

# Czermno / Cherven': seasons 2022 and 2023. Interdisciplinary studies on site 2 Zameczek (hillfort suburb settlement). Chronology, archaeological features, finds analysis

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## **CZERMNO / CHERVEN': SEASONS 2022 AND 2023. INTERDISCIPLINARY STUDIES ON SITE 2, ZAMECZEK (STRONGHOLD, SUBURB SETTLEMENT): CHRONOLOGY, ARCHAEOLOGICAL FEATURES, FINDS ANALYSIS**

### **ABSTRACT**

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The article discusses the results of the latest interdisciplinary studies on Site 2, 'Zameczek', a stronghold complex in Czermno (historical Cherven'). The fieldwork completed in 2022-2023 focused on Site 2 and included non-invasive investigations (GPR and LiDAR prospection), sondage excavation, laboratory analysis and conservation of archaeological finds, absolute dating, and desktop studies. The research objectives and questions formulated when embarking on the investigation of the suburb settlement addressed key issues related to its chronology and function. Another key task was recognising and recording the site's stratigraphy. The two seasons of sondage excavations yielded thirty-eight functionally distinct features interpreted as utility pits, remains of upright timbers, remnants of wooden communication structures, fragments of a rampart (?) and an eco-feature. The excavation of archaeological deposits and features belonging to Phases I and II yielded an assemblage of more than 37,000 objects, most of them pottery.

**Keywords:** Polish-Rus' borderland; Czermno/Cherven'; Site 2, stronghold suburb settlement; interdisciplinary research, chronology, archaeological features, fortification

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## INTRODUCTION

For obvious reasons, research on the origins of Poland has long been dominated (and still is) by the study of Greater Poland, the region known as the cradle of the Polish nation and the domain of the Piast dynasty, the first ruling family (Kara 2020). Additionally, the focus of research was on the areas subjected to Piast expansion: the historical provinces of Pomerania, Silesia, Lesser Poland, and Masovia (synthetic studies: Buko 2021; see most recently: Urbańczyk 2024). Much less well recognised is the eastern periphery of Piast Poland, the region on the border between the Piast and Rurikid monarchies. Unfortunately, the same is true of the situation across the border, in Belarus', Ukraine and Russia, where the primary focus of archaeology has been, and continues to be, the study of Kyiv, Novgorod, the presence of the Vikings in Eastern Europe, and the role played by the Byzantine Empire and steppe nomads in the emergence of Rus'. The western periphery of the Rurikid realm has been studied much less extensively.

However, this region, which serves as a meeting point of two distinct religions, cultures, and civilisations on the periphery of Latin Europe and the Byzantine Commonwealth, definitely deserves special attention (*cf.*, Parczewski and Czopek eds 1996; Janeczek, 2011; Salamon *et al.* eds 2012). One of the major centres of the early medieval Polish-Rus' borderland was Cherven' (first written reference under the year in 981 [6489]; *cf.*, PVL, 95), a fortified town now identified by archaeologists with the settlement complex in Czeremno (for literary evidence see Jusupović 2017). According to the Rus' chronicles, Cherven' was one of the Cherven' Towns, a name given to a borderland region mentioned in the Primary

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Chronicle under the year dates of 1018 [6489] and 1031 [6539] (PVL, 132 and 136). Although the term itself is probably the result of an error of a medieval copyist, the name Cherven' Towns has established itself in the historiography of Poland and Ukraine as a 'lieu de mémoire', a region of special significance related to the remembrance of these nations: in fact, in school textbooks written in Warsaw and in Kyiv the history of the relations between Poland and Ukraine starts with the reference to the Cherven' Towns. The discussion about the location, chronology, function and importance of the Cherven' Towns (and of the stronghold Cherven' too) has continued for more than 250 years (Błachowska 2017), and



**Fig. 1.** The settlement complex in Czermno. Aerial photograph of the stronghold (1) and stronghold suburb settlement (2, 3); Digital Elevation Model (DEM) and 3D models.  
Photo M. Czarnecki, graphic design M. Jakubczak

their study has been of significant interest both for the research community and the general public (*cf.* Bagińska and Wołoszyn 2022).

For more than a decade, the site in Czerwno/Cherven' has been investigated a team of researchers from the Institute of Archaeology of the Marie Curie-Skłodowska University and of the University of Rzeszów in cooperation with several other centres in Poland (Institute of Archaeology and Ethnology of the Polish Academy of Sciences) and the Leibniz Institute for the History and Culture of Eastern Europe (GWZO) in Leipzig (Germany). An important element of this activity is fieldwork aimed at establishing the chronology of the stronghold rampart (*cf.*, Dzieńkowski *et al.* 2020) and at determining the environmental conditions for the development of the settlement complex (Dobrowolski *et al.* 2018). Moreover, the excavations are a race against time and the destruction of the site, the effects of both natural and anthropogenic factors, the latter including the steady destruction of the stronghold by metal detectorists.

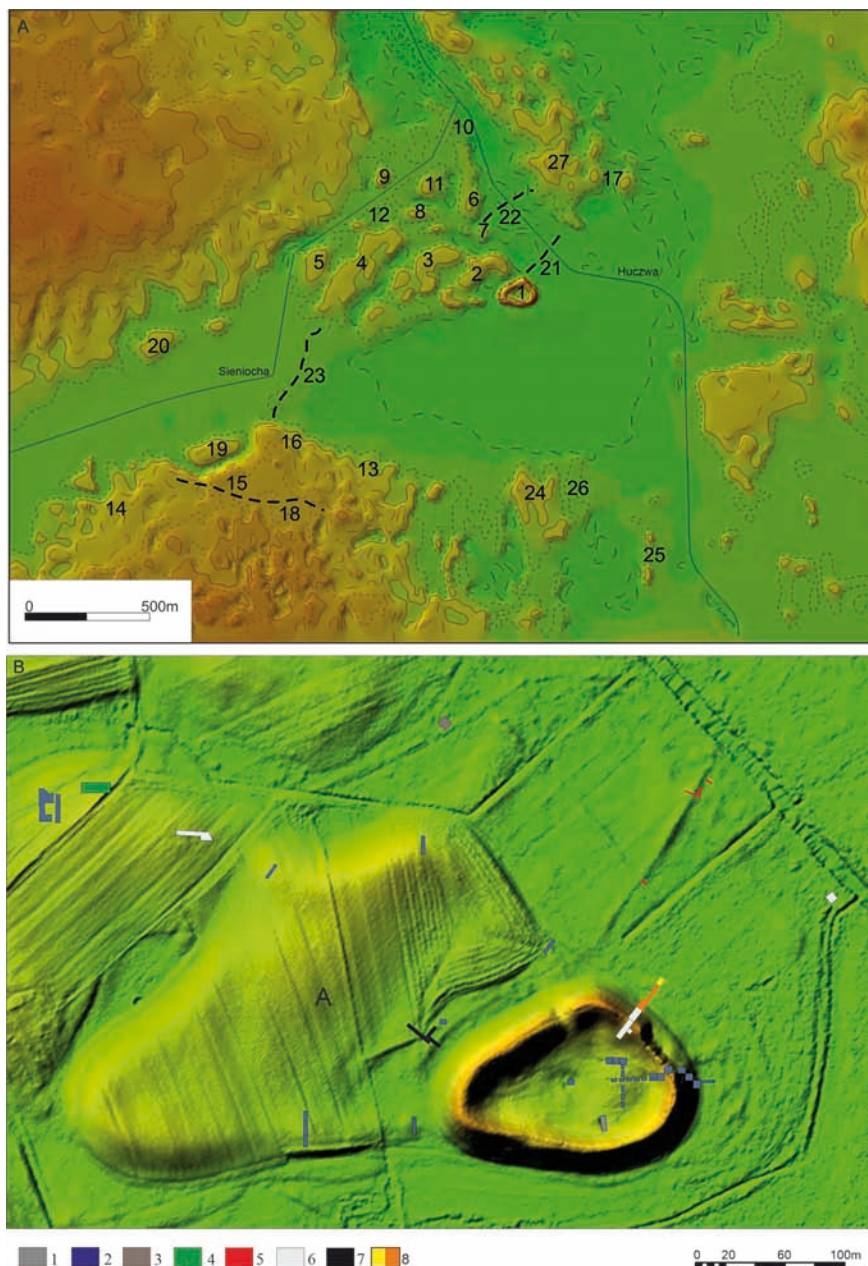
The fieldwork completed in 2022-2023, focused on Site 2 in Czerwno (the suburb settlement of the Czerwno stronghold), and took the form of non-invasive investigations (GPR – Ground-Penetrating Radar, and LiDAR prospection), sondage excavation, laboratory analysis and conservation of archaeological finds, absolute dating and desktop studies (Fig. 1).

## PAST AND CURRENT STUDIES

Located at the marshy confluence of the Sieniocha and Huczwa Rivers, the early medieval settlement complex in Czerwno comprised a stronghold and several settlements and cemeteries, connected by a network of causeways. Based on data from the nationwide fieldwalking project (AZP), the settlement complex could have occupied an area of up to 150 ha (Jażdżewski 1959; Sadowski 2008; Dzieńkowski and Sadowski 2016). This is suggested by archaeological material datable to the 10th-13th centuries recovered from more than 30 sites identified around the stronghold, with additional sites found at distances of 3-4 km from the stronghold (see Fig. 2: A; Dzieńkowski and Sadowski 2016).

Archaeological excavations, non-invasive projects and paleoenvironmental studies had been carried out over several seasons between 1952 and 2024 following upon a small-scale sondage excavation project carried out during World War II (1940) followed by further work after this: 1952, 1974-1976, 1979, 1981, 1985, 1997, 2010-2015, 2022-2023, 2024 (see Fig. 2: B; Poleski 2004; 2013; Florek 2016a, 2016b; Wołoszyn 2016). Investigations had focused on the site of the stronghold (Site 1), settlements in its hinterland (Czerwno, Sites 2, 3, 6, 63, 68, 70; Wronowice, Site 1), and on the rampart enclosing the complex on its west side (Czerwno, Site 66) (Florek 2016a; 2016b; Dzieńkowski *et al.* 2020, 418-423). The excavation and non-invasive fieldwork were carried out by different research teams and mostly took the form of sondages, except for larger-scale excavations conducted in the stronghold. Despite many seasons of investigation, the knowledge gained about the strong-





**Fig. 2.** Czermno: A – early medieval Sites 1-27 identified during the national fieldwalking survey (AZP) and archaeological excavations (1 – stronghold, 2 – suburb settlement *Zameczek*, 3 – further suburb settlement, 4-27 – others); B – location of archaeological trenches excavated between 1952 and 2024 (1 – 1952, 2 – 1976-1979, 3 – 1985, 4 – 1997, 5 – 2012-2015, 6 – 2013-2016, 7 – 2022-2023, 8 – 2023-2024; A – suburb settlement *Zameczek*). Graphic design T. Dzieńkowski, DEM P. Zagórski

hold and settlements in its catchment remains relatively modest, given the size of the complex and the quantity of recovered archaeological material. The results of past fieldwork were published only in 2016 based on the surviving documentation and MA dissertations (*cf.*, Florek and Wołoszyn eds 2016). The case of the results of current investigations is different – these are already in scholarly circulation (Piotrowski and Wołoszyn 2012; Wołoszyn *et al.* 2016; 2018; Musin and Wołoszyn eds 2017; Dzieńkowski *et al.* 2020; Wołoszyn ed. 2022; 2023; 2024). When made available, the findings from past research served as input for interdisciplinary studies of selected categories of archaeological objects, *e.g.*, glass and lead artefacts (Wajda *et al.* 2024; Merkel *et al.* 2024, respectively), Byzantine amphorae (Korokhina *et al.* 2024).

Described variously as a ‘suburb settlement’ or as the ‘Wały’ or ‘Zameczek’ settlement, Site 2 has a dating of 10th–13th centuries and occupies a 5-hectare elevated landform (flood terrace) within the valley of the Huczwa at its confluence with its minor tributary the Sieniocha, now with an altered channel (Figs 1 and 2; Janeczek 2016; Dobrowolski *et al.* 2018). In the research literature, Site 2 has been interpreted as a walled-in suburb of the stronghold, organised adjacent to it and associated with the stronghold in both functional and chronological terms (Jażdżewski 1959; Gurba 1988, 303–305). This term will be used in our article.

The suburb of Czermino was investigated for the first time in 1940 by the Ukrainian archaeologist Levko Chikalenko, with the permission of the German occupying authorities. A single trench was excavated at Site 2, the location of which is unknown at present, which yielded a large assemblage of finds (Chikalenko 1998; Wołoszyn 2016). Subsequent excavations were launched by Andrzej Kutyłowski in 1972. They were continued in 1976 and 1979 (Florek 2016a; 2016b). A fragment of a timber causeway connecting the suburb with settlements in the Huczwa valley was investigated in 1985. In 1997, timber samples for dendrochronological dating were obtained from the zone of contact between the suburb and the stronghold; the results of this project “startled” the medieval studies community in Poland because they established the earliest possible date of the settlement complex as mid-11th century (*cf.*, Urbański 2000; Kowalczyk 2000; Wołoszyn 2013; Dzieńkowski *et al.* 2020, 428, 429).

Approximately 100 m<sup>2</sup> of the suburb had been investigated over three seasons (1972, 1976 and 1979). However, their results were compromised by several issues, including a lack of comprehensive documentation, an uncertain trench location, and failure to excavate through to the natural soil. Furthermore, an analysis made by Marek Florek of site reports and MA dissertations (2016a; 2016b) revealed several flawed interpretations. Although the conclusions of this research are still being verified, it is worth recalling the key findings. Between 1976 and 1979, twelve trenches of different sizes and shapes were excavated (IIA–IIF; Fig. 2: B). Trenches IIA, IID and IIF had been laid out in an area of lower-lying ground between the suburb and the stronghold. Each of them revealed preserved timber structures interpreted as remains of a causeway or a timber road (IIA, IID), a suburb

rampart (IIB, IIC, IIF) and a stronghold rampart (IID). In each trench, two or three stratigraphic levels were distinguished, indicating a dynamic, yet long-term, occupation.

After a nearly three-decade pause, the investigation into the suburb was resumed. In 2010–2012, more than 3,000 archaeological finds were collected by fieldwalking from the surface of Site 2 and located in 3D; they are currently undergoing analysis (*cf.*, Florkiewicz *et al.* 2020; Wołoszyn ed. 2022; 2023; 2024). Their large concentration was an additional argument in support of intensive occupation and its diverse nature, documenting several different economic activities – agriculture (querns), crafts (the working of antler and bone, pottery), commerce (lead seals, weights, plates of weighing scales), and others, associated with lifestyle – *e.g.*, jewellery (bangles, finger rings), religion (icons, cross pendants), warfare – weapons, equestrian gear (*cf.*, Piotrowski *et al.* 2011; Wołoszyn ed. 2022; 2023; 2024).

In 2013 and 2014, a non-invasive study was conducted on the suburb settlement using fluxgate magnetometers as part of a large project funded by the National Programme for the Development of Humanities (Florek and Wołoszyn eds 2016). The magnetometry survey recorded a series of anomalies, indicating the presence of archaeological features – pits and dwellings (Pospieszny 2016), and in the N and W area of the site, a feature identified tentatively as a fragment of the rampart; its nature remains open as no follow-up excavations were made to confirm this interpretation. On the other hand, paleoenvironmental studies documented large-scale earth-moving, levelling and hydrotechnical activity aimed at altering the course of ditches and moats to drain off surface waters and improve defensibility (Dobrowolski *et al.* 2018, 258–273).

In 2022 and 2023, a study was conducted of the northern moat of the stronghold and the earth bank at Czermno Site 66 (Fig. 2: B; Wołoszyn *et al.* 2024). In 2024, fieldwork on the stronghold's eastern fortifications continued.

The findings from the investigation of the suburb settlement may be summarized as follows: 1) in its contour, the suburb followed the shape of the local elevated landform (terrace), roughly 5 ha in area, 2) apparently, the settlement was enclosed by a circumferential (?) earth-and-timber rampart, 3) outside and inside the suburb there were, respectively, causeways and timber tracks, 4) evidence was found of large-scale earth-moving, levelling and hydrotechnical projects, 5) two to three occupation levels were identified, establishing the dating of the site to between the 10th and 13th centuries. These data served as a point of departure for the research completed in seasons 2022 and 2023.

## ARCHAEOLOGICAL FIELDWORK, SEASON 2022 AND 2023

The research objectives and questions formulated when embarking on the investigation of the suburb settlement addressed key issues related to its chronology (the date of its construction and later development) and function (open settlement in the hinterland of the stronghold, or fortified suburb settlement, possibly a tribal stronghold; Poleski 2013).



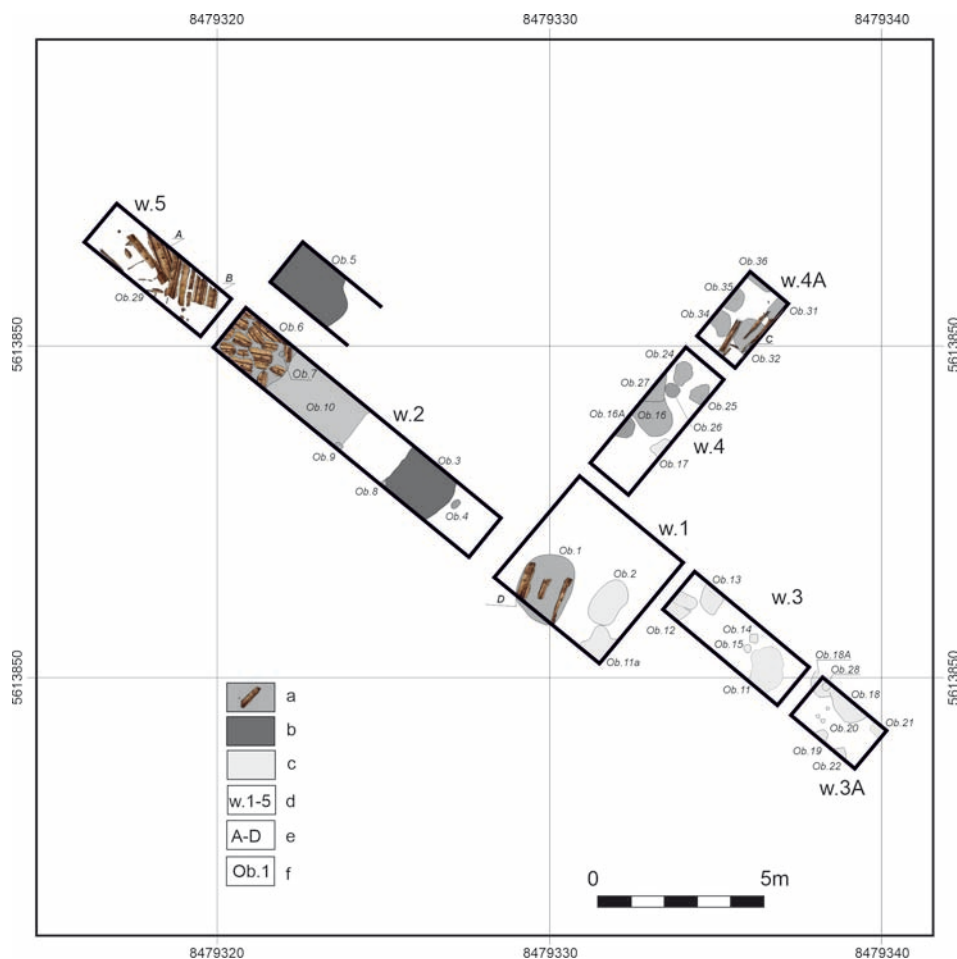
Another key task was to determine and document the site's stratigraphy. Other than that, there was a need to investigate the character of the buildings inside the settlement and its spatial organisation. Also in need of clarification was the construction design and layout of the fortifications. The decision was taken to investigate the zone between the suburb and the stronghold as the most promising. Additionally, this waterlogged, low-lying area was expected to produce well-preserved timber remains useful for dating. Complementary to the sondage excavation, the site surface was investigated using non-intrusive methods, *e.g.*, geophysical prospection (Ground-Penetrating Radar), aerial photography, and DEM (digital elevation model) analysis. The latter activities helped to recognise the broader context of the settlement, identify previously unknown archaeological features, and record the effects of erosion on the site.

### Sondage excavation

Sondage trenches (Nos. 1-5), jointly covering an area of 60 m<sup>2</sup>, measuring respectively 4 × 4 m, 11 × 1.5 m, 1.5 × 5 m, 1.5 × 3 m (Figs 2 and 3), were laid out in the south-eastern zone of the suburb. Aligned NW-SE, they uncovered 38 archaeological features, including the remains of a timber road inside the settlement (Nos. A and B), a causeway/road (?; Nos. C and D; *cf.* Fig where these features were marked distinctly), utility pits (19), the remains of a rampart (?), fragments of upright timbers (13), and an eco-feature – a hollow filled with peat (Feature 6). The assemblage of excavated finds comprised more than 37,000 objects, including a large group of special finds. The four trenches exposed a complex stratigraphy comprising two occupation levels, for which absolute dates were obtained using dendrochronology (2), thermoluminescence (3), and radiocarbon (10).

The largest group of archaeological features (17) consisted of oval pits with usable areas ranging from 0.7 to 1.5 m (17). Their fill, mainly of a few layers, contained animal remains and fragments of pottery vessels. The original function of these pits is hard to determine. Based on their plan, size, and contents, they were broadly classified as utility pits used for storage or waste disposal. Three features (Nos. 1, 5, and 10) apparently had more complex functions. Pits 1 and 5 had a fill of several layers marked by fire and contained finds (metal) suggesting production activity. Feature 10, approximately 3 m in width, with an evidently levelled area of ground underneath, contained the remains of a structure of vertical posts (Features 8 and 9) and was interpreted as a rampart (?). The features were too damaged to allow for a more in-depth analysis. On the other hand, none of them can be identified as dwellings.

In all of the trenches, archaeologists found the remains (ends) of wooden stakes and postholes. In diameter, the latter ranged from 15 to 35 cm and were dug at different depths (15-30 cm). The arrangement of the posts was apparently irregular, although some could have accompanied features (Nos. 3 and 10, and 11 and 28 *e.g.*, as elements of some sort of roofing.



**Fig. 3.** Czermno, Site 2. Location of trenches excavated in 2022-2023:

a – Phase I, b – Phase II, c – early medieval feature, d – trench, e – timber remains; f – features (ob. 1-36).  
Graphic design T. Dzieńkowski and

Timber structures interpreted as remains of a track (A), footbridge (B) and causeway/road (C, D) were recognised at some locations (Figs 4 and 5). Rough planks resting on a wooden substructure found inside Trench 5 were interpreted as a track – an inner road of the settlement (A) running NE-SW. The surviving width of the ‘roadway’ was 1.8-2 m. The planks rested over a waterlogged layer of loam, peat and brushwood. Unfortunately, the wood was too decomposed for dendrochronological dating, but it nevertheless yielded two radiocarbon dates. The following structure was a timber footbridge (B) laid over a natural peat-filled hollow (Feature 6). Three rough pinewood planks, aligned E-W, also yielded  $^{14}\text{C}$  dates. Timbers identified as the remains of a road (or a causeway, Nos. C and D) were recorded inside Trenches 1 and 4A. Both trenches produced fragments of horizontal timbers

(most likely sleeper beams) aligned NE-SW. The planks from the upper part of this structure did not survive. The beam from Trench 4A yielded a dendrochronological date.

The stratigraphy of the site was established by analysing the sequence of layers and features, their relationships, and differences in structure and content (Figs 3-5). The results of this analysis suggest the presence of two occupational phases; their chronology was determined using absolute dating. The trenches contained 77 stratigraphic units corresponding to short-lived activities (single-episode backfills) and to deposits formed by prolonged processes associated with intensive use. The two groups of stratigraphic units had been subject to the destructive effect of post-depositional factors, both natural and anthropogenic. The last element of the site's stratigraphy is 38 archaeological features – pits and structures; the wealth of the recovered archaeological finds documents the heavy occupation of the site. Also recorded during the fieldwork were the remains of environmental processes, *e.g.*, eco-features (natural peat-filled hollows), wet ground, and peat deposits within man-made features such as the ditch. Considerable damage was observed, as evidenced by archaeological objects affected by erosion and the transport of earth masses, especially during Phase II of the occupation. The complex stratigraphy of the site, as recorded inside Trenches 1, 2, 4, 4A, and 5, is illustrated in Figure 5.

Phase I is represented by archaeological deposits, features, and roads/footbridge (A-B) dug into or resting over the natural layer (sandy loam characteristic of valley deposits). The stratigraphic sequence ends with horizontal timbers belonging to structures C and D, which have a later stratigraphic position within the occupation layer (Phase Ib [?]). At the present stage of the investigation, this situation appears to reflect a rapid change in occupation



Fig. 4. Czermno, Site 2. Timber roads in Trench 5: 1 – track, 2 – ‘footbridge’ over eco-feature filled with peat (Phase I), 3 – levelling layer; 4 – occupation layer in Phase II. Photo T. Dzieńkowski

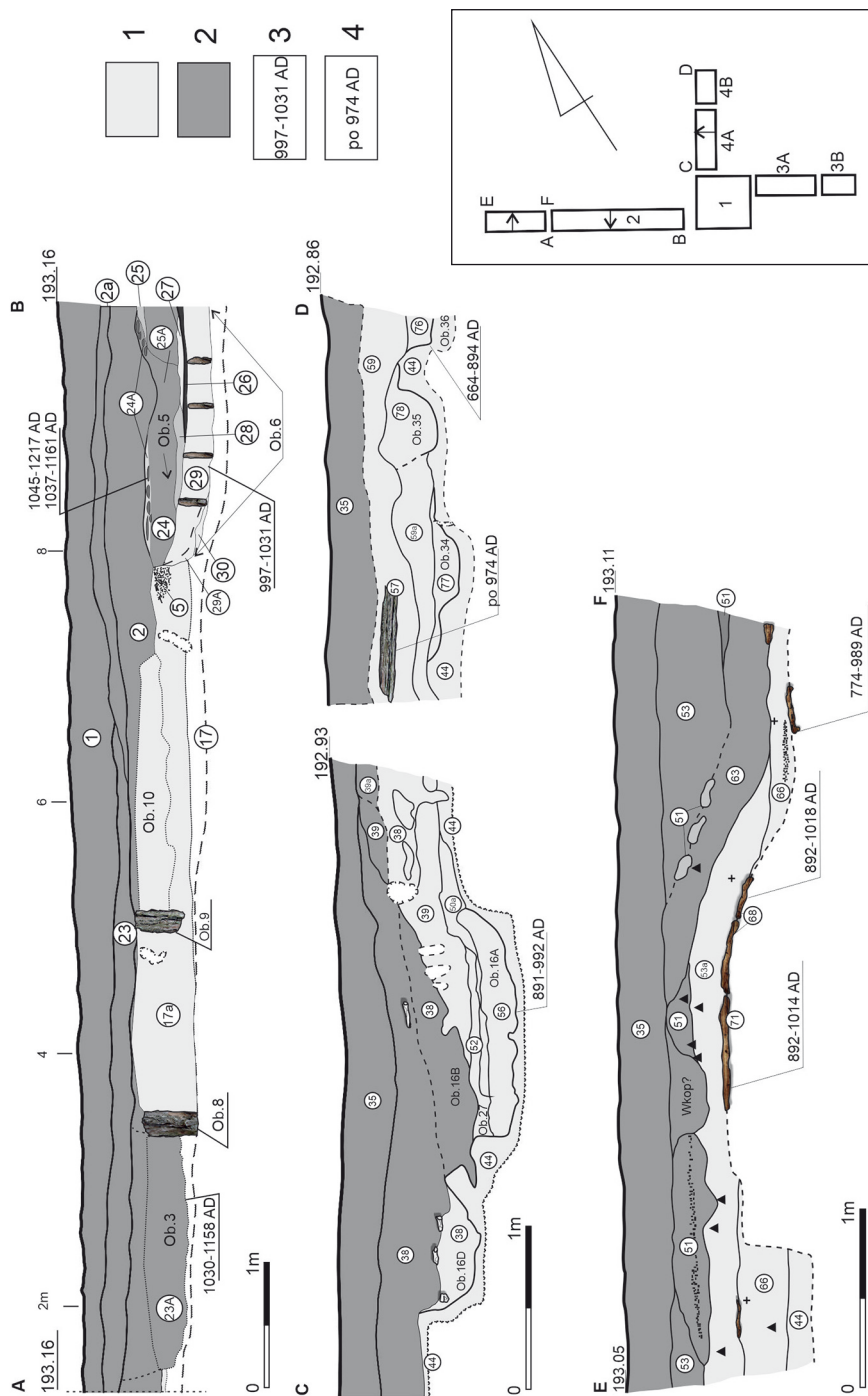


Fig. 5. Czermno, Site 2. Stratigraphy in Trenches 2, 4, 5 with absolute dates: 1 – Phase I, 2 – Phase II, 3 – radiocarbon dates, 4 – dendrochronology dates (Ob. – obiekt [feature], wkop – dig). Graphic design T. Dzińkowski

within a single phase (I). These questions require further clarification through research and dating.

These remains document the occupation of this part of the site, and its use for economic activity – crafts, storage or production. Radiocarbon dates were obtained for seven samples of charcoal and wood recovered from Feature (1 sample), structures A-C (3), the peat-filled hollow Feature 6 (1 sample), Features 16 (1) and 36 (1) (Tables 1-3). The results from four samples, with a probability of 95.4%, fall within the 9th to late 10th centuries; for three other samples, within the early decades of the 11th century. The horizontal timber of the road (or causeway, no. D), stratigraphically the youngest, is dated by dendrochronology to after 974 AD (Table 2). A slightly later date, after 998 AD, was yielded by a stake belonging to the post-built structure in Trench 3. At the same time, we note that, with no sapwood layer available for analysis, the tree's felling date could not be determined in these two cases. The chronology of Phase I, corresponding to the first occupation and use of this part of the site, may be referred to the late 10th century and the first decades

**Table 1.** Radiocarbon dating by laboratory ETH Zurich (2022-2023)

	Sample	Trench	Feature	Material	Dating [95.4%]		Phase
1	ETH-129294	1	1	Charcoal	892	994	I
2	ETH-129295	2	3	Charcoal	1030	1158	II
3	ETH-129296	2	5	Charcoal	1037	1161	II
4	ETH-129297	2	6	Decomposed wood	977	1031	I
5	ETH-138986	5	-	Decomposed wood	892	1018	I
6	ETH-138987	4	16A	Decomposed wood	891	992	I
7	ETH-138988	4A	36	Charcoal	655	888	Ia
8	ETH-138989	5	24	Charcoal	1045	1217	II
9	ETH-138990	5	29	Wood (from track)	892	1014	I
10	ETH-138991	5	29	Wood (from track)	774	989	I

**Table 2.** Dendrochronological dates based on analysis of M. Krąpiec (2023)

	Laboratory code	Sample	Genus/species	Tree-ring count	Sapwood	Dating of tree-ring sequence	Felling date	Phase
1	CZER52	Peg	Oak ( <i>Quercus</i> sp.)	86	-	906-991	after 998	I
2	CZER53	Beam		53	-	915-967	after 974	Ib

**Table 3.** Thermoluminescence dating of pottery (A. Ginter 2022)

	Sample	Trench	Feature	Material	Dating		Phase
1	18	2	3	Pottery vessels	1080	± 44	I-II
2	26	2	6		1023	± 52	I-II
3	32	2	6		1002	± 51	I-II



of the 11th century. The dating of Feature 36 (in the range 664-894 AD, or at the latest by the end of the 9th century) points to an earlier occupation (Phase Ia).

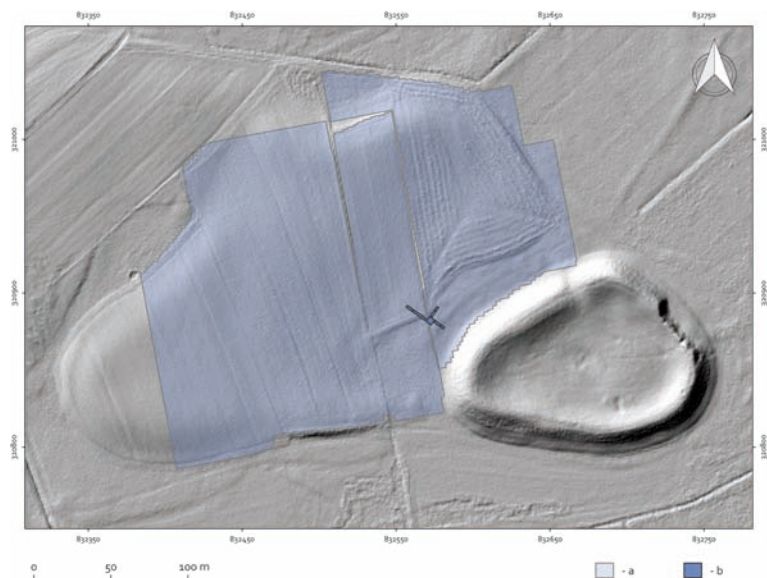
Phase II is represented by deposits and features with a later stratigraphic position that rest over the remains of Phase I occupation. The former include traces of earth-moving and levelling activity, as well as a vast quantity of pottery vessel fragments and features (Nos. 3 and 5). Radiocarbon dating of charcoal from utility pits (three dates from Feature 3 and 5) indicates their use between the second half of the 11th and early 13th centuries. Unfortunately, this phase is marked by a severe deterioration of archaeological finds.

## NON-INVASIVE SURVEYS

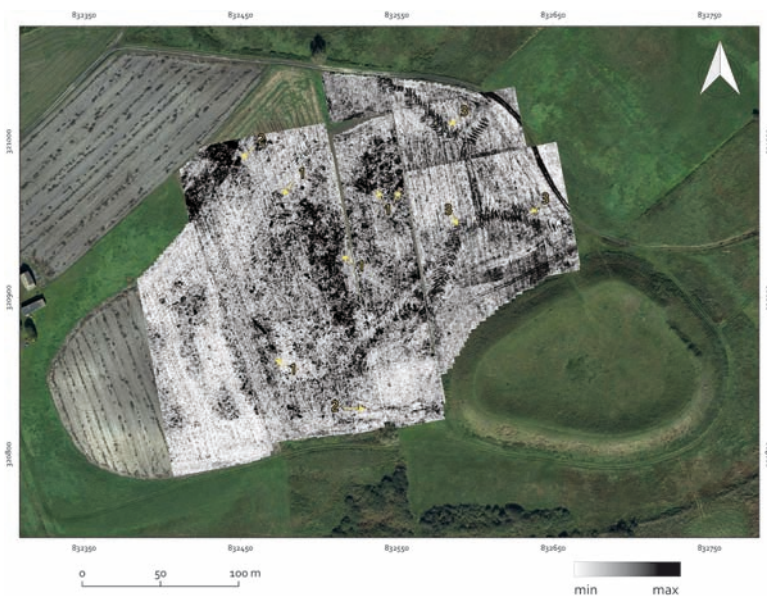
### Ground-Penetrating Radar prospection

The role of geophysical methods in understanding archaeological sites and their contexts has been increasing for several decades. GPR is one of the most commonly used geophysical methods in archaeology (Campana *et al.* 2009; Conyers 2013; Trinkins *et al.* 2014; Milo *et al.* 2022). It enables the acquisition of three-dimensional information about subsurface structures based on their dielectric properties. The method itself is based on transmitting a high-frequency wave into the ground under test and observing its propagation. In 2022, we conducted large-scale GPR prospection in Czermno to obtain data on the spatial organisation of the settlement, the identification and location of archaeological features, and their preservation.

Geophysical data were collected using a single-channel Malå Ground Explorer with a 450 HDR antenna. The measurements were carried out along parallel profiles spaced every 0.5 m in a point-based grid, staked out using GNSS RTK. The survey covered approximately 4.8 ha – almost the entire area of the slightly elevated landform on which Site 2 lies (Fig. 6). The time-slices were derived from a set of over 2,500 particular 2D profiles to demonstrate the spatial distribution of electromagnetic wave reflections at different depth levels (Goodman *et al.* 1995). Subsequently, the GPR dataset was incorporated into the GIS database and integrated with other data categories, such as orthomosaics and digital elevation models. The obtained data are complex, both in terms of anomaly types and spatial distribution. We identified numerous electromagnetic-wave reflections just below the topsoil (Fig. 7). Many of these are likely due to archaeological remains. GPR data indicate the complex layout of structures organised in clusters, separated by walkways or roads. They can be interpreted as the remains of dwellings, or other types of buildings, most likely of wooden or constructed of wood and daub. The largest cluster of this type was identified in the highest part of the elevated landform occupied by the archaeological site. Conspicuous linear anomalies recorded on the margins of the landform were interpreted



**Fig. 6.** Czerwno, Site 2: a – area of 2022 ground penetrating radar survey (ca. 4.8 ha), b – location of trenches excavated in 2022-2023. Source of background map [www.geoportal.gov.pl](http://www.geoportal.gov.pl). Coordinate system: EPSG:2180 (Poland CS92). Graphic design R. Ryndziejewicz



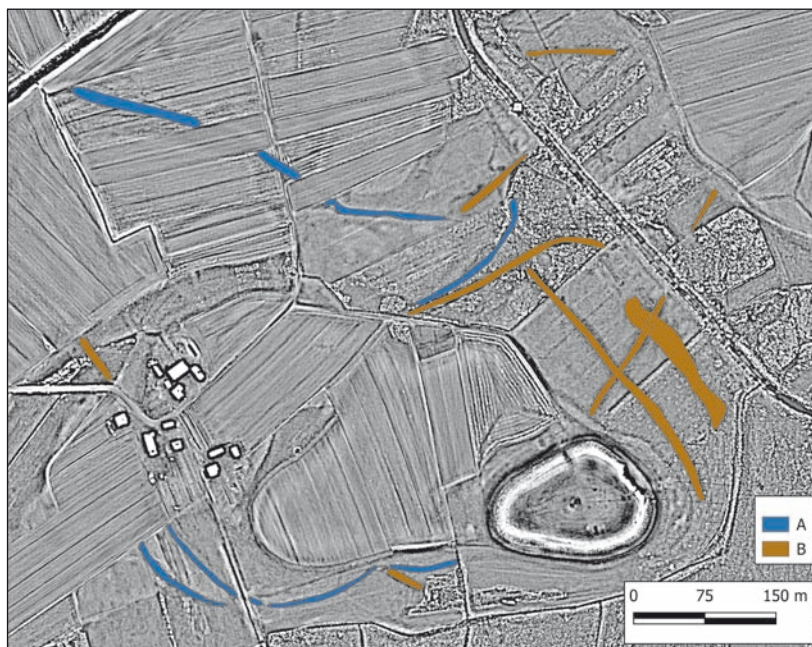
**Fig. 7.** Czerwno, Site 2. GPR data at ca. 0.60-0.80 m below the ground surface. Antena Malà Ground Explorer with 450 HDR antenna. The yellow arrows mark the features interpreted as: 1 – clusters of buildings, 2 – remains of fortifications, 3 – deep ploughing. Measurement resolution –  $0.5 \times 0.03\text{m}$  (interpolated). Source of background map: [www.geoportal.gov.pl](http://www.geoportal.gov.pl). Coordinate system: EPSG:2180 (Poland CS92). Data processing and graphic design R. Ryndziejewicz

as the remains of fortifications enclosing the settlement. They are more apparent in the north-western part of the studied area.

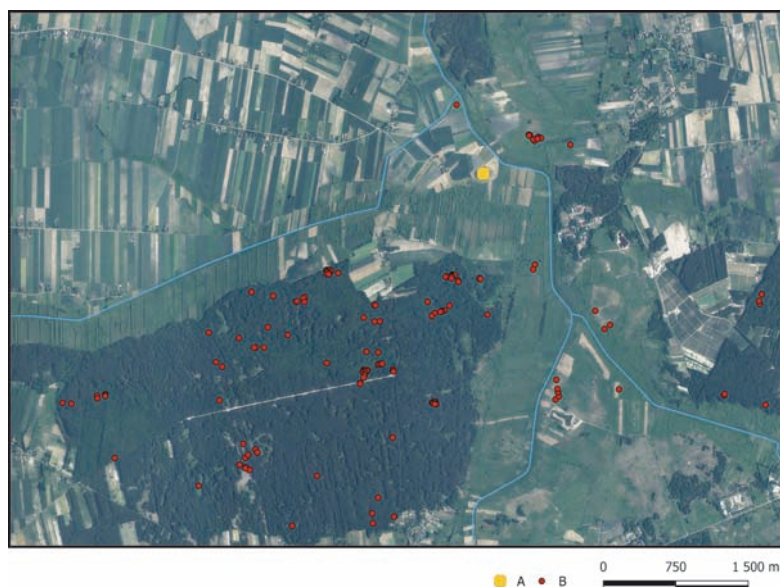
Generally, the viable prospection depth was not more than 140-150 cm due to strong electromagnetic wave attenuation in the ground (usually less than 1 metre). The entire area under investigation is heavily agricultural, which contributes to the erosion of archaeological remains and degrades the quality of the GPR data. Data from the eastern part of the site indicate significant damage to the archaeological remains caused by deep ploughing.

### Spatial analysis

Analysis of data derived from LiDAR and drone detection was carried out on the site and its immediate surroundings to recognise the presence of archaeological features. The study covered an area of 45 km<sup>2</sup>, using a point cloud from the ISOK project (2013). This input was used to create a digital elevation model (DEM) with a resolution of 50 cm and generate visualisations: Local Dominance, Local Relief Model, Analytical Hillshading and Sky View Factor. Orthophotomaps were created from data collected with a DJI Matrice 2 quadcopter equipped with RGB, radiometric, and multispectral sensors.



**Fig. 8.** The settlement complex in Czermno. Analysis of spatial data. Features recorded in the catchment of the stronghold: A – sunken features (possible ditches, ditches), B – raised features – causeways, banks. Graphic design M. Jakubczak



**Fig. 9.** Analysis of DEM data: A – stronghold, B – location of raised features identified as barrows, mounds – 143; twenty-nine recorded during AZP national fieldwalking project. Graphic design M. Jakubczak

Analysis of the site's microrelief and orthophotomaps enabled the identification of several archaeological features. Some of them may be interpreted as traces of ditches, earth banks, dykes, *etc.* (Figs 8 and 9). While dating these features recognised by remote sensing is problematic, at least some of them are likely to belong to the period when the medieval settlement was in use as elements of its spatial layout – the network of roads, dykes, causeways and crossings.

The analysis of the Digital Elevation Model of the area surrounding the settlement complex identified 143 features most likely to represent mounds/burial mounds, of which only 29 had been recorded during the AZP national fieldwalking survey (Sadowski 2008; Dzieńkowski 2023; Wołoszyn *et al.* 2024). The same study determined the course of the outer earth bank enclosing the settlement on its west side, some stretches of which had been investigated in the 1950s and more recently, in 2022.

## ARCHAEOLOGICAL SOURCES

An analysis of selected groups of finds, artefacts, and biofacts sheds light on aspects of craft production and, more generally, on the economic activities of the medieval inhabitants of the complex. The excavation of archaeological deposits and features belonging to Phases I and II yielded an assemblage of more than 37,000 objects, most of them pottery.



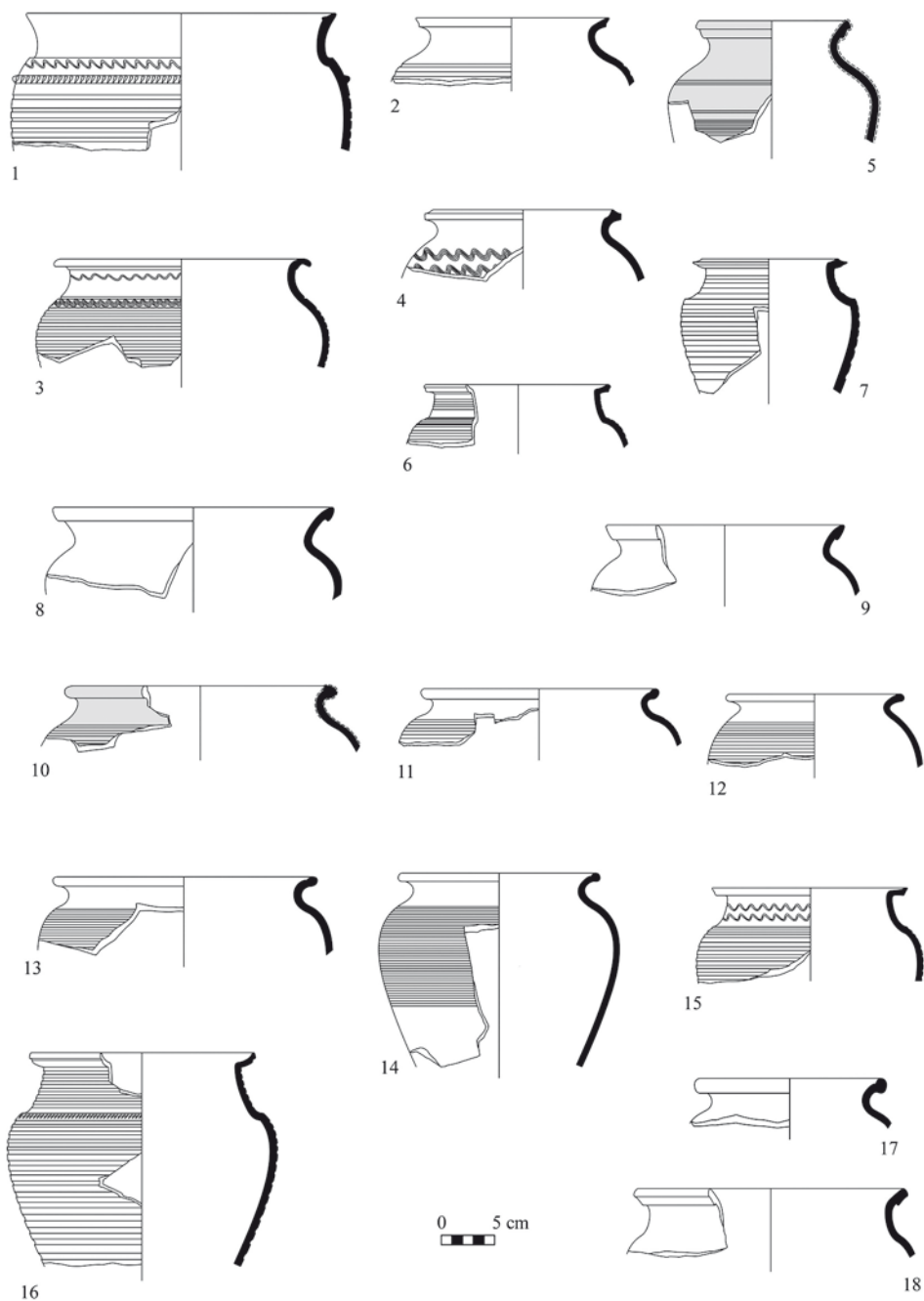
A statistically smaller group included objects made of other materials, *e.g.* horn/antler (cheek-piece), bone (hafts, ice-skates), metal (small lead seals, valuable objects, personal ornaments), glass (bangles, beads, finger rings) and other. There was also a significant quantity of post-consumption animal remains.

## Pottery

Fragments of pottery, due to their mass occurrence, are the key source for studies on the everyday life of the stronghold inhabitants. The entire assemblage from the site consists of 28,033 sherds, 99% of which represent the early medieval phase of occupation on Site 2. The assemblage included a single fragment of a prehistoric vessel, apparently of Early Iron Age date, and 55 fragments of late medieval and post-medieval pottery. Fragments of early medieval vessels primarily derive from the excavation of archaeological layers, as opposed to the fill of archaeological features, which have yielded only 1531 sherds (6.7% of the assemblage). Similarly uneven is the distribution of pottery finds in chronological horizons – no less than 80% fragments derive from layers and features allocated to Phase II, and only 5.4% can be identified with occupation during Phase I. It needs noting at the same time that the 'responsibility' for this disproportion rests mainly with the largest assemblages (jointly 11,261 fragments) deriving from layers nos 1, 2, 36-38, which accumulated only when the early medieval settlement complex had ceased to function. The other 14.6% comes from stratigraphic units dated to the early medieval period (phases I-II).

The assemblage of early medieval pottery was divided into four ware groups (see, *e.g.*, Auch 2017, 127-129; Auch and Trzeciecki 2021, 83-85; both publications provide a list of further literature). Roughly 92% finds are fragments of brownware vessels, made from iron-rich clays fired in an unstable firing atmosphere. Fragments of pottery made of white clays (whiteware) make up only 7.5%. Remarkably, this ware group is particularly characteristic of early medieval sites in western Ukraine and the Polish-Rus' borderland. Whiteware was manufactured from kaolinite clays, deposits of which occur in the Roztocze region, *e.g.*, in the vicinity of Potelyč, approximately 50 km from Czermno. The assemblage also included fragments of four glazed vessels and a body sherd of an amphora. All the brown- and whiteware vessels bear traces indicating coiling technique and turning on a slow wheel. Similarly, in pottery assemblages recovered at other sites within the settlement complex in Czermno, brownware included a relatively large percentage of vessels tempered with sand. Whiteware products contained temper of sand and/or crushed potsherds (Auch 2017, 144-145, 168-169). In both ware groups, the repertoire of vessel forms was modest: cooking pots account for approximately 99%. The brownware group additionally included a fragment of a jug, two bowls, three scooping vessels, and eight lids; the whiteware pottery assemblage included fragments of two jugs and two bowls. Glazed pottery was too fragmented to determine its function, but most likely the fragments belong to jugs. The only other vessel form represented in the assemblage is the amphora.





**Fig. 10.** Czermno, Site 2. Selected pottery from Phases I (1-9) and II (10-18). Brown (1-4, 6, 7, 11-16), brown slipped (5, 10), white (8, 9, 17, 18). Graphic design M. Trzeciecki

Preliminary analysis of the pottery assemblage revealed some chronological differences in the proportions of ware groups and stylistic features of vessels. The assemblage dated to Phase I includes only two types of pottery – brownware predominates (84%), but the percentage of whiteware is relatively high (16%). A minor percentage (*ca.* 2%) of the brownware vessels is coated with a white slip. Morphological analysis of brownware pots revealed the prevalence of S-shaped forms with rims either unthickened (Type III – 38.5%; Figs. 10: 2, 3), thickened and profiled (Type VII – 26%; Fig. 10: 4), or everted (Type VIII – 10.6%; Fig. 10: 5). Less frequent in the assemblage are vessels with separated neck and a nearly biconical profile (Type IV – 10.6%; Fig. 10: 7), and forms with a belly body (Type V – 13.5%; Fig. 10: 6). An exceptional form is a vessel with a cylindrical neck (Type II; Fig. 10: 1).

The percentage of decorated vessels falls slightly short of 50% of the whole, but the selection of decorative motifs is limited to five. The pattern of horizontal grooves is observed on the most significant number of vessels (74.4%; Fig. 10: 2, 5-7), followed by combinations of grooves and engraved wavy lines (16%; Fig. 10: 3, 4), grooves and stamped impressions (8.6%). The assemblage of white pottery is stylistically much less diverse. Vessels classified to Type VIII account for more than 96% (Fig. 10: 8, 9), the remainder represents Type VII. Only 6% in this ware group were decorated – most often, with a zone of several horizontal grooves or a wavy line placed over the maximum body diameter.

In the Phase II assemblage, the percentage of brownware increases to 93%, and the percentage of white vessels drops to 6.7%. The percentage of slipped brownware vessels is on the same level as in Phase I. Next to the two main pottery groups (brown- and white-ware) is a third – vessels with a green-glazed surface. The pottery assemblage from Phase II includes a truly exceptional specimen – a fragment of an amphora imported from the Byzantine Empire (Korokhina *et al.* 2024). On the other hand, there is a marked difference in the assortment of forms and decoration of brown and white wares. S-profiled pots with a rolled-up, circular-sectioned rim (Type IX; Fig. 10: 10, 11, 13, 14), absent in Phase I, make up 31.6% of the brownware. Type III vessels are less common, accounting for 20.6% (Fig. 10: 12), and Type VII for 15.9%. At 6%, Type VIII forms are significantly fewer in number. This is unlike necked vessels classified to Types IV and V – they remain at a constant level of around 10-12% (Fig. 10: 15, 16). The percentage of vessels with a cylindrical neck remains low.

In the Phase II assemblage, the proportion of decorated wares has not changed, but the number of decorative motifs has increased to sixteen. At the same time, horizontal grooves continue as the most common motif (83.7%; Fig. 10: 10-14, 16), occasionally, in combination with a wavy line (5.3%; Fig. 10: 15) or stamped impressions (4%); all other types of decorative motifs identified in the assemblage are observed once, at most, a few times only. Similar changes are observed in the assemblage of white wares. While Type VIII continues to prevail, the percentage of these vessels has dropped to 60% (Fig. 10: 18). Type IX vessels account for 31% (Fig. 10: 17); a handful of forms represent Types III and VII. No

change is noted in the percentage of decorated wares, and the assortment of decorative motifs remains as modest as in Phase I.

To conclude, it is important to note that the assemblage of early medieval pottery under discussion has numerous analogies in materials from earlier studies of the settlement complex in Czermno. Possibly the most noteworthy characteristic of all the pottery assemblages from Czermno is that they all demonstrate a stylistic shift in the 12th century, leading to the appearance of highly standardised vessel forms classified as Type IX. Another development is the gradual decrease in the percentage of white wares, and the occurrence of glazed pottery and amphorae, primarily in twelfth- and thirteenth-century contexts (Auch 2017, 214-230; see also Korokhina *et al.* 2024). It is also notable that the assemblage includes a relevantly low percentage of vessels with a separated neck, in particular, angular forms Type IV, prevalent in assemblages from the second half of 11th and early 12th centuries, and regarded as material evidence for the presence in Czermno of potters from the Western Slav environment (Auch 2017, 190-192, 228, 229). Also worth noting is the absence of partly turned brownware vessels from the discussed assemblage, of which only a very small number was recorded during past research; these wares are mostly regarded as evidence of occupation pre-dating the construction of the stronghold (Auch 2017, 143, 226, 227).

## Glass finds

The assemblage of glass finds recovered during the fieldwork carried out in 2022 and 2023 numbers 24 finds: mostly fragments of glass bangles (13) and beads (6), a fragment of a finger ring, a finger-ring with a glass bezel, a glass vessel and two small glass balls (Fig. 11). The latter are identifiable as beads warped through exposure to heat (?). Most of the glass artefacts (15 specimens) had been excavated from Layer 2; a handful turned up in Layers 1 and 38. All three strata (nos. 1, 2 and 38) post-date the decline of the settlement. The rest (10) originate from deposits dated to the early medieval period; it is important to note that one bead was discovered in Layer 66, dated to Phase I of the settlement complex.

The assemblage of glass items from fieldwork seasons 2022 and 2023 shows a similarity to materials recovered in Czermno and Gródek-upon-the-Bug since the 1950s (*cf.*, Wajda 2022/2024). Glass bangles fall into four types:

1. with a triangular-sectioned hoop made of blue glass – Wajda Type 2 (Fig. 11: 1; *cf.*, Wajda 2022/2024, 104, Fig. VIIIA: Type 2:10, 36, 105, 90);
2. with an ornament of glass dots – Wajda Type 4a (Fig. 11: 2; *cf.*, Wajda 2022/2024, 105, Fig. VIIIA: Type 4a:13, 96), one fragment found;
3. with an impressed ornament of spirally twisted grooves – Wajda Type 5b (Wajda 2022/2024, 105, 106, fig. 8: A: Type 5b), eight fragments found, four fragments made of green glass (Fig. 11: 3-5), three fragments of blue glass (Fig. 11: 6-8 [one fragment was too corroded to determine the colour of its glass]);



Fig. 11. Czermno, Site 2. Archaeological finds – selected glass finds, season 2022. Photo by S. Wajda

4. with an ornament of spirally twisted grooves and trailed glass – Wajda Type 6 (Fig. 11: 9; *cf.* Wajda 2022/2024, 106, fig. 8: a: Type 6), one fragment found.

Three translucent blue glass fragments are too small to determine their type.

Glass bangles were a popular ornament in the Eastern Slav environment and are abundant on the territory of Kyivan Rus' (Wajda 2022/2024, 107; Wajda *et al.* 2024, with a list of reference literature). In Poland, most of the finds of objects of this type are found in the eastern regions, belong to the 11th-13th centuries and are associated with Rus' (*cf.*, Wołoszyn 2007, fig. 14). Large assemblages of glass bangles are known from Przemyśl (Krzemińska and Zahel 2021), Gródek upon the Bug River (Wajda 2022/2024) and Chełm (Fituła 2008). The most significant number of these ornaments was in use between the 12th and mid-13th centuries.

Site 2 yielded glass beads – a total of six specimens made using the winding technique. Three beads are ring-shaped, two made of translucent yellow glass, one of translucent blue glass (Fig. 11: 10; *cf.*, Wajda 2022/2024, 110, fig. 8A: 3.2). A bead of violet glass, now nearly opaque, belongs to Type 3 (globular beads; Fig. 11: 11). Another bead made of blue glass was classified to Type 4 (segmented beads; *cf.*, Fig. 11: 12); it consists of two segments, without an intervening collar. Finally, a bead classified to Type 10 (Wajda 2022/2024, 111, fig. 8: A) has a dark brown body decorated with a broad zigzag trail of white glass inserted in the middle. Additionally, on one surface near the stringing canal, there is an inserted yellow coloured trail (Fig. 11: 13).

Glass finger rings include a fragment with a bezel, and another fragment of a ring (Fig. 11: 14, 15). Both were made of translucent green glass. Identical specimens have been identified among earlier glass finds from Czermno (Wajda 2022/2024, 114, fig. 8: A: 16). Glass finger rings were not as popular among Eastern Slavs as were bangles, but are known from many sites on the territory of Rus' and have a dating confined to the 11th and the 14th centuries (Shchapova 1972, 97; Stolyarova 2020, 241; Wajda 2022/2024, with a list of reference literature).

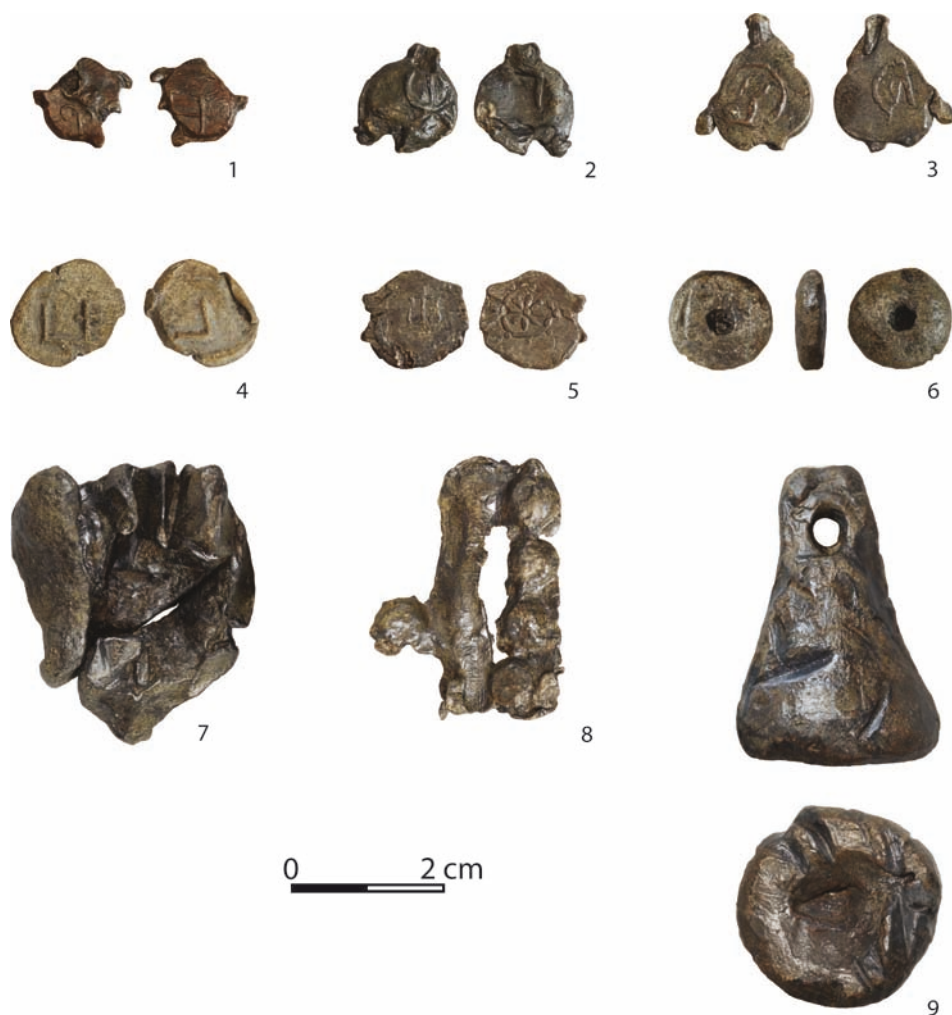
The most recent analysis of glass finds from Czermno failed to confirm the presence of a glass workshop in the settlement complex. Nevertheless, both past and most recent research have produced a large volume of slag that is not easily attributed to any specific industry. Some of these finds may, in fact, be melted-down glass. However, further research is needed to determine the origin of these remains and their original function.

To conclude, the glass assemblage uncovered during the most recent fieldwork in Czermno shows numerous analogies with materials from previous research. The largest group of finds are glass bangles of Type 5b (decorated with spirally twisted grooves). Glass beads make up a fairly large group, which – and this important to note – does not include earlier (11th-century) forms known from previous research (*cf.*, Wajda 2022/2024, fig. 8A: Type 1, Type 10: 141, 152, Type 11: 179).



## Small lead seals of 'Drohiczyn type' and other lead finds

A group of finds: eleven small lead seals of 'Drohiczyn type' (examples – Fig. 12: 1-5), two globular small lead seal blanks, a lead casting with small seal blanks still in place (Fig. 12: 8), a lead scale weight (Fig. 12: 9), and a scale weight/weighted object (?) (Fig. 12: 6) was excavated from archaeological deposits and features or picked up on the surface of the site. They furnish an important clue to the function of the suburban settlement and the entire settlement complex, intimating involvement in long-distance trade. Other lead finds



**Fig. 12.** Czermno, Site 2. Selected lead finds : 1-5 – small seals of 'Drohiczyn type'; 6 – scale weight/weighted object (?); 7 – lump; 8 – casting with small seal blanks; 9 – scale weight. Photo by S. Wajda

include lumps (Fig. 12: 7) and castings identified with the production of a variety of objects from this metal. Most of the small lead seals and other objects in this group have analogies in the assemblage of finds recovered earlier in Czeremno (small lead seals – *cf.*, Florkiewicz *et al.* 2020, *e.g.*, Catalogue nos. I.19, I.73, II.11, II.69; other lead finds – *cf.*, Florkiewicz 2022/2024, fig. 13: 42-49, 144, 149; Catalogue nos. XIII.48-55, XIII.217, XIII.226).

### Other finds

Another remarkable object is a fragment of a fired clay egg, glazed and decorated with a floral design, brown in colour, interpreted as the Tree of Life (its surface covered with stems, touching, with symmetrically arranged, lanceolate leaves). Glazed pottery eggs of this description were manufactured in Kyiv between the 10th and 13th cc.; this would be the most likely provenance of the egg from Czeremno (Hilczerówna 1970, 115; Siemianowska 2008).

## ARCHAEOZOOLOGICAL FINDS

The assemblage of biofacts excavated in 2022-2023 at Site 2 in Czeremno provides the first reliable, well-documented basis for assessing the interaction between the communities inhabiting this key settlement complex and the animal world. The analysis of the large assemblage of consumption waste (more than 6,000 bone fragments) and of objects made of bone (34 various items) has yielded the first conclusions about the local economy, methods of exploitation of natural resources, structure of animal husbandry, animal products use and valuable features of living animals of different animal species. Although archaeological investigations of the remains of the stronghold in Czeremno (Site 1) and sites in its hinterland date back to the 1940s, the results of archaeozoological studies have so far received limited attention (Krysiak 1966; Makowicz-Poliszot 2016; Tomek 2016; Gwiazdowska-Nowak and Piątkowska-Malecka 2016). The recently obtained data can serve as a good point of departure for the study of the animal economy practised in the Cherven' Towns region and the Polish-Rus' borderlands in the early medieval period, a subject that has been treated only superficially and marginally previously.

The present article reports only the preliminary results of the archaeozoological analysis of the distribution of waste species. The comprehensive results of this research are currently undergoing an in-depth analysis and will be published in a separate volume dedicated to the archaeozoological evidence. Special attention has been paid to the new chronological findings, which were used in assessing a possible shift in the economy during the two phases identified in the development of the suburb settlement. The assemblage, numbering 6,083 animal bone fragments, consists of material in a fairly good state of preservation, as reflected by a relatively high percentage of taxonomically determined remains (75.0%). The character of the assemblage, the state of preservation of the fragments, the

Table 4. Archaeozoological consumption waste from Site 2 in Czermno

Trench no.	1-4	1/2	2	2	2	2	3	3	3	3	3	3A	4	4	4	4A	4A	4A	4A	
Layer/ Feature	Layers	Feature 1	Feature 2	Feature 6	Feature 3	Feature 5	Feature 11	Feature 12	Features 12/13	Feature 13	Feature 14	Feature 18	Feature 16	Features 24/26	Feature 27	Feature 31	Feature 32	Features 32/34/36	Feature 35	Feature 36
Chronology	10th- 13th cc.	10th c.	11 <sup>th</sup> - 13 <sup>th</sup> cc.	10th c.	11th- 12th cc.	11th- 12th cc.	10th- 13th cc.	10th- 13th cc.	10th- 13th cc.	10th- 13th cc.	10th- 13th cc.	10th c.	10th c.	10th c.	10th c.	10th c.	10th c.	10th c.	10th c.	9th c.
Cattle	1248	33		4	20	34	5					5	14				1	1	1	1
Sheep/Goat	1162	18	8	5	32	74	3			1			5	2	1		1	2		
Sheep	46												1							
Goat	19	1			1															
Pig	1086	32	2	2	22	47	9	2	1		11	2	22			1	1	1	1	2
Horse	72				2		18						2					1	1	
Dog	50			1		3			1				6							
Cat	4																			
Aurochs/ <i>Bison bonasus</i>	3	6				1														
Red deer	39	1			3								1							
Roe deer	76				5	7						2								
Elk	11					2														
Wild boar	41	4																		
Hare	20				1	1														
Beaver	1																			
Rodent	1																			
Bird	155	6	1	2	1	7							2							
Fish	5	1				1														
Undetermined	1374	23	11		22	28	19		4			4	22	1	1	2	3	5	1	3

taxonomic and anatomical diversity of the remains, and marks observed on the surface of most bones caused by butchering and cooking processes suggest that the assemblage is mostly consumption waste. Bone fragments were excavated from archaeological deposits and seventeen features, mostly identified with household activities, more rarely, with production/crafts (Features 1 and 5). The bone material found in most of the features was allocated to the two chronological phases of the settlement – the earlier, corresponding to the 10th and early 11th centuries (Features 1, 6, 1, 18, 24/26, 27, 31, 32, 32/34/36, 35 and 36) and the later phase, dated to the second half of 11th – early 13th centuries (Features 2, 3 and 5).

Standard analytical procedures were used (Lasota-Moskalewska 2008; Rietz and Wing 1999; Gifford-Gonzales 2018). The taxonomic assessment of the assemblage showed that the remains all belong to vertebrates – mostly mammals, more rarely, birds and fishes (Tables 4-6). Among the mammal bones, the largest group belong to domesticated species (94.9%); animals living in the wild account for only a minor percentage (5.1%). The latter assemblage includes many bones of roe deer, wild boar, and red deer, and a smaller amount of hare, elk, European bison/aurochs and beaver. The four main livestock species accounted for approximately 30% of the assemblage. Bones of small ruminants were the most

**Table 5.** Distribution of archaeological remains in layers and features by species, Czeremo, Site 2

Species determination	Layer		Feature		Total	
Cattle	1248	33.8%	118	25.3%	1366	32.9%
Sheep/Goat	1162	31.5%	152	32.6%	1314	31.6%
Sheep	46	1.2%	1	0.2%	47	1.1%
Goat	19	0.5%	2	0.4%	21	0.5%
Pig	1086	29.5%	158	33.9%	1244	30.0%
Horse	72	2.0%	24	5.2%	96	2.3%
Dog	50	1.4%	11	2.4%	61	1.5%
Cat	4	0.1%	0	0.0%	4	0.1%
Domesticated mammals total	3687	100.0%	466	100.0%	4153	100.0%
Aurochs/ <i>Bison bonasus</i>	3	1.6%	7		10	4.4%
Red deer	39	20.4%	5		44	19.6%
Roe deer	76	39.8%	14		90	40.0%
Elk	11	5.8%	2		13	5.8%
Wild boar	41	21.5%	4		45	20.0%
Hare	20	10.5%	2		22	9.8%
Beaver	1	0.5%	0		1	0.4%
Wild animals total	191	100.0%	34		225	100.0%
Rodent	1		0		1	
Bird	155		19		174	
Fish	5		2		7	
Undetermined	1374		149		1523	

numerous (34.2%), with almost twice as many bones of sheep as of goats, followed by cattle (32.9%) and pigs (30.0%). Bones of the horse, dog and cat made up only a small percentage, 2.3%, 1.5%, and 0.1% respectively.

The distribution of bone remains of domestic and wild animal remains recovered from the archaeological deposits and features was similar (Fig. 13). The greatest difference was shown by bones of cattle: their percentage recovered from the feature fill was smaller (25.3%) as compared to the percentage deriving from archaeological deposits (33.8%). The percentage and species composition of wild animal bones were similar.

Analysis of the same values made for bone fragments recovered from features with a precisely determined chronology revealed differences in the species distribution of domesticated mammals (Fig. 14). In Phase I, the dominant species was pig (37.6%), followed by cattle (34.7%), followed by small ruminants (21.2%). Differently in Phase II, where the remains of sheep and goat were the most numerous (46.9%), followed by pig (29.1%) and cattle (22.1%). The difference in the percentages of horse and dog bones was negligible. This is also true of the remains of wild animals, which in each phase accounted for around 7.5%. The species composition of these animals was similar, except for a larger number of roe deer remains and the appearance of hare bones in the assemblage belonging to the second chronological phase.

**Table 6.** Archaeozoological remains distribution in features with a determined chronology, Czermno, Site 2

Species determination	Phase 1		Phase 2	
Cattle	59	34.7%	54	22.0%
Sheep/Goat	34	20.0%	114	46.5%
Sheep	1	0.6%	0	0.0%
Goat	1	0.6%	1	0.4%
Pig	64	37.6%	71	29.0%
Horse	4	2.4%	2	0.8%
Dog	7	4.1%	3	1.2%
Cat	0	0.0%	0	0.0%
Domesticated mammals total	170	100.0%	245	100.0%
Aurochs/ <i>Bison bonasus</i>	6		1	
Red deer	2		3	
Roe deer	2		12	
Elk	0		2	
Wild boar	4		0	
Hare	0		2	
Wild animals total	14		20	
Bird	10		9	
Fish	1		1	
Undetermined	65		61	



The analysis of the animal bone assemblage from Site 2 in Czeremno indicates that the mainstay of animal economy practised by the community inhabiting the suburb settlement during the early medieval period was animal husbandry, complemented to a certain extent by hunting game and – very probably – fishing. Animal protein and fat were supplied in similar proportions by cattle, sheep, goats and pigs. Occasional consumption of

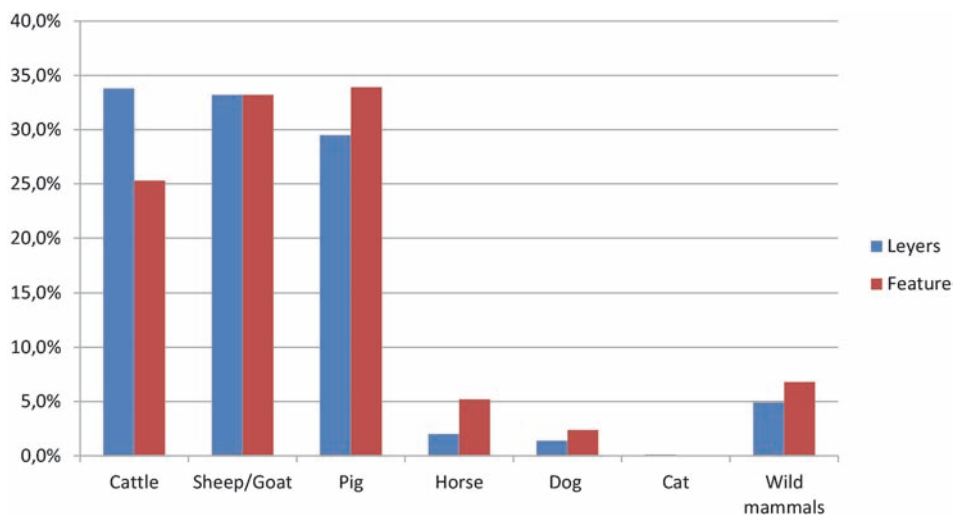


Fig. 13. Domestic and wild animal species recorded in archaeological deposits and features.  
Graphic design J. Piątkowska-Matecka

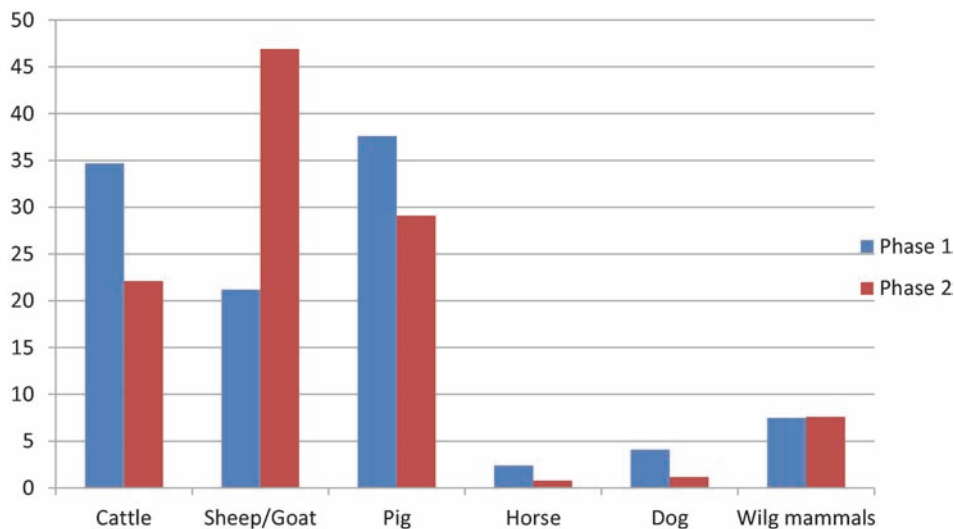


Fig. 14. Domestic and wild animal species recorded in archaeological features, Phase I and II.  
Graphic design J. Piątkowska-Matecka

horse meat cannot be discounted; it is suggested by butchery and cooking marks identified on the bones of this species. Game animals and birds apparently played a smaller role in the local diet. The general structure of animal economy suggests a mixed model of husbandry, without an apparent preference for any specific species. It is more than probable that things evolved over time. The faunal assemblage from Phase I is dominated by bones of pig, followed by cattle, and only then, small ruminants. The pig's leading role in the establishment of the suburb can be attributed to rising meat demand. During the second phase, when the settlement situation had stabilised, there was a shift in the direction of animal husbandry. The role of pigs and cattle was reduced, and there was an increase in the importance of small ruminants, which, next to meat, also supplied milk, and in the case of sheep, wool. During both phases of occupation, livestock breeding was supplemented by hunting. Game animals included in the first place, deer and wild boar, to a smaller extent, aurochs and European bison, hare and beaver. During the second phase, the number of roe deer bones increased; the remains of hares were observed for the first time. This suggests progressive forest clearance of the land in the immediate vicinity of the settlement complex. The results of archaeozoological studies suggest a shift in the animal economy of the suburb settlement in the 11th century, particularly in the structure of animal husbandry. Because of the small size of the analysed sample, these findings require verification.

## FINAL REMARKS

### Spatial organisation of the suburb settlement

Magnetometry and GPR data from 2013-2014 and 2022, respectively, were used to determine the boundaries of the site and the layout of the ditches; numerous anomalies were identified, indicating the presence of buried features throughout the settlement. When interpreted, the GPR prospection data revealed that the suburb settlement had an organised layout, with rows of dwellings aligned NE-SW, and a system of inner timber roads. Valuable information was secured in the NE part of the site – the remains of a large building (?), and several dwellings and outhouses (?) discovered at the centre of the settlement and in its southern area (see Piotrowski *et al.* 2011; Gazda 2010; Ryndziejewicz 2023). Naturally, the view obtained from the non-invasive studies requires validation through excavation; nevertheless, it affords a good starting point. Notable in this context is the documentation from Levko Chikalenko's excavations of a dwelling with a hearth, but without a more detailed description or location (Chikalenko 1998; Wołoszyn 2016). On the other hand, the focus of archaeological studies of the 1970s was mainly on the recognition of the system of defences of the suburb settlement and contributed no data about the buildings within.

The two seasons of sondage excavations led to the discovery of thirty-eight functionally different features interpreted as utility pits (19), remains of upright timbers (13), remnants of wooden communication structures (4), fragments of a rampart (?) and an eco-feature (Figs 2 and 3). The absence of dwelling structures must be due to the site's location at the edge of a flood terrace, on the periphery of more close-knit habitation, the marshy ground, and the economic-defensive function of this zone (Dzieńkowski 2023).

The remnants of communication structures (Features A-D) were the following: a timber road (A), roughly 2 m wide, laid over a natural layer covered with fascine (brushwood and bark). Horizontal timbers used presumably as sleepers were poorly preserved, the rough planks resting on top of them were in a slightly better shape. The road ran NE-SW parallel to the edge of the terrace and the conjectured rampart. The presence of an inner track intimates the existence of an orderly spatial layout of buildings inside the suburb settlement. The existence of a road network and its plan was also confirmed by the data from GPR studies. A 'communication makeshift' was a footbridge of rough pinewood boards (D) covering the peat-filled hollow. This is a typical measure used in a marshy terrain for crossing it without getting one's feet wet (Figs 3 and 4). It is fairly safe to ascribe a similar function to structures C-D found in Trenches 1 and 4A (Fig. 5). They too are very likely the remains of a road of which only horizontal timbers had survived. Their NE-SW course, outside the terrace edge, suggests the function of a track outside the settlement, connecting the suburb with the stronghold (?). A similar structure, only interpreted as a causeway, was uncovered in 1972 in Trench IIA laid out to the east of the currently investigated area (Florkiewicz and Urbański 2016). With only limited fragments of these structures uncovered in the excavation trenches, these issues remain open for future research. Let us add that back in 1959 Konrad Jażdżewski already noted the possibility of communication between the two sites over causeways. At that time, using aerial photographs he traced a line interpreted as a causeway, noting that it 'ran from the conjectured gateway of the stronghold directly towards the edge of the suburb hummock on the opposite side' (Jażdżewski 1959, 73).

### The riddle of suburb settlement defences

While the first references to the presence of earthworks in Czeremno, other than the ramparts of the stronghold, go back to the 19th century, the first archaeological record of fortifications of the suburb settlement dates from the 1940s and 1950s (Pavlishchev 1865, 244-247; Chikalenko 1998, 623-635; Jażdżewski 1959, 71-74; Musin and Wołoszyn 2017, 422-423). Describing the archaeology of Czeremno during the war, Levko Chikalenko noted that the settlement 'on an island', now known as 'Zameczek' [suburb settlement], was probably enclosed by a wall for the purpose of defence (Chikalenko 1998, 623-635; Wołoszyn 2016, 202). Similar conclusions were reached after field surveys and aerial prospection made in Czeremno by the team of Konrad Jażdżewski. Writing about Site 2, the

Polish archaeologist recorded traces of a ploughed-out earthwork along the south-eastern edge of the elevated landform (Jażdżewski 1959, 71, 74). The reconstructed course of the earthworks was marked on drawings and maps with a line that either surrounded the site on all sides, or only enclosed a part of the suburb settlement. This lack of certainty was one of the reasons the fortifications of the suburb settlement were investigated in the 1970s (Fig. 2). Remnants interpreted as fragments of a rampart were uncovered inside Trenches IIB, IIC[?], IIF[?]; the structure was described as an earthen wall, 5-6 m wide, reinforced on the outside with a wooden palisade. The only surviving description and drawing of Trench IIB records the recognisable stratigraphy as an earth bank (Florek 2016b, Fig. 8). Subsequent non-invasive studies (geophysical magnetometry and GPR prospection) have failed to confirm the layout of the defensive earthworks. The first method has identified the remains of fortifications (?) on the edge of the terrace in the SW and NE area of the studied site. Analysis of GPR data suggests that the fortifications ran along the SE edge of the terrace. On the other hand, the examination of the Digital Elevation Model and aerial photographs suggest the earthwork ran along the north, east and west edge of the terrace, but do not rule out its presence in the zone between the stronghold and its suburb (Figs 1 and 6-8). This mixed, and somewhat chaotic image, currently leaves unresolved the question of the layout, construction design, phasing and dating of the conjectured rampart. The new evidence brought in by the more recent excavations on this part of the site are also inconclusive. Another open question is the function of Feature 10, possibly the remnant of a rampart from Phase I. This is suggested by its character: levelled sub-base, substantial width (3-4 m), construction material (earth) and presence of upright timbers – posts (Features 8 and 9; Fig. 5). Its identification as a defensive wall is supported by the location of this feature on the edge of the terrace, outside the area occupied by dwellings and the inner timber track. Furthermore, no other settlement features and/or structures have been uncovered in this zone. The construction of the conjectured rampart can be described only broadly as an embankment with a timber revetment (?). At the same time, stratigraphic evidence would place its construction and destruction in, respectively, Phase I and II, suggesting changes in the spatial organization of the suburb settlement. At the present stage of research, the proposed interpretation needs validation through continued excavation.

## Chronology

In the preexisting and in more recent reference literature alike, the operation of the suburb settlement has a broad dating of between the 10th and 13th century (Gurba 1988, 302-305; Dzieńkowski *et al.* 2020, 460-466). This was dictated largely by the chronology established for the settlement complex by archaeological evidence (stratigraphy, assemblage of finds) and the historical record (written sources – the much-invoked reference in the Primary Chronicle found under the year date 981 [6489], and later; see Jusupović 2017, 66-74). The first absolute dates obtained for the archaeology in Czermno date to the

1990s, when the timbers of the rampart and causeways were dated using chronometric methods (Urbański 2000). A significant increase of the number of radiocarbon and tree-ring dates started in 2013 (Dzieńkowski *et al.* 2020, 424-452). By 2021, the total number of absolute dates secured for the whole settlement complex (79) includes 25 dendrochronological and 54 radiocarbon dates obtained from timbers of the causeways and timbers of the rampart ( $^{14}\text{C}$  dates – [24], tree-ring dates [25]), organic remains (peat – thirteen  $^{14}\text{C}$  dates), inhumation (four  $^{14}\text{C}$  dates), organic residues in the pottery (thirteen  $^{14}\text{C}$  dates) (Auch 2017; Dobrowolski *et al.* 2018, 258-273; Dzieńkowski *et al.* 2020, 431-452).

Analysis of the dating results dates the origins of the settlement complex to the 10th century, the time of the construction of also the stronghold defences (Phase I), and later remodelling projects (Phase II; early 11th cent. and, very likely, the extension works in the middle/late 11th century). Intense use continued until at least the middle of the 13th century, possibly later (see Wołoszyn *et al.* 2018; Dzieńkowski *et al.* 2020, 431-452). For the suburb settlement, no absolute dates had been available, the time of its occupation determined by archaeological evidence was quite broad. Two dendrochronological dates of ‘after 1030’ and ‘1050’ obtained from Trench IID, came from structural timbers used to stabilize the stronghold rampart. This rather unsatisfactory situation changed for the better after the investigations of 2022-2023 which recorded a complex stratigraphic sequence of the site, identified two phases of occupation, and secured fifteen absolute dates (10 radiocarbon, 2 dendrochronological and 3 thermoluminescence). This made it possible to establish a preliminary chronology for the site and refer these results to the general discussion of the origins of occupation in Czeramno-Cherven’.

The chronology of Phase I is thought to belong to the period middle/late 10th century -1020s. This is indicated by the radiocarbon dating results with a probability of 95.4% deriving from Features 1 and 16, and from the timbers of the trackway (A, B) – *cf.*, Table 1-3. The tree-ring dates of ‘after 974’ and ‘998’ probably also belong to this period (Phase Ib [?]), except that there was no surviving sapwood to make this dating conclusive. The only feature to obtain a dating as early as possibly the 9th century is no. 36 (Phase Ia [?]), suggesting that occupation could have started in that early period. Although a single date cannot be sufficient proof, traces of occupation during that age correspond with dates obtained from organic materials in pollen profiles informing about a major clearance in the 9th century (Dobrowolski *et al.* 2018). Furthermore, the results of dating obtained from the suburb settlement agree with evidence obtained previously about the construction of the stronghold rampart, at the latest, in the late 10th century, and its remodelling in the 1020s (Dzieńkowski *et al.* 2020, 424-452).

Phase II, easily discernible in the stratigraphy, is dated by three radiocarbon analyses confined to the period between the mid-11th – mid-12th, early 13th centuries (Table 2). Occupation during this period is confirmed fairly well by dates obtained from the timber of the causeways, stronghold rampart and from inhumation burials (Wołoszyn *et al.* 2018; Dzieńkowski *et al.* 2020, 431-455).

Based on stratigraphic evidence and absolute chronology, it is safe to argue for some form of occupation of the suburb settlement already in the 9th century (Phase Ia), but more close-knit occupation presumably started only in the 10th century (Phase I, Ib). It is very probable that this was also the time when the fortifications were raised (Feature 10 [?]). Phase II brought a change in the spatial organization of the suburb settlement which at that time was presumably expanded to the south-west; this is suggested by the presence of levelling layers and thickness of the occupation level, also found in this part of the site. These data suggest a change in solutions used to defend the southern zone of the suburb settlement, and very likely, its communication with the stronghold. The questions that arise here have to be resolved through further excavations, but definitely another research step has been taken.

While the size of the assemblage of finds recovered on the Huczwa River is an important consideration when planning future excavation work at this location, it is equally important in our attempt to understand the character of the Cherven' stronghold: it was definitely not a small garrisoned border outpost, but a large centre of commerce, a meeting ground rather than a place of separation.

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