

ANIMAL REMAINS FROM OJCÓW MEDIEVAL CASTLE (SOUTHERN POLAND)

Abstract

The castle of Ojców belongs to the most impressive defensive fortifications of the Polish Middle Ages. The earliest stages of human occupation of the castle hill are dated to the Early Iron Age corresponding to the open-air settlement of the Lusatian Culture. After the fall of this settlement the castle hill was uninhabited until the early castle building works in the 14th century. The castle was a foundation of King Kasimir III the Great. In the 16th century the castle was ruled by Queen Bona Sforza, among others. At the end of the 18th century the castle lost its tenorial status for a while, and since it was not any longer profitable, at the early 19th century it was abandoned.

The excavations in trenches I and II of Ojców castle yielded > 7,500 fish, bird and mammal remains. During the entire history of Ojców castle, from the beginning of the 14th to the 19th century, the main food resources for residents were domestic animals, especially mammals (cattle, pig, sheep and goat). However, birds (chickens and geese) were important dietary supplements. Fish remains are rare in the material studied. However, there is a noteworthy presence of sturgeon remains in the medieval cultural layers. Apart from the sturgeon, the high social position of the castle's residents is also reflected in the presence of exotic bird species (peacock), dated to the post-medieval period.

Keywords

Zooarchaeology, Middle Ages, castle, sturgeon, peacock

INTRODUCTION

The castle of Ojców (Skała commune, Krakow district), located in the scenic landscape of the Ojców National Park in the Krakow Upland (Gilewska, 1972), belongs to the most impressive defensive fortifications of the Polish Middle Ages. The castle – now for the most part in variable states of decay – sits on the flat crest of a limestone hill on the right bank of Prądnik creek (**Fig. 1**); its advantageous natural and strategic position clearly contributed to its prominent past.

Due to the castle's poor state of repair and the scarcity of written accounts, archaeological excavations are needed to preserve its history and answer the question of how it developed and changed through time. The castle has been the subject of several archaeological campaigns (1991, 2006-2020) which have shed light on both its development and the material culture of its inhabitants. Given the castle's ruination and the large size of the castle hill (around 63 acres or 0.63 hectare), detailed reconstruction of the multiple settlement phases is still in progress (Olszacki, 2011; Wojenka, 2008, 2016, 2018).

The purpose of this paper is to describe the animal remains from Ojców castle, a set of information that is seldom a focus of castle archaeology in south-eastern Poland. We hope this publication will fill a gap in our current state of knowledge and will provide, at least up to a point, a significant benchmark for understanding the role of animals at castles in this part of the country.

This paper is based on faunal assemblages unearthed in excavated trenches I-II, which were set out in 2006-2007 and 2011 (Fig. 2). The large collection of animal bones recovered from the castle site has been divided into five main phases of occupation that range from the prehistoric period (Phase I) up to medieval and modern times (Phases II-V).

CASTLE OJCÓW – HISTORICAL BACKGROUND

The scope of this paper includes both prehistoric and historic periods. We begin by providing a brief overview of the site's pre-castle occupation phases, traces of which were unearthed during the excavations. The earliest stages of human occupation are represented by finds in a cultural layer overlying the sterile natural loess strata. Apart from several flint scrapers of probable Neolithic age, this layer yielded hundreds of everyday artefacts dated to the Early Iron Age and corresponding to the open air settlement of the Lusatian Culture from Hallstatt HaC - HaD. In light of archaeological evidence, it is likely that the fall of this settlement was linked with a Scythian attack at the end of the 7th or in the first half of the 6th century BC (Wojenka, 2016: 222). According to the present-day state of research, from that time onward the castle hill was uninhabited until the early castle building works in the 14th century.

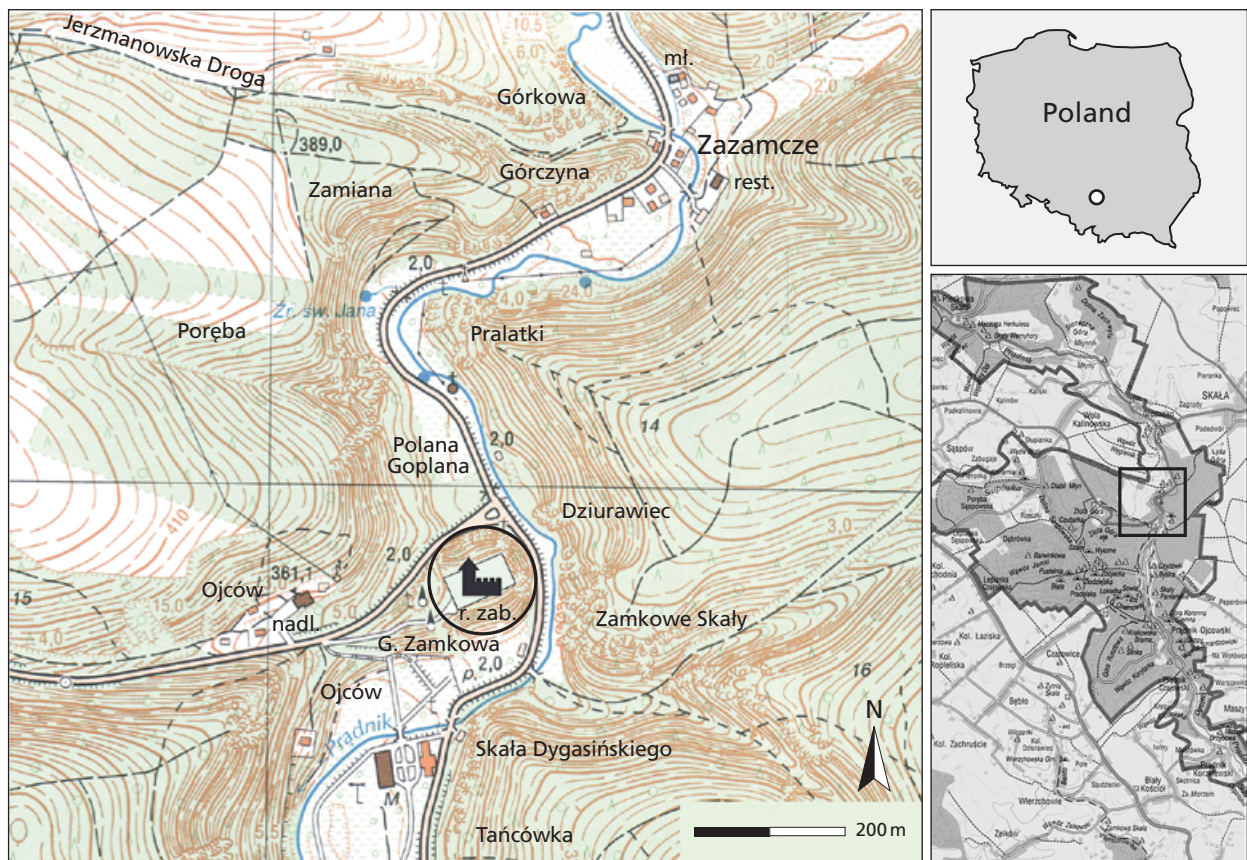


Fig. 1 Map showing the location of Ojców castle.

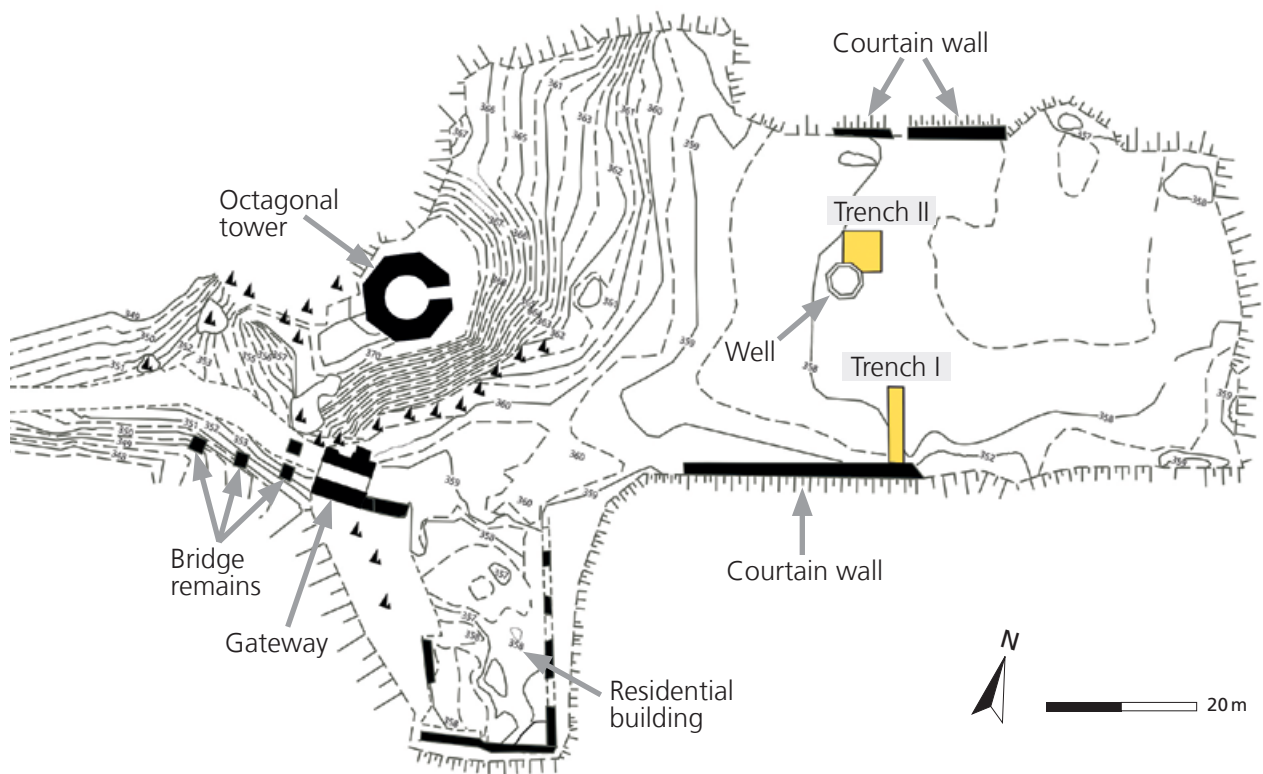


Fig. 2 Map of Ojców castle and location of trenches.

There is no doubt that the castle was a foundation of King Kasimir III the Great. The earliest written evidence on the castle dates from May 16th 1370, when *Zalica burgrauio de Oczecz* was mentioned in a royal document, while slightly later, an anonymous text called *Quomodo regebat regnum et populum* mentioned the site in the index of foundations of the King († 1370; see Wojenka 2018, with further literature). The story of this fortified site started possibly soon after 1354, when the King incorporated the nearby village Smardzowice into the royal lands by a land exchange with the bishop of Krakow, Bodzanta. There are strong indications that the area of present day Ojców primarily belonged to this settlement (Laberschek, 1996: 270), and thus the beginning of building works at the Ojców castle is hereinafter assigned to 1354-1370. This assumption corresponds with archaeological data: the earliest assemblages representing medieval phases of the castle are not earlier than the 14th century.

It is commonly regarded that the castle was built as a commemorative realisation, given to honour the memory of Władysław the Elbow-high, the father of King Kasimir. According to the local tradition, Władysław the Elbow-high, early in the 14th century found a refuge in a cave located nearby (note the castle's name: Oczecz – later Ojców – in Polish means “father”) (Wojenka, 2018).

Before 1385 the castle was given as a tenure (for 500 marks of silver) to Jan from Korzkiew, and since then, albeit still formally a royal site, it was managed by noblemen and regularly changed hands (Falniowska-Gradowska, 1999). In the 16th century the castle was ruled by Queen Bona Sforza (1536-1556), among others. In the following century (from 1619 until 1676) it became a seat of the Koryciński family, Topór house, who rebuilt it in a modern style. Later on, it was held by several noble families, but due to the political conditions at the end of the 18th century the castle for a while lost its tenorial status, and since it was not any longer profitable, at the early 19th century it was abandoned by the last governor, Teofil Załuski. Since it was uninhabited, the castle's state of repair inevitably went from bad to worse. In 1815, it passed to the Kingdom

of Poland (Congress Poland) but in 1829 it was bought by Konstanty Wolicki, who started to dismantle its walls for building materials (Falniowska-Gradowska, 1995, 1999; Ziarkowski, 2015).

TRENCHES I AND II – GENERAL REMARKS

Archaeological excavations in the south and central parts of the Ojców castle hill were made in 2006–2007 and 2011, led by Michał Wojenka (Institute of Archaeology, Jagiellonian University). Two main trenches were set out to examine the stratigraphy. Trench I (2.5 m × 10 m in size) was located near the south curtain wall, and trench II (5 m × 5 m and 2.5–6.5 m in size) was placed in the middle part of the courtyard by the castle's well (Fig. 2). The depth in both trenches was terminated where an undisturbed soil (a yellow clayey loess) appeared. The recorded stratigraphic evidence in trenches I and II is presented in Tables 1 and 2 and in the cross-sections (Figs. 3–4) (for more detailed description of the stratigraphic sequence see Wojenka, 2016).

THE MAIN OCCUPATION PHASES OF THE CASTLE HILL

The archaeological examination of the stratigraphic sequences in trenches I and II provided a detailed insight into the occupation of the castle hill. Thanks to the analysis of archaeological sources combined with historical evidence on the castle (Laberschek, 2016; Falniowska-Gradowska, 1995, 1999) it was possible to distinguish five main phases of settlement, as follows:

Phase I

This is the Early Iron Age open air settlement of the Lusatian Culture communities, which covered the whole castle hill (Kruczek, 2001; Wojenka, 2016). The evidence so far indicates that the settlement may have been destroyed late in the Iron Age, in the 7th century or first half of the 6th century BC (Wojenka, 2016: 222) by a Scythian attack. This is evidenced by finds of a Scythian bone arrowhead found in trench I and – indirectly – by readable traces of fire in the stratigraphic sequence (Wojenka, 2016). We note that after the 2018 excavations, the collection of Scythian arrowheads has grown and currently includes five objects – four made of bronze and one made from a bone (Fig. 5: 1). Stratigraphically, Phase I is associated with the lowermost cultural layer of the castle hill (layer 27 in trench I and layer 12 in trench II), as well as with several sunken features representing the settlement's internal infrastructure (Wojenka, 2016). Phase I is dated broadly to Hallstatt HaC - HaD (in this respect, from mid-8th to the 7th or the first half of the 6th century BC).

Phase II

This marks the beginnings of the castle and the earliest medieval settlement on the castle hill. In the light of more recent excavations, human activity during Phase II may be associated with the earliest masonry buildings at the castle: the octagonal dwelling tower (Wojenka, 2018), the castle's gateway, and the curtain wall. It is likely that slightly later in Phase II the castle was given a rock-cut well. The area adjacent to the curtain

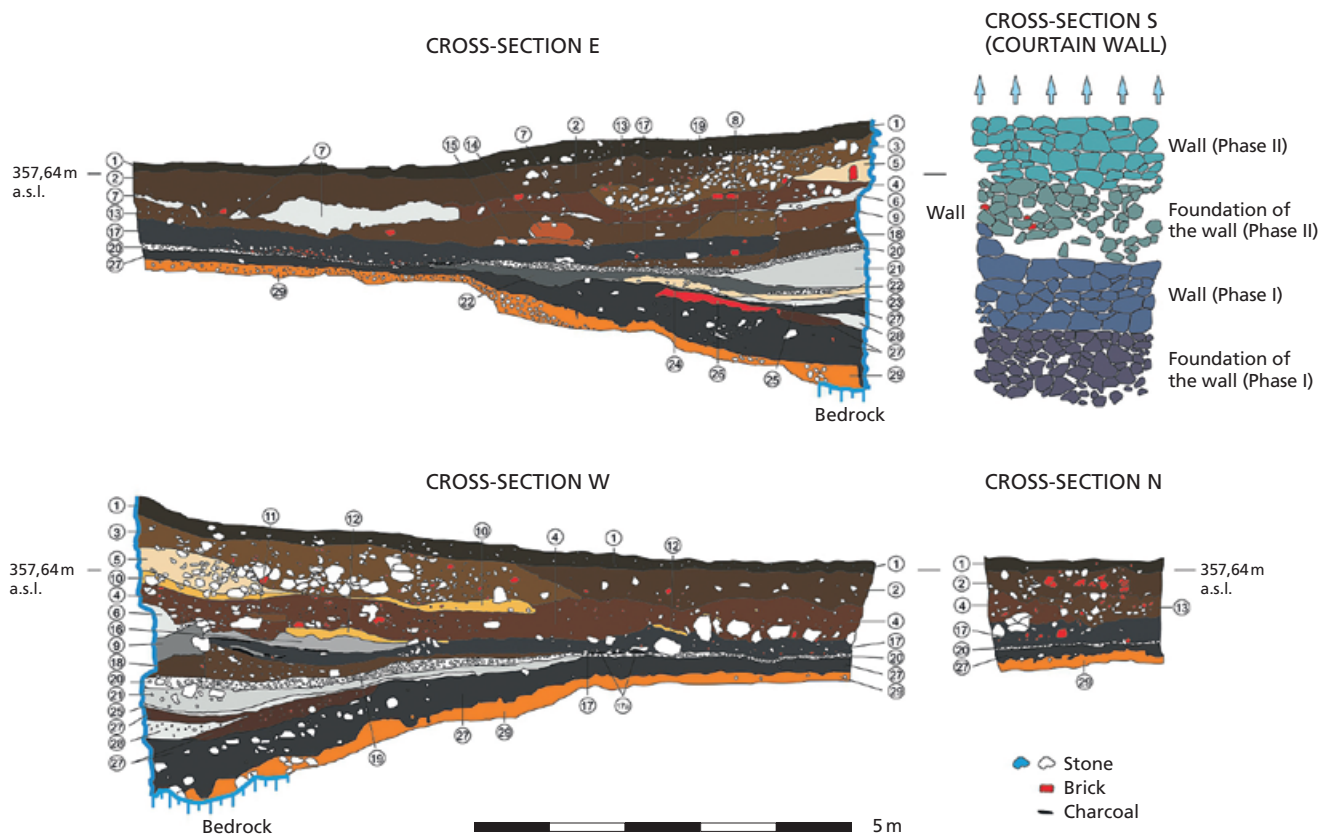


Fig. 3 Stratigraphic profiles of trench I, Ojców castle.

wall in this phase was built up by wooden buildings, but their number and spatial range are unknown. The end of Phase II we synchronise with the completion of essential building works, cutting the well, and cobbling of the courtyard, which was apparently done around the turn of the 15th century. This is confirmed by a find of the Jagiellonian coin issued in 1387-1396 at the top of layer 9 in trench II (the coin was used shortly up to the very early 15th century). The chronological range of Phase II is limited basically to the second half of the 14th century (from 1354-1370 to the turn of the 15th century).

Phase III

This is the period of late medieval occupation of the castle, associated with the deposition of layers 17 and 19 in trench I. These layers must be seen in a context of cultural strata formed inside an undefined building adjacent to the curtain wall. Phase III may be dated to the 15th century.

Phase IV

This is the time of the early Post-medieval (Renaissance) castle, which in a stratigraphic sequence is associated with layers 8, 13-15 in trench I, and layer 8 in trench II. The end of Phase IV can be synchronised with extensive restoration works carried out at the southern line of the curtain wall. Although in most previous

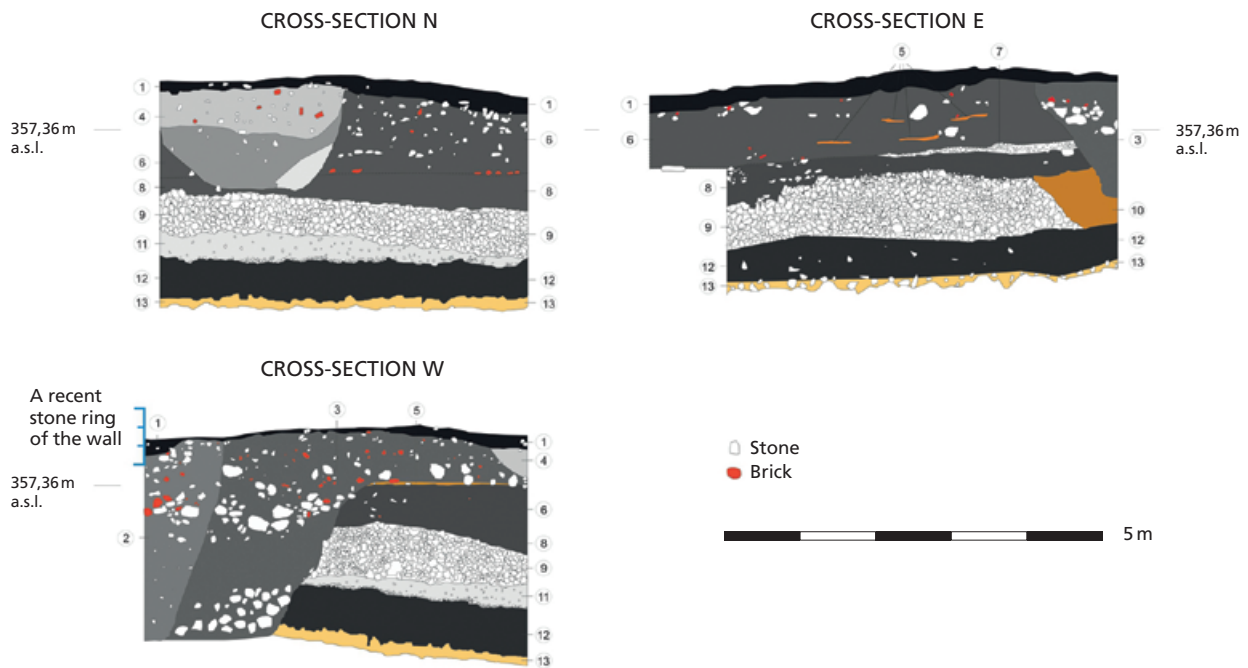


Fig. 4 Stratigraphic profiles of trench II, Ojców castle.

works on the castle the restoration of the wall was conditionally linked with the Koryciński family in 1619-1660 (Wojenka, 2008, 2016), in the light of recently published building registers from 1539-1540 it is not certain whether this restoration started earlier, at the end of the first half of the 16th century (Laberschek, 2016). Given the aforementioned circumstances, the dating of Phase IV may be the 16th century. However, a broader timespan is still tentatively assumed, even up to the first half of the 17th century.

Phase V

This marks the later stages of the castle's history in the Post-medieval period, represented by mostly mixed strata, found above layers 6 and 7 in trench I and over layer 7 in trench II. In light of archaeological finds (numerous pottery vessels, stove-tiles, metal objects including coins) the chronology of Phase V is limited to the period from the 17th to the turn of the 19th century (Wojenka, 2016). It must be stated, however, that archaeological assemblages from this phase hold some redeposited objects from the earlier periods of castle occupation, especially from the 16th century (this refers mostly to layer 4 in trench I).

MATERIAL AND METHODS

The studied osteological materials were recovered during excavations in the courtyard of the castle. We were able to study animal remains from the two trenches (Fig. 2). All osteological materials discovered during excavations are stored in the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences in Krakow (ISEA PAS).

A few thousand bone remains from various animal classes (fish, birds, and mammals) were collected from trenches I and II. However, a complete set of zooarchaeological analyses were carried out only on mammal remains. Fish and bird remains were taxonomically identified. Zooarchaeological studies of bird remains are in progress and results are in preparation.

In trenches I and II animal bone remains were discovered in the sediments which cover both the prehistoric stage of castle hill occupation and the period between the second half of the 14th century to the turn of the 19th century.

All collected mammal remains were subjected to standard procedures used in zooarchaeological studies. In the first step, the bones were identified to element and assigned to species on the basis of comparative material from osteological collections held at ISEA PAS, bone atlases (e. g., Erbersdobler, 1968; Gromova, 1950; Kraft, 1972; Pales and García, 1981a, 1981b; Tomek and Bochenski, 2009), and online digital collections.

Layer number	Layer description	Phase
1	Recent humus, with admixture of limestone gravel and small pieces of brick.	–
2, 3, 4, 5, 11	Mixed layers, for the most part containing large quantities of limestone and smaller pieces of brick, with numerous Post-medieval artefacts including pottery fragments, stove-tiles and metal objects. Generally, the finds may be broadly dated to the 17 th -18 th /19 th c.	V
6, 16	Light-grey mortar layer corresponding to the building of phase II curtain wall, likely during the 1 st half of the 17 th c. or a century earlier – in 1539-1540.	IV/V
7	Concentration of poured lime, possibly for paving (after the erection of phase II curtain wall).	IV/V
8, 13, 14, 15	Mixed layers with limestone gravel and brick fragments, with numerous everyday artefacts dated to the 16 th c.	IV
9, 18	Layers in the foundation ditch of the Phase II curtain wall, containing a few pieces of Post-medieval pottery (the 16 th -17 th c.?).	IV
10	Yellow clayey layer (possibly an earthen floor), with low levels of admixture of Post-medieval pottery fragments and pieces of stove-tiles.	V
12	Yellow clayey layer (possibly an earthen floor), with low levels of admixture of 16 th c. pottery fragments.	IV
17, 17A	Late medieval cultural layer, with numerous pieces of pottery vessels and metal objects, including weaponry (bolt-heads, a falchion handle) and riding gear (spur fragments).	III
19	Dark brown layer with small quantity of stones and numerous medieval artefacts, mostly pottery vessels.	III
20	Limestone cobble of the courtyard.	II/III
21, 23, 25	Building layer with several dozen fragments of medieval pottery.	II
22	Grey cultural layer below the cobble, with a few medieval pottery fragments.	II
24	Pale yellow-greyish layer with mortar below the cobble, with large quantities of medieval pottery fragments.	II
26	Remnant of a clay hearth corresponding to the remains of a wooden building adjacent to the curtain wall. In the area of the hearth few medieval pottery fragments were noted.	II
27	Prehistoric cultural layer, although with several dozens of medieval artefacts in the upper parts and hundreds of the Early Iron Age finds in the lower parts. These include pottery vessels, flint artefacts, bronze objects and a Scythian arrowhead.	I (I/II)
28	Building layer corresponding to phase I curtain wall.	II
29	Sterile loess with sharp-edged limestone.	–

Tab. 1 The stratigraphic sequence recorded in trench I (cf. Fig. 3).

Layer number	Layer description	Phase
1	Recent humus.	–
2	Younger repair trench by the well, dated by a Russian coin after 1895. The trench yielded numerous redeposited artefacts from all phases of occupation.	V-I
3	Older repair trench by the well, dated by an Austrian coin after 1791. The trench yielded numerous redeposited artefacts from all phases of occupation.	V-I
4	Loose, mixed layer with limestone gravel and brick fragments – a filling of a late Post-medieval pit.	V
5	Sterile yellow clayey layer in the NE part of the trench.	V
6	Dark grey, loamy layer with several pieces of brick and admixture of limestone gravel. This layer contained numerous artefacts dated to the 17 th - and 18 th c.	V
7	Limestone cobble with several pieces of 17 th -18 th c. pottery and a copper coin of king John II Kasimir (second half of the 17 th c.) on top. The cobble was adjacent to the remains of a stone foundation of an undefined building, unearthed in the NE corner of the trench.	V
8	Dark grey loamy layer with several dozen fragments of Post-medieval pottery, mostly dated to the 16 th c. Due to the analysis of the stratigraphic sequence on the castle hill as a whole, the accumulation of this layer may be linked to a period before the building of the phase II wall in trench I. It is most likely that this layer mainly corresponds to phase IV.	IV
9	Thick (50-90 cm) sterile layer of sharp-edged limestone. Formation of this strata is linked to cutting of the bedrock for a well. Layer 9 served as cobbles and it is important to note that its medieval chronology is beyond doubt – the surface of layer 9 yielded several medieval artefacts, including 5 small Jagiellonian coins: of Kings Władysław II Jagiełło and Jadwiga (issued in 1387-1396), Władysław II Jagiełło (after 1406), two coins of Władysław III of Poland (1434-1444) and one undefined coin. It is worth noting that medieval finds were also discovered below layer 9.	II/III
10	Yellow clayey loess without archaeological content.	II/III
11	Mortar layer, possibly a remnant of the earliest building works at the castle hill during the 14 th c.	I
12	Prehistoric cultural layer, with several dozen of medieval artefacts in the upper part, and hundreds of the Early Iron Age finds in the lower part.	I (I/II)
13	Sterile loess with weathered limestone.	–

Tab. 2 The stratigraphic sequence recorded in trench II (cf. Fig. 4).

Fish bones were identified by comparing archaeological samples with the recent bones in the reference collection of the Archaeological Research Collection of Tallinn University. Both the taxon and anatomical part the bones represent were identified.

In the next step for mammalian and avian remains, standard zooarchaeological quantifications were calculated, namely Number of Identified Specimens (NISP) and Minimal Number of Individuals (MNI). These values were calculated on the basis of the definitions in Klein and Cruz-Urbe (1984) and Lyman (1994). The MNI was calculated by counting right and left elements and dividing by two, without trying to match pairs of bones with similar sizes and shapes.

In the next step of analyses all mammal remains were carefully inspected under strong oblique light to discover possible signs of human activity such as marks made by knives (cut-marks), percussion marks made by butchers' axes, and fire traces.

In addition to the evidence for human activity signs of dog activity, namely gnawing marks and digested bones were additionally recorded.

RESULTS

During the excavations of the Ojców castle trenches I and II, the following numbers of remains were collected: 7,653 mammalian bones, 307 bird bones, and 11 fish remains (Tabs. 3-4). Among the mammals only ~23.3% (NISP = 1,783) of all osteological materials could be identified to taxon and skeletal element. Only part (NISP = 4,544; ~59.3% of all mammal remains) of the osteological material could be connected to specific phases of castle development. In the assemblage remains of domestic mammals dominate (NISP = 1,737). Only 46 taxon identified bones represent wild animals, which is about 1% of all identified mammalian remains. Excavations in trenches I and II yielded bones from hare (*Lepus europaeus*), red fox (*Vulpes Vulpes*), wolf (*Canis lupus*), roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), and wild boar (*Sus scrofa*). Among these taxa only hare (NISP = 32) and red deer (NISP = 7) are represented by more than two bones. Among domestic mammals three taxa dominate: cattle (*Bos taurus*; NISP = 811), pig (*Sus domesticus*; NISP = 580) and goat/sheep (*Capra hircus* / *Ovis aries*; NISP = 308). Horse (*Equus caballus*) and dog (*Canis familiaris*) are represented by only 18 remains each.

Similarly to the mammalian pattern, bird remains are dominated by domestic species (Tab. 4). The largest number of remains (NISP = 166; MNI = 11) belongs to domestic fowl (*Gallus domesticus*). Geese (*Anser* sp.) are also very well represented (NISP = 60; MNI = 5). Other bird taxa, both domestic and wild, are represented by single specimens.

Fish remains were represented by very low numbers (n = 11). Single bones were found in sediments from all phases. Only trench II yielded just two bones. The number of fish remains is too low to reconstruct the preferred fish species in the castle's faunal material; pike (*Esox lucius*), common bream (*Abramis brama*), and Atlantic sturgeon (*Acipenser oxyrinchus*) are all represented.

Phase I (The Early Iron Age)

Phase I is represented by nearly 600 mammal remains from the middle and lower parts of the earliest cultural layer (layer 27 in trench I and layer 12 in trench II), and is clearly associated with the archaeological context of the Lusatian Culture (Early Iron Age). Only ~21.7% of the faunal remains (NISP = 130) could be identified to taxon. The osteological material is strongly dominated by remains of domestic animals; only two bones belong to wild animals, hare and red deer. Remains of cattle (NISP = 48; MNI = 4) are most numerous among domesticated mammals, followed in numbers by pig and goat/sheep (Tab. 3). We note that the largest number of horse remains (NISP = 9, MNI = 2) was found in this phase.

Signs of meat processing (dismembering and filleting cut-marks) were recorded on 71 mammal bones from this phase (Tab. 5). However, only 5 bones with cut-marks and 11 with percussion marks could be identified to taxon. It should be noted that there were cut-marks on a dog metacarpus bone, assigned to skinning. Also, a percussion mark is visible on a horse pelvis. Percussion marks are present on a fragment of red deer antler, probably created during preparation of the antler for making a tool or an ornament. Only four burnt bone fragments were recovered, with none identifiable to element or taxon.

A Scythian bone arrowhead (see Chmielewska, 1956) (Fig. 5: 1) was found in trench I. Beside this find another fragment of polished bone was also discovered (Fig. 5: 2), but its possible function could not be identified.

Dog gnawing marks were found on 58 mammal bones in the sediments of Phase I, with 11 located on identified bones of domestic animals, and the rest on unidentifiable bone fragments which were also probably from domestic species (Tab. 6). Notably, a dog scapula has a gnawing mark.

Taxon	Chronology														Total	
	Phase I		Phase II		Phase III		Phase IV		Phase V		Mixed layers					
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI		
Rabbit (<i>Oryctolagus cuniculus</i>)												1	1	1	2	1
Hare (<i>Lepus europaeus</i>)	1	1			5	1	1	1				7	2	18	32	5
Red fox (<i>Vulpes vulpes</i>)					2	1									2	1
Wolf (<i>Canis lupus</i>)					2	1									2	1
Dog (<i>Canis familiaris</i>)	7	2										1	1	10	18	3
Horse (<i>Equus caballus</i>)	9	2			1	1						5	1	3	18	4
Roe deer (<i>Capreolus capreolus</i>)												1	1	1	2	1
Red deer (<i>Cervus eleaphus</i>)	1	1			4	1								2	7	2
Goat/sheep (<i>Capra hircus/Ovis aries</i>)	23	3			42	2	36	3	58	3	149	308	11			
Cattle (<i>Bos taurus</i>)	48	4	5	1	215	8	92	8	120	6	331	811	27			
Pig (<i>Sus domesticus</i>)	41	1	5	1	148	5	70	6	76	4	240	580	17			
Wild boar (<i>Sus scrofa</i>)					1	1						1	1			
Identifiable total	130	14	10	2	420	21	199	18	269	19	755	1,783	74			
Small sized mammals	7		2		8		52		33		85	187				
Medium sized mammals	80		3		194		149		189		485	1,100				
Large sized mammals	130		6		452		193		281		760	1,822				
Unidentifiable	251		5		760		393		328		1,024	2,761				
Unidentifiable total	468		16		1,414		787		831		2,354	5,870				
Total NISP/MNI	598	14	26	2	1,834	21	986	18	1,100	19	3,109	7,653	74			

Tab. 3 NISP (Number of Identified Specimens), % NISP and MNI (Minimum Number of Individuals) of mammal remains from trenches I and II, Ojców castle.

Taxon	Chronology																Total		
	Phase I		Phase II		Phase I-II		Phase III		Phase IV		Phase III-IV		Phase V		Phase IV-V		Phase I-V		
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	
Goose <i>Anser</i> sp.	4	1					3	1	1	1	1	1		29	2	13	9	60	5
cf. <i>Anser</i> sp.																1		1	
Mallard <i>Anas platyrhynchos</i>											1			1	1	1	4	7	2
cf. <i>Anas platyrhynchos</i>							1	1								2		3	1
Indian Peafowl <i>Pavo cristatus</i>																2	1	2	1
cf. Galliformes (small size)													1					1	1
Domestic fowl <i>Gallus domesticus</i>	35	5	3	1	8		5	1	17	2	1		22	2	31	44	166	11	
cf. <i>Gallus domesticus</i>	1						1		4				6		5	12	29		
Capercaillie <i>Tetrao urogallus</i>																		1	1
Hazel grouse <i>Tetrastes bonasia</i>	1	1																1	1
Eurasian sparrowhawk <i>Accipiter nisus</i>											1							1	1
Rock pigeon <i>Columba livia</i>	1	1																1	1
<i>Columba livia/oenas</i>							1	1										1	1
Jackdaw <i>Corvus monedula</i>														2	1			2	1
Magpie <i>Pica pica</i>														1	1			1	1
Aves indet.	3		1				1		1					2		2	2	12	
Aves indet. (big size)											1		3				1	5	
cf. Aves indet.							2						2		9			13	
Total NISP/MNI	45	8	4	1	8		15	5	23	3	5		69	8	66	72	307	28	

Tab. 4 NISP (Number of Identified Specimens), % NISP and MNI (Minimum Number of Individuals) of bird remains from trenches I and II, Ojców castle.

Bird bones were also collected from this phase. The majority of them belong to the domestic fowl (*Gallus domesticus*) (Tab. 4), which were evidently reared at the site, as evidenced by the presence of immature specimens (four bones from juvenile specimens and two bones from subadult individuals), as well as adult females that died during the egg-laying period (eight remains have a structure called medullary bone that develops during that period; see Serjeantson, 2009). Almost half of the chicken bones were cut-marked which confirms the bird was heavily exploited for meat. Goose bones were found in much lesser quantity but they may also have originated from domesticated specimens.

An interesting case is the early presence of the rock pigeon (*Columba livia*). Poland is beyond the bird's natural occurrence (Voous, 1960) but there are questions about whether the species was introduced to the region by humans or if it had expanded its range to Poland by gradual colonisation of human settlements (Tomiałojć and Stawarczyk, 2003). Lasota-Moskalewska (2005) mentions that the pigeon was willingly already bred by Slavs in the Early Middle Age, but it is unknown when that began to happen. Its bones were recovered at a few Polish sites from that period (Bocheński et al., 2012, Lasota-Moskalewska, 2005) but there are doubts whether they come from domesticated/feral or colonising specimens. The recovered bone at Ojców Castle (*tarsometatarsus*) has a cut-mark on its proximal end suggesting portioning of the bird.

The bones of the hazel grouse (*Tetrastes bonasia*) surely come from wild living specimen; the bird is a known game bird. Methods for its hunting were described in the 16th century by a Polish nobleman, Matusz Cygański (1584).

In this phase, only one fish costa coming from the family Cyprinidae was found. This family includes a group of freshwater fishes, the carp-like fishes, and is widely distributed in European freshwater bodies.

Phase I-II (Early Iron Age or first half of the 14th century)

The topmost part of the earliest cultural layer in trench I (i. e., layer 27) yielded an interesting fragment (~7 cm long) of a red deer antler, with visible percussion marks made by a metal tool (Fig. 5: 3). We think it is likely an initially processed raw material rather than a finished product. Due to the stratigraphic position of the find its chronology must remain uncertain prior to radiocarbon dating.

Phase II (second half of the 14th century)

Sediments of Phase II are dated to the turn of the 14th and 15th century. In this phase the smallest number of mammal remains were found (NISP = 26), which were collected from trenches I and II. Only bones of cattle (NISP = 5) and pig (NISP = 5) were identified. The other 16 bone fragments could not be identified (Tab. 3). Signs of human activity were found on six remains: two cut-marks, three percussion marks, and burning of fragments (Tab. 5). One percussion mark was found on a cattle tibia shaft.

Despite the very small number of animal remains, a fragment of bone was found that had been modified by human action. It is a fragment of the spinous process of a thoracic vertebra, belonging probably to cattle. Part of the bone is intentionally polished, which is not connected with food consumption (Fig. 5: 4).

Dog gnawing marks were also found on a very small number (n = 4) of bone fragments, and only one cattle bone has these marks (Tab. 6).

The only identified bird species from sediments of this phase is the domestic fowl (*Gallus domesticus*) (Tab. 4). In trench I one dental bone and four pieces of bony plates (scutes) of sturgeon (*Acipenser* sp.) were found.

All remains come from a very large individual about 2.5 m long. According to Desse-Berset (2011), the dental bone is attributed to the Atlantic sturgeon (*Acipenser oxyrinchus*) (Fig. 5: 5).

Phase III (15th century)

The largest number of remains belongs to Phase III, which is dated to the 15th century. In these sediments were found 1,834 mammal remains, but only 22.9 % of them could be identified to taxon. The remains of domestic mammals dominate the osteological material from this phase. Cattle and pig clearly dominate both in NISP and MNI (Tab. 3). These two taxa comprise more than 86 % of all remains discovered in this phase. Goat/sheep remains are only 10 % of total osteological material (NISP = 42; MNI = 2). It should be noted that also in this phase the largest number of wild mammal bones (NISP = 14) and taxa (n = 5) were discovered. Included are remains of hare, red fox, wolf, red deer, and wild boar. Remains of wolf, red fox, and wild boar were only discovered in this phase. The remains of wild mammals are only about 3.3 % of all identifiable mammalian remains from Phase III.

Although 452 bone fragments lacked characteristic landmarks and could not be identified to taxon of animal, the thickness of their cortical bone indicates they are from large (cattle/horse sized) animals. Because sediments of this phase contained only one bone fragment identified as from horse, we assume that the unidentified fragments are from cattle.

The most numerous taxon, cattle (NISP = 215), is represented by all parts of the skeleton. The axial bones from the cattle material include 29 teeth, horn, and mandible fragments, and eight vertebral fragments. Appendicular bones are dominated by long limb bones, most of them fragmented, and 25 having percussion marks made during the dismembering of carcasses (Fig. 5: 6). The appendicular materials include 26 fragments of scapulas and pelvises. Eight scapulas and three pelvises have visible percussion marks. It should be noted that the only complete bones are metacarpals and metatarsals (n = 89). Cattle feet are represented by 63 bones. Pig (NISP = 148) is also represented by both axial and appendicular elements. In trenches I and II 60 fragments of skulls, mandibles, and isolated teeth, and seven vertebrae were recorded. Of the 39 long limb bones identified, only two with unfused epiphysis were complete. Percussion marks were found on three long limb bones. Pig foot bones are represented by 16 specimens, and no carpals bones were found.

The goat/sheep are represented by a much smaller numbers of bones and teeth (NISP = 42) than cattle and pig. The remains consisted of mainly head fragments (n = 20): isolated teeth (n = 12), skull and horn fragments (n = 4), and mandible fragments with teeth (n = 4). There were only two vertebral fragments found, an atlas and an axis. Limb bones are represented by 20 elements, including only long limb bones (none complete) and no foot bones (carpals, tarsals, phalanges).

The sediments of Phase III yielded the largest number of signs of human activity. Percussion marks were on 110 bones, 22 bones had cut-marks, and 14 specimens were burned. Of the cattle bones 45 had percussion marks, with 27 of these on long limb bones, 11 on scapulas and pelvises, four on vertebra, and three were on astragalus bones. Percussion marks were also observed on five bones of pig and five bones of goat/sheep. We note that red deer remains (NISP = 4) were also collected from the sediments of this phase; a percussion mark is located on a fragment of red deer pelvis, and percussion marks are also visible on unidentifiable bone fragments. The largest number of percussion marks in the Phase III assemblage (n = 39) was on remains whose dimensions suggest that they are from large sized mammals. In the sediments of this phase > 200 cattle remains were collected and only four red deer bones, so we assume that most or all of the unidentified percussion-marked fragments belong to cattle.

Taxon	Chronology												Total											
	Phase I			Phase II			Phase III			Phase IV			Phase V			Mixed layers								
	Cut-marks	Percussion marks	Burned bones	Cut-marks	Percussion marks	Burned bones	Cut-marks	Percussion marks	Burned bones	Cut-marks	Percussion marks	Burned bones	Cut-marks	Percussion marks	Burned bones	Cut-marks	Percussion marks	Burned bones						
Rabbit (<i>Oryctolagus cuniculus</i>)																	1		1					
Hare (<i>Lepus europaeus</i>)																			1					
Red fox (<i>Vulpes vulpes</i>)																								
Wolf (<i>Canis lupus</i>)																								
Dog (<i>Canis familiaris</i>)	1																		1					
Horse (<i>Equus caballus</i>)		1																		1				
Roe deer (<i>Capreolus capreolus</i>)																								
Red deer (<i>Cervus eleaphus</i>)		1						2												3				
Goat/sheep (<i>Capra hircus/Ovis aries</i>)		2						5											1	7	3	20	3	
Cattle (<i>Bos taurus</i>)	1	4			1		3	45	4				26	1					4	80	4	8	192	9
Pig (<i>Sus domesticus</i>)	3	3				1		5	4				4	2	2	4			1	20	8	6	36	15
Wild boar (<i>Sus scrofa</i>)																								
Identifiable total	5	11	1	1	3	8	0	35	3	4	42	0	6	107	16	18	253	28	13	1	1	1	1	
Small sized mammals	3						2				1		7											
Medium sized mammals	11	1	2	1		2	7	1	4	1	8	4	1	21	6	7	47	18	12					
Large sized mammals	19	13	1	1	2	15	39	5	16	19	24	45	3	80	61	11	155	179	20					
Unidentifiable	3	5	1			2	7		3	9		8		11	17	22	19	46	23					
Unidentifiable total	36	19	4	2	2	0	19	53	6	25	28	1	33	58	4	119	84	234	244	56	56	56	56	
TOTAL NISP/MNI	41	30	4	2	3	1	22	110	14	25	63	4	37	100	4	125	191	252	497	84	84	84	84	

Tab. 5 Number of mammal bones with signs of human activity (cut-marks, percussion marks, burnt bones) discovered in trenches I and II, Ojców castle.

Taxon	Chronology										Total	
	Phase I		Phase II		Phase III		Phase IV		Phase V		Mixed layers	
	Gnawing marks	Digested bones	Gnawing marks	Digested bones	Gnawing marks	Digested bones	Gnawing marks	Digested bones	Gnawing marks	Digested bones	Gnawing marks	
Hare (<i>Lepus europaeus</i>)									1	1	1	2
Dog (<i>Canis familiaris</i>)	1									1	1	1
Goat/sheep (<i>Capra hircus/Ovis aries</i>)	4			13		7	2	7	4	29	2	8
Cattle (<i>Bos taurus</i>)	4	1		66		27		20		69		187
Pig (<i>Sus domesticus</i>)	2			36	1	12	1	11		38		99
Wild boar (<i>Sus scrofa</i>)				1								1
Identifiable total	11	1	116	1	46	3	39	5	136	4	349	13
Small sized mammals		1		7		12		21				0
Medium sized mammals	14	1	76		58		65		118		332	0
Large sized mammals	9	1	103		59		50		135		357	0
Unidentifiable	24		139	7	44	1	39		89		335	8
Unidentifiable total	47	3	318	7	168	1	155		354		1,045	8
TOTAL	58	4	434	8	214	4	194	5	490	4	1,394	21

Tab. 6 Number of mammal bones with signs of dog activity (gnawing marks, digested bones) discovered in trenches I and II, Ojców castle.

Despite the large number of animal remains only two bone artefacts were discovered. One is a fragment of a heavily modified, polished, and ornamented bone fragment, possibly depicting an eagle(?) (Fig. 6: 1). Due to the fragmentation of the find its function is uncertain, although there is a strong possibility it is a bone ornamental plaque, possibly from a belt, sword shield, or saddle (see Marek, 2016: 306, Fig. 3). The second item is a pig 4th metatarsus with a drilled hole (Fig. 6: 2), which may be interpreted as a bone fastening device (see Jaworski, 2012: 167, Fig. 2.d-k).

A small number of bird bones (NISP = 15) attributed to this phase, which (Tab. 4) weakens our ability to generalise about the potential economic importance of different taxa. Even so, we think there is a shift in the pattern of human utilisation of birds; the number of goose bones in proportion to that of the chicken is higher than in the earlier phases. The duck and pigeon might have been caught in the wild or kept in captivity, which is suggested by the presence of medullary bone structure within the pigeon's bone. The capercaillie (*Tetrao urogallus*) was a highly regarded game bird (Cygański, 1584; Samsonowicz, 2011), with the recovered bone belonging to a male.

From Phase III, a dental bone was recorded from the cyprinid fish, the Common bream (*Abramis brama*), a common species in central and north-eastern Europe.

Phase III-IV (15th-16th century)

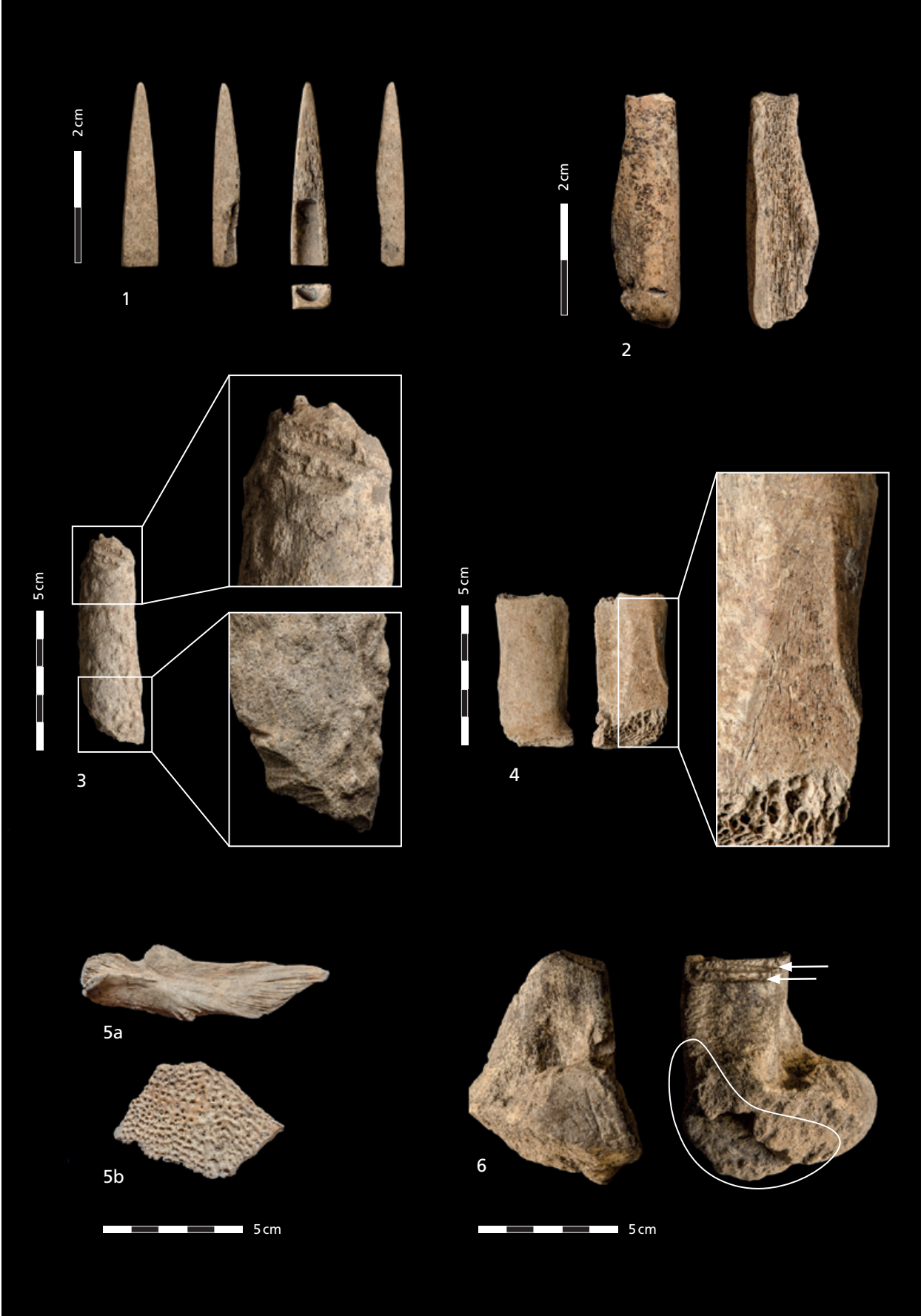
An important bird remain lacking clear stratigraphical position was found in mixed sediments of Phase III-IV (Tab. 4). A bone of the Eurasian sparrowhawk (*Accipiter nisus*) was recovered within a context of 15th and 16th century pottery sources. Wild-living sparrowhawks, due to their feeding and nesting behaviour, do not occur in human dwellings; their presence may be rather connected with hawking because of the popularity of the sparrowhawk in that activity (Bochenski et al., 2018). The suggestion of hawking is further supported by the fact the bone belonged to a female. Hawking was enormously popular sport for the upper ranks of society in Europe and Asia (Serjeantson, 2009).

Phase IV (16th to mid-17th century)

In sediments from Phase IV, 986 mammal bones and teeth were collected. Cattle remains (NISP = 92; MNI = 8) dominate the osteological material, followed by pig (NISP = 70; MNI = 6), and goat/sheep (NISP = 36; MNI = 3) (Tab. 3). Only one other bone could be identified to taxon, belonging to a hare. For the other mammal remains only a relative size of animal could be determined (small, medium, large mammals). Cattle remains (NISP = 92) are represented by head elements (NISP = 14), mainly upper and lower teeth. Only one mandible fragment was found and no other skull fragments. Among vertebrae only two separate axis bones were discovered. Long limb bones (NISP = 35) clearly dominate the osteological material identi-

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Fig. 5 Ojców castle. **1** Scythian bone arrowhead (Phase I: Early Iron Age); **2** fragment of polished bone (Phase I: Early Iron Age); **3** Red deer (*Cervus elaphus*) antler, with visible percussion marks made by a metal tool (Phase I-II: Early Iron Age or first half of the 14th c.); **4** fragment of the spinous process of a thoracic vertebra of large mammal with part intentionally polished (Phase II: second half of the 14th c.); **5 a** dental bone of Atlantic sturgeon (*Acipenser oxyrinchus*), **b** fragment of bony plate (scuta) of sturgeon (*Acipenser* sp.) (Phase II: second half of the 14th c.); **6** cattle (*Bos taurus*) distal part of right humerus with gnawing marks and percussion marks (Phase III: 15th c.).



fied as belonging to cattle. Most of them are only fragments; only four complete bones were collected, two metacarpals and two metatarsals. Percussion marks were seen on 11 discovered limb bones, which is about one-third of the total number of limb bones. These marks explain the extreme fragmentation of these bones. Also, foot bones (carpals, tarsals and phalanges) are numerous (n = 29), with a high number of calcaneus bones (n = 10) were found.

The second-best represented taxon in this phase is pig (NISP = 70). Head elements (teeth, skull fragments, mandibles) are the most numerous (n = 49). Only one vertebra (atlas) was discovered. Also collected were six scapula and pelvis fragments. Long limb bones are the next most numerous pig remains (n = 10). Pig feet are represented by four bones.

Goat/sheep head elements are represented by 11 teeth and bone fragments. Also found were two vertebrae (an atlas and another cervical vertebra), and four fragments of scapulas and pelvises. Long limb bones are represented by 11 specimens; no complete bones were discovered. Seven foot bones were also recovered.

Signs of human activity on mammal bones from Phase IV consist of mainly percussion marks (n = 63) and cut-marks (n = 25) (Tab. 5). Only four burned mammal bones were collected. Percussion marks were found mainly on cattle bones (n = 26) (Fig. 6: 3); pig and goat/sheep bones had only single marks (four and five respectively). Cut-marks were found only on unidentifiable bone fragments. The unidentifiable fragments belonging to large sized mammals included 19 specimens with percussion marks and 16 with cut-marks. It is assumed that these remains of large sized mammals belong to cattle.

In sediments of Phase IV three bone artefacts were discovered. One is likely a board game piece (see Blazevičius, 2013: 147, Fig. 8; Haak et al., 2012: 316, Fig. 18). It is very well preserved, very carefully modified and prepared (Fig. 6: 4). Another is a fragment of an inlaid adorned with floral motive, possibly from a wheel-lock firearm (Fig. 6: 5) (see Haak et al., 2012: 313, Fig. 15.3-4). The third is a fragment of furniture cladding (wardrobe, chest) or mirror frame (Fig. 6: 6).

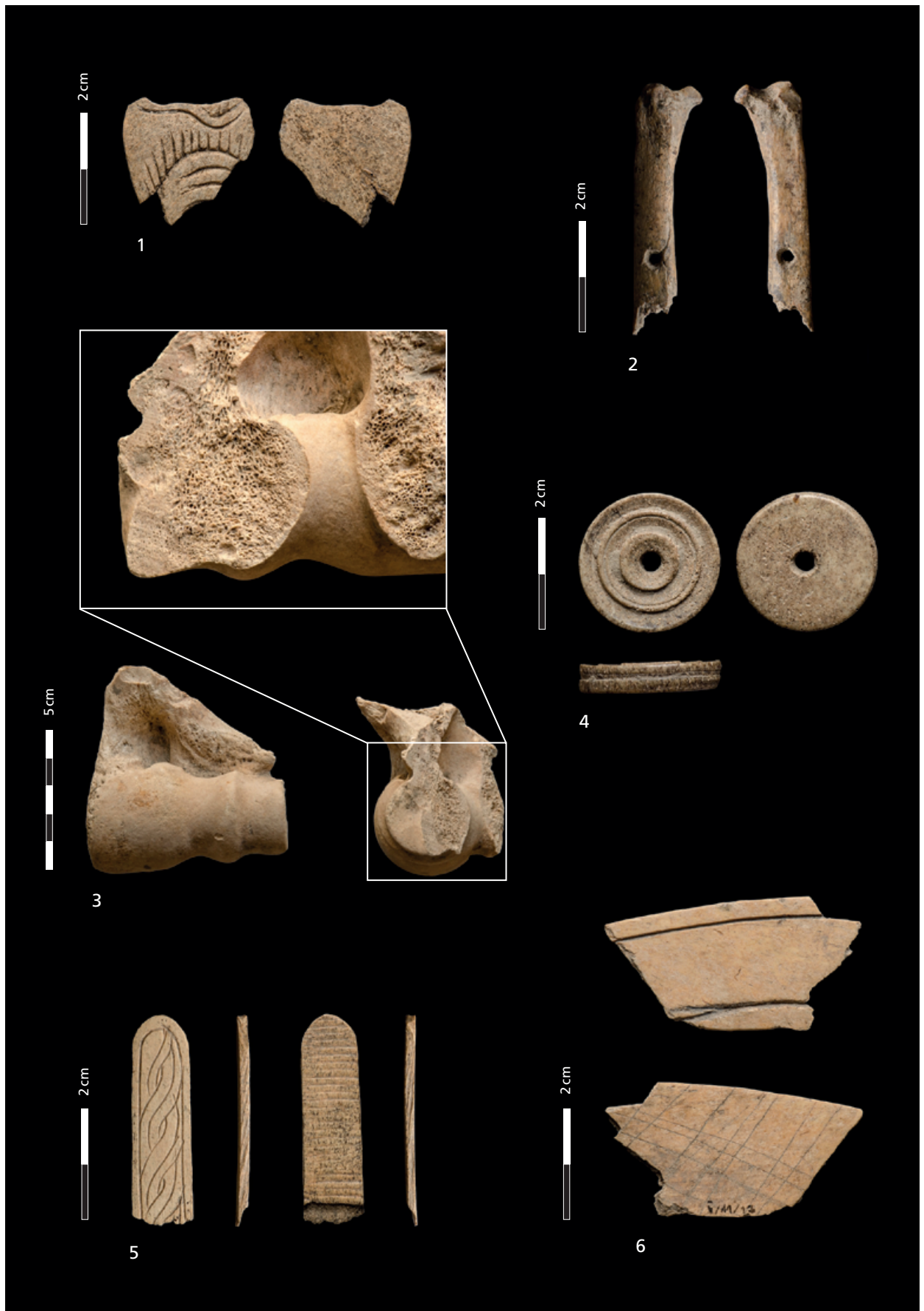
Marks made by gnawing dogs were also found on mammal bones. The largest number of gnawed specimens were from cattle (n = 27) (Fig. 7: 1); another 59 specimens with dog gnawing marks are from large-sized mammals which also are probably cattle. Such marks were also noted on 58 bones of medium sized mammals which probably belong to pig or goat/sheep.

The bird assemblage from Phase IV is dominated by chicken bones (NISP = 17) (Tab. 4). Almost half of them come from immature specimens. A few bones have cut-marks. At least one bone has been gnawed, probably by a dog; the bone also appears partially digested. A few other bones were gnawed by rodents, which means they were thrown either onto a garbage heap or exposed on the ground and not buried in a pit.

Phase IV-V (16th to the turn of the 19th century)

In mixed sediments of Phase IV-V the avian assemblage is mostly made up of chicken and geese remains. A few bones of mallard duck were also recovered. The unique finds in this phase are two bones of peacock

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Fig. 6 Ojców castle. **1** fragment of a heavily modified, polished, and ornamented bone, possibly depicting an eagle(?) (Phase III: 15th c.); **2** pig (*Sus scrofa*) 4th metatarsus with a drilled hole, which may be interpreted as a bone fastening device (Phase III: 15th century); **3** cattle (*Bos taurus*) distal part of right humerus with percussion marks (Phase IV: 16th to mid-17th c.); **4** bone board game piece (Phase IV: 16th to mid-17th c.); **5** fragment of an inlaid adorned with floral motive, possibly from a wheel-lock firearm (Phase IV: 16th to mid-17th c.); **6** fragment of furniture cladding (wardrobe, chest) or mirror frame (Phase IV: 16th to mid-17th c.).



(*Pavo cristatus*), a tibiotarsus and femur (Fig. 7: 2). The latter bone was radiocarbon dated, which confirmed its post-medieval chronology (1484-1648 cal AD; 95.4 % probability), supposedly the first half of the 17th century, i. e., the period in which the Koryciński family managed the castle (Wojenka and Wertz, 2018). The peacock is rarely found at archeological sites in Poland, although the oldest find occurred as early as in the 11th century at Ostrów Lednicki, a place related with the Piasts, i. e., the ruling dynasty of Poland (Makowiecki et al., 2014; Wojenka and Wertz, 2018). The bird had a great value in the past and its presence surely communicates the high status of the Castle's owner.

Phase V (17th to the turn of the 19th century)

The composition and the number of mammal remains is similar to that of the other phases. Remains of domestic mammals dominate the osteological material. The largest number of remains are cattle (NISP = 120, MNI = 6), following by pig (NISP = 76, MNI = 4) and goat/sheep (NISP = 58, MNI = 3). Also single bones of domestic mammals were found, specifically horse, dog, and rabbit (Tab. 3). Besides the domestic mammals, single bones were found of wild taxa, hare and roe deer. As with the assemblages from other phases, most of the remains from Phase V could not be identified to taxon (n = 831). However more than 500 bone fragments could be ordered into size group: small mammals (NISP = 33), medium sized mammals (NISP = 189) and large sized mammals (NISP = 281).

Cattle is represented by all parts of skeleton. From the head (n = 24), teeth (n = 11), horn fragments (n = 2), fragments of maxilla (n = 2) and mandible (n = 7), as well as skull fragments (n = 2) were collected. Only four vertebral fragments were discovered. Long limb bones are represented by 43 specimens. Similar to in other phases, only metapodials are complete in Phase V; other long bones were found broken, as mainly proximal or distal fragments. Small compact foot bones (carpals, tarsals, phalanges) are well represented (n = 36).

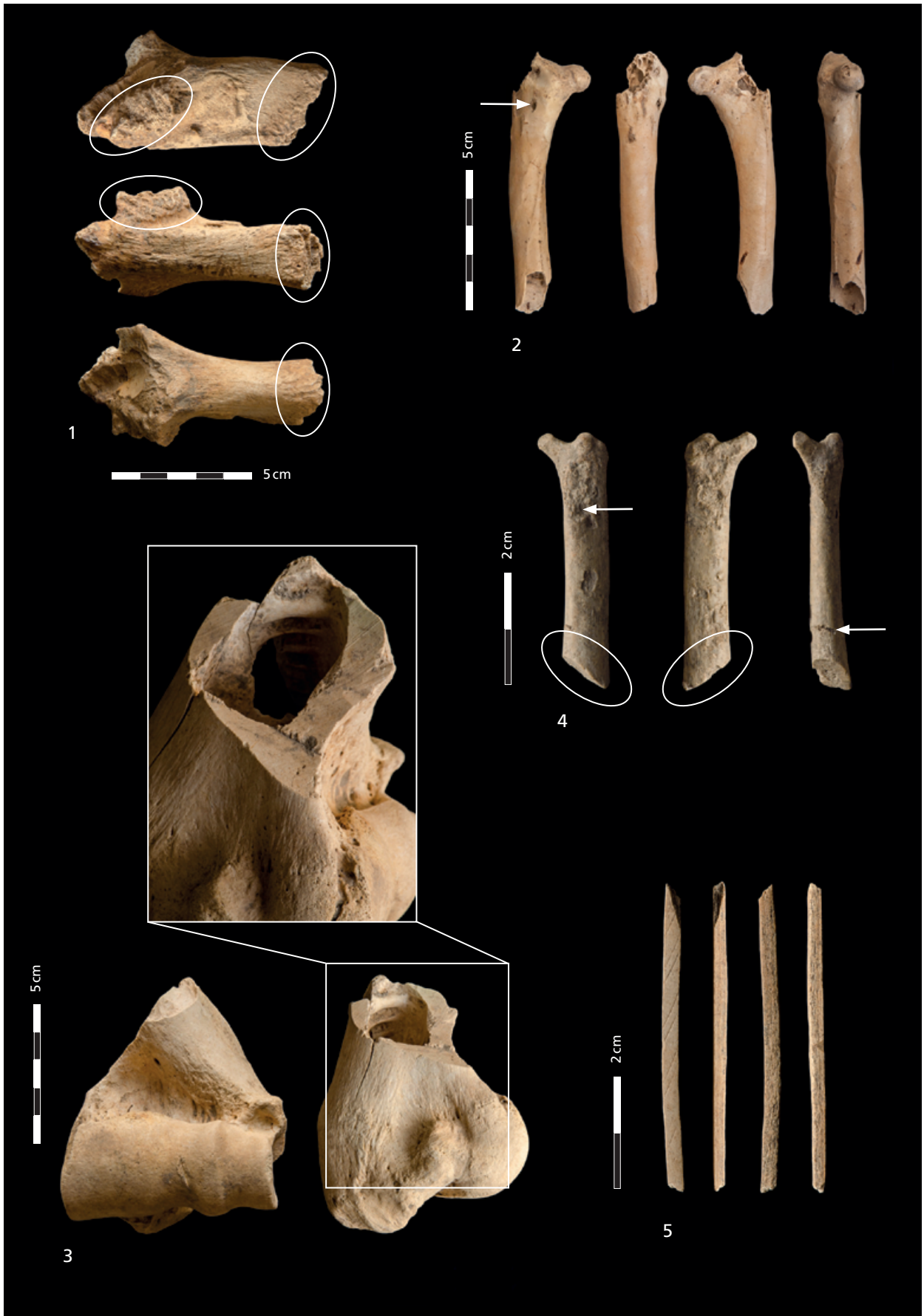
Pig head fragments were found in large numbers, including parts of skull (including maxillae and mandibles with teeth) and isolated teeth (n = 28). Long limb bones are represented mainly by shaft fragments (n = 16), and only one complete tibia was found. Also discovered were 21 foot bones (carpals, tarsals, metapodials and phalanges).

Goat/sheep remains are represented mainly by head fragments (teeth, skull fragments) (n = 6), long limb bones (n = 16), phalanges (n = 34), one fragment of pelvis, and one tarsal bone (astragalus).

As in other phases, the signs of human activity (n = 141) consist mostly of percussion-marked specimens (n = 100) (Fig. 7: 3), followed by cut-marked (n = 37) and burned bones (n = 4). Most of the identified bones with human modifications belong to cattle (Tab. 5). Only isolated bones of pig (Fig. 7: 4) and goat/sheep with percussion and cut-marks were found. As in other phases most of the signs of human activity were found on unidentifiable bone fragments (Tab. 5).

In this phase only one modified bone fragment was discovered, a polished fragment rectangular in cross section with a surface ornamented by cuts (Fig. 7: 5).

Fig. 7 Ojców castle. **1** cattle (*Bos taurus*) right calcaneus with dog gnawing marks (Phase IV: 16th to mid-17th c.); **2** femur of peacock (*Pavo cristatus*) with dog gnawing marks (Phase IV-V: 16th to the turn of the 19th c.); **3** Cattle (*Bos taurus*) distal part of left humerus with percussion marks (Phase V: 17th to the turn of the 19th c.); **4** pig (*Sus scrofa*) 5th metatarsus with percussion marks and dog gnawing marks (Phase V: 17th to the turn of the 19th c.); **5** polished fragment rectangular in cross section with a surface ornamented by cuts (Phase V: 17th to the turn of the 19th c.).



Noticeable in this phase is the high proportion of goose bones in the avian assemblage (Tab. 4); the NISP of goose (NISP = 29) exceeds even that of the domestic fowl (NISP = 22). What is also noteworthy is that many chicken and goose bones are recorded as shafts, and since these elements were virtually omitted from calculations of MNI (because bones were not matched), the obtained MNI values are probably very underestimated. Bones of the domestic goose are hard to differentiate from the bones of its wild form, the greylag goose (*Anser anser*) as well as from the bean goose (*Anser fabalis*); nevertheless it is reasonable to assume that most of the recovered bones belonged to the domesticated form. The duck bone might have belonged to either a domesticated specimen or a wild mallard. Both discovered corvids, the magpie and jackdaw, are common synanthropic birds in the region and might have entered the sediment without human assistance. The bone identified as "cf. Galliformes (small size)" is a distal part of a tibiotarsus that resembles in overall morphology the same elements of grey partridge (*Perdix perdix*) and common quail (*Coturnix coturnix*). Its size, however, is too small for the grey partridge (Kraft, 1972), and apparently too big for the quail (perhaps due to limitations of the comparative collection).

Four fish bones were found in sediments of Phase V. These are two vertebrae of pike (*Exos lucius*) and two costae from fish of family Cyprinidae.

DISCUSSION AND CONCLUSION

During the excavations in trenches I and II of Ojców Castle > 7,500 mammal remains were collected. Unfortunately, ~40% (NISP = 3,109) were discovered in mixed cultural layers and could not be assigned to one of the five phases of sediment accumulation. The osteological materials of all of the five phases are clearly dominated by domestic mammals, and wild taxa are represented only by single bones. Thus, it is apparent that even from beginning of the castle's existence (dating to Phase II) the residents derived their main food resources from breeding livestock. Cattle dominate in all phases, even in Phase I, when the site was an open settlement of the Lusatian Culture.

Small differences are evident in NISP and MNI percentages over time. Analytical results from Phase II are not considered here because of the very low number of collected remains from it (NISP = 26). In all other phases, cattle dominate both in NISP and MNI values. In Phase I (Lusatian Culture occupation) the MNI of goat/sheep exceeds that of pig, which is the only case of that situation from the castle. In other phases pig NISP and MNI have higher values. In Phase V (dated 17th to turn of the 19th century) the number of remains and individuals of cattle and pig decrease in comparison to Phase IV (dated to the 16th-17th century). In the same Phases IV and V, the goat/sheep NISP and MNI increase which could be connected with the lesser importance of the castle in the 18th century, and subsequent fewer residents. Wild mammals (hare, red deer, roe deer, wild boar) are rare in the osteological material, suggesting that this group of animals was not important as a dietary supplement.

Although the fish remains are few in our studied material, there is a noteworthy presence of sturgeon in the sediments of the second half of the 14th century when the castle began to be built. Most of the sturgeon remains known in the territory of medieval Poland come from the area of Szczecin Pomerania and Gdańsk Pomerania, i. e., they come from sites located in the Bay of Gdańsk, near today's Gdańsk, Sopot, and Pruszcz Gdański, which historically belong to Eastern Pomerania. Fewer such sites are known in Western Pomerania and they are situated within the Szczecin Bay or by the waters of the Odra estuary, examples being Szczecin and Wolin, and in Kołobrzeg; these were locales with several castles not having direct access to the sea (Makowiecki, 2003, 2008).

In the Middle Ages, the sturgeon was rather abundant in the Baltic Sea and due to its ability to live also in freshwaters, it would have appeared also in rivers during the spawning season. According to recent aDNA studies, the European sturgeon (*Acipenser sturio*) in the Baltic Sea was replaced by the Atlantic sturgeon (*Acipenser oxyrinchus*) by the Middle Ages (see e.g., Popović et al., 2014).

The sturgeon was enthusiastically fished because of its high nutritional value. Meat of this fish is practically boneless, tender, and tasty. This fish is difficult to breed because its reproduction takes place at long intervals and the females reach sexual maturity quite late, making it very expensive to buy today and also highly valued in the past. The remains of the sturgeon from the Ojców castle excavations came from a very large specimen. Based on the size of the dental bone, the body size is estimated to be about 250 cm. As shown by the data from the site in Staraya Ladoga (Berg, 1962), the Ojców castle specimen was a mature individual whose weight could range from 100 to 180 kg. This sturgeon was bigger than most of specimens from the Gulf of Gdańsk and Zatoka Szczecińska, but it should be emphasized that juveniles were also caught there, measuring about 50 cm (Makowiecki, 2003, 2008).

During the entire history of Ojców castle, from the beginning of the 14th to the 19th century, the main food resources for residents were domestic animals, especially mammals (cattle, pigs, sheep and goats). However, birds (chickens and geese) were important dietary supplements to livestock meat. The high social position of the castle's residents is reflected in the presence of rare fish remains (sturgeon) and an exotic bird species (peacock).

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