kaleta 1963, 85–94; Kocańda 2018b, 326). In the following years, the castle was systematically extended. It served as the seat of the burgrave, who was responsible for managing the Biecz district, the residence of the monarch, as well as the border fortress. In the 15th century, the castle ceased to function, as evidenced by the document issued in 1475 by King Casimir Jagiellon, according to which the building was abandoned. At the beginning of the next century, the demolition of the castle began (Kajzer *et al.* 2010, 92; Kaleta 1963, 94–98).

The ruins of the castle were first encountered between 1876 and 1877. At that time, researchers unearthed the perimeter walls, a 10-meter diameter cylindrical tower and some inner structures. However, the excavations were quickly finalized. What remained of them was a not very accurately recreated plan of the castle which included the rooms uncovered during the debris removal (Kocańda 2018a, 6; Tomkowicz 1900, 242–245; see Fig. 4). The first professional archaeological reconnaissance on the Castle Hill in Biecz was conducted in the 1950s by Andrzej Żaki (Kocańda 2018a, 7). Meanwhile, the first, and thus far only, large excavations took place in 1961. At that time, the stratigraphy of the hill was identified; furthermore, the defensive tower and outlines of the castle were uncovered again. Additionally, it was revealed that the courtyard was covered with stone paving (Kocańda. 2018a 10–11; Kunysz 1963, 72–74). Unfortunately, the results of the archaeological exploration were not properly documented. For this reason, it is necessary to undertake fresh research to verify the previous findings. To some extent, new data have already been provided by the presented non-invasive reconnaissance.

3.2 Kobylanka

The beginnings of the settlement in Kobylanka have not yet been properly identified. The village itself, formerly known as Kobylanka Dolna, was established after 1327 and before 1342, in the northern part of the forests which belonged to the early medieval Dominikowice, owned by the Odrowąż family yet abandoned at the turn of the 13th and 14th centuries. After some time, Kobylanka Dolna was created to the south-east of the village; then, since the 16th century, it became known as Dominikowice (Kurtyka 1993, 626–632). The supposed fortified stronghold is neither mentioned in written reports, nor is it marked on any of the cartographic sources. The object of our interest, under the name of Wizna Góra, which can be translated as Łysa Góra (the Bald Mountain) is found only on the so-called Austrian Mieg map from the years 1779–1783 (Bukowski *et al.* 2015, section 68B1).

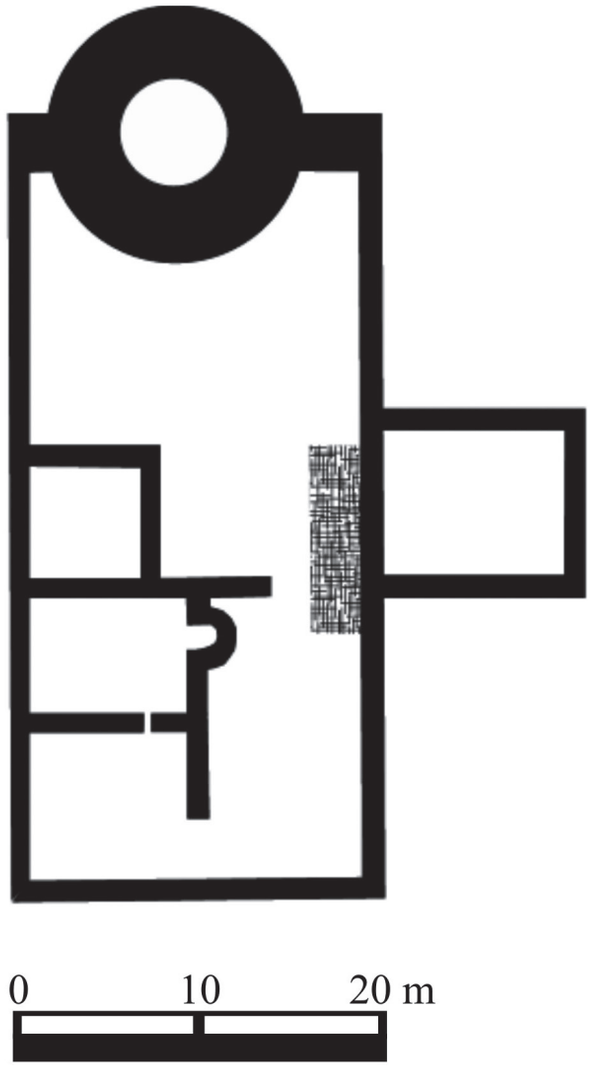

Fig. 4. The plan of the castle prepared by Stanisław Tomkowicz based on the research from 1877 (1900, 245)

In addition to the above-mentioned distinct anthropogenic structures in the form of ramparts and ditches (observed during fieldwork), the site is also highly transparent in terms of remote sensing data (LiDAR, Fig. 5). Based on these results, we can determine the shape of the fortification and define its exact dimensions. More specifically, we are dealing here with an irregular, oval object, 50×48 meters long, located on a promontory, on the edge of a steep slope – the terraces of the Ropa river, cut off by gullies from the north-east and south. Despite its oval shape, it appears to be quite regular in its north-eastern part. In this area, it is clearly divided into three curtains, curved at sharp angles, whose length, starting from the north, is respectively: 16, 23 and 21 meters long. Then, from the south, the rampart turns into a curvilinear section that is 37 meters long and turns at a right angle at the edge of the slope (from the west) into a 4-meter long section of the embankment. This is where the fortifications of the defensive structure end. Considering the prominent landslide from the north-western side, it could be assumed that the remaining elements of the fortifications could have gone down along with some parts of the slope. Nevertheless, this is by no means certain, as the object in this area could have been enclosed only with a wooden palisade, or it might not have any fortifications at all. Inside the building, one can notice a breastwork reaching the height of 1–1.5 meters in certain places; a ditch which is up to 1 meter deep and a maidan which is clearly separated from the fortification and has the outline of an irregular rectangle measuring 27×26 meters in length. Additionally, in the southern area at the top of the rampart, there was a rifle-pit made in 1915 – most probably associated with the presence of the Russian army. The moat is located at the front of the defensive structure, i.e. on the south-eastern side and is connected with the southern gully. The fortifications in this part are the most massive. What is more, there are remnants of a gate in their central section, however this observation requires further verification by means of excavations.

4. The results of the archaeological field surveys

The geophysical surveys were preceded by a surface prospection of both sites, during which movable material was collected from the ground. Metal detectors were also used for this purpose. Artefacts were collected from the surface and the humus layer to the depth of 0–20/30 cm.

The stronghold in Kobylanka was first discovered in 2014 by Piotr Szmyd and Joanna Pilszyk from Jasło, but at that time it was neither included in the Register of Historic Monuments, nor granted protection as an archaeological site. Regardless of the first explorers, while analyzing the LiDAR maps in March 2019 (Fig. 5), Paweł Kocańda came across this object, which was later identified during a field trip (Fig. 6). Even back then, it was obvious that we were dealing with an anthropogenic structure of a defensive type, most probably a stronghold. Unfortunately, in the case of this feature, the surface surveys did not yield any artifacts that could be used to determine the chronology of the castle. In fact, there were only a few pieces of metal, one forged nail and a horseshoe-shaped heel tap. Since only the latter deserves a more extensive coverage, we shall focus exclusively on this object. Bearing in mind the analogies from the Czech Republic, Wrocław and

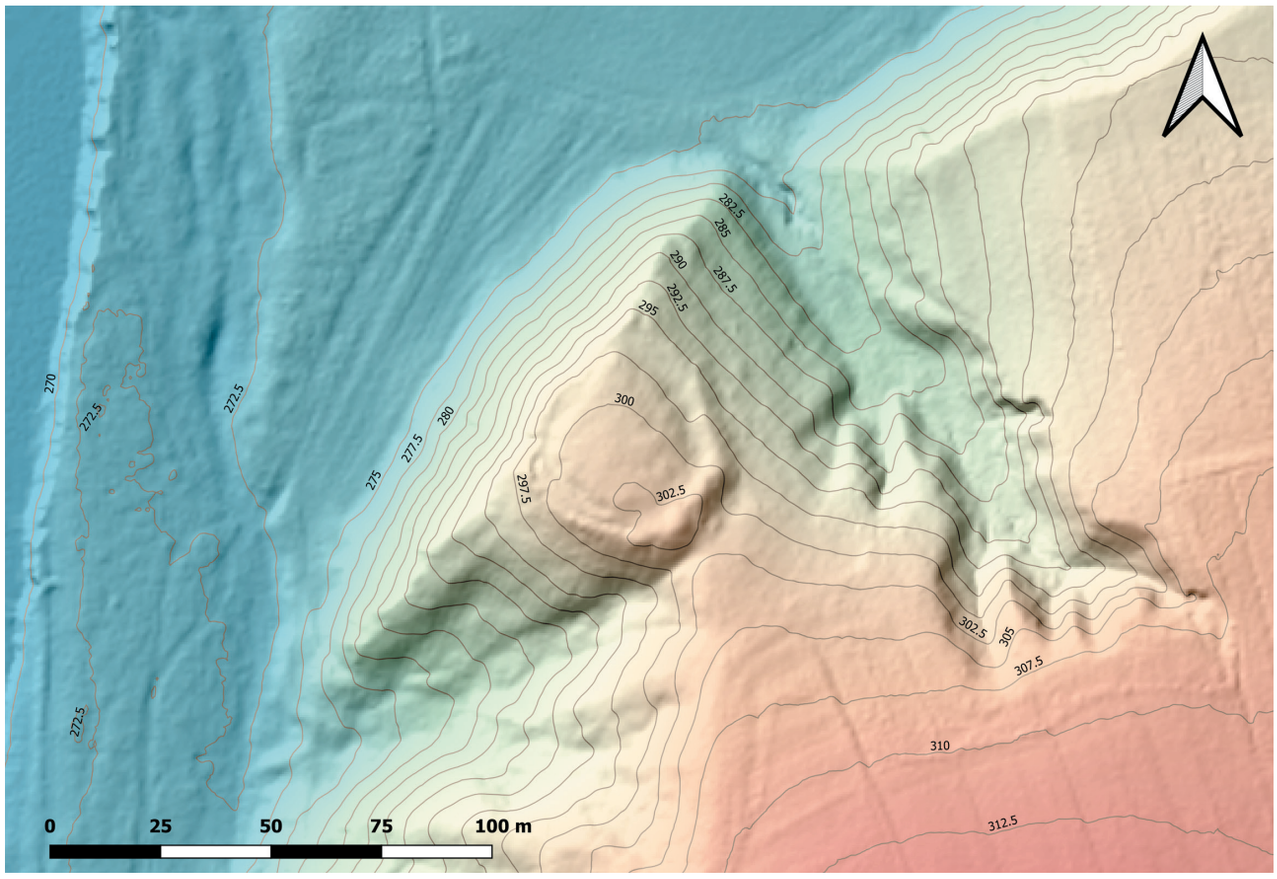

Fig. 5. Stronghold in Kobylanka shown on a map with a numerical model of the terrain – ISOK Project – GRID1m – shading (prepared by M. Pisz)

Fig. 6. Field inspection of the fortified stronghold in Kobylanka (photo taken by P. Kocańda, 2019)

Rzeszów, this item qualifies as a flat horseshoe-shaped heel tap (type III according to T. Cymbalak) with holes for studs. Such pieces are dated quite widely, from the 18th to 20th century. The fact that such an object was obtained from the surface would indicate the upper limit of its functioning (Cymbalak 2006, 264–282; Kocańda *et al*. 2018, 154–155; Konczewska and Konczewski 2004, 106).

A much greater and definitely more interesting collection of artefacts was obtained during the research on the Castle Hill in Biecz. Of course, this group comprises objects that are either hardly representative and difficult to identify (such as metal plates, iron clods, rods), or chronologically insensitive and widely dated (various types of nails, fragments of horseshoes, spoons and knives); furthermore, the collection also includes contemporary items (a button from an English uniform from World War II, cartridge cases, coins from the 20th century). Among the remaining metal artefacts we should mention two horseshoe-shaped heel taps. In accordance with Cymbalak's classification (2006, 264–282), the first one represents type III – the same as the one found in Kobylanka. More specifically, it is an arch-shaped, flat, hammered heel tap with a distinctive tip and three holes for studs. The second object, on the other hand, is a fragment of a heel tap with a spike which enables it to be attached to the shoe and a base that appears to be square-shaped in the cross-section. Such pieces are dated between the 16th and the beginning of the 17th century (Cymbalak 2008, 272–273). A few words should also be said about the crossbow bolts, three of which were discovered at the site. Two of them represent forms with a rhomboid cross-section with a casing, found en masse on medieval sites and dating back to the period between the 12th and 15th centuries; the third one is also a bolt with a rhomboid cross-section of the blade, but equipped with a tang (Kotowicz 2006, 13–14; Nadolski 1990, p. 149–150). However, the most valuable metal artefact is a small denarius of Kazimierz Jagiellończyk, minted in the years 1447–1492. The location of the selected metal relics discovered in the area of the Castle Hill in Biecz is shown in Fig. 7 and Table 1 below (see Fig. 7 and Table 1).

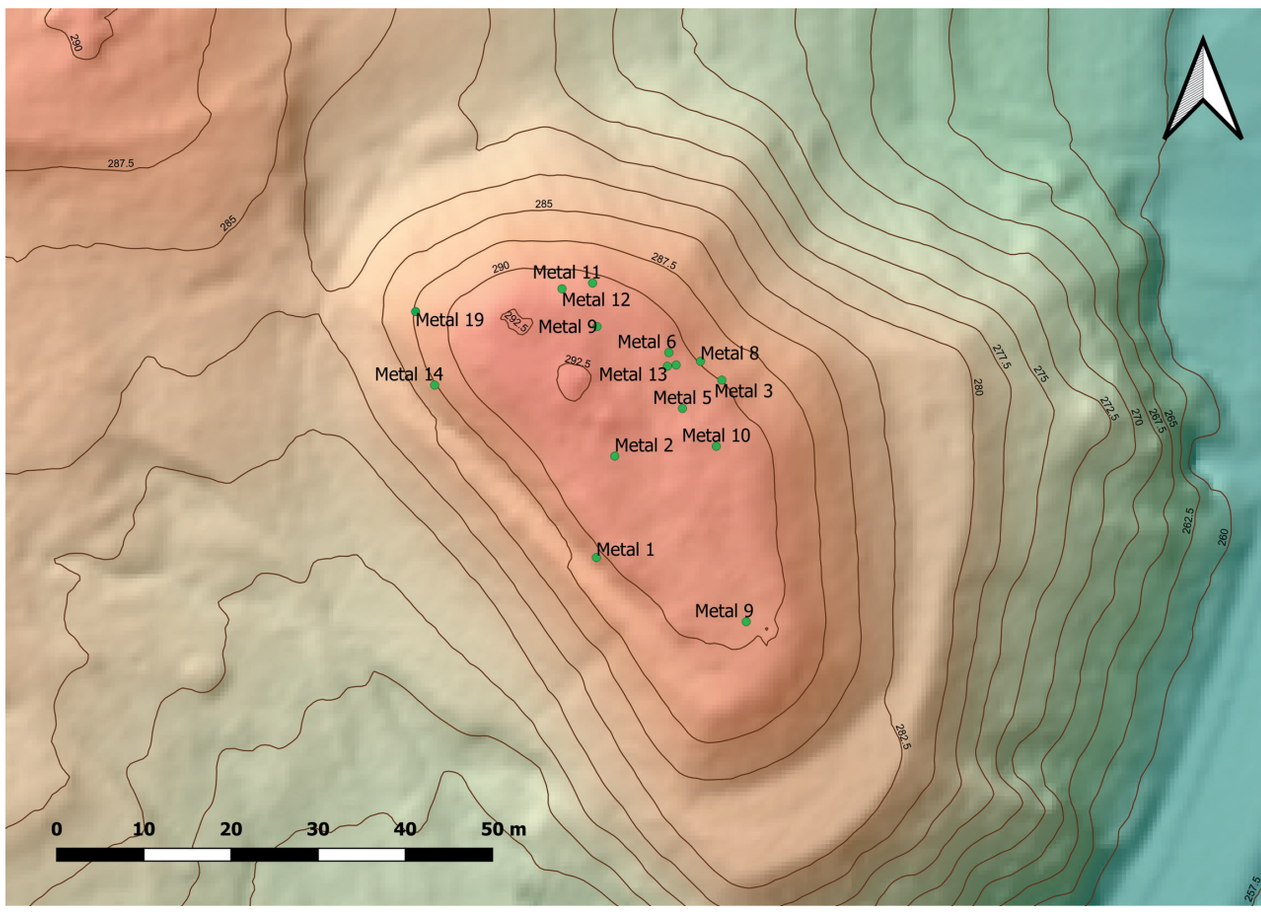

Fig. 7. Location of the selected metal relics discovered on the Castle Hill (with the use of GPS tracking, prepared by M. Pisz and P. Kocańda)

No.	No. on the map	Type of an artifact
1	Metal 1	metal plate
2	Metal 2	nail
3	Metal 3	nail
4	Metal 5	nail
5	Metal 6	English button
6	Metal 7	a piece of a knife
7	Metal 8	coin (1 heller 1901 r.)
8	Metal 9	coin (5 groszy, 1925 r.)
9	Metal 10	bolt
10	Metal 11	nail
11	Metal 12	bolt
12	Metal 13	lumps of metal
13	Metal 14	coin (denarius of Kazimierz Jagiellończyk)
14	Metal 19	bolt

The ceramic material is represented by 17 fragments of vessels, 14 of which can be categorized as middle sections, one piece from a bottom, another one is a part of the pouring lip and the last one is a handle. Most of the vessels were fired at a reduction temperature; their surface is grey. Only 6 fragments were fired at oxidizing temperature, and as a result, they are brick-red. All of them were made from well-dredged ferrous clays on a high-speed potter's wheel. Their fractures are monochromatic; however, one may notice a fine-grained admixture in the form of crushed stone. None of the fragments have any ornamentation; nonetheless, there are clear traces of turning in the form of horizontal lines, with only one piece showing traces of diagonal grooves made with a nail or a stylus. As far as the middle and bottom parts are concerned, their condition prevents any morphological and typological identification. The handle must have come from a jug or a pot, fired in a reductive atmosphere – the piece was glued to the vessel and has two fingerprints. A fragment of the pouring lip comes from a pot or jug. It has a characteristic flange, typical of the late-medieval vessels, a notch for the lid and a pouring lip which is slightly curved outwards. In accordance with Lenarczyk's (1983, 146–148) classification, it can be categorized as type 27. On the basis of analogies from Kraków, the author associates such vessels with the period from the 13th to 15th century. Similar pouring lips can also be found among the samples unearthed in the chartered city – not surprisingly, they are also dated to this period (Rembisz-Niziołek 2010, 78–82). Hence, the foregoing chronology should also be adopted for the discovered fragment, whereas the remaining pieces should be placed in a wide period of time – from the Middle Ages to late modernity.

All of the movable historical objects from the Castle Hill represent a relatively long chronological range. It is worth noting, however, that some of them, precisely the bolts, the fragment of the pouring lip, and above all, the denarius of Kazimierz Jagiellończyk, coincide in time with the demolition of the castle, which took place around 1475. This means that the fortress was not intensively penetrated after the downfall, as it served only as a source of building material, a viewpoint and a venue for strolls. As a side-note, we shall add that Kazimierz Jagiellończyk was the one to order the demolition of the castle (Bujak 1914, no. 62; Kaleta 1963b, 96–97).

5. GPR Research

5.1 Measurement methods

GPR measurements were performed with the help of Detector Duo equipped with two shielded antennae with frequencies of 250 MHz and 700 MHz; the apparatus was discussed in detail in Pasterkiewicz and Rajchel (2017, 271–284). During the GPR profiling, the antenna is moved along the defined profile. In this way, we are able to record information in a perpetual manner at each point of the profile, including the data on the structure of the subsurface layers that exist along the delimited profile.

5.2 The results of the measurements

A number of GPR profiles (echograms) were generated in the designated area. Some of the most interesting ones were recorded, a selection of which is discussed in the article. Each time a figure with the echogram is included in the paper, it features a 250 MHz antenna profile in the upper part and 700 MHz antenna profile in the lower part. In total, more than 60 profiles of different lengths were made.

During the first stage (1), the research was carried out on the Castle Hill, at the site where – according to the archaeological data – a castellan stronghold was located; in the course of time, said stronghold was replaced with a brick castle. Here, we established three measurement spots. At the first point (1a), 14 GPR profiles were generated and recorded by establishing

a grid – 11 profiles (echograms AA – AK) that were parallel to each other, and then 3 profiles (echograms AL – AN) that were perpendicular to the previous ones. The second designated place (1b) on the Castle Hill (the central part of the investigated area) had 5 GPR profiles (AO – AS echograms) made and recorded on the grid: 3 that were parallel to each other and 2 that were perpendicular to the previous ones. The third place (1c), located near the entrance of the examined area, was where 3 GPR profiles were generated (AT-AV echograms). Additionally, measurements were taken in the fourth place (1d), located below the upper part of the Castle Hill. Here, 4 GPR profiles were recorded (BE – BH echograms).

As far as the second stage of the research is concerned (2), it was conducted on Łysa Góra (the Bald Mountain) in Kobylanka, where 4 profiles were recorded.

5.3 Interpretation of the results and conclusions

Upon the completion of GPR surveys (selected echograms are shown in the figure below, see Fig. 8A-D), an area with suspected brick structures was marked in spot 1a – it is probably the outline of the tower walls (Fig. 9). The specified area is not perfectly circular, which may be caused by the soil sliding down from the slope. In place 1b (Fig. 8E), a second, small area with GPR anomalies was marked, possibly originating from the pre-existing object located there. In the third place (1c), near the exit from the research area, another zone with some interesting anomalies was marked (Fig. 8F). It should be added that the results of GPR measurements in the surveyed area may have been partially disturbed by the remains of the infrastructure used for oil extraction which remains in the ground (Fig. 8G). Furthermore, no anomalies were recorded when measurements were taken below the designated location of the tower (1d) (Fig. 8H).

The GPR surveys carried out on Łysa Góra (stage 2), both on the surface of the rampart (Fig. 8I) and in the inner area, did not show any anthropogenic objects. The few recorded anomalies came mainly from tree roots – this fact was confirmed on site in some points.

On the basis of the above-described investigation, the following two conclusions can be drawn. First of all, following the GPR measurements in the designated area, we came across an interesting zone that includes an outline of the fragments of the tower walls. In addition, we identified two smaller areas which may hide the location of the remaining objects of the castle. Second of all, no anomalies were observed on the Castle Hill below the tower and on the fortified stronghold in Kobylanka.

6. The results of magnetometry and earth resistance survey

The aim of the research was to identify expected archaeological remains in the area of the castle hill in Biecz and to conduct the first identification of the supposed motte / stronghold in Kobylanka, which was discovered in the DEM LiDAR data.

The architectural remains were expected to be detected in Biecz, since the site was partly excavated back in 2020. However, the modest documentation and imprecise plan only gave a very general idea of how this object might have looked like in the past. In Kobylanka the situation was very different – the site has never been researched before, nor was it evidenced in any official archaeological registry.

6.1 Surveying conditions and methodology

The geophysical research was planned and executed according to the European Archaeological Council guidelines (Schmidt *et al.* 2015). In case of Biecz, the survey was considered to be a Level III investigation, aiming at the characterisation of the archaeological remains, while in Kobylanka it was a Level II investigation (Gaffney and Gater 2003, 88–91; Schmidt *et al.* 2015, 10–11, 42), since the site was never researched before but its limits were determined by the terrain form.

The site in Biecz is located on the terraced top of the hill called Góra Zamkowa. The surface of the plateau on the top of the hill was cleaned of vegetation in advance in order to facilitate the measurements. The area of the hillfort in Kobylanka was just briefly cleaned of overlaying branches. A grid-based survey was implemented in each case, since it was the only reasonable method due to the presence of the trees which impeded the proper functioning of the RTK GPS. Gridded measurements allow further data processing, which was performed in Geoplot 4 software.

On both sites two archeo-geophysical prospecting methods were applied. The first one was magnetometry, a passive geophysical method, consisting in the measurement of the naturally occurring Earth's magnetic field (Aspinall *et al.* 2008; Fassbinder 2015; Gaffney and Gater, 2003, 36–42). Measurements have been carried out with a fluxgate magnetometer Geoscan Research FM256 (Gaffney and Gater 2003, 62–64). The

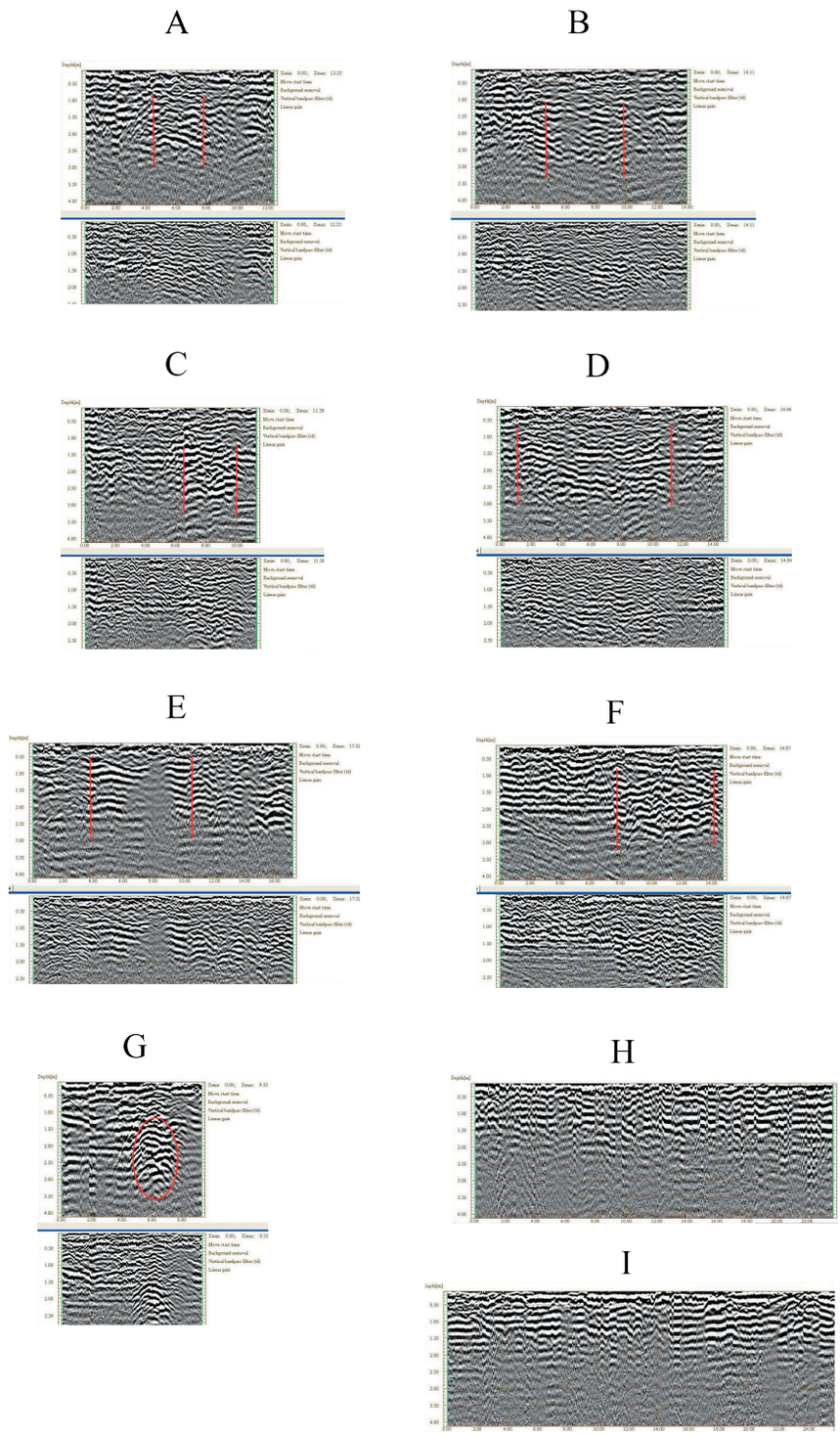

Fig. 8. Echograms developed on the basis of GPR surveys (prepared by B. Rajchel): A – Echogram AB. Anomaly visible on the profile length of approx. 5 m to 8 m. Georadar Detector Duo, IDS, shielded antennas, 250 MHz and 700 MHz; B – Echogram AB. Anomaly visible on the profile length of approx. 5 m to 8 m. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz;C – AE echogram. Anomaly visible on the profile length of approx. 6.5 m to 10 m. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz; D – AM echogram, perpendicular to the previous ones. Anomaly visible on the profile length of approx. 1 m to 11 m. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz; E – AP echogram. Anomaly visible on the profile length of approx. 4 m to approx. 11 m. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz; F – AV echogram. Anomaly visible on the profile length of approx. 8 m to 14 m. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz; G – AY echogram. The marked anomaly arises due to a fragment of drilling infrastructure. Georadar Detector Duo, IDS, shielded antennas 250 MHz and 700 MHz; H – Echogram BF. No visible anomalies. Georadar Detector Duo, IDS, shielded antenna 250 MHz; I – Echogram BI. Measurement made on the surface of the rampart. No visible anomalies. Georadar Detector Duo, IDS, shielded antenna 250.

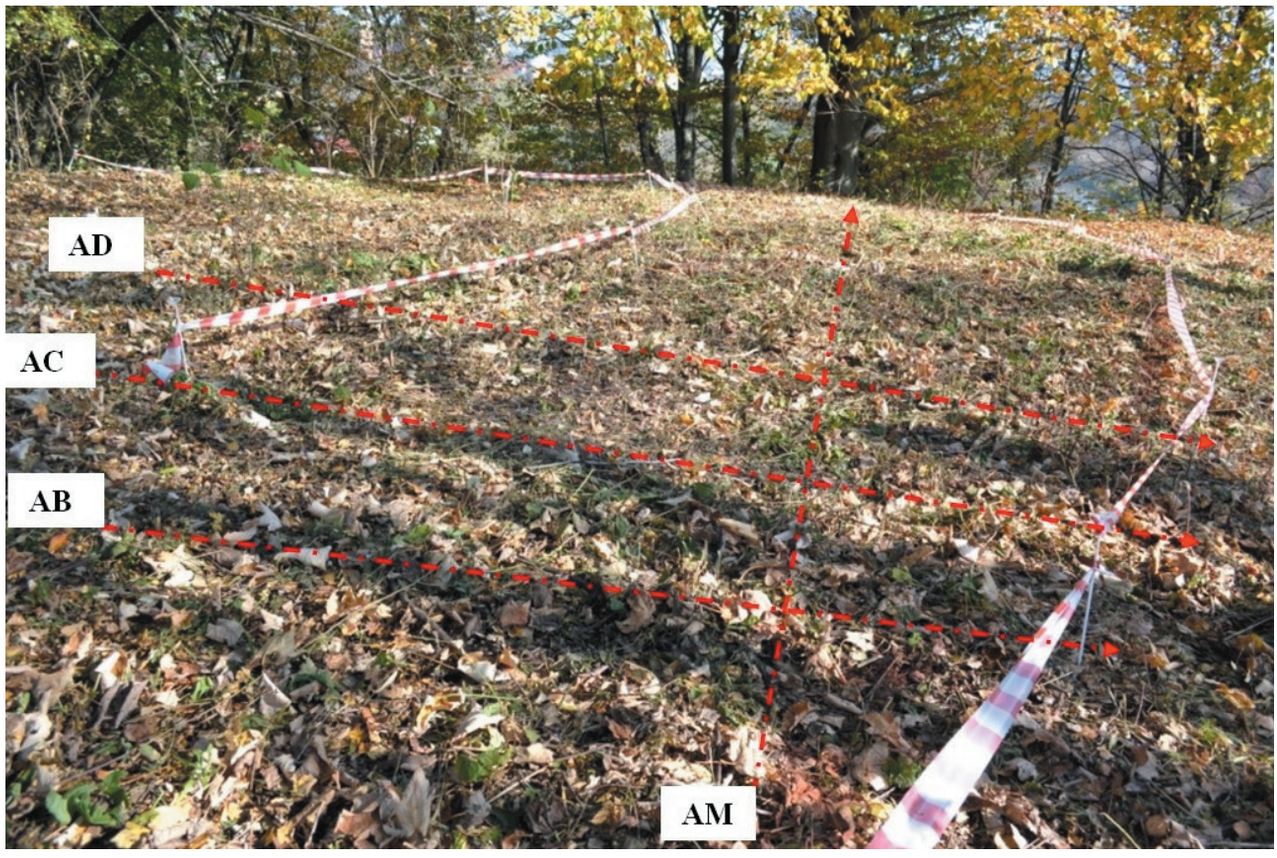

Fig. 9. The schematic distribution of GPR profiles on the investigated site 1a (prepared by B. Rajchel 2019)

second applied method was earth resistance survey, complementary to the magnetometry method. It consists in feeding electric currents into the ground and measuring the resistance of their flow (Gaffney and Gater 2003, 26–36; Schmidt 2013) Earth resistance measurements were carried out with a state-of-the-art meter Geoscan Research RM85 MPX, a successor of the RM15 (Gaffney and Gater 2003, 57–60). In each case a grid-based survey was conducted.

The survey resolution was set according to the EAC guidelines and the level of investigation. Hence, magnetometry was carried out with 0.5 and 1 m of traverse interval, while sample interval was 0.125 and 0.25 for Biecz and Kobylanka respectively. An earth resistance survey was carried out with different probe array electrode configurations. In Biecz a multi-depth investigation was carried out with the use of twin-probe multiplexed array (Schmidt 2013, 41–42). Mobile probes (AM) separation distances were: AM1 = 0.5 m, AM2 = 1 m and AM3 = 1.5 m, what provided the maximum depths of prospection up to ca. 0.25 m, 0.5 m and 0.75 m respectively (Schmidt 2013, 79–80). The survey resolution in Biecz was 1 × 0.5 m, where the smaller interval stands for sampling. In Kobylanka a Wenner electrode array configuration was used with 0.5 m separation distance between the electrodes (Schmidt 2013, 40–41). The Wenner array was considered to be much more versatile and convenient for surveying in the woods, since it does not require the use of remote probes (Pisz and Olszacki 2017).

The magnetometry survey covered the estimated area of 0.33 ha (ca. 7 ares in Biecz and 26 ares in Kobylanka), while the earth resistance survey was conducted within the extent of ca. 0.31 ha (8 and 23 ares for Biecz and Kobylanka respectively). A mesh of 10 × 10 m grids was set in Biecz, while 20 × 20 m grids were used in Kobylanka. Points of grids were staked out with the use of Total Station and/or GPS RTK. The corners of the mesh were measured with the GPS RTK in Polish national Coordinate Reference System PUWG 1992. Reference points were measured in FIXED solution, with ASG EUPOS corrections, providing a cubic accuracy of below 3 cm.

The main reason for such a choice of prospecting methods was their complementarity, which allowed us to obtain the information about the different physical parameters of the ground and buried objects. Most of the geophysical methods widely applied in archaeol-

ogy are complementary with each other, however our choice was based on the good practice in geophysical prospection in archaeology, as well as the assumed Level of Investigation (Gaffney and Gater 2003, 88–91; Schmidt *et al.* 2015, 10–11). Another factor taken under consideration were the limitations of geophysical methods in woodland (Kobylanka) and anthropogenically changed areas (Biecz).

The area of investigation in Biecz was relatively small, well accessible for the measurements, but heavily affected by recent anthropogenic activity. On the other hand, the site in Kobylanka has not been affected by human activity, but was heavily damaged by natural factors, e.g. landslides.

The results of the measurements were processed and visualised with the use of dedicated software for geophysical data development – Geoplot 4. The results have been presented as 2-dimensional maps of the horizontal distribution of measured values of physical fields at various stages of data processing, according to the European guidelines (Schmidt *et al.* 2015, 100–104).

6.2 Results of the prospection

Biecz

The magnetometry survey in Biecz (fig. 10A) resulted in a series of extremely strong dipolar anomalies being registered. The magnetic map is dominated by an extensive dipolar anomaly, whose dynamics exceeded the measurement range of the FM256 fluxgate magnetometer, located in the southern part of the area. It was a complex of the magnetic field disturbances caused by the infrastructure of a borehole and ferrous elements of its infrastructure, e.g. chains, shaft, etc. Hence, the image of possible archaeological remains in this area has been fully disturbed in this part of the surveyed area. The northern part of the area has not been affected in such an extreme way like the southern one, however numerous dipolar anomalies have been registered there as well. Most probably they were caused by the contemporary remains related to the time of the drilling of the shaft. In general, the data visualised in the scale below ±10 nT was noisy and illegible. In conclusion, the results of the magnetometry survey in Biecz could be described as strongly domintated by the remains of contemporary infrastructure. The dynamics of the archaeological remains rarely exceeds a range of ±20 nT, hence even few positive point magnetic anomalies registered in this area could not be interpreted as archaeological remains, due to the general magnetic noise in the area.

On the other hand, earth resistance survey brought a very different picture. Since the earth resistance measurements are not that strongly affected by the ferrous infrastructure and debris, a lot of interesting anomalies of probable archaeological origin have been registered. Despite that, also in the resistance distribution maps an anomaly from the drilling shaft occurred. It was a quite large, negative anomaly, suggesting that the shaft was made from a highly conductive material.

Earth resistance measurements results might be considered very good in comparison with magnetometry (fig. 10B). All three maximum depths of prospection (D1 = 0.25 m for AM = 0.5 m, D2 = 0.5 m for AM = 1 m and D3 = 0.75 m for AM = 1.5 m) provided slightly varied but still comparative images of horizontal distribution of apparent resistivity. The most important achievement of this part of the survey was registering a few relatively clear though not strong electrical anomalies which, despite the discussive state of preservation of the castle relics, are almost undoubtedly caused by architectural remains.

The prospection at all three depth levels (D1, D2, D3) allowed us to register quite similar anomalies, which differed mostly in terms of their dynamics and contrast. Due to the lack of any significant differences between three levels, we propose one common interpretation for earth resistance survey results, without any distinction between particular levels.

The most interesting features were detected on northern and southern edges of the plateau (fig. 10C). In the northern part we captured a faint, circular high resistance zone anomaly, which is around 9 m in diameter. This round zone anomaly has a slightly higher resistive border at its edges. We interpret this feature as the remains of a tower (bergfried). The outer, stronger anomaly might be related to the remains of its wall or foundations, while the inner, weaker zone of high resistance anomaly might be caused by the rubble from collapsed walls. This interpretation is considered to be quite certain, since the anomaly relates well to the archival plans, which were apparently not very precise.

Another interesting electrical anomaly is a square zone high resistance feature, which is joined to the bergfried from the south. The dynamics of this anomaly suggests that we could be dealing with an inhomogeneous soil of very similar parameters to the inside of bergfried. Perhaps this feature is caused by some previously unknown object, nonetheless no higher resistance anomaly outlines the feature as it was in case of bergfried anomaly, which puts in question the presence of actual walls or foundation relics.

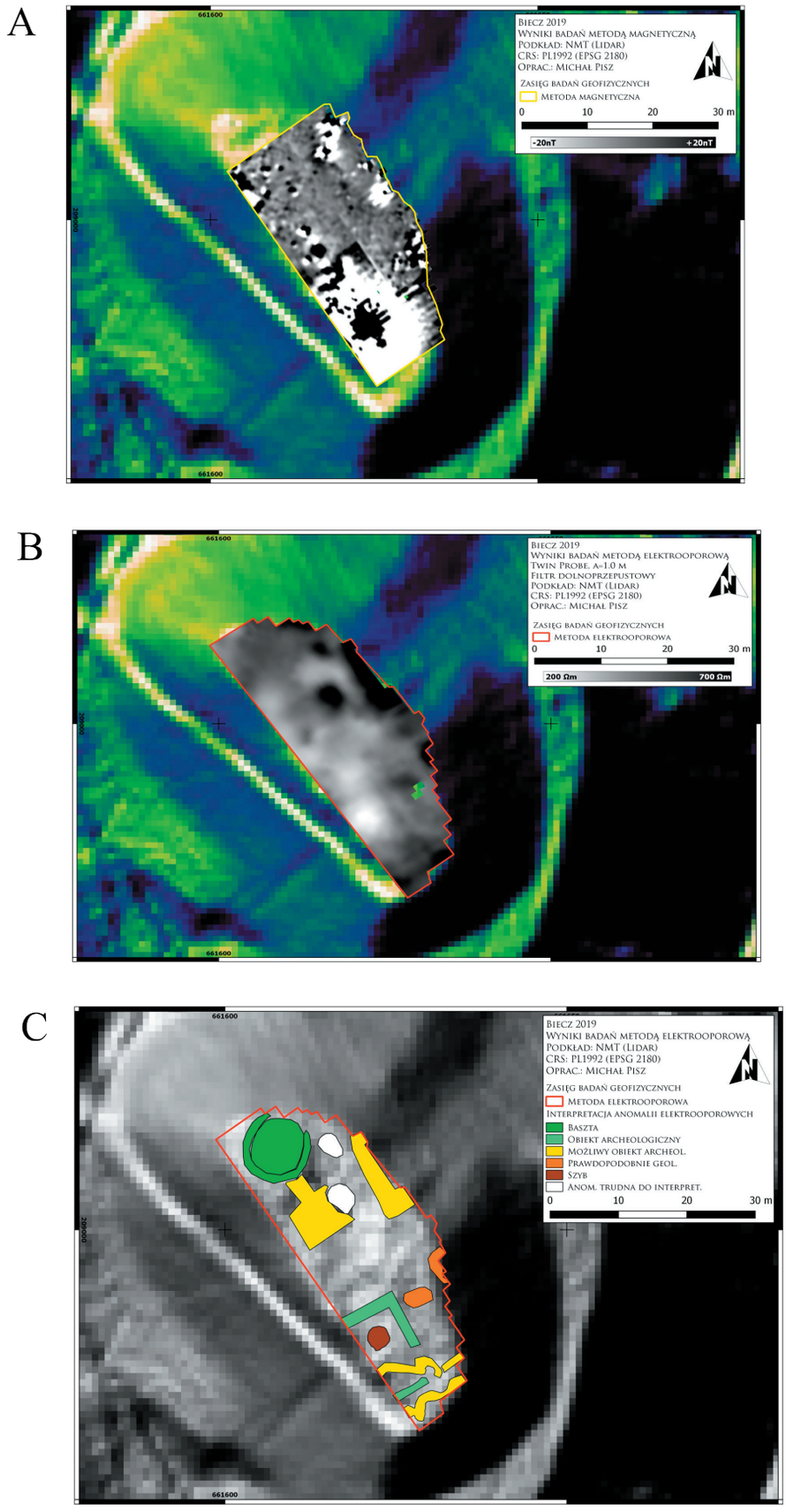

Fig. 10 A–C. The results of non-invasive research on the Castle Hill in Biecz (compiled by M. Pisz); A – magnetometry survey; B – earth resistance survey. ERI to inna metoda; C – the initial proposal for the interpretation of the results

In the eastern part of the surveyed area, by the edge of the plateau, we registered strong high resistance zone anomalies of unknown origin. Neither their properties nor lack of analogies provide any evidence that this anomaly is caused by an archaeological object so perhaps it is caused by a shallow geological structure or recent earthworks.

The complex of linear high resistance perpendicular anomalies in the southern part of the plateau can certainly be interpreted as architectonic relics. We concluded this on the basis of both the properties of the registered anomalies (moderate to faint dynamics, high resistance, not very thick, linear, perpendicular) and by a comparative analysis of the archival plan of the site. Some of them, however, are unclear and cannot be fully explained. For instance, some of the southernmost anomalies were not evidenced in the archival plan, although it might mean that these objects were simply not located or documented. Some other features cross with the others, confirmed anomalies at the angle of *ca.* 45°, which would mean that they are not architectonically related to the other walls, unless we are dealing with some linear infrastructure which is not a wall or building foundation.

Our interpretation of geophysical survey results in Biecz seems to be certain, though to fully understand the site a thoroughly planned verification of particular features is strongly advised.

Kobylanka

The geophysical survey in Kobylanka brought a lot of emerging and important information about the site. In this chapter we will briefly present the results, however we would like to stress that advanced discussions and comparative analysis are in progress and the discovery of the Kobylanka hillfort with non-destructive methods will described further in a separate scientific paper.

The measurements from the sampling resolution in the case of Kobylanka was lower than in Biecz due to the conditions on the site – the presence of forests and big denivelations of the terrain.

In opposition to Biecz, the magnetometry survey in Kobylanka delivered much new information about the site (Fig. 11B). Regarding the geophysical value of the measurements, they could be described as relatively noisy and unclear results. This is due to the very faint contrast between background anomalies and disturbances caused by the features themselves. Nevertheless, after proper data treatment, we have been able to distinguish numerous anomalies which, regarding their physical properties, are most likely caused by archaeological objects. These are mostly very weak, linear positive anomalies which are located next to each other in a ring shape. They surround the middle of the maidan where no anomalies of such a type have been detected. Beside a few strong dipolar anomalies, which were most probably caused by some contemporary ferrous wastes, the whole dynamics of the registered magnetic anomalies is extremely low. Also, no signals have been detected within the extent of the hillfort's embankment. That could mean that it was solely made of the earth and / or stones, or it has a different type of construction but was not burnt.

Magnetometry results (Fig. 11C) are the subject of further analysis and will constitute the basis for further research.

An earth resistance survey allowed us to visualise the distribution of soil apparent resistivity up to *ca.* 0.25 m depth. The wide range of registered resistivity values is worth mentioning. They start from a few dozens of Ωm and reach more than 1500 Ωm. This might be a result of a diverse shallow geology (perhaps the presence of high resistant sandstones and low resistant shales) as well as the topography of the terrain (steep slopes). In the extent of the maidan, no significant earth resistance anomalies have been registered. In the extent of the embankment, some very faint low resistant anomalies have been registered. It might indicate that the embankment was earthen, or wooden-earthen, and it might have been partly made of silt or clay (Fig. 11A).

7. Conclusions, summary and research proposals

The interdisciplinary research carried out in 2019 on two archaeological sites, the Castle Hill in Biecz and the newly discovered stronghold in Kobylanka, was implemented in several phases (Fig. 12). The first one consisted of library and archive queries aimed at collecting basic information, pertaining to the history of the sites and the current state of research. The second phase included field surveys, during which movable historical material was collected from the surface. In the case of Kobylanka, we expected that the acquired historical objects would enable us to determine the initial chronology. Unfortunately, as shown above, this was not possible. The third stage focused on performing GPR research, while the fourth stage comprised electrical resistivity imaging and geomagnetic exploration. In both of the latter cases, our aim was to try to identify potential archaeological relics in the area of both sites. As far as the Castle Mountain is concerned,

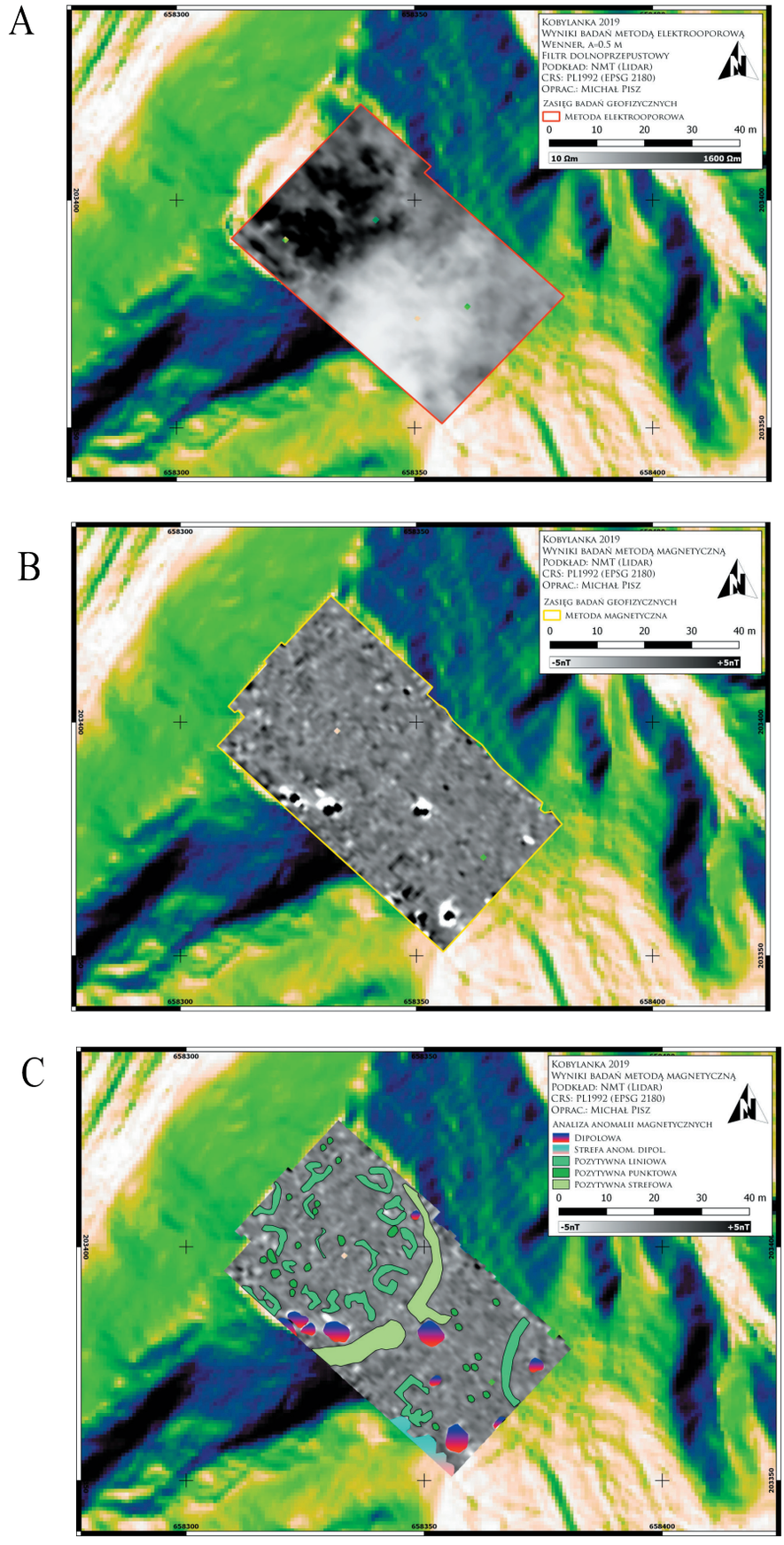

Fig. 11 A–C. The results of non-invasive research in the Kobylanka stronghold (compiled by M. Pisz);
A – earth resistance survey; B – magnetometry survey; C – the initial proposal of the interpretation of the results

Fig. 12. The researchers conducting the earth resistance survey (photo taken by P. Kocańda, 2019)

the remains of the brick structures of a defunct medieval castle were sought. The obtained results were also supposed to facilitate the process of finding previous research excavations and linking the archival excavation documentation to the contemporary topographical situation. In Kobylanka, the research was aimed at performing preliminary recognition of the site with regard to the presence of possible archaeological features. An important secondary objective of the research was to assess the risks associated with – among other things – landslides.

All of the above-described types of work brought novel, thought-provoking pieces of information about both archaeological sites. To exemplify, the queries allowed us to summarize the existing findings; this proved to be particularly important in the case of the Biecz castle, where the first excavations took place in the 1870s, followed by subsequent research carried out in the first decades of the second half of the 20th century. The results of the first research project (published by Tomkowicz, 1900, 242–245), which are known only vicariously, raise many doubts, primarily owing to their unprofessional character. An important remnant of Father Jaszczor's work is the hand-drawn projection of the walls, which to this day constitutes the basic plan of the Biecz Castle (Fig. 4); nevertheless, the projection does not match the topography of the hill. For this reason, verification by means of excavation is necessary. Unfortunately, this task was not fulfilled during the archaeological works from the years 1957–1958 and 1961, conducted by Antoni Kunysz (see Kunysz 1961, 12–16; 1963, 72–74). Despite providing plenty of valuable data on the chronology of the site and the phases of the settlement, the above-mentioned explorations were, in many respects, characterized by a number of shortcomings. To start with, the discovery of the remains of the castle was not marked on the plan (despite the creation of the hill's height projection), which makes it difficult to verify and compare with the 1877 sketch. Also, the historical material, which is still stored in the warehouses of the Biecz Land Museum, has not been analyzed. To complicate things further, the conclusions drawn on the basis of these studies were published by Kunysz only in the form of short announcements. Having said that, some new data became available through a query in the National Archive in Kraków, where the correspondence between Tomasz Jaszczor and Józef Łepkowski

was found; however, due to the limited framework of the present article, this topic will be discussed in a separate paper. Moreover, the non-invasive research described above also provided additional information. In the case of Kobylanka, the query did not produce any answers pertaining to the discovered stronghold, which has not been mentioned in any written and/or cartographic sources. It is worth adding that the defensive structure in Kobylanka should not be confused with the well-known 16th century manor house, located on the border of the same village and Dominikowice, which was investigated in 1965 (A. Kunysz 1968b, 53–54).

Still, the most interesting results were provided by dint of GPR examination, to which we shall devote a little more attention. In order to provide more insight into the subject matter, both Biecz and Kobylanka will be discussed separately.

7.1. The Castle Hill in Biecz

Concerning the Castle Hill in Biecz, a considerable challenge the researchers had to face was the possibility of a disturbance in readings caused by the oil derrick that was constructed on its top by the Germans in 1939–1945 (Kaleta 1963, 115). The said machinery is noticeable in many photographs from that period. The erection of the oil derrick was connected with the excavation of a deep, small-diameter well, in which a drilling auger was placed. In addition, the implementation of the derrick was accompanied by the construction of all the necessary wooden and metal infrastructure (pipes, chains, pipelines, platforms). Unfortunately, the actions undertaken by the Germans led to some far-reaching consequences, including the destruction of the site and the walls located there, as well as the undue interference into the cultural stratigraphy in this part of the castle. The existence of a large metal construction, in the form of an oil well, also affected the research results; this is particularly visible in the graphs presenting geomagnetic reconnaissance, which display a large area of dipole anomaly. Thus, we had to deal with considerable interference prompted by the metal structures located underground.

Having analyzed the results of the GPR surveys for possible archaeological features and the relics of the brick castle, it should be stated that some of the anomalies coincide with the sketch drawn in 1877 (see Fig. 10C). We are referring here to the cylindrical tower, located in the north-western part of the structure, which is considered to be the oldest element of the brick castle, dating back to the end of the 13th century and connected with the work of King Wacław II and his supporters (Kajzer *et al.* 2010, 92; Kocańda 2018b, 326). In the previous literature on the subject (see Kajzer *et al.* 2010, 92; Kunysz 1963, 73; Tomkowicz 1900, 245), it was assumed that its diameter was 10 m, which allowed it to be placed in one row with similar bergfrieds in Czorsztyn (10 m), Myślenice (10.2 m), Kazimierz Dolny (10 m) and Będzin (10.7 m).The results of electrical resistivity imaging have shown that its diameter may be one meter smaller, which makes it possible to compare it with the towers in Dobczyce (9 m), Rytro (9–9.5 m), Lipowiec (9 m) or Slovakian Stara Lubowla (8.4 m). Of course, the difference may result from a measurement error or a loss in the surface of the external walls of the tower. Furthermore, on the basis of the research carried out, we can assume that the walls of the tower are relatively well preserved, while the interior is now covered with debris (Fig. 13 and Fig. 14). Therefore, any doubts connected with the tower of the Biecz Castle

Fig. 13. Cylindrical tower in Czchów castle from the late 13th century analogous to the tower of Biecz castle (photo taken by P. Kocańda, 2018)

should be resolved by means of an invasive method. An interesting regional anomaly with a regular quadrilateral shape was discovered on the south side of the tower. Its layout suggests that we are dealing with an anthropogenic object with non-homogeneous base (similarly as inside the tower). It seems possible, then, that we are dealing with a previously unknown castle building, since no structure is situated in this particular place on Jaszczor's plan. Another possibility is to interpret this anomaly as the remains of cobblestones, fragments of which were discovered as early as 1961. Since the cobbles were adjacent to the tower, one may venture a guess that both elements were built at the same time (Kunysz 1961, 13–14; 1963, 73). Finally, we may be dealing with an old archaeological excavation from 1877 or from the post-war research. Other options include a dismantling negative filled with rubble, or a heap created during the demolition of the castle. Again, a verification by means of excavation will be required here. Another interesting piece of data was provided by the research in the northern part of the hill's peak. Two oval anomalies, very difficult to interpret, were revealed there. Perhaps we are dealing here with some archaeological feature or a dismantling negative. However, it is also possible that one of the oval points will turn out to be a well. Water storage facilities, whether in the form of a cistern or a well that was dug deep in the rocks of the castle hills, were an indispensable element of any medieval stronghold. It is difficult to assume that the residents of the castle brought water from the nearby Ropa river (Hislop 2013, 224–227) and certainly such an object also existed within the castle in Biecz. In the said area, there is also an oblong anomaly, with its ends turning in the north-eastern direction (see fig. 10C). This may be the remains of the building, located in the eastern part on the outside of the walls on Tomkowicz's plan. According to the authors, it must be the entrance gate to the castle. A number of other castles in Lesser Poland provide an analogy in this case, especially in Rytro and Czchów, where gates were erected in the 15th century in the form of a separate tower building located in front of the walls (see Dworaczyński 2014, 143–157; Szpunar 2003, 497–514). Linear, oblong anomalies were also revealed in the southern part of the structure. Their arrangement suggests that we are dealing with the remains of the residential part of the castle. Some of them can be compared with the buildings on the plan from 1877.At present, their layout can only be reconstructed after excavations.

The geophysical surveys failed to reveal any anomalies that should be interpreted as the peripheral walls of the castle. Their absence can be explained by a number of possibilities. First of all, due to the layout of the slopes, as well as the fact of them being covered with dense bushes and trees, it was impossible to reach the very edge of the hill with the equipment. Secondly, the walls could have been heavily demolished or they could have partially slid down the slopes. Possibly, the only things left of them were all the negatives and demolition layers.

Fig. 14. The cylindrical tower in Rytro Castle, built at the end of the 13th century; most likely a similar tower to the one that used function in Biecz (photo taken by P. Kocanda, 2018).

The above-mentioned results of the non-invasive research in the area of the Biecz Castle yielded extremely important and valuable findings, which coincide closely with the plan published by S. Tomkowicz. We know that we are dealing there with debris-covered rooms and dismantling negatives or full walls. In the latter case, it is certainly a cylindrical tower, as evidenced by the fact that it has been captured by all research methods. The anomalies presented in the visualizations were analyzed not only on the basis of the results obtained during the previous excavations or by dint of archival and source queries, as we have also relied on the observations of other researchers conducting non-invasive diagnoses on various medieval sites in Poland. Among such objects we should mention

the castle – monastery of Blessed Salomea in Grodzisk pod Skałą (Domagała and Mościcki 2006, 405–418) and Teutonic castles in Starogród, Unisław and Kowalewo Pomorskie (Wiewióra 2018, 95–98; Wiewióra *et al*. 2016; 109–111; 2020. 1–28). The above constructions, as in the case of Biecz, are sometimes covered by a thick layer of soil and rubble. For this reason, the classification of some of the anomalies may be similar, whereas the differences may arise due to their interpretation – such a situation is caused by the fact that we are dealing with relatively diverse constructions. Unfortunately, in the case of the Biecz Castle, the written sources are scarce, and the results of the previous research are not very detailed. Meanwhile, the inventories and surveys from the 17th century and onwards, which would prove extremely valuable for the reconstruction of the building, are not available. This, in turn, can be ascribed to the early demolition of the castle, which took place in the second half of the 15th century. As a result, the only possible way to reconstruct the spatial layout of the stronghold would be to use the outcomes of the planned archaeological excavations, which at the same time, could be used to verify the findings of the non-invasive reconnaissance presented in this article. It is therefore necessary to undertake a new series of excavation works, which shall lead to a full recognition of the site. Such an identification would prove extremely important for the Polish castellology, since the castle in Biecz serves as an example of a stronghold erected in the first stage of the construction of brick castles in Lesser Poland, which dates back to the second half of the 13th and the beginning of the 14th century and is related to the reign of the Czech monarch Wacław II, Duke of Cracow in 1291–1300 and the Polish king from 1300 to 1305 (see Guerquin 1974, 43–47; Kajzer *et al*. 2010, 30–40; Kocańda 2017, 93–104; Kołodziejski 2017, 62–66). Identifying the castle will also bring other benefits. For instance, it might serve as an important contribution to the partial reconstruction of the castle, which will consequently boost the tourist appeal of Biecz.

7.2. Stronghold in Kobylanka

The electrical resistivity imaging and geomagnetic surveys carried out within the Kobylanka stronghold have produced a number of fascinating anomalies, which can be interpreted in many ways (Fig. 11C). The GPR, on the other hand, did not provide any interesting data. While analyzing the graphs depicting the results of the research, we encountered linear, regional and point positive anomalies, which were arranged in areas reflected in the topography of the site. Among the most noticeable elements, we should distinguish two very large linear anomalies, running in a curved fashion along the line of the preserved rampart. This is, of course, the reflection of this defensive structure, the dynamics of which may indicate a burnt structure. Additional data were provided by the electrical resistivity imaging, which recorded a depression within the rampart; this, in turn, may point to an earthen or wood-earthen structure. The graphs show that the two anomalies running along the rampart lines are not in contact with each other; moreover, the south-eastern one ends with a characteristic protrusion, which is directed at a right angle and runs further to the south. Certainly, we are dealing here with clear remnants of the gate and the entrance to the facility. Attention should also be paid to the linear positive anomalies, running in rings, along and next to the ramparts, as well as to the small oval points between them. Regrettably, their interpretation at this point in time, creates various difficulties. Perhaps the stronger point anomalies can be associated with hearths, while the linear ones may come from archaeological features of the residential type (dugouts, storage pits?). The central part of the maidan is an "empty" area; there are only a few points there. The north-western part includes some relics from the period of the World War I occupation; the existence of such objects was confirmed by the conducted research. Certain archeological works were also carried out on the southern side of the structure –here, two positive linear anomalies were found, the first one being arched-shaped and the second one being fairly regular and quadrilateral. In addition, several point "objects" appeared there.

The results of the measurements confirm that we are dealing with an anthropogenic object, one comparable with a stronghold. Nonetheless, at the present stage of the analysis and interpretation, it is impossible to reconstruct its spatial layout and determine its chronology. However, an attempt can be made to open the discussion on this structure. The well-preserved field form reinforces our belief that it is a defensive building. Taking into account its appearance, location and character, the first association one could make would be to identify the structure as a motte-and-bailey castle. Such defensive buildings were extremely popular in the Middle Ages, not only on Polish lands but also in Western and Central Europe. Structures of this type are primarily associated with knighthood (see Kajzer 1993a, 93–112; Kołodziejski 1994, 5–110; Marciniak-Kajzer 2016; Nowakowski 2017, for further literature). A few of them are located in the vicinity

of Biecz and Kobylanka, e.g. in Jeżów, Berdechów and Żmigród Stary (Kołodziejski 1994, 141–142, 188–189, 204–205). Bearing in mind the above remarks, the authors initially assumed that we are dealing with the foregoing type of building. It was expected that the non-invasive research would lead to the discovery of an anomaly in the shape of a quadrilateral building, which could then be identified as a residential and defensive tower. Such structures appeared, for example, during the geomagnetic reconnaissance on motte-and-bailey castles in Pniów and Stare Tarnowice (Michnik *et al*. 2016, 85–88). Yet the results of the non-invasive surveys that were obtained in Kobylanka forced the authors to re-consider the original concept more thoroughly. The first suggestions came up during the query of the written records, which revealed that the investigated building is not mentioned in any historical sources; this, in turn, leads to the assumption that it did not function in the late Middle Ages. Moreover, both the oval and quadrilateral outlines of archaeological features that run in circles along the ramparts and appear next to them, should be interpreted as the relics of buildings buried in the ground, most probably household pits or residential houses, which might have been burnt. If such an interpretation proves correct – as excavations should verify – it will be possible to classify the site as a defensive settlement or a stronghold with buildings accumulated near the inner wall of the rampart. The chronology of the structure may turn out to be an intriguing issue. The strongholds with dwellings located near the ramparts or with circular housing are characteristic of both the early Middle Ages and subsequent periods, namely the late Middle Ages and modernity. As regards the second case, the stronghold in Mymoń, studied by M. Cabalska in 1969, is worth mentioning, as it was inhabited in three chronological phases: the prehistoric, early medieval and 14th–15th centuries. Obviously, the phase that seems to be the most relevant for our study is the third stage, which is related to the motte-and-bailey castle and the buildings situated both in the central part of the structure and by the ramparts (see Kotowicz 2007, 51–67, earlier literature there). Furthermore, we should also mention the stronghold in Raciąż, which was erected in the 13th century as the residence of the castellan, where houses were located along the ramparts thereby forming a kind of an inner ring (Barnycz-Gupieniec1983, 91–123). In the third case, i.e. the period that includes modern times, objects of this type (as proved by L. Kajzer's findings, 1993b, 33–43), were motte-and-bailey castles transformed into the so-called manor houses on a mound. Here, within the hill as well as its fortifications, one could encounter not only the manor house but also some additional farm buildings. Still, the oval (ring-type) stronghold with buildings located by the ramparts was the most common in the early Middle Ages. The examples which corroborate the foregoing statement are manifold, hence we shall restrict ourselves only to a few. For instance, in Upper Silesia there are Lędziny and Lubomia, which are dated from the end of the 8th to the middle of the 10th century (Tomczak 2012, 100–102), in the Lubelskie region we shall mention Jurów, Strzyżew and Turów (Banasiewicz-Szykuła 2019, 219–232; Bania 2019a, 323–328; 2019b, 329–332), and finally, as far as Lesser Poland is concerned, objects that are adjacent to the inner wall were discovered in Naszacowice (Poleski 2004, 266–274). Similar solutions can be found, among others, in strongholds in Gilów and Dobromierz in Silesia (Jaworski 2005, 199–224), as well as in Łodygów site 1 and Kamionka site 9 in the Iławskie Lake District (Kobyliński 2019, 18, 373).

The discovery of an early medieval stronghold would not be surprising, as there are numerous early medieval settlements in the vicinity. The settlements from that period were located in several points of Biecz, Libusza, Korczyna and GrudnaKępska. Unfortunately, their chronology is difficult to establish, however, it may reach back to the 8th–10th century tribal times (Parczewski 1991, 24–43; Poleski 2013, 161–170). The strongholds, on the other hand, existed in Trzcinica, Brzezowa, Wietrzna-Bóbrka, Braciejowa, Przeczyca and Lisów (Kunysz 1968b, 43–45, 56, 63–65, 76–78, 80–81; Poleski 2013, Katalog (CD), 10–11, 96–97, 117–121, 122–124).

Attention should be drawn to the shape of the object, which – as suggested earlier – is quite regular in some of its parts. This is not a major exception, as it should be borne in mind that other fortified strongholds are also partly symmetrical. Here, we shall mention one example, namely the site in Brzezowa, situated less than 25 km away (Parczewski, 2010, 431–441); still, such a regularity is quite rare among the early medieval defensive structures. Generally speaking, newer fortifications used to be rather regular in shape, especially the modern ones in the form of sconces and redoubts. Consequently, one may consider whether this might be a more recent object, or whether it was reused in the subsequent centuries for the military needs. Undoubtedly, during World War I, some individuals entrenched themselves there and most probably these were the Russians. Following the history of the region, we should also mention the earlier conflicts

that swept through the area. Such a disturbance was the Bar Confederation – an armed association of the Polish nobility established on 29 February 1768 in the village of Bar in Podolia, which aimed at restoring old noble privileges, weakening the royal power and rejecting the reforms imposed by Russia. Since the very beginning of the four-year period (1768–1772) of uprising, the main military actions moved to the mountainous areas of Małopolska A chain of Confederate fortresses ran from Lanckorona in the Wieliczka Foothills to the Upper Roztoki in the Bieszczady Mountains. In 1769, a camp was established in Kobylanka, which was soon abandoned after the Russian invasion (Konopczyński 1931, 83; Pułaski 1909, 19–22; Śliwa 2019, 41). We do not know, however, whether the base was fortified with sconces or if it was open in the form of, for example, an ordinary camp. Even the very location of Kobylanka, i.e. a plateau with steep slopes falling towards the valley of the Ropa River, renders this area a defensive position.

When analyzing the outline of the object and measuring its surface, one can spot a number of evident contradictions with the nearby fortifications of the Bar confederates. Of course, the most striking contrast is that of the outline, which is regular in the case of the majority of confederate fortifications. There is also a considerable disparity between their surface areas. The position in Kobylanka measures only 20 ares, while the confederate camps in Muszynka, Izbach, Wysowa or Roztoki Górne are huge defensive structures of over 1 ha (Muszynka, Wysowa) and up to approximately 4–6 ha, as far as the camp in Izby is concerned. The deployment of fortifications in the prospective area of military operations is also quite important. The Confederate camps were planned in a way that allowed for a quick escape, with the main fortifications facing away from the front of the structure, and the neck that was usually less fortified. In addition, they provided a wide view of the entire area. Even though these were not entirely well thought-out structures, they still allowed for a quick evacuation and quite effective defense (Filipowicz 2018). In the case of Kobylanka, which is located on a promontory, under a hill and additionally separated on the sides by steep gullies, one cannot consider neither the possibility of a quick and trouble-free evacuation, nor the effective defense or insight into the foreground. Moreover, the fortification can be easily bypassed from the back, as one may position himself up against it and shoot from above, i.e., a much more advantageous position. Also, the breastwork does not protect against the penetration of bullets that could fall into the maidan, thereby wreaking havoc. Therefore, it is unlikely that these fortifications were erected by the confederates. Perhaps they used the former ramparts, slightly modifying them for their military needs and making them some sort of an observation and control point. However, without strengthening the structure with some additional sconces that would flank it, this location (according to the standards of the fortification craft of that time) is deprived of any military value. The structure itself, placed on the edge of the slope and the forest, resembles a deeply hidden refuge in which the population wished to hide rather than to engage in fierce resistance.

To sum up the current findings from Kobylanka, it should be stated that the electrical resistivity imaging and geomagnetic research have provided a lot of interesting information about the stronghold. The results enable us to make a few assumptions about its function, spatial arrangement and chronology. However, the verification of the above speculations will be possible only by means of field excavations, which should provide us with the data necessary to formulate definitive conclusions. Nevertheless, we can confidently state that a new, interesting defensive structure has appeared on the archaeological map of Lesser Poland.

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