

ARTICLES

FASCICULI ARCHAEOLOGIAE HISTORICAE XXXV: 2022

ISSN 0860-0007, e-ISSN 2719-7069

DOI 10.23858/FAH35.2022.003

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STRONGHOLD AND ITS HINTERLAND ON THE BASIS OF KLENICA SETTLEMENT COMPLEX, LUBUSKIE VOIVODESHIP – A SUMMARY OF STUDIES TO DATE

Abstract: The early medieval fortified settlement in Klenica is located on the right bank of the Oder River, on the left side of the road leading from Bojadła towards Klenica. The stronghold and its open suburb settlements boast a rich history of studies. The beginnings of archaeological excavations in the Klenica settlement complex date back to 1935, when Kurt Langenheim discovered the stronghold. Soon afterwards Ernst Petersen, the head of the State Office for Prehistory in Wrocław, commenced archaeological excavations by digging an 81-metre long trench, which allowed for the exploration of the southern stretch of the ramparts and the central part of the stronghold. In 2016 Andreas Kieseler carried out a study on archaeological material assembled in the pre-war period stored in the archives of the Museum of Archaeology in Wrocław. In a comprehensive study A. Kieseler also compiled the results of excavations carried out in 2007, which addressed some research questions and attempted to obtain samples for dendrochronology. The next stage was non-invasive research carried out in 2017. At that time geophysical studies using the magnetometry method in the area of the stronghold as well as a part of one of the suburb settlements were carried out. At that time many analyses on the reconstruction of the former natural environment were also conducted. One of the most interesting features discovered during geophysical research is an oval anomaly measuring 28×21 m, registered in the southern part of the stronghold. Results of magnetometry survey connected with the reinterpretation of the results of archaeological excavations allow us to put forward yet another research question concerning the function of these identified features. The results of dendrochronological dating allow us to conclude that the four-stage earth and wooden rampart had been constructed by 850 AD. The stronghold burnt down at the beginning of the 10th century and was not rebuilt afterwards.

Keywords: Klenica, stronghold, early medieval settlement, Tornow-Klenica zone, geophysical survey

Received: 14.11.2022 **Revised:** 18.11.2022 **Accepted:** 24.11.2022


Citation: Gruszka B. 2022. *Stronghold and Its Hinterland on the Basis of Klenica Settlement Complex, Lubuskie Voivodeship – A Summary of Studies to Date*. "Fasciculi Archaeologiae Historicae" 35, 27-41, DOI 10.23858/FAH35.2022.003

Introduction

The early medieval stronghold in Klenica is located on the right bank of the Oder River, on the left side of the road leading from Bojadła towards Klenica. The present riverbed of the Oder River is currently about

2 km east of the fortified settlement (Fig. 1). There are about 20 settlements and remains of open settlements dated to approximately the same period as the Klenica stronghold located within a radius of approximately 4-5 km of Klenica, (2nd half of the 9th – 1st half of the 10th century) (Fig. 2).

The stronghold and its supporting open settlements boast a rich history of archaeological and historical studies. Considering the fact that the Klenica settlement complex is one of the best explored in the valley

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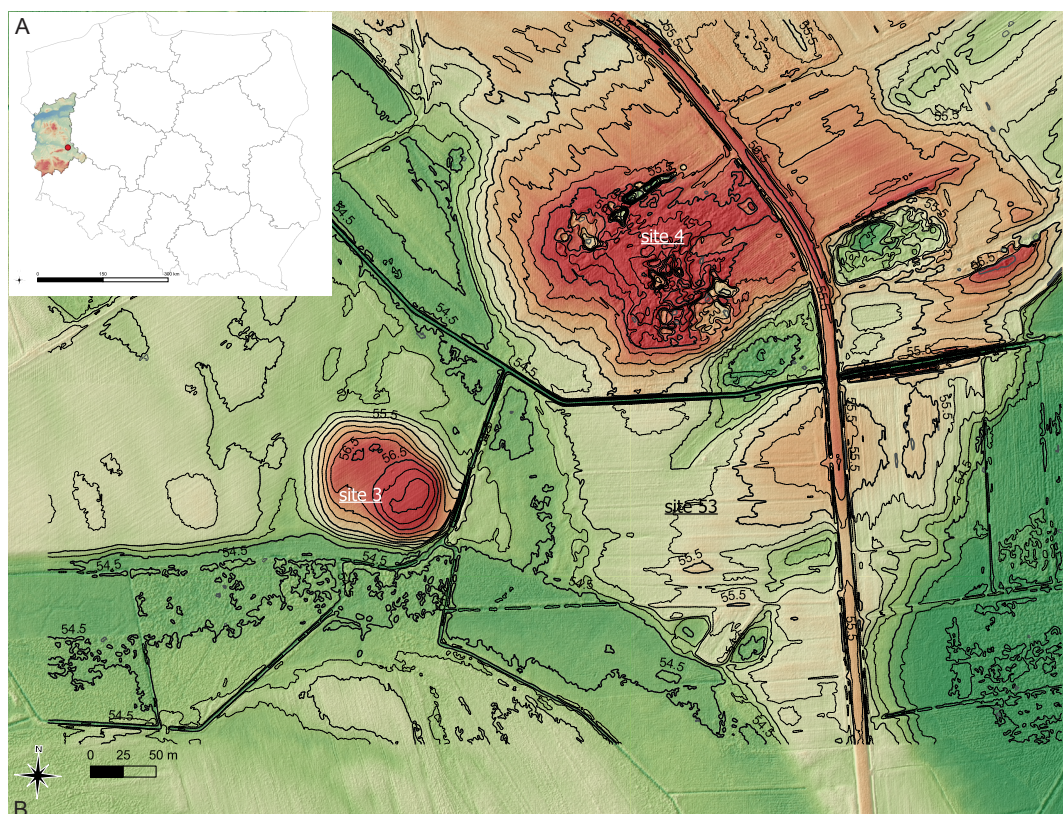


Fig. 1. A – Location of the stronghold in Klenica on the map of Poland. B – Klenica, site 3. Location of the stronghold and supporting settlements (site 4 and 53) on LiDAR map. Graphic design: B. Gruszka.

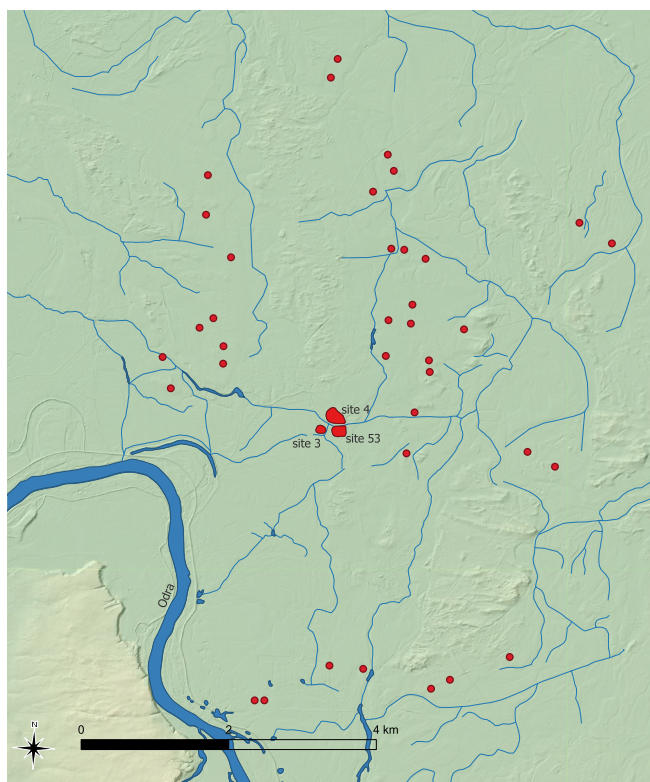


Fig. 2. The Klenica settlement complex, location of the stronghold on the settlement map. Graphic design: B. Gruszka.

of the middle course of the Oder River, the results of these studies are of major importance to the body of knowledge about Western Slavs in the Early Middle Ages.

The beginnings of archaeological excavations in the Klenica settlement complex date to 1935, when Kurt Langenheim, curator of the State Office for Prehistory in Wrocław [German: *Breslauer Landesamt für Vorgeschichte*], discovered the stronghold. Soon afterwards Ernst Petersen, the head of the State Office for Prehistory in Wrocław, commenced archaeological excavations by digging an 81-metre long trench, which allowed for the exploration of the southern stretch of the ramparts and the central part of the stronghold.¹ Because of the outbreak of World War II and Petersen's death in action, comprehensive results of the studies were not available until over 80 years later, although a short note by Petersen about the results of works which were being carried out,² a few short articles in the local press, and a longer piece by Kurt Langenheim had been published in 1937.³ In 2016 Andreas Kieseler carried out a study on the archaeological material assembled in the pre-war period stored in the archives of the Museum of

¹ Langenheim 1938.

² Petersen 1937.

³ Langenheim 1936.

Archaeology in Wrocław.⁴ Apart from archaeological field reports, well-preserved and perfectly kept by Petersen, the archives also contained artefacts, *inter alia*, shards and animal bones. In a comprehensive study A. Kieseler also compiled the results of excavations carried out in 2007,⁵ which addressed some research questions and attempted to obtain samples for dendrochronology. At that time two trenches, measuring respectively 3×10 m and 2×15 m, were explored: one parallel to Petersen's trench from 1936, the other in the central part of the stronghold.⁶ A total of 20,000 pieces of pottery and over 200 of other finds made of bone, antler, stone, and iron were excavated, which allowed for an insight into the culture of former inhabitants and the way they exploited their immediate surroundings. An important element of the work carried out in 2007 was obtaining a series of dendrochronological dates, which made it possible to establish the date of construction and expansion of the Klenica stronghold.

The next stage was non-invasive research carried out in 2017 as a part of the project entitled 'Complex, non-invasive studies of archaeological material from the Klenica Stronghold, Lubusz Voivodeship,' financed by the Ministry of Culture and National Heritage of the Republic of Poland within the program for the 'Protection of archaeological heritage.'⁷ At that time, archaeologists carried out geophysical studies using the magnetometry method in the area of the stronghold as well as in a part of one of the open settlements (Klenica, site 4),⁸ analysed the environmental pollen profile sampled in the immediate vicinity of the fortified settlement,⁹ took geomorphological measurements in the immediate vicinity of the settlement,¹⁰ and carried out a detailed surface survey that resulted in the discovery of new settlement sites from the period corresponding to the period in which the Klenica stronghold existed.¹¹ Moreover, a study of the remains of bone finds uncovered during archaeological excavations in one of the nearby settlements was carried out (Klenica, site 4).¹² A more comprehensive interpretation of the results of the non-invasive methods of archaeological survey carried out in the Klenica fortified settlement since 2017, together with an attempt to formulate new research hypotheses concerning the interpretation of finds, were presented in 2020.¹³

It seems worth mentioning that the picture of the Klenica settlement is complemented by important results of excavations in the open settlement (Klenica, site 4) discovered at the beginning of the 1960s and excavated by Adam Kołodziejewski in 1962.¹⁴

Geographical and natural environment of the Klenica settlement complex

A very important element of the archaeological survey carried out so far was an attempt at the reconstruction of some elements of the original geographical and natural environment. Because these factors determined, to a large extent, the living conditions and the type of economy of the inhabitants of the stronghold and the nearby settlements, the location of the stronghold and supporting settlements had to be carefully selected.

Thanks to the geomorphological survey carried out by Juliusz Twardy and Jacek Forsysiak we know that the stronghold of Klenica was constructed on a sandy hill on geological formations of river sand and gravel sand of the bottomland of the Oder River valley.¹⁵ Such deposits are characterised by proper bearing capacity which ensured the foundation of heavy wooden and earthen defence structures of the fortified settlement, while oxbow lakes surrounding the Klenica stronghold from the north, east, and south are made of fine-grained alluvial soils and aggregate mud, which are far less consolidated (they are composed of muds, sand muds, silt muds, silts, and sand). Due to their limited bearing capacity, the area of the oxbow lakes was not suitable for the construction of heavy structures; however, it proved to be perfect natural terrain obstacles and defences. In case of intense rain or flood, the bottoms of oxbow lakes created an exceptionally muddy land barrier.¹⁶ Similarly, the open settlements were located on sandy holms 1.0-1.5 m above the floodplain (bottomland).

At the time of the Klenica stronghold's most dynamic development, i.e., in the 2nd half of 9th century and the 1st half of 10th century, the climate was warmer than it is today, belonging to the Holocene Climatic Optimum, also known as the Medieval Warm Period (MWP),¹⁷ which lasted from c. 950 to c. 1250 and can be divided into two sub-periods: dry and wet. Data presented by Leszek Starkel and his team¹⁸ indicates that the activity of river systems at the beginning of the Middle Ages was low and relatively stable, which can be associated with the dry Early Medieval Warm Period (until

⁴ Kieseler 2016.

⁵ Biermann et al. 2008; Biermann et al. 2011.

⁶ Biermann et al. 2008; Biermann et al. 2011.

⁷ Gruszka ed. 2017.

⁸ Pospieszny 2017.

⁹ Milecka 2017.

¹⁰ Twardy and Forsysiak 2017.

¹¹ Gruszka et al. 2017.

¹² Makowiecka et al. 2017.

¹³ Gruszka et al. 2020.

¹⁴ Gruszka 2010; Gruszka 2016.

¹⁵ Twardy and Forsysiak 2017.

¹⁶ Twardy and Forsysiak 2017.

¹⁷ Lamb 1977; Twardy and Forsysiak 2017.

¹⁸ Starkel et al. 2013, after: Twardy and Forsysiak 2017.

the mid-10th century).¹⁹ Thus it can be assumed that in the period when the settlement in Klenica existed, the water discharge and water level in the Oder River and some other minor waterways was relatively even, spates and floods were relatively low, and the processes of erosion, transport, and water accumulation were characterised by low intensity. However, the stability of water systems started to decrease from the mid-10th century, which could be influenced by the wet sub-period of the Early Medieval Warm Period, resulting in the increase in water discharge²⁰ and a rapidly increasing activity of fluvial processes.²¹ In the 11th century river flooding in Poland was already a severe natural disaster,²² and in the course of the Middle Ages the frequency of violent hydrological phenomena clearly increased.²³

It is possible that these natural processes, which coincided with the expansion of the early state of Mieszko I and Bolesław Chrobry (Bolesław I the Brave) to the west, were extra factors which led to settlements in the valley of the middle course of the Oder River being deserted at the end of 10th and the beginning of 11th century.

The geomorphology of the terrain as well as the system and activity of the watershed had an impact on the living conditions. Similarly, the type of soil surrounding the settlements determined the possibility of economic exploitation of the immediate neighbourhood.

The analysis of the possibilities of economic exploitation of the landscape in the immediate surroundings by the inhabitants of the settlement (site 4) and the Klenica stronghold (site 3) was made on the basis of contemporary soil and agriculture maps at 1:5000 scale, which were processed, digitised, and then divided into four equal quality classes according to the criterion of crops grown in conditions prevailing in the early medieval period, i.e., technological development at that time. Selected soil types can be presented as follows:

- a. Class 1 – soil suitable for the cultivation of crops (brown earths, black soils, degraded black soils, and grey soil)
- b. Class 2 – soil which was possibly covered with forest (coniferous and oak forests in the Middle Ages (podzol soils, leached brown soils, brown acid soils) and alluvial soils (fen soils, gleyic alluvial soils, gleyic soils);
- c. Class 3 – soils well-suited for meadows and pastures (peaty soils and peaty-sapric soil, mud-peaty soil and peaty-mud soil, low peats, sapric soil);
Class 0 – no information about the type of soil.

The area subject to the analysis was a 30-minute walk from the stronghold (site 3) in one direction and the nearest settlement (site 4) considering natural obstacles in the terrain (e.g., the Oder River Valley) and landforms (Fig. 3).

The analysis shows that the dominant soils in the area subject to the analysis were class 2 soils (91% – 10.284 km²). It was not possible to identify the type of soil for about 6% of the area (Class 0 – 6%, approximately 0.67 km²), allowing us to conclude that in the case of the Klenica stronghold, crop cultivation could not have been the main industry or main source of food for its early medieval inhabitants.

This hypothesis is also confirmed by the results of palynological studies carried out by Krystyna Milecka in 2017²⁴ and the results of the analysis of animal bone remains excavated both in the stronghold and the suburbium.

The profile for palynological studies (approximately 2 m deep) was collected in June 2016. The place for collecting the core was a marsh located about 200 meters north-east of the stronghold, in the area of one of the oxbow lakes of the River Odra.²⁵ The upper strata, 49 cm deep, were composed of alluvial soils below which there was a peat layer and detritus gyttja. Considering the profile of studies concerning the reconstruction of natural conditions of early medieval settlements, only the upper part of the core was selected for further detailed analysis,²⁶ with sediments dating back to the period between the 8th and the 9th centuries accumulated at the depth of 55-60 cm. To determine the age of the stratum radiocarbon 14C dating method was used, which showed the period 671-896calAD (MKL-3122) with probability of 93.6%.²⁷

The results of the analysis indicate a decrease in forest tree species in the Early Middle Ages, mainly in the European hornbeam and elm, and to a lesser extent the oak, which favoured less dense canopy. Simultaneously, there was a slight increase in the importance of the birch and the hazel, which require full sun; it is possible that fruit of the hazel was used by the inhabitants of the stronghold and the nearby settlements. A minor culmination of the anthropopressure level was also noted; it was marked by the increased presence of ruderal and pasture species, including dock and buckthorn. Isolated corn pollen: *Secale*, *Hordeum* type and *Cerealia* undiff. was also noted. There was also a higher share of grass pollen and flowering plants of the Cruciferae family (*Sinapis* genus), Umbelliferae family (*Peucedanum* and

¹⁹ Twardy and Forysiak 2017.

²⁰ Maruszczak 1998.

²¹ Starkel et al. 2013, after: Twardy and Forysiak 2017.

²² Starkel 1995.

²³ Kalicki 1991; Kalicki 2006.

²⁴ Milecka 2017.

²⁵ Milecka 2017.

²⁶ Milecka 2017.

²⁷ Milecka 2017, Fig. 4.

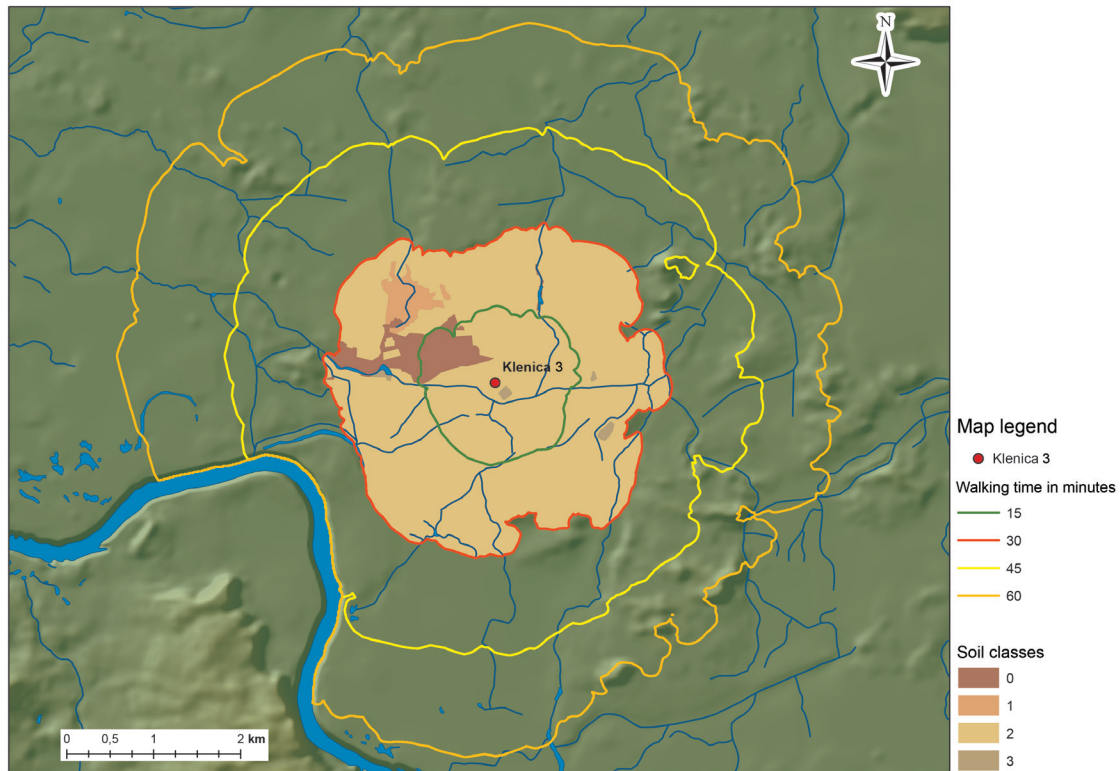


Fig. 3. Soils within a 30-minute walk from the Klenica stronghold (site 3) and settlements (sites 4 and 53).
Graphic design: A. Łuczak and B. Gruszka.

Cicuta genera), as well as Lamiaceae family (*Ballota* genus) which grow in open habitats.²⁸

The results of palynological studies correspond to the results of archaeological studies carried out on animal bone remains uncovered in the stronghold (site 3)²⁹ and the open settlement (site 4)³⁰ concerning the possible exploitation of the surrounding area for the purpose of obtaining food by the former inhabitants of the stronghold and the nearby settlements. In both cases, on the basis of the result of the studies it can be concluded that breeding animals was of primary importance, both in terms of food provision as well as the supply of raw materials necessary for the production of objects of everyday use and clothes.³¹ It is possible that this resulted from favourable natural conditions which prevailed at that time, which are confirmed by the results of palynological studies.³² To a lesser extent, raw materials from wild animals were also used, a practice which is unique on the regional scale.³³

Regarding livestock, cattle were the most important food source. They were also used as a beast of burden and parts of their bones were used to produce everyday objects such as skates.³⁴ Pigs were also an important source of meat and fat; tools made of their bones (such as prongs, among others) were also uncovered. Breeding sheep or goats was of lesser importance. Regarding wild animals, the remains of deer were common, as in the case of neighbouring settlements. On the basis of detailed studies of the anatomy of excavated bones of this species it can be concluded that parts of the carcass most appreciated for culinary purposes (i.e., ham and leg) were delivered to the settlement. Shed antlers, a very precious material, were used to produce tools such as the arrowhead uncovered in one of the features.³⁵ The archaeological material excavated at the site also included the remains of aurochs and a few beaver bones, an animal which was hunted for its meat and precious fur.³⁶ No fish or bird remains were found in the settlement, though this could be an anomaly due to the way faunistic material was collected and not indicative of the historical reality, especially in view of the fact that numerous such remains were excavated at the stronghold.³⁷

²⁸ Milecka 2017.

²⁹ Benecke 2016.

³⁰ Makowiecka et al. 2017.

³¹ Makowiecka et al. 2017; cf. Makowiecki et al. 2014; Benecke 2016.

³² Makowiecki et al. 2014.

³³ Cf. Makowiecki et al. 2014.

³⁴ Makowiecka et al. 2017.

³⁵ Gruszka 2010, 140; Makowiecka et al. 2017.

³⁶ Makowiecka et al. 2017.

³⁷ Cf. Benecke 2016, 487.

Settlement hinterland

The Klenica stronghold ringed by open settlements was a major settlement complex in the area of the middle course of the Oder River. The establishment of dense settlement structures can be observed by the early stages of the Early Middle Ages.³⁸

Open settlements

The first large-scale studies on the occupation of the Klenica stronghold's hinterland began in the early 1960s, when Edward Dąbrowski discovered a big supporting settlement (site 4), located north-east of the stronghold.³⁹ After a few reports on the decaying remains of the settlement and numerous one-day trips to collect shards of pottery from the surface of the site and pits visible in archaeological profiles, rescue excavations started in August 1962. These works, supervised by Adam Kołodziejcki and headed by Bogdan Kres, were carried out from 20 August to 29 August.⁴⁰ At that time three trenches were opened in the most fragile parts of the excavation site, uncovering a total area of 3 ares and revealing several features, of which 5 were numbered and recorded (marked as 'pits' and numbered from I to V) and several others that were left unnumbered.⁴¹

The timeline of the Klenica settlement was established on the basis of abundant ceramic material, the analysis of which revealed numerous formal and stylistic resemblances to the material from Zawada, site 1 and Sulechów, site 28. Spatial relationships in the Klenica stronghold and the nearby settlement, as well as visible analogies in the ceramic material, justify the use of the results of dendrochronological analyses obtained for wood used for the construction of the stronghold ramparts with simultaneous verification of the timeline of the settlement established by using archaeological methods.

On the basis of a lower frequency of the ornamental ribs or grooves that were used to decorate almost exclusively type C2 vessels (with a few sub-types according to the local typology of pottery),⁴² we are of the opinion that the settlement in Klenica was established a few decades earlier than the settlement in Zawada, which is dated to 2nd half of the 9th century – 1st half of the 10th century, in which a much larger assemblage of forms decorated with ornamental ribs or grooves were found (more than 50% of decorated pieces). The results of dendrochronological analysis made for the ramparts

of the Klenica stronghold do not contest this thesis, which is also confirmed by the results of studies carried out by Felix Biermann, who is of the opinion that the period to which the biggest variety of vessels decorated with ornamental ribs or grooves dates back is the 10th century,⁴³ i.e., partly the timeline which coincides with the timeline of the settlement in Zawada. Biermann's thesis is confirmed by the results of analyses of vessel fragments from, for example, the Miedzyrzecz stronghold. For the second stage of settlement at the Miedzyrzecz stronghold, i.e., the mid-10th century, the share of Tornow type pottery was the highest recorded at any site excavated so far, at over 40%.⁴⁴ Very similar percentages of Tornow type vessels in use during the corresponding period was noted in some Lower Lusatian fortified settlements, e.g., Leuthen-Wintdorf and Presenchen.⁴⁵ Moreover, the dating of the Klenica settlement to the 2nd half of the 9th century is also not contested by the presence of Menkendorf type pottery or by pottery with very similar decorative motifs, of which numerous finds were excavated in sites located in the area of Wzgórza Dalkowskie (Dalków Hills) (similar finds are known from excavations in the Klenica stronghold, see below).

The decline and fall of the Klenica settlement are not satisfactorily accounted for by archaeological excavations. The few shards which date back to the so-called 'transitional period' or were made on a potter's wheel (uncovered in secondary deposits) signal only the possibility that the settlement survived until the 11th century, when (according to most recent studies) ceramics of standardised decorations and forms appeared.⁴⁶

A wider surface survey of the supporting settlements of the Klenica stronghold began in 1980. Numerous settlement points were marked in two areas of the Polish Archaeological Record (AZP): 60-17 and 61-17. Further surface surveys were carried out in 2016.⁴⁷ The selected area was subject to a surface survey in both spring and autumn. The major aim was to verify locations known from previous AZP surveys as well as areas which were identified as possible locations of sites dating back to the early medieval period on the basis of GIS (Geographic Information System). Of special importance was a detailed survey of the range of settlement at site 4, which was a direct supporting settlement of the stronghold.

³⁸ Gruszka 2021, 30-40, Map 4.

³⁹ Kołodziejcki 1966, 226; Gruszka 2010, 109.

⁴⁰ Gruszka 2010, 109.

⁴¹ Gruszka 2010, 112-117.

⁴² Gruszka 2010, 126-129.

⁴³ Biermann 1999, 118.

⁴⁴ Zamelska-Monczak 2006, 245.

⁴⁵ Henning 1998, 399-400.

⁴⁶ Cf. Zamelska-Monczak 2006, 247-248; Zamelska-Monczak 2015, 281-287.

⁴⁷ Gruszka et al. 2017.

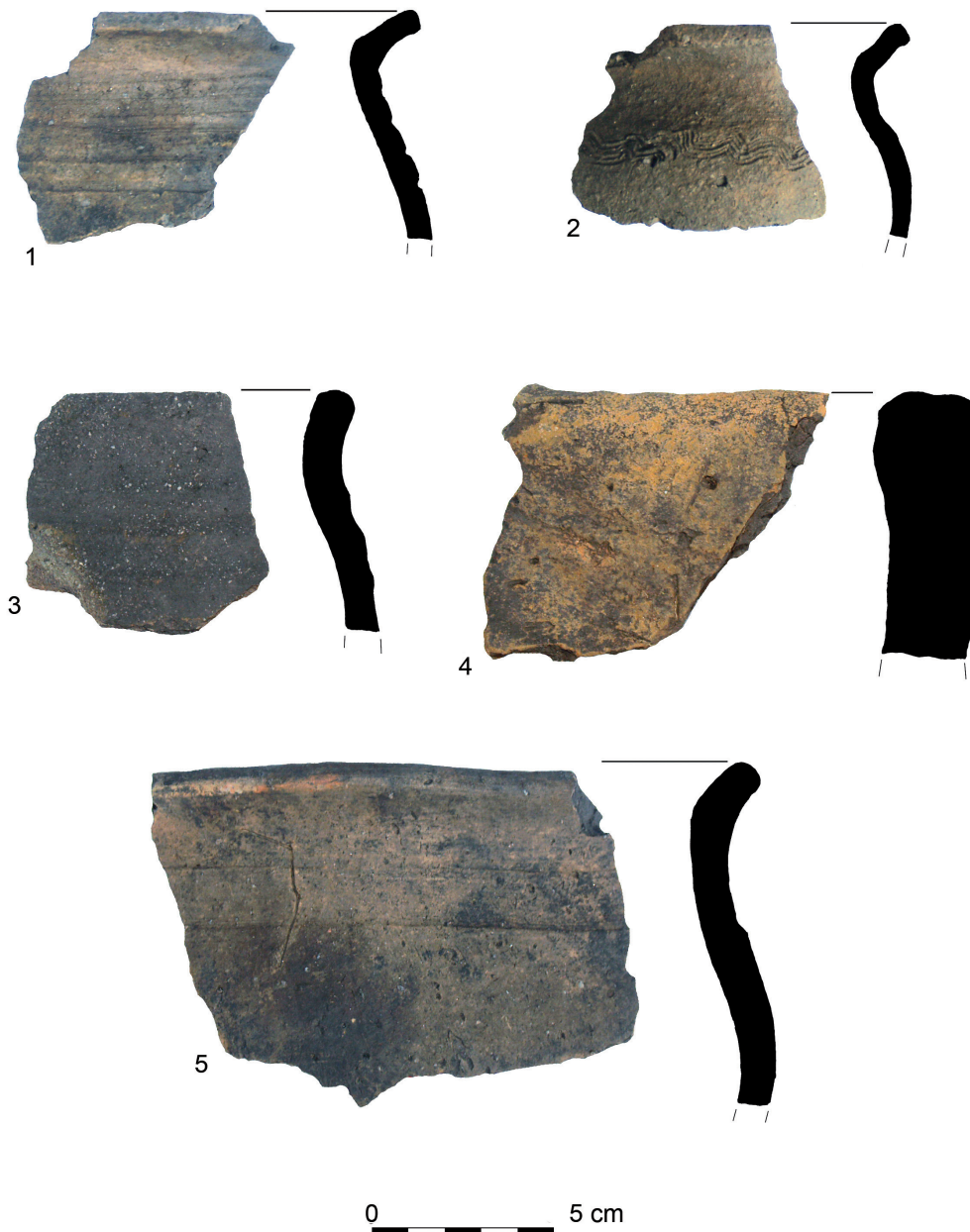


Fig. 4. Klenica, site 53. Potshards (1-3, 5) and side of a grain drying plate (4) discovered during a surface survey in 2016. Photo: S. Kałagate.

Following the survey, a total of 29 archaeological sites dating back to the Early Middle Ages were registered in both the 60-17 and the 61-17 areas of AZP, which were verified during excavations in 2016.⁴⁸

The surface survey carried out in 2016 resulted in the discovery of a settlement from Early Middle Ages which had not been known before (site 53). Moreover,

10 new sites dating back to the Stone Age (3), the Roman Iron Age (4), and prehistory in general (4) were also identified.

From the perspective of the research issues of the supporting settlements of the Klenica stronghold, the most vital discovery was to establish precisely the range of the settlement at site 4 known since the 1960s⁴⁹

⁴⁸ Gruszka et al. 2017.

⁴⁹ Gruszka 2016.

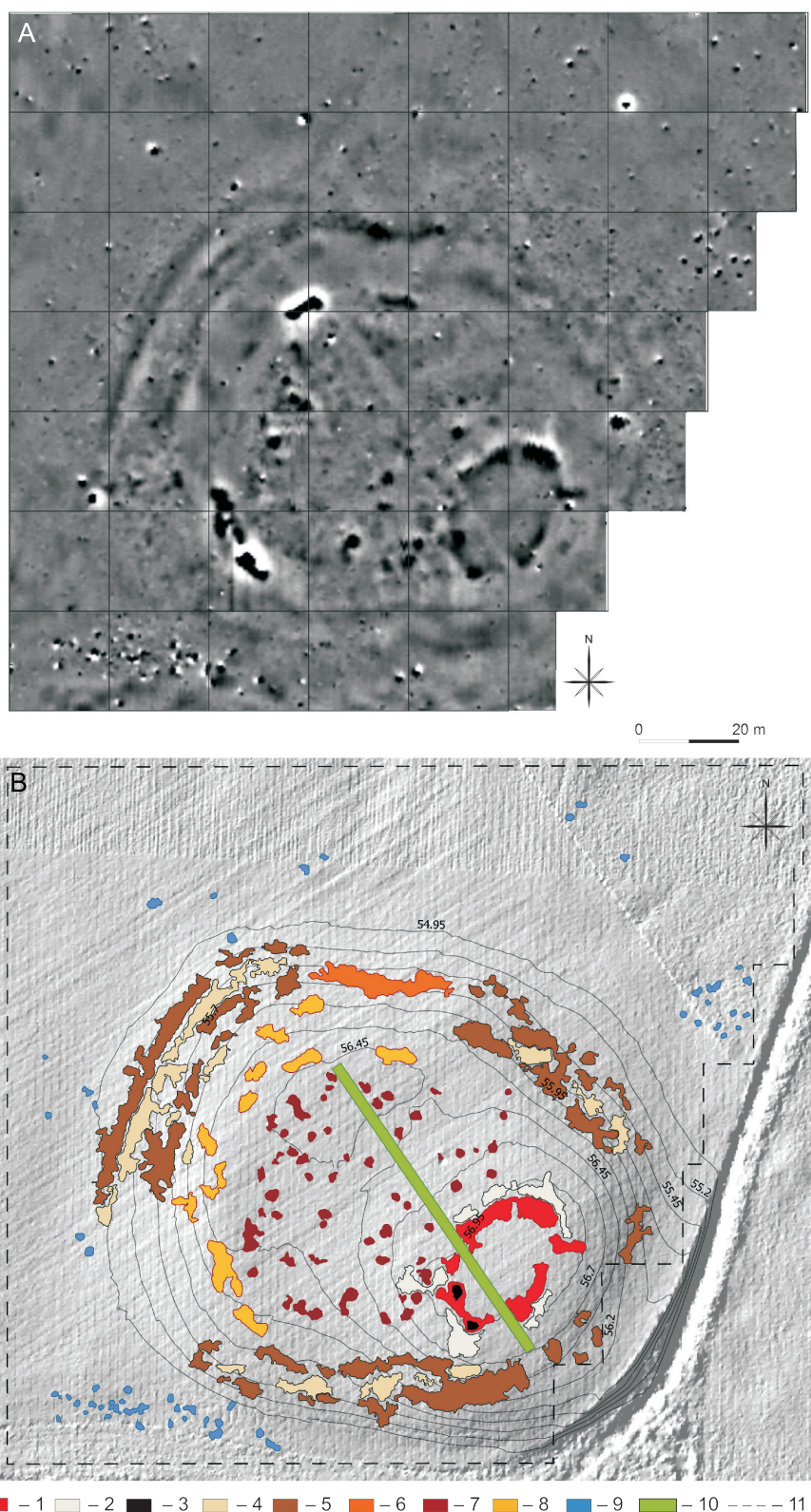


Fig. 5. Klenica, site 3. Geophysical image of examined area. A – gradiometer Bartington Grad 601-2, measurement grid 0.5×0.25 m, interpolated to 0.25×0.25 m, dynamics $-10/+10$ nT, white to black. By Ł. Pospieszny, B. Gruszka; B – digital terrain model of the surroundings of the settlement complex. Based on ALS/LiDAR data from project ISOK (IT system of the country's protection against extreme hazards). Graphic design: A. Łuczak, B. Gruszka. Key: 1 – anomaly outlining the location of several mounds (hearths/bonfires) creating an oval measuring c. 28×21 m in the south-eastern part of the stronghold; 2, 3 – other, strong dipole anomaly possibly relevant to the oval structure of the hearths/bonfires; 4, 5 – anomalies outlining the fortification ring (ramparts); 6 – anomaly measuring c. 15 m outlining the location of the gate (probably burnt); 7 – anomalies located in the central part of the stronghold which can indicate the location of relics of oval features of an unidentified function; 8 – anomalies possibly outlining relics of burnt structures adjoining the ramparts; 9 – anomalies with scrap and contemporary rubbish deposited in arable layer; 10 – anomaly outlining the location of former excavation trench made by Ernst Petersen in 1936; 11 – border of magnetic prospection range.



Fig. 6. Klenica, site 3. Aerial photograph of the stronghold taken in May 2018. Thanks to plant discriminants it is possible to discern (apart from relics of houses) ramparts and the gate, as well as traces of former excavation trenches made in 1936 and 2007 (with pointing arrows). Graphic design: B. Gruszka and A. Kieseler.

and the discovery of a further extensive settlement located directly east of the stronghold (site 53). The latter settlement is located in a presently cultivated field. During excavations 10 pieces of pottery and a part of a side of a grain drying plate (Fig. 4:4) dated to 9th-10th century were found. The shards include some of the characteristic Tornow type (4:1, 5) and some vessels of S-shaped profile (Fig. 4:2, 3). It cannot be excluded that site 53 is a continuation of the previously known site 4. The two sites are separated only by a wide modern melioration ditch.

Another major settlement (Klenica, site 2) is located over 1200 m east of the stronghold. No other major open settlements, which could be dated to the 9th-10th century, were registered further out.

It needs to be noted that the majority of the discovered early medieval open settlements are located east and north-east of the stronghold – no settlements have been registered to the north and west. The nearest cluster in that direction was located in the vicinity of Mieszkowo (c. 3 km north-west of the Klenica fortified settlement; Fig. 2). We do not believe this is the result of possible flaws of the applied surface survey method, but rather reflects historical reality: geomorphological research indicates that access to the stronghold was most convenient from the north-west, making this direction most vulnerable to attack. Access

from any other direction was hindered due to marshy ground. We believe it was for this reason that the massive (at least double) defence system of ramparts and moats, discovered during the geophysical survey, was constructed (Fig. 5). No similar double system of ramparts was registered in the remaining part of the enclosing ring of the stronghold.

Therefore, leaving the area north-west of the stronghold uninhabited was intentional, possibly designed to limit loss and raiding in case of a possible attack.

One goal of the 2016 investigations was to establish where the tract connecting the Klenica stronghold and the settlement at site 4 was precisely located. The results of geophysical survey and the analysis of aerial photography taken in May 2018 allowed us to establish the place where the gate of the fortified settlement was located (Fig. 5 and 6),⁵⁰ in the northern part of the stronghold. It is possible that it was from that location that the crossing towards other settlements led (sites 4 and 53). Based on the visualisation of the results of geophysical survey and the aerial photography taken in May 2018, in addition to the basis of plant discriminants, we can conclude that the transport route ran from

⁵⁰ Gruszka and Pospieszny 2017.

the fortified settlement gate northwards and then north-east towards the settlements. Hence it can be assumed that the magnetic anomalies which can be seen both in the geophysical images as well as aerial photographs are traces of a former tract joining both elements of the settlement. Considering the location of the gate and the type of terrain, such a transport route seems to be logical.

Stronghold

The central point of the settlement complex discussed here is the stronghold in Klenica, site 3 – one of the major early medieval fortified settlements in the area of the middle course of the Oder River. The outer diameter of the establishment measured up to 90 m, while the inner diameter was approximately 60-70 m. The results of dendrochronological dating allow us to conclude that the four-stage earth and wooden rampart had been constructed by 850 AD,⁵¹ in a traditional box and frame wooden structure. Stratigraphic analysis indicates that the fortifications were constructed directly on the ground and later were extended approximately every 15 years. (sub-stage 1a – late 860s; stage 2, probably late 870s), with the final extension (stage 3) dating just before the turn of the 9th century. The stronghold was burnt at the beginning of the 10th century and was not rebuilt afterwards, though there are traces indicating that the nearby open settlement (site 4) was inhabited at the end of the 10th and the beginning of the 11th century.⁵² Originally, a wide, muddy, and quite shallow ditch ran along the rampart of the stronghold but it was gradually built-up along with the extension of the fortifications; nevertheless, it is still clearly visible in aerial photographs in the form of cropmarks (Fig. 6 and 7). A major discovery is the location of the above-mentioned entrance gate to the fortified settlement, made on the basis of aerial photographs and the results of geophysical survey (Fig. 5 and 6), which allowed us to put forward a hypothesis regarding its appearance and construction.

Archaeological excavations allowed us to conclude that inside the stronghold the thickness of settlement layers ranges from 1.5 m (in the northern part) to 2.3 m (in the southern part). Considering that in the case of many Tornow-type strongholds the remains of structures and traces of economic activity of the inhabitants are concentrated along the inner ramparts, the fact that the remains of intensive use are scattered all over the area of the Klenica stronghold is a unique phenomenon.⁵³

Stratigraphic data obtained both during the pre-war period as well as data obtained in 2007 allows us to establish three stages of the spatial development of the

fortified settlement in Klenica. The first stage was spatially limited to the southern and central part of the stronghold. A multi-layer convex structure consisting of thin, alternate layers of charcoal, charred remains, and burnt clay levelled with a layer of sand (feature 15b) was discovered in trench I/1936. A similar feature, 15a, was discovered a bit further to the north-west. Petersen related those structures with the relics of the oldest rampart, a small stronghold, which was later extended to the west and north; however, this hypothesis was contested even before excavation works started in 2007. For this reason, a new trench parallel to the trench made by Petersen was excavated: to explain the function of these mysterious ‘mounds.’ Further parts of feature 15a, as well as a fragment of another feature (no. 4) were uncovered in trench III/2007. At the time archaeologists hypothesised they were relics of mounds of rubbish which were c. 3×4 m big and c. 1.25 m high which accompanied households (feature 4), or relics of hearths which were used repeatedly (feature 15a/2/7d). One of the arguments supporting the thesis that they were rubbish heaps were finds uncovered inside the ‘mounds’: numerous shards, pieces of grain drying plates, and animal bones. Their arrangement in rows, equal spacing of 1.5-2 m would indicate a regular built-up plan of the southern part of the stronghold during the first stage; therefore, Petersen’s hypothesis was disproved.⁵⁴

In the central part of the fortified settlement there were isolated postholes. However, it is difficult to associate them with any specific structure.

In the second stage of the stronghold, its area was levelled and covered with a thick layer of sand, *inter alia*, in places of convexities from the first stage. Associated with this stage are relics of wattle and daub structures, the remains of which were uncovered in trenches I/1936 and III/2007.⁵⁵ Wattle and daub houses were built in equal rows and at equal spaces of 1.5-2 m. The last stage in the fortified settlement’s development is associated with scattered hearths and tub-shaped features, while in the upper strata there is evidence of the fire which destroyed the Klenica stronghold.⁵⁶

Results of a magnetometry survey connected with the reinterpretation of the results of archaeological excavations allow us to put forward yet another research question concerning the function of the features interpreted as relics of the internal rampart by Petersen and as heaps of rubbish left by the inhabitants of houses identified nearby by Biermann and his team (feature 4, 15a/2/7d, 15b).

⁵¹ Kieseler 2016, 254.

⁵² Kieseler 2016, 243-258.

⁵³ Kieseler 2016, 269.

⁵⁴ Kieseler 2016, 263-273, Fig. 41.

⁵⁵ Kieseler 2016, 265-268.

⁵⁶ Kieseler 2016, 252, Fig. 30, supplement 1 A, B.



Fig. 7. The Klenica stronghold (site 3) and the supporting settlement (site 4) with clearly visible relics of structures (thanks to plant discriminants). Aerial photographs taken from north-eastern (top) and western (bottom) sides. In the top picture, in the top left-hand side corner the present streambed of the Oder River is visible. Photo: B. Gruszka.

Although today it is not possible to fit the trench made by Petersen precisely into the geophysical image, considering that the error margin is 1-2 m, the features are within the outline of the oval anomaly measuring 28×21 m, which was registered in the southern part of the stronghold (Fig. 5). The anomaly seems to be a uniform structure cut through only in its north-western and south-eastern part by the trench made by Petersen in 1936 and by trench III/2007. It consists of several (possibly 20) mounds, probably the remains of hearths/bonfires which were used repeatedly, the structures of which are identical to feature 15a/2/7d. It is also possible that the whole anomaly subject to these considerations, just as features 15a/2/7d (Fig. 8) and 15b encircled by its outline, and the cultural layout relevant to it (15) could be associated with the oldest stage of the stronghold. However, it cannot be stated beyond a doubt whether the hearths (together with the cultural

layer) were created before or after the first fortifications were constructed. Layer 15 appears in the southern part of the stronghold at the bottom of the inner part of the ramparts and is covered partly by a layer of charred rubble of burnt wooden parts of walls.⁵⁷

Accepting the hypothesis that the oval anomaly consists of several 'mounds' which are the relics of bonfires which were made repeatedly, it is difficult to find an analogy among other early medieval sites in the territory inhabited by West Slavs.⁵⁸ Regarding the inventory of finds excavated in the mounds, it was not any different from the inventory uncovered in the remaining part of the stronghold. A total of 900 pottery shards and some minor finds (a few awls, a spindle support, an iron knife, two whetstones, and a flat-surfaced stone which could

⁵⁷ Kieseler 2016, 260, supplement 1 A, B; supplement 3 A1, B1.

⁵⁸ Gruszka et al. 2020.



Fig. 8. Klenica, site 3. One of the mounds (hearths) 2/7d (feature 15a from 1936 cont.) with visible neighbouring layers 7 and 8. Trench III/2007. Photo: F. Biermann.

be interpreted as a masher) were found in feature 15, excavated in 1936 and 2007.⁵⁹ However, quite unusual and mysterious is the oval layout of hearths, which could be interpreted as intentional, aimed to protect some outlined space, possibly associated with offering a sacrifice. It also should be mentioned that over 3600 pieces of bone remains (mostly cattle and pig) were discovered in the two oldest layers in the area of the mounds of about 30 sq. m,⁶⁰ and three human bones were uncovered in the oldest cultural layers (7 and 8) in the area of mound 15a/2/7d (Fig. 8). One of the bones displays a fracture, though we were unable to determine whether it was sustained pre- or post-mortem.⁶¹ Pieces of two clay cups were also excavated in the oldest layer (8) – it is possible that these rare artefacts were used during feasts, as their finds in early medieval contexts is associated with the presence of political and social elites.⁶² In addition, under the oldest part of the rampart, in the southern part of the stronghold archaeologists discovered a part of the calvarium of a young woman. This unique find should be considered in the category of an offering to scare off demons.⁶³ Considering the lack of human remains inside the mounds themselves, however, they cannot be interpreted as remains of barrows (known, e.g., from the Ryczyn stronghold).⁶⁴

⁵⁹ Kieseler 2016, 334, 338.

⁶⁰ Benecke 2016, 487, Fig. 1.

⁶¹ Gruszka et al. 2020.

⁶² Dąbrowski 1999, 250; Gruszka 2012, 76-77.

⁶³ Biermann et al. 2008, 79, 89, Figs. 9 and 11; Kieseler 2016, 258-259, Fig. 32.

⁶⁴ Moździoch and Przysiężna-Pizarska 2008, 239-241, Figs. 5 and 9.

Another possible interpretation of the function of the features discussed here can be put forward as a result of archaeological excavations and geophysical surveys:⁶⁵ it is possible that the space they outlined was used for holding ritual feasts during which animal offerings were made at the hearths/bonfires, combined with feasts during which drinks were drunk out of clay cups.⁶⁶ It is possible that human offerings were also made, although it cannot be proven that the isolated fragments of human bones discovered near the mounds were related to the alleged rituals.⁶⁷ In any case, however, a verification of this thesis would need detailed excavations of both mounds as well as the area they outlined.

The analysis of ceramics carried out by A. Kieseler shows that vessels discovered during excavations in 1936 and in 2007 are technologically unified. Almost all sherds were from vessels turned from the top. The collection is dominated by undecorated pieces, which make up over 60% of the collection excavated in 1936 and over 70% of the shards excavated in 2007. The vessels decorated with ornamental ribs which make up over 25% of the potshards excavated in 1936 and about 15% of the potshard excavated in 2007; those decorated with a variety of various deeply engraved ornaments of parallel grooves and ridges make up over 10% of the potshards excavated in 1936

⁶⁵ Cf. Gruszka et al. 2020, 157.

⁶⁶ Labuda 1954, 233; Gruszka et al. 2020, 166.

⁶⁷ Biermann 2017, 107-108.

and about 13% of the potshards excavated in 2007.⁶⁸ With regard to their shapes, the shards are dominated by fine-rounded bodies that are more or less clearly outlined. Shards displaying the biconical, angular design characteristic of the Tornow type (common at the Zawada settlement, site 2, and the Nowiniec stronghold, site 2) are rare; in contrast, the characteristic feature of vessels excavated at the Klenica stronghold (unusual at sites located further west and north which date to that period) are potshards with clearly distinct necks decorated with sculptural elements. This feature makes the pottery similar to the Dalków-Obra group of pottery on the border of furthest north-western territory of the Lower Silesia and southern territory of the Greater Poland, in the Dalków Hills.⁶⁹

Other potshards include plates (265 pieces), pieces of grain drying plates (114 pieces), and the two pieces of cups mentioned above. Other finds belong to groups of objects made by the inhabitants of the stronghold for household use, such as awls, whetstones, objects made of bone or antlers, including spikes, hilt covers, or skates. Metal objects include primarily iron knives, but a fragment of a semi-scythe and two fragments of fire strikers were also found. A small, flat, oval-shaped glass artefact is a unique find; it is possibly a game piece made in the millefiori technique of Middle East origin which arrived in the Klenica stronghold probably via centres on the southern Baltic coast.⁷⁰ It is likely that this particular artefact is from the Roman Iron Age.

Most finds were probably produced *in situ* and used as a part of daily activities done by the inhabitants of the fortified settlement. Only some artefacts, such as the glass game piece, could indicate some limited trans-regional contacts.

Conclusions

Both current and past studies give some insight into the relationship between the stronghold and the open settlements characteristic of Tornow-Klenica settlement complexes. In most such complexes known to us, as large open settlements were established in the immediate vicinity of a fortified settlement, immediately next to the ramparts of the stronghold, e.g., in the case of the strongholds at Tornow, Bruszczevo, or Sławie.

As Andreas Kieseler noted, the Klenica stronghold was probably a home to a small tribal elite which developed from older settlement structures, the origins of which date back to older stages of the Early Middle Ages.⁷¹ It is possible that the position of the local elite was strengthened by taking over and ruling a local centre of worship which was in place probably as early as at the end of the 1st half of the 9th century (the oval structure of big hearths/bonfires discovered in the course of geophysical survey). Further extensions of the fortified settlement and traces of intensive occupation inside the stronghold would indicate its importance among the local community. The fall of the centre came suddenly, as shown in the layers of charred rubble that can be seen in the youngest settlement stratum and burnt wooden defence structures. What caused the stronghold and the neighbouring open settlements to fall? Although we can't know for certain whether the settlement complex fell as a result of internal conflict between competing local leaders (chiefs) or the expansion of the Piast state, the disappearance of 11th century settlements is characteristic of the whole territory on the middle course of the Oder River:⁷² after the fire, the fortified settlement in Klenica was not rebuilt. Fragments of younger shards indicate possible occupation of the area at the beginning of the 11th century by a new wave of settlers.⁷³

Future studies on the Klenica settlement complex should concentrate on searching for further elements of the settlement network by using aerial photography. Geophysical survey, in particular magnetometry survey, would need to be carried out in selected open settlements, including the completion of prospection in site 4 as well as carrying out works at sites 53 and 2 and covering the area of the stronghold with electrical resistance survey.

Regarding archaeological excavations it would be of great importance to carry out archaeological excavations and a specialised analysis of another mound (hearth) which is a part of the oval structure registered in the course of the magnetometry survey. It is possible that such studies would provide an unambiguous answer to the questions regarding the functions and the chronology of the settlement complex discussed in this paper.

⁶⁸ Kieseler 2016, 273-289.

⁶⁹ Rzeźnik 2006, 181; Siemianowska 2010.

⁷⁰ Kieseler 2016, 302, Fig. 55.

⁷¹ Kieseler 2016, 304-306.

⁷² Gruszka 2021, 57-61, Fig. 52.

⁷³ Gruszka 2010, 141.

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