ANIMAL BREEDING AND BUTCHERING: A GLIMPSE FROM OLD KLAIPĖDA

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Abstract

Archaeological excavations in one of the Old Town areas around Kurpių Street have provided new and valuable information for research related to urban development in the 16th and 17th centuries. Previously accomplished complex research into archaeological, historical, palaeobotanical and zooarchaeological material enabled us to go deeper into both the constructional development of the area and the daily life of the citizens. This article presents up-to-date results from research into zooarchaeological material from one plot on Kurpių Street from the mid-16th century to the second half of the 17th century. On the basis of this data and published historical sources, an analysis is made of some unexplored aspects relating to features of animal breeding and butchering among the local population in the 16th and 17th centuries. It also includes an evaluation of animal osteometric data. The results are compared with data from other Lithuanian records. The insights presented add to our slender knowledge about the nutrition of locals at that time and their daily life.

Key words: Klaipėda, 16th and 17th centuries, zooarchaeology, animal, osteometry, breeding, butchering, nutrition.

Introduction

Zooarchaeological material and archaeological data are exceptionally important in research into the lifestyles of people in different periods and in different cultural regions. They assist in the accurate identification of nutritional habits and diet, animal breeding, butchering and hunting. They also help to reconstruct specific morphological attributes of animals.

Osteological material in Lithuanian archaeological investigations has been collected over a long period of time, and has resulted in a huge collection of zooarchaeological material. Despite this, the primary results of zooarchaeological analyses often remain as supplements to reports about archaeological research. Some are presented briefly in the annual publication *Archeologiniai tyrinėjimai Lietuvoje* (Archaeological Investigations in Lithuania). However, exhaustive studies, generalising and summarising zooarchaeological material, particularly that related to cities in historical times, are still missing (Pičiauskienė 2008a). Some can still be mentioned. In recent years, the bones of animals collected in Vilnius' Lower Castle and dated to the 14th to the 17th centuries have been thoroughly investigated (Daugnora, Piličiauskienė 2004; Piličiauskienė 2008a; Piličiauskienė 2008b). Zooarchaeological material from Klaipėda Castle from the 14th to the 17th centuries is analysed in publications about the nutrition of its residents (Žulkus, Daugnora 2009). The results of research into zooarchaeological material from Rotušės Square in Vilnius have been presented briefly in several publications (Kundraitė, Daugnora *et al.* 2006). An analysis has also been made of cattle metacarpals (found in different areas of Lithuania) and their osteometry (Daugnora 2002).

Exhaustive archaeological excavations in the Old Town of Klaipėda (the area around present-day Kurpių St 3) were implemented in two stages. In 2007 and 2008, the cellar of the larger building was investigated first, followed by the excavations of the interior and the backyard of the smaller building (Masiulienė 2008; 2009a). The investigated complex occupies three plots of a historically formed block, bordering on Kurpių, Mėsininkų, Kalvių and Pasiuntinių[1] streets (Fig. 1). The archaeological excavations have provided valuable information on urban topography and urbanisation-related issues, and assisted in the reconstruction of several aspects of the lifestyle of the citizens (Masiulienė 2009b; 2009c). Attempts were made in this work to trace the nutrition of the local population on the basis of data from palaeobotanical and zooarchaeological research, supporting them with already published historical sources. The article only reviewed a part of the zooarchaeological material discovered in sections two and three of the block at Kurpių St (Masiulienė 2008).[2]

This article presents data from osteological research material collected in the first plot during the second stage of the archaeological investigations (Masiulienė 2009a).[3] The aim of the work is to review the nutrition and features of local animal husbandry and butchering in the 16th and 17th centuries on the basis of zoo-

[1] The present-day street names are given in this paper.

[2] The analysis of zooarchaeological material discovered in 2007 and 2008 was performed by Professor Linas Daugnora.

[3] The analysis of zooarchaeological material discovered in 2008 was performed by Dr Giedrė Piličiauskienė.

Fig. 1. Klaipėda Old town, Kurpių St 3 excavation site, 2007 to 2008 (drawing by I. Masiulienė).

archaeological material and historical sources, and to estimate osteometric data for animals bred.

The archaeological background

The topography of Klaipėda changed radically at the beginning of the 16th century. It started with a reconstruction of the castle, the excavation of the New Danė River as a defensive ditch, and the formation of an island on to which the town was resettled from the area around the castle (Žulkus 1991, pp.43-52). The town island was initially filled with the blocks around Tiltų and Turgaus streets, whereas the area in the northwest part of the island was populated later (from the mid-16th century). Archaeological, palaeobotanical, cartographic and historical material suggests that there was a rather large pond in the western part of the town, which determined the process of settlement in the block at Kurpių St 3 (Masiulienė 2009b, p.242ff, Fig. 2). In the first stage in the mid-16th century, attention focused on the second plot of the block; whereas in the second stage around the end of the 16th century and the beginning of the 17th century, plots one and three were built up (Fig. 2).

On the basis of dendrochronological research, the a house with an annex in the second plot were built in 1542 and 1554 (Masiulienė 2008, p.351). The house along Kurpių St was eight metres wide and nine to ten metres long. The interior was divided into two or three rooms. The kitchen had a hearth connected to a tile

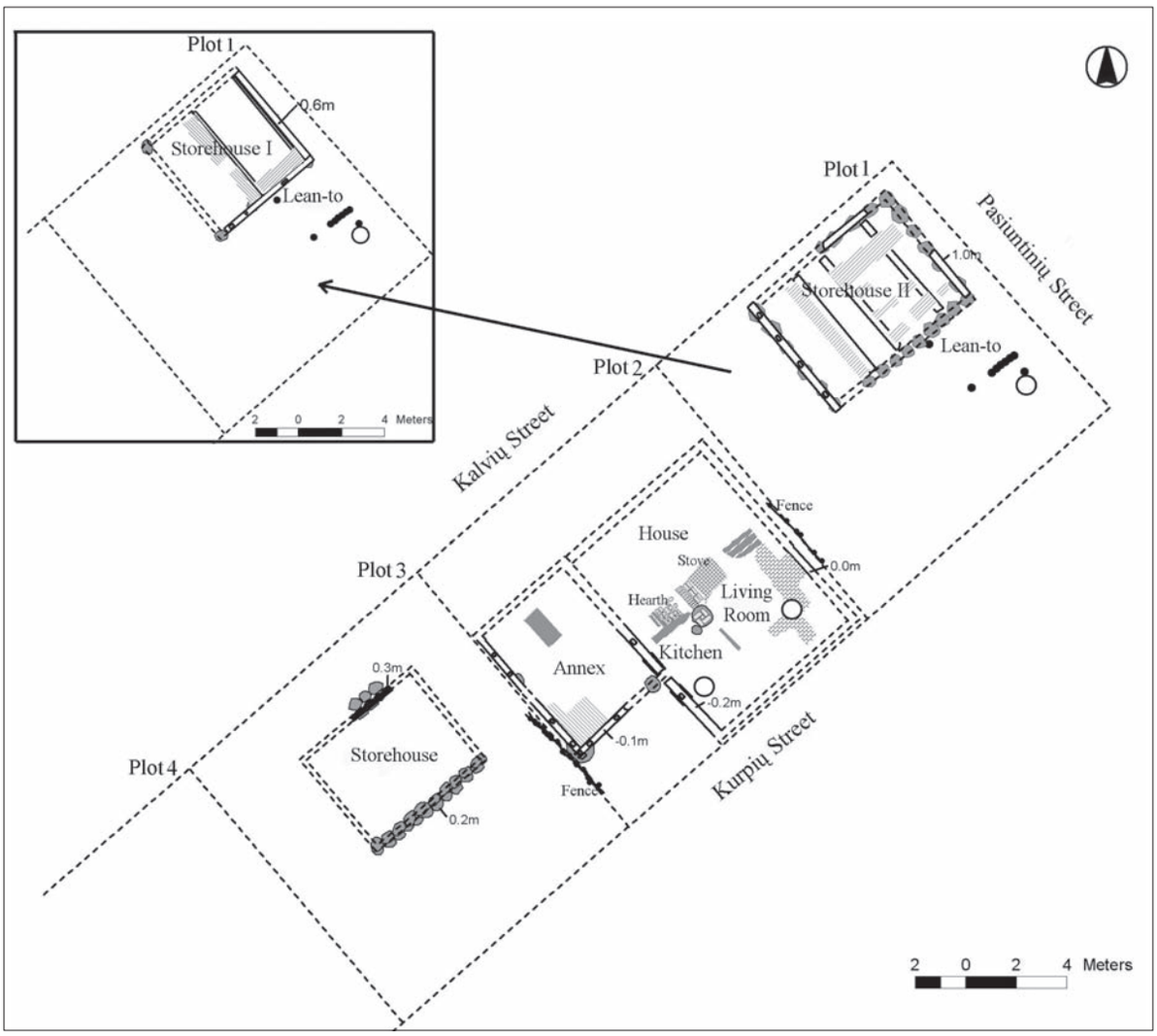

Fig. 2. Buildings on previous structures in plots of the block in the mid-16th and 17th centuries. Plot 1: storehouse I and a lean-to, preliminarily dated to the late 16th and early 17th century; storehouse II, dated to the 17th century up to 1678. Plot 2: a house with an annex, dated to 1542/1554 to 1678. Plot 3: a storehouse, preliminarily dated to the late 16th and early 17th century up to 1678 (drawing by I. Masiulienė).

stove in the living-room. The floors of the rooms were wooden, brick, or stone in some areas. The construction of the house and the interior arrangement point to a high quality of life, which was alien to buildings in Klaipėda at that time. This kind of interior is characteristic of the interiors of buildings in cities of Central and Western Europe in the 16th to the 18th centuries (Masiulienė 2009c, p.97ff). A five-by-six-metre annex was built beside the house, probably designed for storage. This is pointed to by the arrangement of the interior and the results of palaeobotanical research: macrofossils of figs and copious shells of walnuts and nuts were found in samples from the interior of the building (Masiulienė 2009c, p.107). In the 16th to the 18th centuries, figs, walnuts and other provisions, drinks and consumer goods were shipped from other Baltic ports, and sold in local markets (Sembritzki 1926; Willoweit 1969; Groth 1995).

In the meantime, until the end of the 16th century, the neighbouring plots were not built up. The cultural layer, including animal bones, was forming in them. The remains of development in the third plot of the excavated block are rather fragmentary. There was a backyard behind the building in Kurpių St, and the results of palaeobotanical research of samples of the layer in it show that pollen from rye, hemp and buckwheat, prob-

ably ending up there in the process of storage, prevail in the area (Masiulienė 2009c, p.103). Undoubtedly, the annex was designed as an outhouse for the storage of grain, other provisions and merchandise. On the basis of layer stratigraphy, it is possible to maintain that the building could have been built in the late 16th or the early 17th century.

In the first plot on the corner of Kalvių and Pasiuntinių streets, buildings from two different periods were discovered (Masiulienė 2009c, p.99ff). The arrangement of a previously erected five-by-5.5-metre building enables us to maintain that it could have been used for the storage of different kinds of merchandise. On the basis of archaeological finds, the building is dated to the late 16th or early 17th century (Masiulienė 2009a, p.349ff). A 2.5-by-two-metre lean-to was attached to the storage in the backyard (Plate VII.1). An intensely trampled organic layer (wood chips, moss, straw, acorns, the remains of excrement, and so on) was fixed inside the structure and around it. This points to the fact that domestic animals used to be kept there. The interior of the subsequent building was divided into two equal 3.5-by-5.5-metre parts, with a floor of coniferous planks (Plate VII. 2). The building itself was 5.5-by-seven metres in size, and the finds show that it could have been built at the beginning of the 17th century (Masiulienė 2009a, p.350). The remains of several barrels found inside enable us to maintain that provisions and other goods could have been stored there.

The development of the first and the second plots shows that the house with an annex and a storage area with a lean-to were owned by the same person, since similar duplicate sites have also been discovered in other blocks in the Old Town (Žulkus 2002, p.48). A warehouse in the third plot was also built at Kalvių St, whereas a rather large household yard stood between the building and Kurpių St. The orientation of the buildings and the planning of the block show that present-day Kalvių St rather than Kurpių St was more important in the 16th and 17th centuries. The growing port on the New Danė River was very important for the development of the area from the mid-16th century, as a certain infrastructure was necessary for it (Masiulienė 2009b, p.246ff). Different structures for storage stood on the plots of the block investigated. Archaeological and palaeobotanical material justifies the links between owners and their involvement in trading activities (Masiulienė 2009c). Archaeological finds also show that the owners of sites from the second plot were rich citizens (Masiulienė 2008; 2009a).

The fire of 1678 had a negative impact on the development of the area, as it started in the suburbs of Vitė and Krūmamiestis and reached the Old Town. All the buildings in the block went up in flames. There is no accurate data about when it was fully restored; however, it could have been at the beginning of the 18th century.

Material and methods

The analysed zooarchaeological material was collected in 2008 during the second stage of archaeological investigations inside of the present-day small house and its backyard. It occupied one historically shaped plot of the block, conditionally entitled the first plot (Figs. 1; 2). Archaeological investigations resulted in the discovery of about 2,280 bones and fragments of bones, although only osteological material from 'clean' cultural layers is discussed in this article. In some places, the cultural layers were destroyed by the routes of different modern utilities, or during the reconstruction of existing structures. Besides, devastating fires in 1678 and 1854 also impaired the survival of cultural layers. In the process of archaeological research, two major cultural layers were investigated, grounding their chronology on archaeological finds, since dendrochronological research of the buildings found in the site are still in process.[4] On the basis of the finds, the latest layer is dated to the late 16th and early 17th centuries. Unfortunately, in many places this layer has been destroyed by fires and subsequent digs. Accordingly, suitable zooarchaeological material for research is not numerous: only 165 bones and pieces of bones were selected for analysis. They were attributed to Group I. The earliest layer is preliminarily dated to the mid/late 16th century or the early 17th century. A total of 1,305 bones and fragments of bones were collected in this layer. They make up Group II. The results of the research into the osteological material are presented according to the separate groups.

Bones collected during archaeological investigations were measured on the basis of the methodology introduced by A. von den Driesch (1976). The minimal number of individuals (MNI) was defined on the basis of the method offered by T. White (1953). The employment of methodologies and indexes described by V. Calkin (1960; 1962), P. Jewell (1963), M. Howard (1963) and R. Thomas (1988), and the application of the discriminant function suggested by E. Kobrynczuk and H. Kobryn (1993), helped to identify the sex of animals on the basis of metacarpal lengths and the co-

[4] The dendrochronological research was carried out by Dr M. Brazauskas.

efficients of V. Calkin (1962). The epiphyseal fusion of animal bones is defined on the basis of the method introduced by E. Schmid (1972). The wither height of pigs is calculated by talus length, using the coefficient of M. Teichert (1969), the wither height of dogs on the basis of the method and coefficients introduced by F. Koudelka (Driesh, Boessneck 1974). Tooth eruption time was defined on the basis of schemes developed by S. Silver (1969). The age of cattle was estimated on the basis of M_1 height using the coefficient introduced by S. Sten (2003).

Results

A total of 1,470 bones and fragments of bones of animals belonging to at least 76 individuals (MNI) were selected for analysis. The bone fragments were rather large and well preserved, so bones and animal species of 1,352 (92%) cases were successfully identified. Unfortunately, most of the bones had been gnawed by dogs, pigs and other animals, so they were not suitable for osteometric analysis. The bones were divided into two groups for further research, and analysed separately, making calculations on the basis of the numbers of identified bones. The general results are presented in the tables (Tables 1 and 2).[5]

Group I (late 16th century/17th century, up to 1678). A total of 165 bones belong to this group (11.2% of all investigated bones). The identification of 151 (91.5%) of them was successful. These bones belonged to at least 14 individuals (Table 1). Almost all the bones (98.4%, MNI 13) (92.9%) belonged to domestic animals, except for two bones of a hare.

A total of 55 bones (44.7%) were attributed to cattle (MNI 4). On the basis of tooth eruption and epiphyseal fusion, it was defined that the bones belonged to animals of one to 1.5, and six to seven years, and two individuals two to 2.5 years old.

Six bones were those of sheep/goats (MNI 1). The mandible and several other bones show that they could have belonged to an animal older than 1.5 years old.

There were only 17 bones of pigs, and they belonged to at least four animals, including a small piglet, a 1.5-year-old pig, and a 2.5-to-three-year-old individual. The calculated height of one pig was 63 centimetres.

Bones of dogs were exceptionally abundant, 43 (34.4%, excluding ribs) of them belonging to at least three animals were found. A large part of the skeleton of one dog, including most of the ribs, vertebrae, both scapula, humerus, and some bones of the hind leg, was discovered. All the discovered bones of dogs belonged to animals older than six to eight months, including one younger than 1.5 years old, and two dogs older than 1.5 years. A mandible with all the permanent teeth and without any signs of attrition belonged to a young dog. The height of the dogs was about 28 centimetres, 50 to 52 centimetres, and 55 to 56 centimetres. However, the skulls of these animals did not survive (except one ear pyramid), so a more accurate characterisation of their shape and appearance is not possible. Two bones of a cat were also found in the layer from this period.

Group II (middle to late 16th century/early 17th century). A total of 1,305 bones in this group were analysed. Skeleton bones and animal species were identified in 1,201 (92.0%) of them. The bones belonged to at least 62 animals (Table 2; Fig. 3). A total of 1,196 bones and fragments of bones (95.6%, MNI 61) belonged to domestic animals. The bones of a hare (five pieces), belonging to at least one animal, were the only ones of a wild animal.

A total of 902 cattle bones[6] and fragments of bones belonged to at least 31 animals (Table 2; Fig. 3), which makes up 75.1% (MNI - 50.0%) of all the explored material. Unbroken bones were not numerous, and these were mostly phalanxes, talus and metapodias (Table 3; Fig. 4). These bones (particularly phalanxes) usually remained uncut during butchering. The most frequent were vertebrae and fragments of vertebrae (19% of all animal bones) and phalanxes (13.5%) (Table 2). This is due to the huge number of these bones in skeletons; besides, the bones of the lower limbs are very compact, and they survive in larger numbers.

Animal sex was identified on the basis of 12 metacarpal bones. To bulls were attributed six (50%), and to cows and steers three (25%) metacarpal bones. The bulls were 101 to 111 centimetres in height (an average of 106 centimetres), cows 99 to 115 centimetres (average 108), and steers 101 to 114 centimetres (average 106). Another two bones of limbs belonged to young calves (aged less than one year). On the basis of tooth eruption in 21 mandibles and fragments of mandibles, it was discovered that 12 (57%) of them belonged to calves under the age of five or six months. All of them except one were with an erupted tooth M_1 (it takes five to six months). The remaining nine mandibles (43%) belonged to adult animals, aged three years or more (Fig. 5). On the basis of M_1 tooth height, it was defined

[5] The number of bones in Group I is very small, so it was not expedient to make a broader analysis and generalise findings due to unreliable results.

[6] Bone measurements are presented in Table 3.

Table 1. The identified bone fragments from group I (analysed by G. Piličiauskienė)

Bone/animal	Cattle	Sheep/goat	Pig	Dog	Cat	Hare	In total
Cranium	2		5	1			8
Mandible	2	1	1	1	1		6
Teeth	1						1
Vertebra	18	1		27			46
Scapula	3	1	1	3			8
Humerus	4			3			7
Radius + ulna	9		2	1			12
Carpi							0
Metacarpus					1		1
Os coxae						1	1
Femur	3	1	2			1	7
Tibia + fibula	5	1	4	4			14
Calcaneus	2						2
Talus	1	1	1	1			4
Tarsi	1						1
Metatarsus	2			2			4
Phalanx	2		1				3
Total	**55**	**6**	**17**	**43**	**2**	**2**	**125**
%	**44**	**4.8**	**13.6**	**34.4**	**1.6**	**1.6**	**100**
MNI	**4**	**1**	**4**	**3**	**1**	**1**	**14**
% MNI	**28.6**	**7.1**	**28.6**	**21.4**	**7.1**	**7.1**	**100**
Unidentified fragments							**14**
Total							**165**

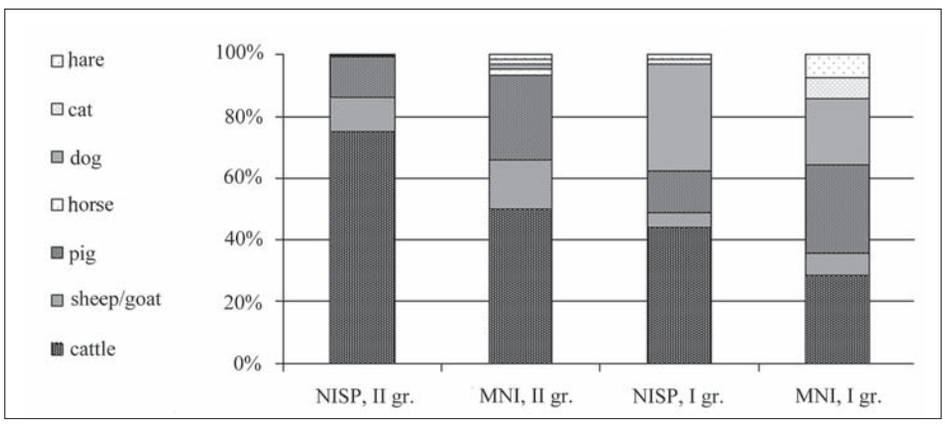

Fig. 3. Species-based composition of animal bones from groups I and II, on the basis of identified numbers of specimens and minimal number of individuals (analysed by G. Piličiauskienė).

Table 2. The identified bone fragments from group II (analysed by G. Piličiauskienė)

Bone/animal	Cattle	Sheep/goat	Pig	Horse	Dog	Cat	Hare	In total
Horncore	13	3						16
Cranium	71	12	27				1	111
Mandible	38	15	30			1		84
Teeth	14	1	6	1				22
Vertebra	171	19	4					194
Scapula	50	21	19				1	91
Humerus	47	10	13		1		1	72
Radius+ulna	56	7	12					75
Carpi	13							13
Metacarpus	73	6	4			2		85
Os coxae	33	10	11				1	55
Femur	43	7	15					65
Tibia	59	14	8					81
Calcaneus	16	1	2					19
Talus	19	1	1					21
Tarsi	7							7
Metatarsus	57	5						62
Phalanx	122		5					127
In total	**902**	**132**	**157**	**1**	**1**	**3**	**5**	**1201**
%	**75.1**	**11.0**	**13.1**	**0.1**	**0.1**	**0.2**	**0.4**	**100**
MNI	**31**	**10**	**17**	**1**	**1**	**1**	**1**	**62**
% MNI	**50.0**	**16.1**	**27.4**	**1.6**	**1.6**	**1.6**	**1.6**	**100**
Unidentified fragments								**104**
Total								**1305**

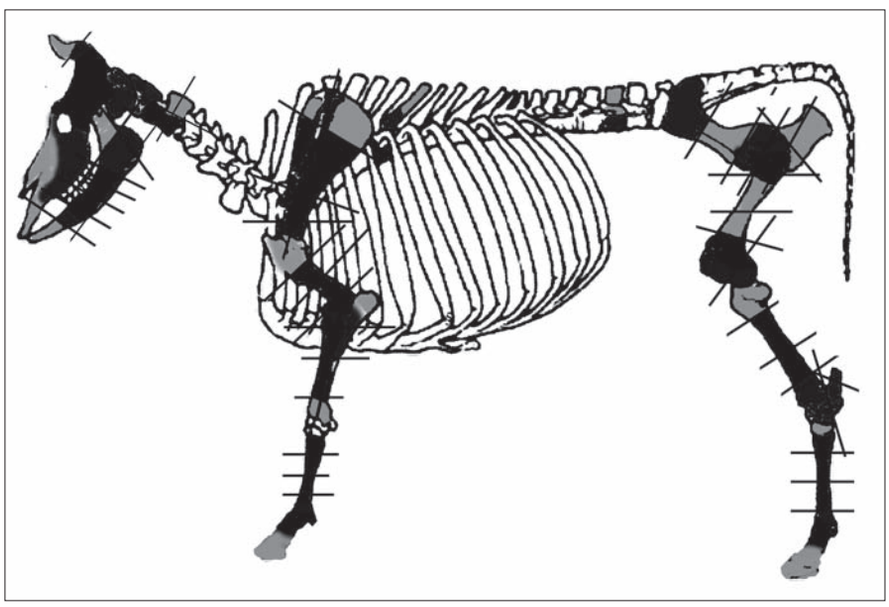

Fig. 4. The fragmentary character of Group II cattle bones and traces of cuts (dark colour: the most frequent parts of bones) (analysed by G. Piličiauskienė).

Table 3. Measurements of cattle and pig bones in group II (analysed by G. Piličiauskienė)

Bone		Cattle				Pig			
		n	min-max	mean	SD	*n*	min-max	mean	SD
Scapula	GLP	4	54.0-60.0	57.0	2.6	4	31.0-38.5	35.2	3.8
	BG	4	37.0-43.0	39.7	2.7	4	22.0-26.1	23.6	3.0
	LG	4	46.0-48.0	47.1	0.8				
	SLC	4	42.0-47.0	43.8	2.4	4	20.0-28.5	24.5	4.3
Humerus	Bd	3	66.0-70.0	68.0	3.4	3	30.0-43.0	37.7	7
Radius	Bp	7	65.0-81.0	72.5	5.3	4	21.0-30.0	27.0	4.1
Metacarpus	Bp	12	38.0-54.0	50.8	4.2				
	SD	11	23.0-31.0	28.6	2.6				
	Bd	28	41.0-58.0	53.1	4.0				
	GL	14	161.0-192.0	173.4	9.4				
Tibia	Bd	4	51.0-60.0	55.5	4.6	2	27.0-32.0	29.0	3.5
Calcaneus	GL	1	120.0						
Talus	GLl	11	54.0-62.0	56.8	3.1	1	42.0		
	GLm	11	49.0-55.0	51.5	1.9	1	40.0		
	Bd	11	35.0-44.0	38.4	2.8	1	24.5		
Metatarsus	Bp	5	40.0-47.0	43.4	3.0				
	SD	5	20.0-25.0	23.2	2.0				
	Bd	19	42.0-54.0	47.3	4.0				
	GL	6	189.0-213.0	201.1	9.1				

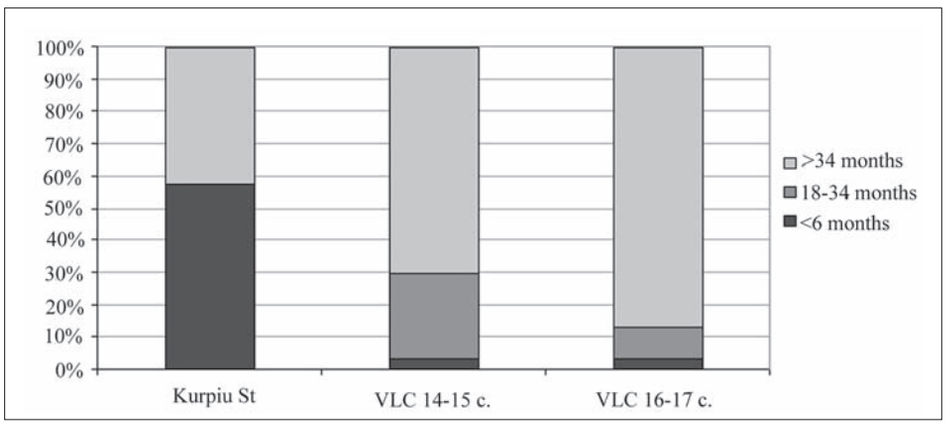

Fig. 5. The age structure of cattle (Group II) on the basis of tooth eruption. For comparison: material from the Lower Castle of Vilnius (analysed by G. Piličiauskienė).

Fig. 6. A fractured and recovered cattle metatarsal bone. Traces of skinning in the lower part of the diaphysis (photograph by G. Piličiauskienė).

that the age of four adult animals ranged from 5.4 to 7.9 years. The average age of animals, defined on the basis of M_1 height, was 6.9 years.

A cattle metatarsus recovered after fracture was discovered in the material from this period (Fig. 6). Such recovered bones are very rare, as injured or ailing animals were butchered immediately. Presumably, this injured animal remained unnoticed: probably it was turned out to summer pasture for a long period of time, and stayed there unnoticed until recovery; perhaps the broken bone was attended to. It was most likely a fractured bone of a young animal, and it limped for the rest of its life.

Sheep/goats. Altogether, 132 (11%) bones and fragments of bones belonging to these domestic animals were discovered. They can be attributed to at least ten (16.1%) animals (Table 2). Most of them are likely to have belonged to sheep, as six mandibles were attributed to young lambs. A fragment of a pelvic bone and a metacarpus could also be attributed to adult sheep. One horncore was attributed to a young goat. On the basis of tooth eruption, 64.3% of mandibles belonged to offspring under the age of three months (cutting M_1 tooth), 14.3% of mandibles belonged to ten-to-18-month-old sheep and goats (M_3 was not yet cutting), whereas 21.4% of mandibles were attributed to animals over two years old (Fig. 7).

Pigs. A total of 157 (13.1%) bones and fragments of bones belonging to at least 17 (27.4%) animals were discovered (Table 2, 3). On the basis of tooth eruption, 18% of mandibles belonged to piglets under the age of four to six months (M_1 tooth not yet cutting). Most of them (41%) were slaughtered after 17 to 22 months of maturation (M_3 tooth cutting). Another 9% of mandibles belonged to animals of 12 to 16 months (mature tooth M_2, M_3 tooth not yet cutting). Two-year-old and older animals made up 32% (Fig. 8). The estimated wither height of one pig was 75 centimetres.

Discussion

Summarising the results of the above research, it is possible to maintain that all the bones in the material of both groups belonged to domestic animals, except for several bones of hares. Material from previous research (by L. Daugnora) provides us with several fragments of bones of red deer, moose, roe deer, hare and wild boar (Masiulienė 2009c, p.102ff). In the 16th and 17th centuries, the bones of domestic animals usually make up more than 95% of all the material collected in European and local urban areas (Piličiauskienė 2008a). Hunting restrictions, remote woods, increasingly centralised meat (mostly beef) and supply appear to be the main reasons for this phenomenon (Bartosiewicz 1995). On the other hand, the bones of wild animals are more frequently discovered in the houses and castles of the nobility (Piličiauskienė 2008a, p.65ff; Žulkus 2002, p.91). The specific structure of domestic animals (Table 2) is slightly different, when analysing it according to the number of identified specimens (NISP) and the minimal number of individuals (MNI). On the basis of NISP, most bones (75.1%) are attributed to cattle; whereas on the basis of MNI, this figure decreases to 50%. On the basis of this parameter, the percentage of pigs increases to 27.4%, and of sheep/goats to 16.1%. These proportions of domestic animals differ from material from the 16th and 17th centuries in Vilnius' Lower Castle ($p<0.05$), where the percentage of pigs (17.6%) and sheep/goats (10.6%) was smaller, whereas horses made up as much as 10% of all identified animals (Piličiauskienė 2008a). Cattle remained the main source of meat for the citizens of the Medieval and post-Medieval periods (Bartosiewicz 1995, p.26; Tourunen 2008). On the basis of animals, the number of cattle in the above material is decreasing; however, the quantity of meat obtained from one, albeit small

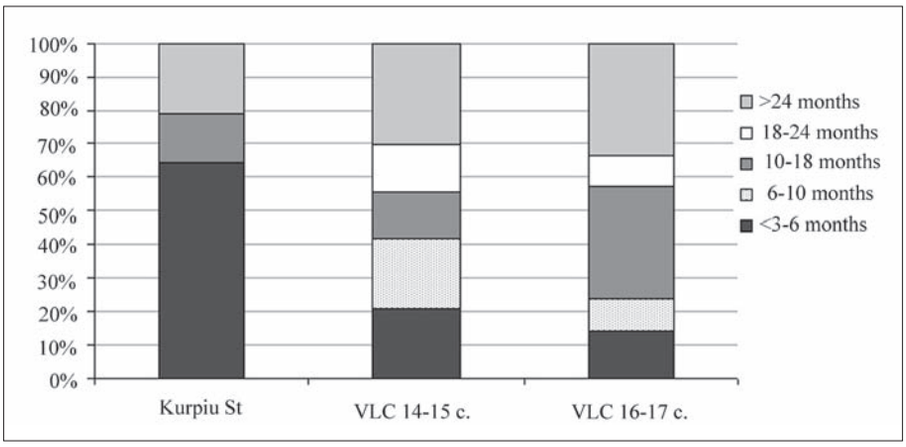

Fig. 7. The age structure of sheep/goats (Group II) on the basis of tooth eruption. For comparison: material from the Lower Castle of Vilnius (analysed by G. Piličiauskienė).

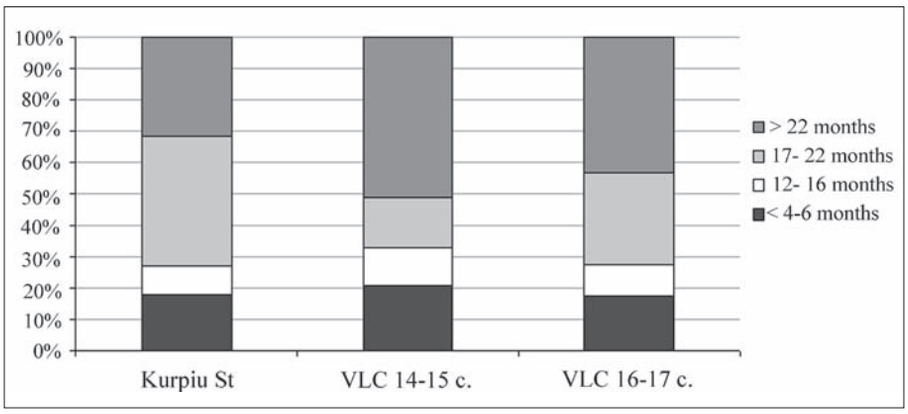

Fig. 8. The age structure of pigs (Group II) on the basis of tooth eruption. For comparison: material from the Lower Castle of Vilnius (analysed by G. Piličiauskienė).

sheep, goat or pig, should be evaluated. Small, slightly higher than 100-centimetre cattle, provided 50 to 130 kilograms of meat, sheep 20 to 30 kilograms, pigs 70 kilograms (Calkin 1956; Shcheglova 1993). Therefore, veal and beef were the most frequently found kinds of meat on tables at that time. Similar results of specific analyses were also obtained during previous research on the plot at Kurpių St 3 (Masiulienė 2009c, p.102ff, Diagram 1).[7]

The material from the investigated site was exceptional, with a particularly large share of young calves. Tooth eruption shows that 57% of these animals were butchered at younger than five or six months old (Fig. 5). Fragments of eight skulls also belonged to small calves. Some calves could be butchered in their very early days, for stomach rennet, employed in the manufacture of cheese. The remaining 43% of lower jawbones belonged to older animals (over three years old). This data is supplemented by information about the time of epiphyseal fusion. This indicator shows that the age of 30% of butchered animals varied from two to four years. It is to be remembered that half of the metacarpal bones could be attributed to bulls. They could be

[7] On the basis of L. Daugnora's zooarchaeological material, 501 bones and fragments of bones were identified out of 988, collected from layers of the second and third plots. A total of 288 of them belonged to cattle, 27 to calves, 57 to sheep/goats, and 65 to pigs.

related to the group of two-to-four-year-old cattle. This is precisely the age, that is, the passage from juvenile to sub-adult, that is treated as most suitable and economically advantageous for butchering. At that stage the weight of animals stops increasing so much, and further rearing becomes pointless (Uerpmann 1973). A large group of cattle from this age group was also identified in the material from Vilnius' Lower Castle from the 14th to the 15th, and the 16th to the 17th centuries (Piličiauskienė 2008b, p.131). On the basis of M_1 tooth height, it was defined that the age of matured cattle (over three years old) varied from 5.4 to 7.9 years, and was 6.9 years on average. The average age of the cattle discovered in the Lower Castle of Vilnius was six years in the 14th and 15th, and 6.1 years in the 16th and 17th centuries (Piličiauskienė 2008a, pp. 47ff). On the basis of this parameter, it was discovered that the age of cattle from the 11th to the 18th centuries discovered in different areas of Sweden was 6.7 years (Sten 2004). This age of cattle seems to be modest; however, even contemporary cattle (particularly cows) are usually butchered at the age of six to eight years. Written sources show that in the Middle Ages, cattle were valued mostly until eight years of age (R.T. Lie, R.W. Lie 1990, p.43; Piličiauskienė 2008b, p.131; Sten 2004). The average identified age of adult cattle in the examined material is similar to other cases from the same period, but it is exceptional in the general structure of butchered cattle with a particularly large number of calves. Besides, it should be taken into account that bones of young animals survive less well than those of adult animals, which means that the share of young bones could be larger.

The butchering of calves and young cattle was typical in rural areas, where people bred animals and supplied themselves with meat. Young cattle under the age of two years were most frequently butchered, whereas older ones used to be sold in urban areas. Archaeological material shows that cattle bones of the same age are found mostly in urban areas. Calves of an early age used to be butchered on dairy farms, as they consumed large quantities of milk, which was not plentiful in cows in the 16th and 17th centuries (Maltby 1989; Crabtree 1984, p.225; 1989, p.207; Uerpmann 1973; Piličiauskienė 2008a, p.76). Different authors emphasise that cattle in urban areas were reared for dairy products, but not for reproduction or meat. The meat of butchered calves was a supplementary product (Maltby 1989; Antipina 2005). However, dairy farming should not be given prominence, as it was not developed and important in Lithuania until the end of the 17th century. Neither milkers nor their product were numerous (Merkienė 1989, p.81; Piličiauskienė 2008a). In the mid-19th century, Lithuanian farmers received about 360 litres of milk from each cow (Mulevičius 2003, p.78); whereas in Hungary, where cattle breeding was highly developed, specialised dairy farming started at the end of the 17th century, after the arrival of pedigree cattle from Switzerland (Bartosiewicz 1995, p.49). In Finland and Sweden, it was noticed that the yield of imported pedigree cattle at that time decreased, since they were reared and fed like local cattle (Tourunen 2008, p.29).

The structure of cattle and animal bones in the investigated site shows that they used to be locally bred and butchered. It should be noted that animals were treated as an ordinary phenomenon in daily life in Medieval and post-Medieval times. In Turku, a slightly smaller town than Klaipėda, the number of cattle at the end of the 17th century varied at different times from 96 to 408 (Tourunen 2008, p.36). Some of these animals could have been on neighbouring country estates which were owned by rich citizens. Animals used to be delivered to their urban owners and butchered there. This was common practice in Sweden, and possibly Finland (Tourunen 2008, p.37).

Such country estates on the outskirts of Klaipėda started developing from the beginning of the 16th century. They were basically involved in stockbreeding (Sembritzki 1926; Willoweit 1969). Historical sources note that there were 11 in the Klaipėda area in the 16th and 18th centuries. They either exported meat or sold it locally (Sembritzki 1926; Willoweit 1969; Groth 1995). Data from archaeological research also points to animal breeding in the first plot of Kurpių St. This is justified by the remains of the lean-to and the neighbouring layer, with chips, moss, straw, acorns, the remains of excrement, and so on (Masiulienė 2009a, p.349). Such structures were also discovered in other investigated areas of Klaipėda (Žulkus 2002, p.48ff). Citizens' animals grazed in nearby grasslands. Historical sources from the 16th century mention these pastures on the right bank of the New Danė River (Sembritzki 1926, p.101).

Zooarchaeological material collected in the plot makes no indication of attributes characteristic of a centralised supply of meat (such as bones of adult animals of the same age) (Bartosiewicz 1995, p.26). Typical urban area-related material with such attributes is analysed in relation to the area of the Lower Castle in Vilnius, where two evident groups of two-to-four-year-old and

six-to-eight-year-old cattle were traced. Mandibles of only a few calves were discovered in this area. This enables us to maintain that cattle were not bred locally (Piličiauskienė 2008b). Material from Trondheim (Norway) from the 15th century, and from Russian towns (Moscow, Novgorod, Pskov) from the same period, points to the fact that most cattle bones also belonged to mature adult animals (R.T. Lie, R.W. Lie 1990; Calkin 1956).

H. Uerpmann's (1973) meat value classification (A category, top value; C, lowest value) shows that the examined material is full of different parts of skeletons: top value (such as vertebrae, humerus, scapula), middle (such as tibia, radius) and lowest (such as phalangs, metatarsal, metacarpal bones) (Table 2, Fig. 4, 13). It also shows that the animals were butchered locally. The remains (the lower parts of limbs and skulls) used to be thrown away in the neighbourhood and picked up by domestic animals. Gnawed bones confirm this assumption.

In the analysis of zooarchaeological material, it is very difficult to distinguish between sheep and goat bones, or pieces of them, so they are presented together. Only a few of these bones are attributed without any doubt to a specific group. Most of these accurately identified bones, metapodias, mandibles with dP4, horncores from this material, belonged to sheep (ratio 8:1); whereas the inventory books of Klaipėda Castle from the first half of the 15th century and the first half of the 16th century point to a 2:1 and 3:1 quantitative ratio of sheep and goats (Willoweit 1969, p118ff). This significantly high number of goats in the castle is rather unusual, in Lithuania and all of Europe. The numbers of bred sheep in Europe, including rural areas of Lithuania, always exceeded that of goats (Bartosiewicz 1995; Tourunen 2008). On country estates, sheep would make up about 29% of the entire animal flock, and goats just 6% (Merkienė 1989). These tendencies are also reflected in zooarchaeological material, where sheep bones are more frequent than those of goats (Calkin 1962; Wiig 1981; Shcheglova 2001, Piličiauskienė 2008a). Sheep, their pastures and sheepfolds around Klaipėda are mentioned many times in different documents describing the life of citizens from the 14th century (Sembritzki 1926). The description of a sheepfold (in German *Althof*), in which separately milked cows and ewes were kept, and in another one dry cows and rams, is very interesting (Sembritzki 1926, p.79). Documents also hint at goats in relation to the export of their wool and hides: 234 dozens of hides and 90 dozens of wool were exported in 1671. Similar quantities are mentioned in reports from 1677 and 1682 (Sembritzki 1926, p.159). The hides of goats (particularly those of billy goats) were valued for their quality, since they were suitable for manufacturing chamois leather (Tourunen 2008, p.42).

An analysis of bone structure among sheep and goats shows that the ages of the butchered animals are different: over 60% of jawbones belonged to very young animals aged three months or less (mostly lambs) (Fig. 11). Whereas offspring of a similar age from Vilnius' Lower Castle from the 14th and 15th centuries made up about 20% of all animals, in the 16th and 17th centuries it made up only 14%. In both periods, the number of mature sheep/goats (over two years old) in Vilnius' Lower Castle was larger and made up more than 30% (Piličiauskienė 2008a, p.34ff). The huge amount of exceptionally young animals in the plot of Kurpių St is rather unusual. When sheep are bred for milk, the lamb is usually butchered slightly later at the age of six to nine months, whereas those bred for meat are best at the age of two to three years. Animals that were bred for wool were usually butchered even later (Payne 1973). Presumably, the main aim of breeding these sheep was milk and milk products. Historical sources mention sheep in the 17th century. They could provide half a quart (about 600 millilitres) of milk for 26 weeks per year (Merkienė 1989). Farmers in Lithuania stopped milking sheep in the 19th century. To keep goats was cheap, and their milk was always treated as having medicinal properties. Besides, goats were also bred for their smell, which was supposed to protect other animals from disease. Due to their undemanding temper, usually poor people kept them, so goats were also called poor man's cows. At the same time, several confessional communities formed a negative attitude towards goats: the Jesuits prohibited the breeding of goats, and the Orthodox Church prohibited the consumption of goat meat (Tourunen 2008, p.41; Merkienė 1989).

The plot examined provided sheep/goat bones of different nutritional values, including butcher's waste, the most valuable parts (these were the most numerous) (Tables 1; 2; Figs. 9; 10). Less nutritionally valued waste was found in smaller numbers. However, it should be noted that these bones of sheep and goats are small, hardly survive, and are rarely found in the process of investigations.

The survival of analysed pigs' bones is less successful compared to those of other animals. This is common to all the bones of these animals found, and it is explained

by the young age of butchered animals, being smaller and more fragile. A comparison of bones and the number of individuals point to a higher MNI. The main reason for this are the mandibles, which survive better than other bones. The proportion of pigs in the investigated material is similar to that in other cases from this period. The age-related structure is also rather typical of most explored finds (Fig. 8) (Piličiauskienė 2008a). Pigs of a similar age were butchered in many places, as they were bred for meat only, which preconditions a similar time of butchering (Bartosiewicz 1995). A large number of piglets (18%) were butchered in their early months, and their bones could hardly survive. Pigs that were 1.5 to two years old, butchered during the second autumn-winter of their life, make up the largest part (about half). This age is optimal for butchering (Uerpmann 1973), and it was common practice at that time. As omnivorous and productive animals, pigs had to be bred in the investigated site, which is justified by the large number of butchered piglets. Bones of pigs of high and average nutritional value were most frequent (Figs. 9; 11). Five mandibles had longitudinal cuts in their underparts: they were opened to extract the bone marrows, a nutritional part of bones.

The breeding of pigs in urban areas and the approach to them were different with every region. They used to be bred in many urban areas, as their excrement is found in cultural layers. Pig excrement was examined in Gdansk. It was rich in millet, corn, horsetails, blackberries, different kinds of bark, corn husks, animal bones, fish waste, horsehair, bristle and sheep's wool (Krysiak 1967). This means that pigs strolled around dwellings freely and fed on anything they could find. For example, in the 16th and 17th centuries, unattended pigs and dogs in Turku grazed a cemetery in a churchyard (Tourunen 2008, p.29). Pigs could not be reared in Frankfurt am Main from 1481, as they were unsuitable for a big city (Pounds 1974, p.278). Historical sources from the 17th century in Klaipėda point to the fact that keeping pigs in the street was forbidden, since it threatened the health of the citizens (Sembritzki 1926, p.114). In that sense, Klaipėda could be treated as a clean and progressive town.

In the 16th and 17th centuries, a tendency towards decreased numbers of pigs reared in the largest European cities becomes evident. This phenomenon is explained by the increasing urban areas and remote woods (acorns used to be the main alimentary source for pigs in winter) (Crabtree 1984; 1989; Reitz, Wing 1999). In the 16th century, a family in Vác (Hungary) bred on average five pigs, whereas in the 18th century it was only 0.23 of a pig (Bartosiewicz 1995, pp.7ff). The growth of the cities, the remoteness of pastures, the centralised supply of cattle and other animals, butchering and city markets, resulted in a decreasing amount of other domestic animals (Bartosiewicz 1995, p.91). On the basis of osteometrical data, the height of a pig from Group II was calculated: it amounted to 75 centimetres, and could be treated as large. Also similar was the height of a pig from Group I (63 centimetres), whereas that of pigs in Vilnius Lower Castle from the 14th to the 17th centuries amounted to 58 to 68 centimetres.

One single molar, belonging to a horse and probably lost while it was still alive, was found in the investigated site. The tooth is worn thin, so it must have belonged to an old animal. It was the only horse bone in the plot, and it is possible to maintain that it was not reared and consumed in this place. Horse meat was prohibited by the Pope for consumption by Christians in 732 (Bartosiewicz 2003, p.187). Despite this prohibition, the tradition still continued in Catholic European areas (Bartosiewicz 1995, p.55ff). In local material dating from before the 20th century, horse bones with chop and cutting traces were discovered, which points to the consumption of horse meat (Piličiauskienė 2008a, p.68ff; Piličiauskienė, Veličkaitė *et al*. 2006).

When were different animals butchered? Usually calves were butchered in spring, followed by lambs in June to August, providing families with their meat in the summer period. In addition, the butchering of offspring would match the appropriate number of animals in a household. Mature sheep were usually butchered between August and November, that is, after their lambs and prior to the main butchering of cattle and pigs. Large animals were usually butchered in October to February, in the cold period, thus preventing large pieces of meat from rotting. Some piglets were slaughtered in July, although most pigs were slaughtered in November to February (Clark 1992, p.78). The age structure of cattle, pigs and sheep from the investigated site in Klaipėda corresponds to the analysed pattern of butchering. In large cities, the butchering of large animals continued all the year round, as demand for meat was high (Landon 1993).

From the beginning of the 17th century, the butchering of animals in Klaipėda was the privilege of regular butchers, who established their own guild in 1627 (Sembritzki 1926, p.166). The prices for their services were registered in newly approved regulations of 1681, governing prices, servants, clothes, weddings, christenings and inhumations. The document was based on the previous 1666 regulations for the town and the

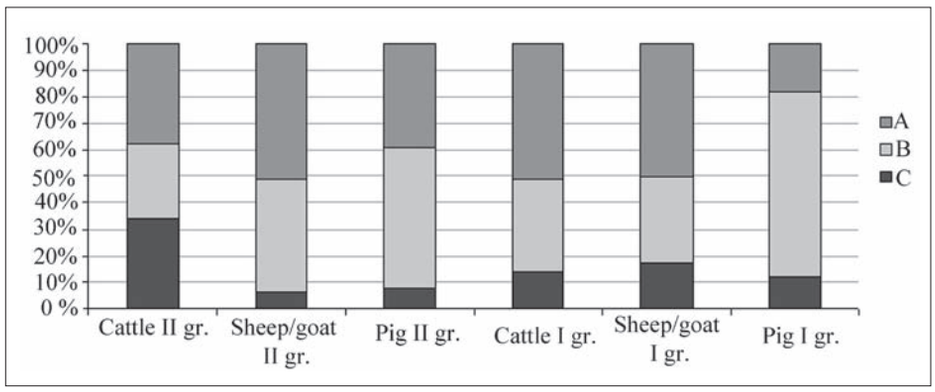

Fig. 9. The distribution of bones in groups I and II on the basis of the nutritional value (according to Uerpmann 1973).

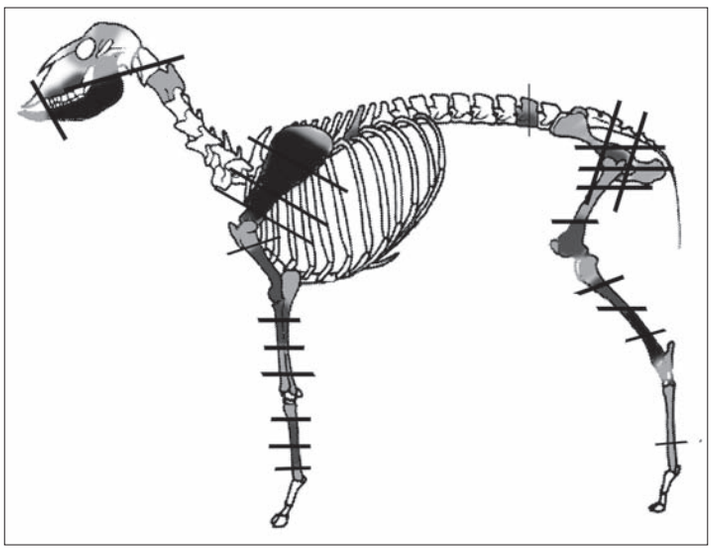

Fig. 10. The fragmentary character of Group II sheep/goat bones and traces of cuts (dark colour: the most frequent parts of bones) (analysed by G. Piličiauskienė).

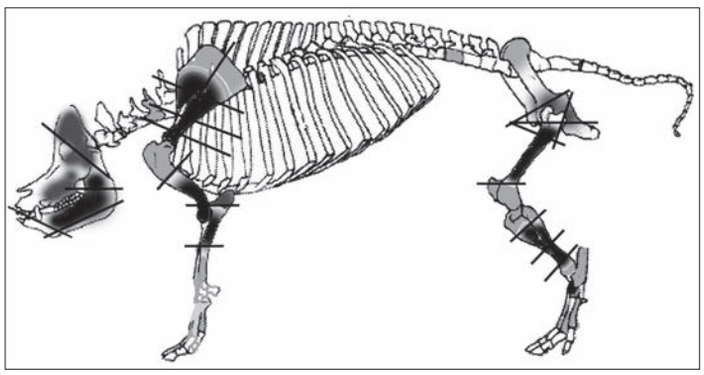

Fig. 11. The fragmentary character of Group II pig bones and traces of cuts (dark colour: the most frequent parts of bones) (analysed by G. Piličiauskienė).

region. It shows that butchers would get 15 mites for butchering a pig and sausage-making, whereas for calves and sheep they would earn six and four mites respectively (Sembritzki 1926, p.146). The slaughterhouse in Klaipėda was built only in 1769, close to the Tilto gates (the present-day area between the River Danė and Herkaus Manto St). The entire complex consisted of the slaughterhouse itself, a pen and a structure for the treatment of entrails. From June 1777 to June 1778, 2,491 bulls and 80 small animals were butchered in it (Sembritzki 1926, p.238). After the appearance of the slaughterhouse, the residents of neighbouring areas had rather unfavourable living conditions (the smell, loud and continuous noise). On the other hand, in those times people treated this as a normal feature of urban life (Bartosiewicz 2003).

One single bone of a dog (a humerus) was identified in the material of the second group. It belonged to an animal 38 centimetres in height, whereas in the material of the first group (posterior) these bones are abundant. Some of them belonged to a single skeleton. All the dogs from the layer of this period could have died in a fire. As was previously mentioned, the buildings of the block burned down during the fire of 1678, and its layers are recorded in the excavated plot. This is pointed to by the fact that no marks of skinning were traced on these bones. Like other animals, dogs would be skinned and their skins would be used in daily life. The bones of dog extremities with cuts after skinning in the 16th and 17th centuries were discovered in Vilnius (the plot at Klaipėda St 7), in Senieji Trakai and on the Anykščiai estate.[8] The heights of the dogs discovered in the plot in Kurpių St varied from 28 to 56 centimetres. Material from the Medieval and post-Medieval ages usually provides bones of similar-size dogs. Dogs under 30 centimetres and over 60 centimetres in height are rarely found. For example, the height of dogs traced in the Lower Castle of Vilnius was about 40 to 56 centimetres, and in the plot in Klaipėda St about 48 to 64 centimetres. The rarely found bones of small or very tall dogs are associated with breeds. Very often during archaeological investigations, almost intact skeletons[9] are another specific feature of dog skeletons. Dead dogs used to be buried in the area, or thrown into household pits or abandoned cellars (Tourunen 2008, p.58). Very often, this was done after skinning.

Single bones of cats were also identified in the material from both periods. Marks of skinning were not found, although this used to be common practice (Bartosiewicz 1995, p.73; Noddle 1974, p.333). The bones of cats are rare in Lithuanian archaeological records. One reason for this is that the small bones of these animals are not found and collected during archaeological investigations.

The analysis of the zooarchaeological material resulted in the measurement of only some of these bones (Table 3). After a comparison of the material with that from Vilnius' Lower Castle (Piličiauskienė 2008a, Tables 18-33), it is possible to maintain that the average measurements of animal bones discovered in Klaipėda are higher. However, these results could be influenced by the ratio of different sexes of cattle, that is, a large number of bull bones, which are larger than those of cows. It should be noted that in the 16th and 17th centuries, cattle were smaller (by 20 to 30 centimetres) than those nowadays of old breeds (ashy, white-backed). These, like most old breeds, are small (~128 centimetres) compared with animals of new breeds (Tušas 2001). At the moment, we still lack data to enable us to reconstruct morphological changes in animals in the period from the 16th and 17th centuries to the 20th century. The available data shows that these morphological changes took place in Lithuania in the second half of the 19th century, and were related to the appearance of new breeds, and the improvement of feed and keeping conditions (Piličiauskienė 2008b). The economy of Klaipėda was mostly affected by Western Europe, so it is possible to maintain that the above processes started earlier in this region.

Conclusions

Archaeological and zooarchaeological investigations relating to the plot in Kurpių Street and historical data enable us to summarise some aspects of life in Klaipėda in the mid-16th and 17th centuries in relation to animal rearing, butchering and nutrition.

In the investigated site, more than 95% of bones discovered from the 16th to the 17th centuries belonged to domestic animals, of which most were cattle. They were the main source of meat for families living here. The second place in meat consumed was taken by pigs. Mutton formed a negligible part of the diet, as did goat meat; whereas horse meat was not consumed at all.

Osteological material from cattle and sheep from the above plot was exceptional by its amount of butchered offspring. This means that cattle were an important source of meat and milk, whereas sheep were basi-

[8] The examination of zooarchaeological material from Vilnius' Lower Castle, the plot at Klaipėda St 7 (Vilnius), Senieji Trakai and Anykščiai country estate was implemented by G. Piličiauskienė.

[9] Almost intact skeletons of dogs were found in Vilnius' Lower Castle, the plot at Klaipėda St 7, and Anykščiai country estate.

cally bred for milk and milk products. The structure of animal age and the anatomical distribution of bones show no centralised supply of meat, and all animals, or the majority of them, were bred and butchered locally. This pattern of economic activity is typical of rural areas and small urban zones. Some of these animals could have been bred on neighbouring estates.

On the basis of the zooarchaeological material, it was discovered that most butchered animals were young. No bones of very old animals were identified, so it is possible to maintain that the local population consumed good meat. This zooarchaeological data points to rich citizens residing in the area. Archaeological finds and extant constructions of buildings also point to this fact.

Osteometrical data shows that the measurements of cattle and pig bones from this plot were slightly larger than those from the Lower Castle in Vilnius. Due to the small numbers of compared bones from Kurpių St, these results are to be treated carefully.

Abbreviations

AB – Archeologia Baltica (since 1995 Vilnius, since 2006 Klaipėda).
ATL – Archeologiniai tyrinėjimai Lietuvoje ... metais. Vilnius (since 1967–).
J Archaeol Sci – Journal of Archaeological Science (since 1974–).
FN – Fauna Norvegica. Trondheim (since 1979–).
LA – Lietuvos archeologija. Vilnius (since 1979–).
MNI – minimal number of individuals.
NISP – number of identified specimen.
Vet Med Zoot – Veterinarija ir zootechnika. Kaunas (since 1994–).
VLC – Vilnius Lower Castle.

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GYVULIŲ AUGINIMAS IR SKERDIMAS SENOJOJE KLAIPĖDOJE

GIEDRĖ PILIČIAUSKIENĖ, IEVA MASIULIENĖ

Santrauka

Archeologiniai kasinėjimai, vykdyti 2007–2008 m. viename iš Klaipėdos senamiesčio kvartalų, prie Kurpių gatvės, suteikė naujų ir vertingų duomenų miesto raidai XVI–XVII a. tyrinėti (1–2 pav.; VII iliustr.). Šiame straipsnyje pristatomi XVI a. vidurio – XVII a. antrosios pusės naujausi zooarcheologinės medžiagos tyrimų rezultatai. Kompleksiškai analizuojama Kurpių gatvės zooarcheologinė medžiaga ir publikuoti istoriniai šaltiniai leidžia daryti tam tikras išvadas apie XVI a. vidurio – XVII a. antrosios pusės Klaipėdos miestiečių mitybą, gyvulių auginimo, skerdimo ypatumus, įvertinti augintų gyvulių osteometrinius duomenis (3–11 pav.; 1–3 lent.).

Zooarcheologinės medžiagos analizės metu buvo ištirti 1470 gyvūnų kaulai ir jų fragmentai, priklausę mažiausiai 76 individams. Tolesnei analizei kaulai padalinti į dvi grupes. I grupei (XVI a. pabaiga / XVII a. pradžia – 1678 m.) priklausė 165 (11,2 %) visų tirtų kaulų, identifikuoti pavyko 151 (91,5 %), kaulai priskirti mažiausiai 14 individų (1 lentelė). II grupėje (XVI a. vidurys – XVI a. pabaiga / XVII a. pradžia) ištirti 1305 kaulai, iš kurių 1201 (92,0 %) pavyko identifikuoti, jie priklausė mažiausiai 62 individams (2 lentelė, 5 pav.).

Tyrinėtame sklype daugiau kaip 95 % rastų XVI–XVII a. gyvūnų kaulų priklausė naminiams gyvuliams, tarp kurių dominavo galvijai. Šiame sklype gyvenusios šeimos pagrindinis mėsos šaltinis buvo galvijai. Antrąją vietą pagal suvartotos mėsos kiekį turėjo užimti kiaulės. Aviena sudarė tik nedidelę raciono dalį. Ožkų vaidmuo šios šeimos mityboje buvo menkas, o arkliai maistui nevartoti.

Sklypo Kurpių g. 3 tyrinėta galvijų ir avių osteologinė medžiaga išsiskyrė neįprastai didele paskerstų jauniklių dalimi. Tai rodo, kad galvijai buvo svarbus ne tik mėsos, bet ir pieno šaltinis, o pagrindinis avių auginimo tikslas buvo pienas ir jo produktai. Gyvulių amžiaus struktūra, anatominis kaulų pasiskirstymas nerodo centralizuoto mėsos tiekimo, visi gyvuliai (ar jų dauguma) buvo auginti, veisti ir skersti vietoje. Toks ūkinės veiklos modelis būdingas kaimo vietovėms ir nedideliems miestams. Dalis gyvulių galėjo būti užauginti greta miesto buvusiuose dvaruose.

Remiantis zooarcheologinės medžiagos analize, didžioji dalis gyvulių buvo skersti jauni, labai senų gyvulių kaulų nenustatyta, todėl galima teigti, kad šioje vietoje gyvenę žmonės maitinosi kokybiška mėsa. Tokie zooarcheologiniai duomenys patvirtina čia gyvenus turtingus miestiečius. Buvus aukštesniojo sluoksnio sklypo gyventojų liudija aptikti archeologiniai radiniai ir išlikusios pastatų konstrukcijos.

Osteometriniai duomenys rodo, kad galvijų ir kiaulių kaulų iš sklypo Kurpių g. 3 matmenys buvo šiek tiek didesni negu rastieji Vilniaus Žemutinės pilies teritorijoje. Šiuos rezultatus reikia vertinti atsargiai dėl nedidelio lyginamų kaulų iš Kurpių g. kiekio.