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A CONTRIBUTION TO THE STUDY OF MEAT CONSUMPTION BY THE WEALTHY BURGHERS OF SŁUPSK (MIDDLE AGES TO MODERN TIMES)

Urszula Iwaszczuk[1], Maciej Marczewski[2]

A u t h o r s' a d d r e s s e s: 1 – Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences, Nowy Świat 72, 00-330 Warsaw, Poland, e-mail: uiwaszczuk@iksio.pan.pl (corresponding author), ORCID: 0000-0003-2996-1625; 2 – Firma Archeologiczna GLESUM Maciej Marczewski, Kartuska 46/6, 80-104 Gdańsk, Poland, e-mail: archeoglesum@gmail.com

A b s t r a c t. During archaeological research of the Old Market Square in Słupsk, cultural strata and architectural relics related to various phases of the market's development were discovered. The oldest remains date back to the pre-location period; the youngest come from the beginning of the 20th century. The original Gothic town hall was made of brick in the 14th century, accompanied by small wooden annexes. The structure was significantly damaged by the great fire of 1477, after which it had to be partially demolished, renovated and expanded. At the end of the 18th century, all existing buildings were destroyed, the area was lowered, and a new, smaller town hall was built. The last reconstruction of the town hall took place in 1901. The excavations in this area documented 1,179 fragments of animal remains. Due to the complexity of the area's history and high number of uncovered structures, the remains were analysed chronologically. Their analysis aims to understand the burghers' meat diet and briefly examine the state of animal husbandry in and around the city from medieval to modern times. The research showed the high importance of livestock, mainly species such as cattle and pigs that provide a large amount of meat. Remains of poultry, especially chicken and geese, were also relatively abundant. Discovery of the remains of the domestic turkey *Meleagris gallopavo domesticus* in 17th- and 18th-century contexts appears to be of great interest, as they were the leftovers from the luxurious meals at the tables of the burghers. Additionally, a surprising assemblage of corvid bird bones was found in a layer of decayed wood dating to the 18th–19th century, which consisted almost exclusively of the tarsometatarsus bones of a rook (*Corvus frugilegus*) and a raven (*Corvus corax*), found along with a skull of a passerine. This find could be associated with some unknown magical rituals; the bones may have also been collected as trophies.

K e y w o r d s: animal remains, meat consumption, wealthy burghers, late medieval period, modern times

INTRODUCTION

In 2017, the City Hall Office in Słupsk commissioned archaeological research in connection with the planned revitalization of the Old Market Square. The research was carried out by the GLESUM Archaeological Company – Maciej Marczewski, and the research was led by Maciej Marczewski, one of the co-authors of this paper. It was aimed at verifying the locations of town halls functioning in this area in the Middle Ages and modern times, registering and documenting architectural relics and archaeological layers and features, as well as determining the actual nature of the site and developing guidelines for further research.

During archaeological research into the Old Market Square in Słupsk (Fig. 1), cultural strata and architectural relics related to various phases of the market's development were discovered (Należny 2019; Marczewski, Należny 2021). The oldest remains date back to the pre-location period. It is possible that after the first location of the city in the 13th century, a large wooden building was erected here, to be replaced in the 14th century by a brick building. The Gothic town hall partially corresponded to the outline of the 18th-century building. It was partially shifted towards the north-east. The building was accompanied by small wooden annexes. The medieval town hall was

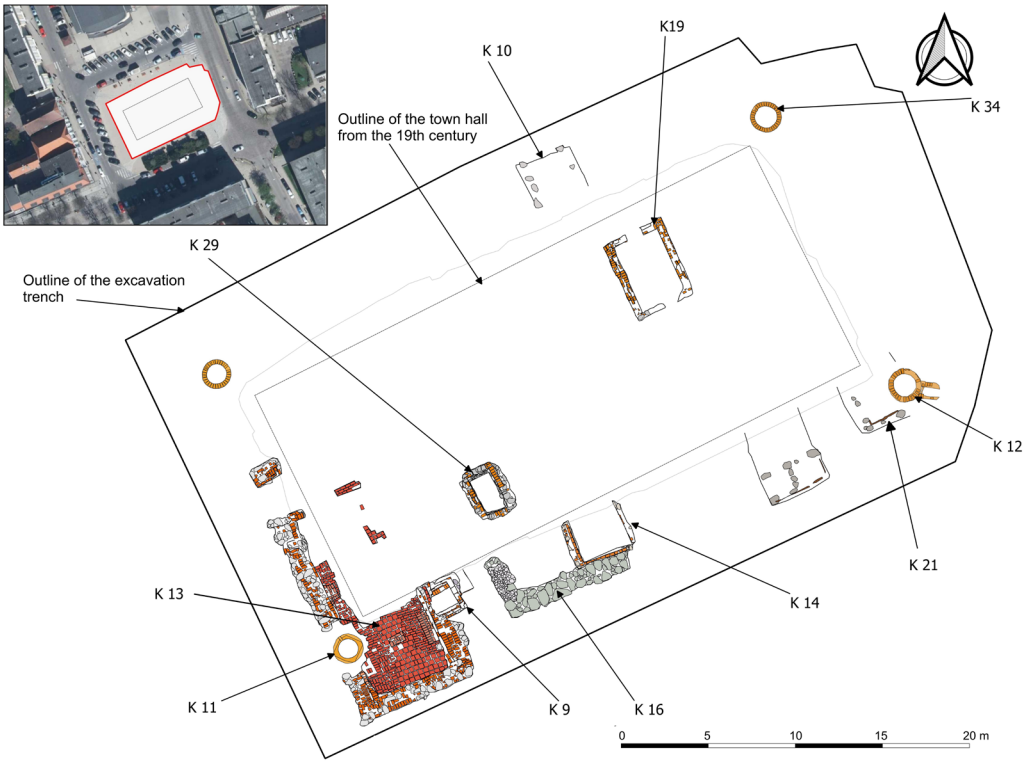

Fig. 1. Plan of the excavated area with the analysed structures marked. Red and orange colours – bricks and floor tiles; grey colour – stones; brown colour – wood (photo: T. Zielenkiewicz, drawing: A. Należny, M. Marczewski)

significantly damaged during the great fire of 1477, after which it had to be partially demolished, renovated and expanded. During its operation, the town hall was enlarged several times with brick annexes. Small, deep basements were built irregularly within the building. During this period, the market complex was also partially surrounded by arcades. At the end of the 18th century, all existing buildings were demolished, the area was lowered and a new, smaller town hall was built, known from photographs and archival plans. In the 19th century, four wells were placed in the corners of the market square, two of which had water supplied to them via pipes. In 1901, the new town hall was almost completely demolished, the wells were filled with rubble, and the area was levelled and paved with stone.

During archaeological research, a large number of small finds and mass material were recovered, including animal bones. Animal remains from settlement sites provide an interesting source of knowledge about diet and husbandry practices in the past. Although the excavations carried out on the site of the former town hall in Słupsk have yielded a relatively small number of animal remains excavated from a number of layers, mainly levelling and demolition layers, and structures, they can provide a valuable insight into the culinary preferences of the Słupsk burghers. The aim of this analysis is to gain an understanding of the burghers' meat diet, and to briefly examine the state of husbandry in and around the city from the medieval period through to modern times.

MATERIALS AND METHODS

The animal remains, a total of 1,179 fragments, came from numerous levelling and demolition layers, construction trenches and structures of complex chronology. For this reason, the remains were analysed within broader chronological phases. More detailed analyses used only the materials from successive phases of the functioning of the stalls, the town hall annexes and the basements, and a few other features unrelated to these structures. The animal remains were in a fairly good state of preservation, with only some, especially the bones of juvenile animals, heavily desiccated and fragile. The bones bore numerous post-consumption marks and traces of gnawing by carnivores, most likely dogs.

The remains were identified in terms of taxon and anatomical elements. Bird bones were identified at the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences (ISEA PAS). Only 7.9% of the remains were found to lack characteristic features allowing their identification.

The age of the animals was determined on the basis of the fusion of the epiphyses with the shafts of the long bones (Schmid 1972: 75) and the degree of tooth development and wear (Lutnicki 1972; Hillson 2005: 207–256). Due to the considerable similarity between sheep and goat bones, not all the bones from small ruminants could be identified to the species level. Where this was possible, standard methods were used to distinguish between the two species (Schramm 1967; Zeder, Lapham 2010; Zeder,

Pilaar 2010). A series of measurements was taken using the method of A. von den Driesch (Driesch 1976), but as it was mainly the width of the bones that could be measured, a detailed estimation of the size of the animals was carried out using point scales (Lasota-Moskalewska 2008: 241–250). For a small number of cattle, heights at withers were calculated using appropriate coefficients (after Lasota-Moskalewska 2008: 170–171). Marks of consumption and butchery processing visible on the bones were assessed.

RESULTS

Pre-location period

The numerous works in the area carried out during the construction and rebuilding of the late-medieval town hall have contributed to the almost complete destruction of the oldest traces of human activity. The two cattle bone remains found from this period do not indicate that the area was permanently inhabited. In addition, the 12 fragments of burnt human remains found in the so-called Early Site may suggest that the site was used as a cemetery in pre-Christian times.

Late-medieval use layers

Animal remains from the late-medieval strata were few in number, at 92 fragments in total, and these belonged almost exclusively to livestock (Table 1). The only exception was a deer tibia fragment, which bore marks of being gnawed by carnivores, most likely dogs, but had no signs of being processed for consumption. Individual bones of cattle and pig were chopped, probably when the carcass was divided into smaller

Table 1. Identification of remains from late medieval contexts from the market place in Słupsk. LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

	Late medieval use layers	
	LMA	LMA/MP
Cattle (*Bos taurus*)	36	3
Horse (*Equus caballus*)	7	
Pig (*Sus domestica*)	21	
Sheep/goat (*Ovis aries*/*Capra hircus*)	11	
Sheep (*Ovis aries*)	1	
Goat (*Capra hircus*)	4	
TOTAL livestock	80	3
Roe deer (*Capreolus capreolus*)	1	
TOTAL game	1	0
Mammals unidentified	11	
TOTAL identified	**81**	**3**
TOTAL unidentified	**11**	**0**

Fig. 2. Horn cores with marks of being chopped off the skull: a. cattle; b. sheep (photos: U. Iwaszczuk)

pieces. Interestingly, a radius of a horse also bore marks indicating that the carcass had been portioned. Chopping marks were also observed on a pig's mandible; the angle of the mandible had been chopped off, which may have been produced when it was separated from the skull to obtain the brawn. Bovine and ovine horn cores were also found chopped off from the skull (Fig. 2); these types of marks could have been made either during skinning or to remove the horn for use for crafts (including the production of glue as well as utilitarian and decorative objects). The goat's horn core found in one of the trenches was probably a semi-finished product, with the upper part cut off and split lengthwise.

Gothic town hall

The remains associated with the functioning of the Gothic town hall constituted the most numerous group of bones from the site, with 966 bone and tooth fragments, of which only 8% were not identified. Animal material was found in small numbers in the numerous levelling layers created during the construction, reconstruction and alteration of the town hall and in various types of buildings. Materials from parts of these structures, including stalls, basements, and annexes to the town hall, were analysed separately; other remains were analysed together within chronological groups. The remains of cattle, pigs and sheep and goats represented all parts of the animal carcasses, but due to their scattering in numerous layers and contexts, a detailed analysis of the anatomical distribution was not carried out, as that would not contribute relevant information.

Levelling and backfill layers and trenches

Late medieval materials

The late-medieval layers and trenches yielded 140 bone fragments and teeth, of which nine remain unidentified. These remains were mostly from livestock; in addition, a few deer bones were found, as well as individual dog and cat remains (Table 2). Among the remains, cattle bones predominated, pig bone fragments were much fewer, and other livestock species, including poultry, were represented by few remains. A large proportion of cattle bones and pig bones bore marks of processing, including, above all, the portioning of the carcass (chopping) (Fig. 3), as well as a few marks of filleting, i.e. the separation of meat from bone. Bovine horn cores were also found chopped from the skull, which, like the horn cores from the use layers, may have been cut off either to facilitate skinning of the carcass or to obtain raw material. It is also possible that the two other horn cores, which showed no signs of chopping and were broken off from the skull, were obtained in order to remove the horn, as was the goat's horn core, also broken off from the skull. Additionally, a fragment of roe deer pelvis with a cut mark through the acetabulum was found in the material from this period. This mark was most likely created when the carcass was dismembered. One layer also provided a fragment of a deer skull with a cut antler, which was probably used as raw material for crafts. Individual bones bore traces of burning. The head of a bovine femur and the shaft of a tibia were partially burnt, while two small fragments were burned white at high temperatures. In addition, a human clavicle was excavated from one of the trenches.

Late medieval and modern materials

The material deposited in layers and trenches from the late medieval to modern periods was slightly more numerous. It contained an assemblage of remains similar to the material of early medieval chronology, and it also provided individual remains of several species of wildlife, including deer, wild boar, roe deer, hare and tawny owl (Table 2). Some of the cattle and pig bones bore marks of chopping. The manner of chopping indicates that the carcass was divided and further portioned. A few marks of filleting were recorded, occurring mainly on the ribs of cattle and small ruminants. In the case of the bovine talus, cut marks were also recorded, which can be linked to the skinning of the animal's carcass. Two bovine horn cores were chopped off from the skull, and horn cores of a sheep and a goat were also found, which were most likely broken off from the skull. One small unidentified bone fragment was burnt grey at a high temperature.

Materials dating from the 16th to 18th centuries

The numerous layers and trenches created after the fire of the Gothic town hall contained very little bone material, with a total of 314 fragments, with only contexts dating to the 17th–18th centuries providing slightly more numerous remains, mainly from livestock, but also a few bones of domesticated birds and wild mammals (Table 2). As in units of earlier chronology, cattle bones predominated in these layers and structures, while pig bones were the second most abundant. Sheep and goat remains

Table 2. Identification of remains associated with the functioning of the Gothic Town Hall in Słupsk. EMA/LMA – Early Middle Ages/Late Middle Ages; LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

	layers and trenches									stall K10		stall K21	annex K6	annex K16
	EMA/LMA (?)	LMA	LMA/MP	16th century	16th–17th century	17th century	18th century	17th–18th century	1779 r.	LMA	17th century	LMA	17th–18th century	17th–18th century
Cattle (*Bos taurus*)	2	70	100	1	1	35	2	91	6	7	1	1	7	
Horse (*Equus caballus*)		1	1			3		4						
Pig (*Sus domestica*)		36	47			20	12	37		2		1	15	
Sheep/goat (*Ovis aries*/*Capra hircus*)		3	15	3		6		17			1		4	1
Sheep (*Ovis aries*)		2	5	1		3		2						1
Goat (*Capra hircus*)		3	4					9		1				
Dog (*Canis familiaris*)		1						1						
Cat (*Felis catus*)		1	1					2						
TOTAL livestock	2	117	173	5	1	67	14	163	6	10	2	2	26	2
Red deer (*Cervus elaphus*)			1					8	1					
Roe deer (*Capreolus capreolus*)		11	2					4						
Wild boar (*Sus scrofa*)			1											
European hare (*Lepus europaeus*)			1											
Brown rat (*Rattus norvegicus*)														
TOTAL game	0	11	5	0	0	0	0	12	1	0	0	0	0	0
Mammals unidentified		9	12			3		36		2			4	
Chicken (*Gallus domesticus*)		1	1										2	
Domestic goose/greylag goose (*Anser anser*)		2	1					2		1			25	
Goose (*Anser* cf. *anser*)														
Goose (*Anser* sp.)													1	
Domestic duck/mallard (*Anas platyrhynchos*)													1	
Domestic turkey (*Meleagris gallopavo domesticus*)						2	1	4						
Tawny owl (*Strix aluco*)			1											
TOTAL birds	0	3	3	0	0	2	1	6	0	1	0	0	29	0
Frog (Anura indet.)														
TOTAL identified	**2**	**131**	**181**	**5**	**1**	**69**	**15**	**181**	**7**	**11**	**2**	**2**	**55**	**2**
TOTAL unidentified	**0**	**9**	**12**	**0**	**0**	**3**	**0**	**36**	**0**	**2**	**0**	**0**	**4**	**0**

Table 2. Continued

	cellar room K13				cellar room K14			cellar room K31		cellar room K29			cellar room K9
	LMA	17th century	17th–18th century	18th–19th centuries	LMA/MP	17th–18th century	18th century	LMA	LMA–16th century	LMA/MP	17th century	17th–18th century	17th–18th century
Cattle (*Bos taurus*)		2			2		1	1	1	2	1	64	8
Horse (*Equus caballus*)													
Pig (*Sus domestica*)		3	1			3	2		1	1		26	3
Sheep/goat (*Ovis aries*/*Capra hircus*)		2	1								1		5
Sheep (*Ovis aries*)			2							1	1	10	1
Goat (*Capra hircus*)			1								1	3	
Dog (*Canis familiaris*)													
Cat (*Felis catus*)													
TOTAL livestock	0	7	5	0	2	3	3	1	2	4	4	103	17
Red deer (*Cervus elaphus*)													
Roe deer (*Capreolus capreolus*)												7	
Wild boar (*Sus scrofa*)													
European hare (*Lepus europaeus*)													
Brown rat (*Rattus norvegicus*)													9
TOTAL game	0	0	0	0	0	0	0	0	0	0	0	7	9
Mammals unidentified		1				2			1			4	3
Chicken (*Gallus domesticus*)			1									8	7
Domestic goose/greylag goose (*Anser anser*)				1					2		1	11	1
Goose (*Anser* cf. *anser*)													1
Goose (*Anser* sp.)													
Domestic duck/mallard (*Anas platyrhynchos*)													2
Domestic turkey (*Meleagris gallopavo domesticus*)			1										
Tawny owl (*Strix aluco*)													
TOTAL birds	0	0	2	1	0	0	0	0	2	0	1	19	11
Frog (Anura indet.)	23												
TOTAL identified	**23**	**7**	**7**	**1**	**2**	**3**	**3**	**1**	**4**	**4**	**5**	**129**	**37**
TOTAL unidentified	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**4**	**3**

Fig. 3. Cattle femur with a mark of chopping by the head (photo: U. Iwaszczuk)

were sparse, while horse bones occurred sporadically, as did dog and cat skeletal elements. Two antler fragments with noticeable processing marks were recorded among the deer remains from units dating to the 17th–18th centuries. One of the fragments had been planed from the narrower upper side and on the outside, while the other had been cut away from the rest of the antler with a very even cut.

The find of domestic turkey bones is interesting (Fig. 4). Remains were found in two trenches, one made for the foundation of a basement (17th century) with two bones, and the other possibly serving as a lime kiln (18th century) with four bones. These bones bore no marks of processing.

Post-consumption marks, however, were recorded on the bones of cattle (Fig. 5), pigs and individual remains of sheep and goats (Fig. 5), including, in the case of cattle and pigs, bone elements from the head (Fig. 6). In addition, there were marks of filleting on a few long bones, ribs and vertebrae. One of the vertebrae of a sheep or goat that had been chopped lengthwise was partially burnt in the area exposed by the chopping.

Among the 16th–18th century material, the most noteworthy was from a very precisely dated pit (1779 AD). This pit contained sparse bovine bones, mainly head elements, and a fragment of a very poorly preserved deer antler with no traces of craft processing.

Stalls (Late Middle Ages, 17th century)

Only two structures of this type contained animal bones (Table 2). A few cattle and pig bones and a goat mandible were found in the backfill and levelling layers of structure K10, interpreted as the remains of a stall. Two bones (cattle and pig) bore post-consumption marks.

Fig. 4. Turkey bones from modern contexts: a, b. tarsometatarsus; c. femur; d. fragment of the sternum; e. tibiotarsus; f. femur (photos: U. Iwaszczuk)

Most of these remains were dated to the late medieval period, with two bones coming from the 17th-century layer. Structure K21 with a late medieval chronology yielded an even smaller number of bones, with only two fragments from cattle and pig, including a bovine ulna bearing evidence of chopping.

Annexes (17th–18th centuries)

The two structures that were annexes to the Gothic Town Hall contained animal remains, of which only two bone fragments belonging to small ruminants were found in structure K16 (Table 2). Structure K6 provided bones of primary livestock such as cattle, pig, small ruminants and poultry. This was the most numerous collection of domesticated bird bones from the site, with goose remains being particularly abundant.

Fig. 5. Bones of cattle and sheep/goats with marks of processing: a. cattle metacarpal bone with marks of chopping along and across; b. cattle scapula with marks of the glenoid cavity being chopped off; c. cattle pelvis bone fragment (ilium) with traces of chopping; d. sheep/goat rib with chopping marks. The chopping directions are marked with arrows (photos: U. Iwaszczuk)

Interestingly, a goose tibiotarsus bore a trace of being chopped across the shaft, probably made during a foot's cutting off. This was the only mark of processing recorded on bird bones from this site.

Basements (Late Middle Ages, 17th–19th centuries)

Animal bones were found within four structures interpreted as cellar rooms of varying sizes. Only structure K29 contained a more significant number of bones, with most of the remains coming from the 17th–18th century layers. Almost all of the cellar rooms contained bones of livestock such as cattle, pig, small ruminants and poultry; only room K14 contained no fowl remains (Table 2). Only a few frog bones were found in the oldest late-medieval demolition layer of cellar K13. The demolition layer

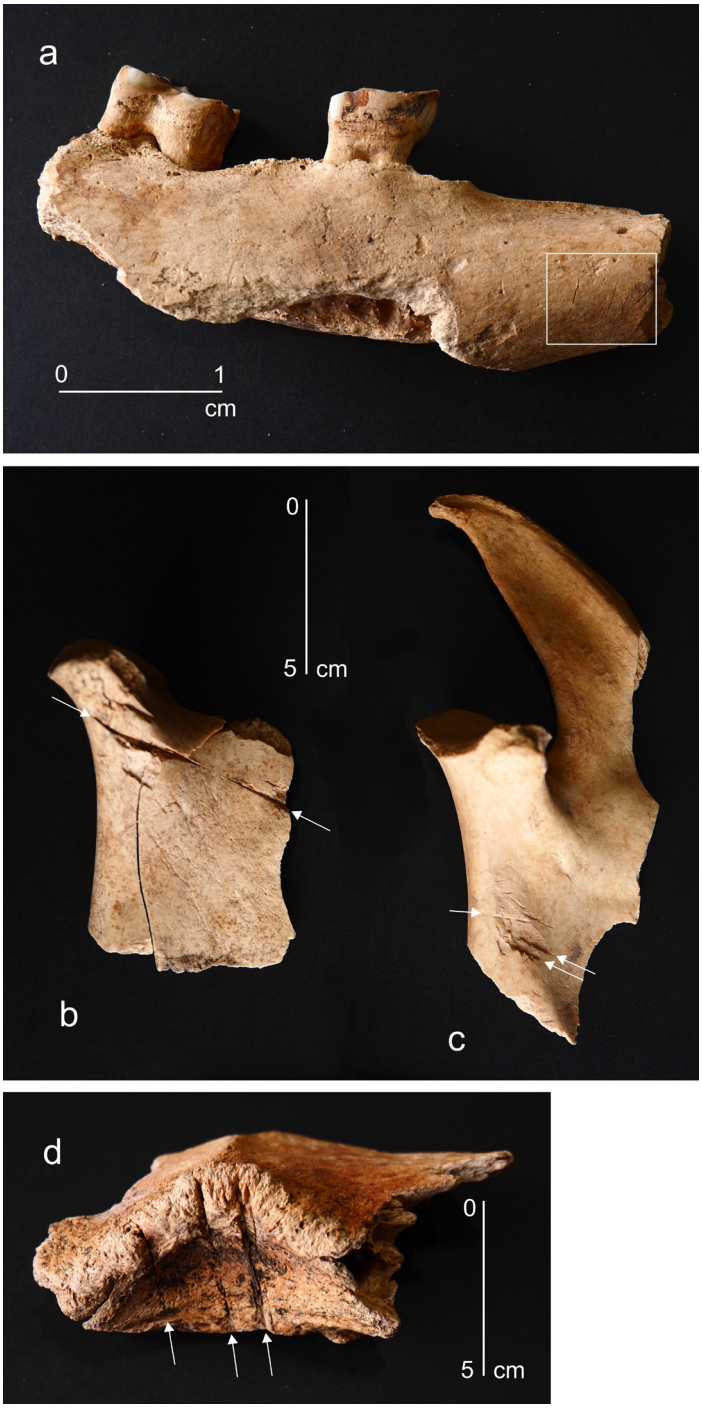

Fig. 6. Cattle cranial elements with marks of processing: a. mandible with filleting marks; b, c. mandibles with chopping marks below the processes; d. occipital bone with chopping marks. The chopping directions are marked with arrows (photos: U. Iwaszczuk)

dated to the 17th–18th century contained the ulna of a domestic turkey with marks of gnawing by carnivores, most likely dogs. In addition, the identically dated layers of cellars K9 and K29 contained goose, chicken and duck bones in small numbers. Very few bones from the basements bore marks of processing, and these were solely chopping marks, most likely from the portioning of meat.

Town hall from 1798

Animal bones from the time of the construction and use of the new town hall commissioned in 1798 were very scarce. There were only 118 fragments, of which five bones could not be identified.

18th–19th centuries

Most of the remains came from units dating to the 18th to 19th centuries. These contexts contained bones mainly of livestock such as cattle, pig, small ruminants and poultry (Table 3). Very few cattle and pig bones bore chop marks indicative of carcass portioning. An interesting find was a collection of 10 tarsometatarsi of corvid birds (9 of which were from the left side of the body) deposited between the remains of decayed wood; these were mainly rook bones, although four of them could have come from a raven. In addition to these bones, the skull of a small bird of the Passeriformes order was also found.

Water installations

A small number of animal remains were excavated from three water installations, including two reservoirs imitating wells (water tanks) K11 and K12 and well K34 from the northern corner of the square. They probably got there by accident during the backfilling of these structures.

Water tanks

Water tanks K11 and K12 contained only bones of livestock (Table 3). Bones of domestic mammals such as cattle, small ruminants and dog were recorded in both, while in K12 additional single chicken and goose bones were also recorded.

Well

The only item from the well was the pelvis of a morphologically adult sheep (Table 3) with filleting marks in the form of two thin cuts under the acetabulum and gnawing marks from carnivores, most likely dogs.

Beginning of the 20th century

In addition, 26 dog skeletal fragments were excavated from pit K3 associated with the demolition of the modern town hall in the early 20th century (Table 3). They included the skull, although the bones were very desiccated and preserved in pieces, both parts of the mandible with teeth, incomplete proximal parts of the limbs (more complete were elements from the proximal parts of the forelimb), and metatarsal bones from the left hind limb. The dog was approximately 1.5 years old inferring from the

Table 3. Identification of remains associated with the functioning of the Słupsk town hall commissioned in 1798

	layers and trenches				water tank K11	water tank K12	well K34
	18th–19th centuries	decayed wood	cellar room	beginning of the 20th century	18th–19th centuries		
		18th–19th centuries					
Cattle (*Bos taurus*)	11		6		4	3	
Pig (*Sus domestica*)	4		1				
Sheep/goat (*Ovis aries*/*Capra hircus*)			2			2	
Sheep (*Ovis aries*)	1		5				1
Goat (*Capra hircus*)			1				
Dog (*Canis familiaris*)				25	1		
TOTAL livestock	16	0	15	25	5	5	1
Roe deer (*Capreolus capreolus*)			5				
European hare (*Lepus europaeus*)			4				
TOTAL game	0	0	9	0	0	0	0
Mammals unidentified	1		3				
Chicken (*Gallus domesticus*)			20			2	
Domestic goose/greylag goose (*Anser anser*)			1	1		1	
Common raven (*Corvus corax*)/ rook (*Corvus frugilegus*)		4					
Rook (*Corvus frugilegus*)		6					
Passerine (Passeriformes)		1					
TOTAL birds	0	11	21	1	0	3	0
Birds unidentified			1				
TOTAL identified	**16**	**11**	**45**	**26**	**5**	**8**	**1**
TOTAL unidentified	**1**	**0**	**4**	**0**	**0**	**0**	**0**

degree of fusion of the epiphyses of the long bones with the shafts. The skull belonged to an individual with brachycephalic features with a short muzzle and a round braincase. The dog was of medium height, with a rather slender body build.

Age-at-death, sex and morphology of livestock

Age-at-death and sex of animals

Cattle were most often slaughtered when they reached morphological maturity. Only a few bones from juveniles were recorded in the material, with remains of individuals under two years old found sporadically. Table 4 shows the age proportion of morphologically immature individuals, with the remaining bones belonging to adults. This pattern applies to material from all periods discussed, although a few remains of newborns or

Table 4. Summary of cattle age-at-death estimated from bones and teeth. LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

chronology	age (bones)	n.	age (teeth)	n.
LMA	under 1.5 years old	1	about 14–25 months old	1
	under 2–2.5 years old	3	more than 15–18 months old	1
	under 3 years old	1	about 24–28 months old	2
	about 3.5–4 years old	1	more than 24–28 months old	1
	under 7–9 years old	4	more than 24–34 months old	1
LMA/MP	under 6–9 months old	1	under 5–6 months old	1
	under 2–2.5 years old	2	more than 15–18 months old	1
	under 3.5–4 years old	1	about 24–28 months old	1
	about 3.5 years old	1	about 24–34 months old	1
			more than 24–28 months old	1
	under 7–9 years old	4	more than 24–34 months old	1
			more than 7 years old	1
17th century	under 2–2.5 years old	1	more than 24–30 months old	1
			more than 24–34 months old	1
17th–18th centuries	under 3 months old	5	newborn	2
	under 2–2.5 years old	1	more than 5–6 months old	2
	under 3.5 years old	1	more than 24–28 months old	3
	under 3.5–4 years old	4		
	about 3.5 years old	3	more than 24–34 months old	3
	about 3.5–4 years old	1		
	under 7–9 years old	3		
18th century	under 7–9 years old	1		
18th –19th centuries	under 6–9 months old	1		
	under 2–2.5 years old	1	under 24–34 months old	1
	under 7–9 years old	2		

very young individuals were recorded in contexts from the 17th–18th centuries. Both males and females were slaughtered, although males were much more common.

Pigs for slaughter were primarily adult individuals that had already reached sexual maturity, although not necessarily morphological maturity. Table 5 collects information on the proportion of morphologically immature individuals, while the remaining bones were from adults. We were able to confirm the culling of males only, as none of the sex-marked bones belonged to a female.

Small ruminants, i.e. sheep and goats, were slaughtered as adults, and only a few remains from different periods came from very young animals. Table 6 shows the proportion of bones of morphologically immature animals; the remaining bones belonged to adult individuals. The sex of the animals could only be determined in six cases based on the shape of the horn cores – three of these were from male sheep, two from male goats and one from a female goat.

Horse remains, found primarily in late medieval contexts, belonged to adult or old individuals, including a mandible from a male over 21 years of age.

Table 5. Summary of pig age-at-death estimated from bones and teeth. LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

chronology	age (bones)	n.	age (teeth)	n.
LMA	newborn	1	more than 7–17 months old	1
	about 1.5 years old	1	more than 8–12 months old	4
	under 2 years old	4	more than 12–16 months old	3
	under 3.5 years old	3	more than 12–17 months old	1
	under 4–7 years old	1	about 17–22 months old	5
			more than 17–22 months old	2
LMA/MP	1–3.5 years old	1	about 7–17 months old	1
	under 3–3.5 years old	1	under 8–12 months old	1
	under 3.5 years old	3	about 8–12 months old	1
	under 4–7 years old	1	about 12–16 months old	1
			about 17–22 months old	4
			more than 17–22 months old	1
17th century	under 2 years old	1	about 7–17 months old	1
	under 3–3.5 years old	1	under 12–16 months old	1
	about 3.5 years old	1	about 12–16 months old	2
	under 4–7 years old	2	about 17–22 months old	2
17th–18th centuries	under 1 year old	1	about 4–6 months old	1
	about 1 year old	1	about 7–17 months old	2
	under 1.5 years old	1	more than 8–12 months old	4
	about 1.5 years old	1	about 12–16 months old	1
	under 2 years old	6	more than 12–17 months old	1
	under 3.5 years old	4	about 17–22 months old	1
	under 4–7 years old	5	more than 17–18 months old	1
			more than 17–22 months old	2
18th century	newborn	1*		
	under 3.5 years old	1	more than 17–22 months old	1
	under 4–7 years old	2		
18th–19th centuries	under 3.5 years old	2	more than 8–12 months old	2
			about 17–22 months old	1

*5 bones from 1 individual; all of them come from a trench related to the construction of the town hall from 1798

Most of the chicken bones and all the goose, duck and turkey bones belonged to adults. Only in the case of four chicken tarsometatarsus bones was it possible to determine the sex of the animals from which they came; these were two bones each of females and males from contexts dating to the 17th–18th centuries and three bones of females from 18th–19th century contexts.

Morphology of animals

The livestock whose remains were found in the excavation materials from Słupsk were mainly small and medium-sized, probably originating from local breeding. The pelvic bones of pigs were characterised by small acetabula. The long bones of these

Table 6. Summary of the small ruminants age-at-death estimated on the basis of bones and teeth. LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

chronology	taxon	age (bones)	n.	taxon	age (teeth)	n.
LMA	sheep/goat	under 20–24 months old	1	goat	about 5–6 months old	1
	goat	under 3 years old	1		about 17–20 months old	1
LMA/MP	sheep/goat	under 18–20 months old	1	goat	about 18–24 months old	1
	sheep	about 15–20 months old	1			
17th century	sheep/goat	under 20–24 months old	1	goat	between 3 and 8–10 months old	1
	sheep	under 3.5 years old	1			
17th–18th centuries	goat	about 20–24 months old	1	sheep	about 18 months old	1
	sheep/goat	under 15–20 months old	2		about 21–24 months old	1
		under 20–24 months old	1		more than 21–24 months old	1
		under 3.5 years old	2			
		under 4–5 years old	5			
		under 3 months old	1			
	sheep	under 6 months old	1			
		about 3–3.5 years old	1			
18th–19th centuries	sheep/goat	under 3–3.5 years old	1	sheep	more than 21–24 months old	3
		about 3.5 years old	1			

Table 7. Measurements of pig bones. LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

LMA					LMA/MP
scapula	humerus			pelvis	humerus
SLC	Bd	SD	BT	LA	Bd
23	38.2 37.1 37.2	18.1 16.5	32	29.2	40.5

17th–18th centuries					
scapula	humerus		radius		pelvis
SLC	Bd	SD	Bp	SD	LA
25.6	34 37.5	12.9	26.7 19.7	19	31.9

animals were slight build (Table 7), ranging from 19–54 points on the point scale (Lasota-Moskalewska 2008: 245), which allows them to be attributed to small and medium-sized individuals.

Bones of cattle also came from relatively small individuals (Table 8). The dimensions of the long bones and scapulae did not exceed the limit of 70 points (Lasota-Moskalewska 2008: 242–243), so these were in the range of small to medium-sized dimensions. In general, cattle from earlier periods, i.e. late medieval and late post-medieval/early modern, were relatively smaller and their dimensions in terms of points did not exceed 50 points. The range of results here was 5–48 points, with an additional single result ranking below the scale. The cattle from the younger phases belonged to the group of small and medium-sized individuals in the point range between 19 and

60 points. The only exception was a radius bone from a context dated to the 16th–18th century, whose proximal end measurement converted to a point scale reached 75 pts, so it was from a large individual. The conversion of bone-length values to withers height was only possible in a few cases. For the late medieval/early modern period, the height at withers of cattle was 107 cm, for the 16th–18th centuries three values were obtained: 99 cm, 117.5 cm and 124.5 cm, while for the youngest phase only one measurement allowed the withers height to be calculated, at 110 cm.

Table 8. Measurements of cattle bones.
LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

LMA					
horn core			humerus	radius	metacarpal
horn core basal circumference	least diameter of the horn core base	greatest diameter of the horn core base	Bd	Bd	Bd
148 120.4	43.6 34.7	45.1 39.6	65	56.8	44.5
femur	tibia	talus			calcaneus
Bp	Bd	GLl	GLm	Bd	GL
95.8	48.1	54.1	50.5 52.1	34.2	115.1
phalanx I					
GL		Bp		Bd	SD
58.5 48.4		24		23.2	19.3
phalanx II					
GL		Bp		Bd	SD
35.9		26.4		21.4	19,8
LMA/MP					
horn core		scapula	humerus	radius	
least diameter of the horn core base	greatest diameter of the horn core base	BG	Bd	Bp	
48.2	51.5	45	70.9	64	
metacarpal					
GL		Bp	Bd	SD	DD
178.3		47.3 47.6 46.7 44.2	50.6 54	26.2 33	18.1 22.9
metatarsal		talus			calcaneus
Bp	Bd	GLl	GLm	Bd	GL
36.1	 47	58 54.2	55.7 51.1	35.1 34	102.8
phalanx I				phalanx III	
Bd		SD	DD	DLS	Ld
54.5		22.9	23.1	71.6	52.8

Table 8. Continued

16th–18th centuries					
horn core			scapula		
horn core basal circumference	least diameter of the horn core base	greatest diameter of the horn core base	GLP	BG	SLC
165	49.1	55.2	71.1	49.6	
147	39.1	51.3			45.7
humerus		radius			
Bd	SD	Bp		Bd	
68.3	26.2	80.6		69.8 58.6	
metacarpal			tibia		
GL	Bp	Bd	GL	Bd	SD
195.6	53.4		286.6	49	26.4
	53.8			48.7	
	51.4		talus		
		50.9	GLl	GLm	Bd
		48.5	53.5	49.2	34
metatarsal					
GL		Bp	Bd	SD	DD
232.8		46.1	55.9	25.4	27.8
		43.2	23.2	26	
		35.2	18.8	20.1	
		44			
		39.4			
phalanx I					
GL		Bp		Bd	SD
64.1		28.8		30.5	23.8
63.1		28.7		30	23.5
61.5		29.3		28.8	22.5
57		25.7			21.1
55.3		24.7		24.6	21.8
53.4		29.4		27.4	
52.3		29.7		28	25
50.2		23.4		22.3	23.1
52.9					
phalanx II				phalanx III	
GL	Bp	Bd	SD	DLS	Ld
37.5	26.8	19	18.9	65.6	50.2
35.9	27.3	21.9	19.9	63.1	51.2
34.7	29.3	23.9	21.8	63.1	50.5
18th–19th centuries					
metacarpal	metatarsal				
Bp	GL	Bp	Bd	SD	DD
59.6 52.3	205.8	40.9	46.2	22.1	21

Table 9. Measurements of small ruminants bones.
LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

Sheep (*Ovis aries*)						
LMA		LMA/MP				
radius		humerus	tibia			
Bp		Bd	Bd		SD	
28.1		30.4	43.6 25.3		12.9	
18th–19th centuries						
radius		pelvis	tibia			
Bp	SD	LA	Bd		SD	
29	15.7	26.1	26.7		14	
metacarpal						
GL		Bp	Bd		SD	
124		17.8	20.8		9.9	
17th–18th centuries						
scapula			humerus		radius	
GLP	BG	SLC	Bd		Bp	Bd	SD
32.2	21.2	22.4	28.3		29	29.2 29.6	15.7 16.5 16.1
pelvis	femur		tibia		30.6 30.7		
LA	Bp	Bd	Bd	SD			
			43.6	12.9			
29.2 26.1	40.5	35.2	26.7 25.3	14		26.8	
calcaneus			metacarpal				
GL			GL	Bp	Bd	SD	DD
52.4			124	17.8	23.4 20.8	11.1 9.9	11.6
Goat (*Capra hircus*)							
LMA							
tibia		metacarpal					
Bd	SD	GL	Bp	Bd		SD	DD
25.1	14.2	140.1	19.2	22.5 21.7		11.3	10.3
LMA/MP							
horn core							
least diameter of the horn core base			greatest diameter of the horn core base				
28.4			47				
17th–18th centuries							
horn core			radius	pelvis	tibia		
least diameter of the horn core base		greatest diameter of the horn core base	Bp	LA	Bd		SD
35 19		48.7 26	30.3	27.3	23.2		12.2
metacarpal				Ph I			
GL	Bp	Bd	SD	GL	Bp	Bd	SD
128.7 127.9	17.2 18.5	23.7 22.3	11.2 10	35.5	11.3	11.1	8.4

Table 10. Measurements of poultry bones.
LMA – Late Middle Ages; LMA/MP – Late Middle Ages/Modern Period

Domestic goose/greylag goose (*Anser anser*)			
LMA			LMA/MP
carpometacarpus			radius
GL	Bp	Bd	Bd
87.2	19.8	10	9.3
87.07	19.51	10.55	
16th–18th centuries			
ulna			femur
GL	Bp	SD	Bd
160.2	13.8	7.8	25.28
	14.83		
	14.45		
	14.2		
carpometacarpus			
GL		Bp	Bd
101.4		25.66	12.7
			12.34
89.91		21.29	11.75
84.96		21.33	11.55
79.35		19.52	9.39
tibiotarsus			
GL	Bp	Bd	SD
137.44	15.78		7.98
		16.93	8.54
		18.47	
tarsometatarsus			
GL	Bp	Bd	SD
91.39	18.89	20.38	8.24
81.46	17.65	18.23	8.09
18th–19th centuries			
tibiotarsus			
GL		Bp	SD
/160/		19.7	9.3

Domestic turkey (*Meleagris gallopavo domesticus*)			
16th–18th centuries			
femur			
GL	Bp	Bd	SD
118.85	19.12	27.44	12.5
118.05	27.9	27.8	11
tibiotarsus			
GL	Bp	Bd	SD
169	23.91	22.05	10.87
118	26.7	23	9.1
117.9	26.8	23.2	9

Chicken (*Gallus domesticus*)			
LMA/MP			
femur			
Bp			
12.49			
16th–18th centuries			
tibiotarsus			
GL	Bp	Bd	SD
111.43	13.77	11.93	5.59
111.05	13.71	12.02	5.81
104.1	17	10.01	5.2
101.14	12.23	10.57	5.63
		11.64	5.98
tarsometatarsus			
GL	Bp	Bd	SD
80.14			7.48
74.2	13.8		5.9
69.88	12.03	11.61	6.21
18th–19th centuries			
humerus			
GL	Bp	Bd	SD
74.1	20.3	15.7	6.8
radius			
GL	Bp	Bd	SD
67.2	5.1	6.9	2.8
64.4	4.4	6.3	2.5
59			
ulna			
GL	Bp	Bd	SD
64.1	8.1	8.6	3.4
femur			
GL	Bp	Bd	SD
83.9	17	16.7	6.5
tibiotarsus			
GL	Bp	Bd	SD
104.7	14	10.6	5.6
120.1	15.2	12.1	6.3
120.1	15.3	12.2	6.2
	12.8		5.6
	12.55		
tarsometatarsus			
GL	Bp	Bd	SD
81.6	13.3	13.6	6.8
81.2	14.1	13.3	6.8

The bones of the goat (Table 9) were derived from large individuals in the range 58–76 points according to Lasota-Moskalewska (Lasota-Moskalewska 2008: 246). It was possible to calculate the height at withers for one individual from a late medieval context and two individuals from contexts dated to the 16th–18th century. These dimensions were 75 cm for the older phase and 68 and 69 cm for the younger phase. Sheep remains came from two size groups, considering the differences between the measurements (Table 9), but for this species, it was impossible to convert width and length measurements into points. It was possible to calculate height at withers for one individual each from the 16th–18th century and 18th–19th century periods: both measured 56 cm.

The dimensions of the birds' bones were also measured (Table 10). For species such as goose and duck, there is no certainty that they originated from domesticated individuals due to the lack of obvious domestication traits in these species. However, wild ducks and geese are smaller in size than domesticated birds. Therefore, at least some of the goose remains should have come from the domesticated form. The bones of the turkey were much smaller than those of contemporary domesticated birds, and the dimensions did not differ substantially from the bone elements of the wild turkey stored in ISEA PAS.

Late Middle Ages vs. Modern times: a summary

The materials from Słupsk show some changes in the meat diet of the inhabitants (Fig. 7). It was possible to observe a gradual decline in the importance of cattle starting from the 16th and 17th centuries. Between the Late Middle Ages and the 17th and 18th centuries, the share of pork in the diet remained unchanged. Also, the share of mutton and goose meat did not change significantly, apart from a sudden increase

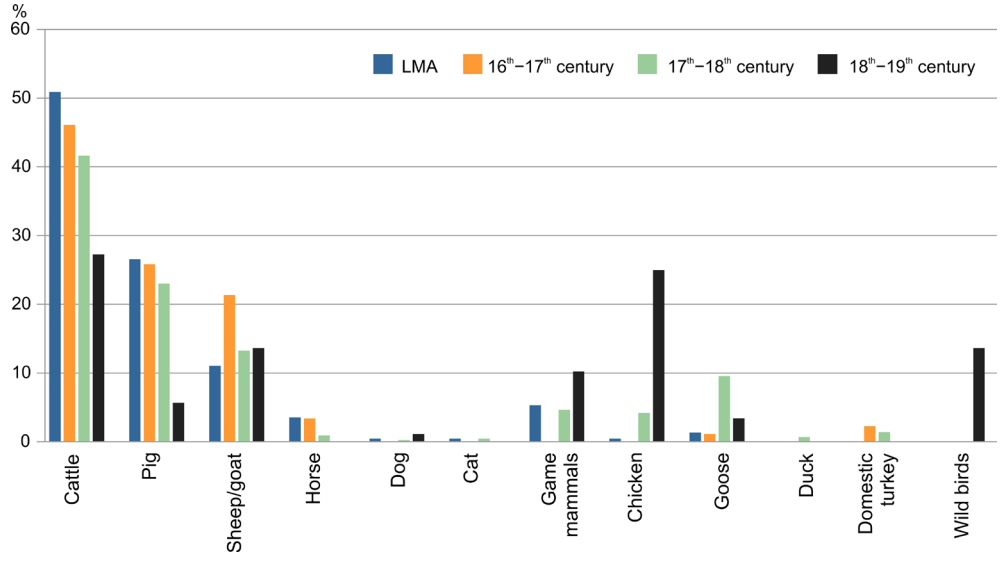

Fig. 7. Share of livestock and game animals in materials from Słupsk

in the importance of these animals in the 16th and 17th centuries. There was also an increase in the goose share in contexts dating back to the 17th and 18th centuries. Moreover, there was a visible increase in the importance of chicken, especially in the 18th and 19th centuries. It seems that poultry meat partially replaced the meat of other livestock. The meat of wild animals did not play an essential role in the diet of the inhabitants of Słupsk.

DISCUSSION

The bone material recovered during the excavations at the Słupsk market square was typical post-consumption material, with a high proportion of remains indicative of the division of the carcass and its portioning. This nature of the remains is also indicated by the species composition – the contexts were dominated by the bones of livestock, mainly species providing large amounts of meat, such as cattle and pig. A similar predominance of cattle remains and the increasing importance of the pig is also evident in neighbouring areas at this time (Pluskowski et al. 2019). The high importance of beef in the diet of urban inhabitants is also known in other regions of Poland (Chrószcz, Janeczek 2012; Makowiecki 2016: 197–199). Bones of poultry were also relatively abundant, especially chicken and geese, both of which were popular among inhabitants of late medieval and modern centres in northern Poland (Makowiecki 2008). However, Makowiecki observed a growing demand for geese in modern times from the 17th century on, along with the decreasing importance of the chicken (Makowiecki 2016: 157). This rule was also confirmed for Słupsk. It is interesting to note some small changes in the meat diet from the Middle Ages to almost modern times. Livestock were mainly slaughtered as morphologically mature individuals; in the case of cattle and small ruminants, both males and females were slaughtered. It is interesting that only male pigs were confirmed for slaughter. However, this may be due to the bias in identifying female bones (in the case of pigs, only cranial elements are diagnostic). The meat of uncastrated males is less palatable than that of females. It may therefore be that meat from castrated males was consumed, as castration improves meat quality. However, this fact is elusive in the osteological material. On the other hand, males might have been more available in the market for several reasons, including the need to spare females capable of reproduction or the demand for meat from animals of a certain age, as the age profiles of females and males at the time of death might be different.

The cattle and pig for slaughter were relatively small, with small and medium-sized individuals, but there is a noticeable shift towards taller individuals between the late medieval and modern periods. In the case of sheep it was possible to observe the presence of individuals from two size groups, while in the case of the goat there was a preference for large individuals.

Birds were a fairly common part of the burghers' diet, as they were relatively readily available and could be kept in backyard gardens, both caged and free-range. As in other Pomeranian sites, chickens, geese and ducks were kept, although the last

were not very common. The dominance of goose bones over chicken remains recorded in the material from Słupsk is characteristic of Pomeranian sites (Makowiecki, Gotfredsen 2002: 75).

The discovery of the remains of the domestic turkey *Meleagris gallopavo domesticus* in 17th- and 18th-century contexts appear to be of great interest. The first mention of the turkey in Europe dates back to the early 16th century. In a document dated 1511, the Bishop of Valencia requested that five pairs of these birds be brought to Seville on each arriving ship (De Grossi Mazzorin, Epifani 2015: 55). Turkeys spread to other European countries in the 16th and 17th centuries, first in the Mediterranean, then in northern Europe. The earliest turkey remains from Italy come from contexts dating to the first half of the 16th-early 17th century, but in Rome itself they are only known from skeletal material from the 17th–18th centuries (Moricca et al. 2018: 84). On the other hand, the earliest certain turkey remains found in Brussels are dated as early as the second half of the 16th century (Thys, Van Neer 2010: 78). As early as 1573, it was considered a Christmas dish in England, and by the 18th century it was widespread throughout the country (Davis 2001: 54). According to written sources, turkey probably also reached Poland in the second half of the 16th century (Kamler 1976: 107–108), and it was initially raised in the estates of magnates in the south of the country and was still rare in the 17th century (Duhart, Dumanowski 2001). As late as the mid-eighteenth century, in Gdańsk it appeared only on the tables of the wealthy burghers and was therefore a luxury good (Biernat 1962: 234). The oldest turkey remains from Gdańsk and several other sites from the northern and north-western parts of the country are dated to the 17th–18th centuries (Makowiecki, Gotfredsen 2002: 75; Makowiecki 2016: 165), and are therefore chronologically consistent with the finds from Słupsk. The turkey remains from the Polish excavations were never numerous, only in Gdańsk their number was slightly higher (26 remains in total), which also confirms the exclusivity of this bird. Interestingly, the turkey bones from Słupsk, from both the 17th- and 18th-century strata, were small, similar in size to wild American turkeys, indicating that their breeding was not very developed at that time. These animals were served in a variety of ways, including roasted, stewed or in champagne, according to one of the oldest Polish cookery books, *Kucharz doskonały* (*The Perfect Cook*) (Wielądek 1783). Unfortunately, none of the bones provided a clue to their consumption treatment. However, all the bone elements came from the meat-rich parts of the carcass – the legs and wings. Marks of gnawing by carnivorous animals, most likely dogs, were observed on one of the turkey bones from the wing, so the bones themselves, like other kitchen waste, were not treated with much reverence.

Much esteem may have been given to other avian remains. A surprising assemblage of corvid bird bones was found in a layer of decayed wood dating to the 18th to 19th century. These were almost exclusively the tarsometatarsus bones of a rook (*Corvus frugilegus*) and/or raven (*Corvus corax*) from both juveniles and adults, and one skull of a small passerine bird (Passeriformes). The deposition of such a collection is difficult to explain if one does not consider its origin as trophies or magical objects.

Another find was the bone of the tawny owl (*Strix aluco*), currently the most common owl in Poland, whose habitat is associated with forests or parks, as the bird builds its nests in tree hollows. The tawny owl regularly visits towns, where it forages for food, so the presence of this bone is not unusual in this context.

Numerous demolition and levelling layers were associated with a tragic episode in the history of Słupsk, the burning of the Gothic town hall in 1477. However, interestingly enough, there are virtually no traces of this event in the osteological material, where very few bones subjected to fire interference have been recorded – in most cases the traces of burning were related to the method of food preparation, i.e. roasting on an open fire, rather than burning as a result of the aforementioned conflagration.

The remains in question came from the area associated with the town hall, which housed the town's most important institutions, as well as, among other things, stalls or butcheries in its immediate vicinity (Wachniewski 2003). They most likely reflect the culinary tastes of the wealthier burghers, who could afford to import exotic birds such as turkeys and good quality meat. It does not appear that the remains, including those found within the stalls and annexes to the town hall, were associated with the meat trade. This is likely to have taken place exclusively within the nearby butcheries.

CONCLUSIONS

The post-consumption remains from Słupsk are typical waste deposited in the settlement contexts of urban centres. However, their origin as leftovers from the kitchens of wealthy burghers is interesting, as indicated primarily by their species composition. It was interesting to find turkey remains in 17th–18th century contexts. Their presence testifies to the lavishness of the burghers' tables. What was surprising, on the other hand, was the assemblage of tarsometatarsus corvid bird bones found among the wood remains, which could have been collected as trophies or objects used for unknown magical rituals.

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