THIRTEENTH CENTURY CULTURAL DEPOSITS AT THE CASTLE OF THE TEUTONIC ORDER IN KARKSI

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INTRODUCTION

In 2012, within the frameworks of the international project 'The Ecology of Crusading', excavations were continued in the ruins of the castle of the Teutonic Order in Karksi, Viljandimaa County, southern Estonia.[1] Works took place in Trench I that had remained unfinished at the end of the 2011 season (Valk *et al.* 2012, 49–50) due to the greater than expected thickness of the deposits. Because of the tight time schedule of the project and high intensity of the cultural layers, from the total area of the 2011 plot (20 m^2), excavations were continued only within its southern half, totalling 8.5 m^2 (Fig. 1). The western end of Trench 1 was filled with large rocks, probably in the late 15th or early 16th century, and was left unexcavated.

The investigated cultural layer was sieved on meshes with 4–5 mm eye diameter. During the works natural spring

Fig. 1. Trench 1 after the excavations.
Jn 1. I kaevand pärast tööde lõppu.
Photo / Foto: Heiki Valk

[1] The specialist reports in the article were processed as follows: Eve Rannamäe – zooarchaeological data, Lembi Lõugas – fish bones, Monika Badura – pollen analysis and macro-remains, Alexander Brown – radiocarbon analysis and modelling and synthesis of pollen and macro-remains data.

water gathered into the western part of the trench that was separated from most of the excavation area by a thin barrier. This artificial pool was used for water sieving of the material taken from meshes. The general stratigraphy of the trench is reflected in its north-eastern profile (Fig. 2).

After re-opening the trench, conserved with plastic and soil, its bottom was cleaned of mud, formed of the fallen upper part of the profiles, i.e. from the zone of the two pavements (Fig. 2A). From this soil a fragment of a bone flute, made of a tibia of sheep or goat, a 15th century crossbow bolt and trigger fragment were found. To the strata excavated in 2011, i.e. the soil and sand around and under the stones of the lower pavement (Fig. 2: 3, 4) and some thin layers of different composition (partly fill, partly formed *in situ*) (Fig. 2: 5–8), a layer of red loam (Fig. 2: 9) and a layer of findless grey soil that contained much wood chips and compressed grass (Fig. 2: 10) followed.

THE 13TH-CENTURY MIDDEN

After digging the upper layers poor in finds, a partly waterlogged layer of black highly organic sediment 15–20/25 cm thick, and abundant in both artefacts and ecofacts (Fig. 2: 12), appeared in the trench, representing the remains of a midden (rubbish) deposit. Although during excavation there appeared to be some local variations in its colour and texture, the overall homogeneity of the unit was apparent in profile by the end of digging.

The exceptional preservation of organic remains was caused by the high water content of the ground resulting from tiny underground spring water channels that

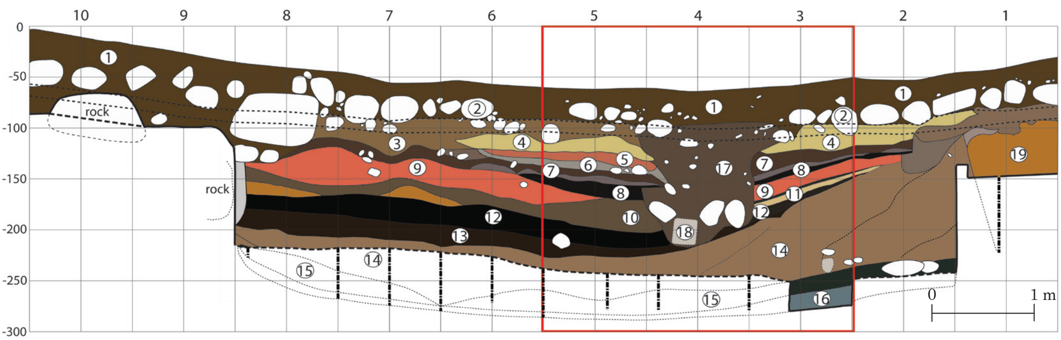

Fig. 2. *North-eastern profile of Trench 1 in Karksi Castle. 1 – dark soil, 2 – upper pavement, 3 – disturbed soil around and below the lower pavement, 4 – white sand around and below the lower pavement, 5 –red clayish loam, 6 – grey soil, 7 – black, rusty cultural layer, 8 – dark soil with organics, 9 – red clayish loam, 10 – dark grey soil with wood chips, 11 – coarse white sand, 12 – black midden, rich in organics, 13 – compressed peat-like organics, 14 – disturbed clay, 15 – poorly decayed plant remains, 16 – natural undisturbed loam, 17 – disturbed soil in the pit, 18 – log, 19 – disturbed loam.*

Jn. 2. *Karksi linnuse I kaevandi kirdeprofiil. 1 – tume muld, 2 – ülemine sillutis, 3 – määrdunud pinnas alumise sillutise all ja vahel, 4 – valge liiv alumise sillutise all ja vahel, 5 – punane liivsavi, 6 – hall täitemuld, 7 – must, roostene kultuurkiht, 8 – tume orgaanikarohke muld, 9 – punane liivsavi, 10 – tumehall laasturohke kiht, 11 – sõre valkjas liiv, 12 – tume orgaanikarohke jäätmekiht, 13 – kokkusurutud turbataoline orgaanika, 14 – segatud savi, 15 – kõdunemata taimejäänused, 16 – looduslik liivsavi, 17 – segatud pinnas sissekaeves, 18 – palk, 19 – segatud liivsavi.*

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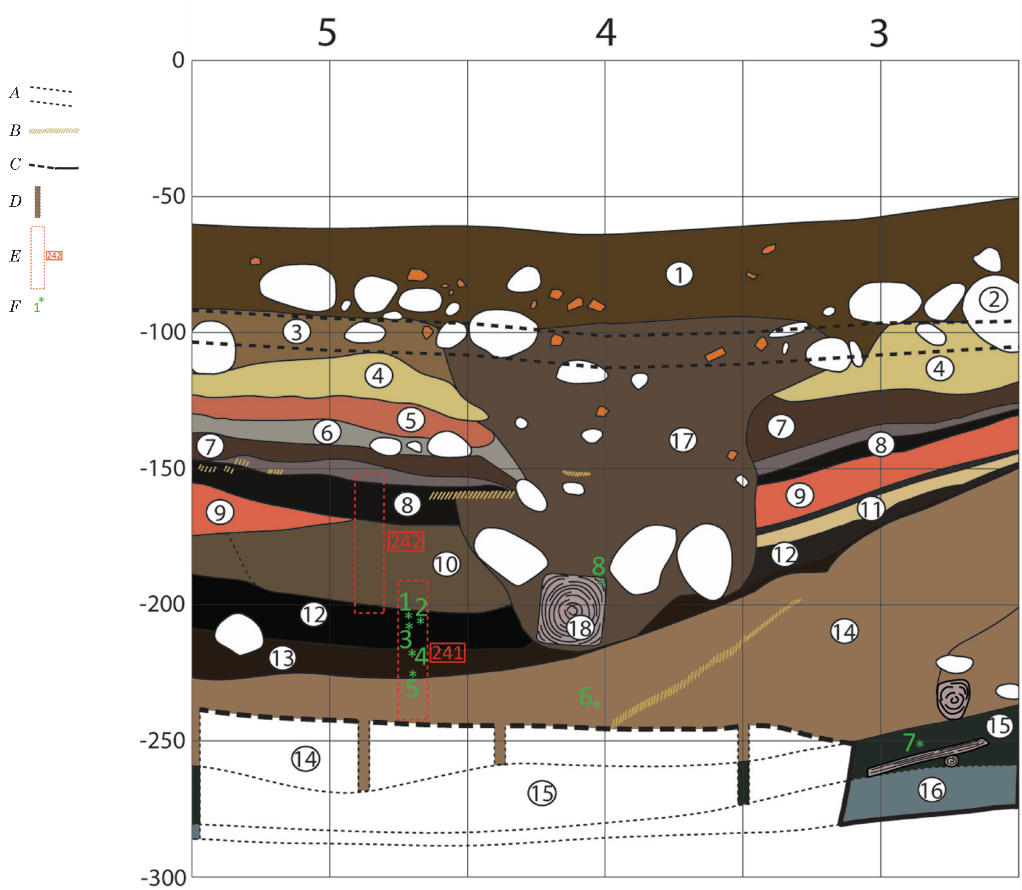


Fig. 2A. *A – zone of the lower pavement, B – stripes of decayed organics, C – border of the excavated area, D – coring site, E – location of sampling tins nos 241 and 242, F – radiocarbon sampling sites (compare with table 1).*
Jn 2A. *A – alumise sillutise tsoon, B – kõdunenud orgaanika viirud, C – kaevatud ala piir, D – puurimiskoht, E – pinnaseproovide nr 241 ja 242 võtmise kohad, F – süsinikuproovide võtmise kohad (vrd tabel 1).*
Drawing / Joonis: Eve Rannamäe

appeared locally at a depth of *ca.* 1.1 m below ground level (the soil was locally wet already in 2011). Although some of these springs could be closed with clay, excavating the base of the midden was possible only by draining the water into specially dug pits from where it could then be emptied.

The midden contained wood chips of different size, branches, nutshells, small fragments of birch bark, egg shells, and numerous animal, bird and fish bones. Artefact finds of organic material were represented by 12 side staves of wooden bowls, a side tablet of a somewhat larger bowl, some hoop fragments of wooden vessels, two bottoms of circular birch bark boxes (Fig. 3: 1, 2), a flat bottom of a wooden bowl, a dice-like timber artefact with four ornamented sides and two pyramid-shaped ends (Fig. 4: 1), a wooden

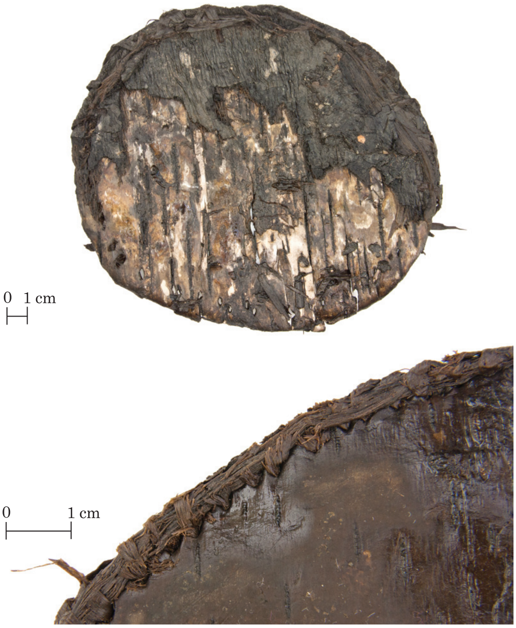


Fig. 3. Bottoms of circular birch bark boxes.
Jn 3. Kasetohust vakakeste põhjad.
(TÜ 1929: 380, 401.)
Photo / Foto: Kristel Külljastinen

gaming piece (a chessman?) (Fig. 4: 2), a rake peg (?), a presumed hidden peg to join wall logs of cross-beam buildings, three pieces of cord (Fig. 4: 3), a leather cord from footwear, a strongly worn-out broom and some fragments of timber artefacts. Exciting finds were wooden sticks with cut marks – some probably meant to account taxation duties (Fig. 5), some of unknown purpose, and fragments of ornamented birch bark (Fig. 6). Also found from the midden were two presumed gaming pieces, made from polished horn ends (Fig. 4: 4, 5), a needle of bream bone (Fig. 4: 11), a fragment of hair brush (Fig. 4: 6), a toggle(?) made from a pig metacarpus (Fig. 4: 10), two unique small ornamented bone plates (Fig. 4: 8, 9), a whetstone (Fig. 4: 7), a grindstone fragment, a hook, probably from horse's harness (Fig. 7: 1), an iron needle (Fig. 7: 2), a hammer's (?) wedge (Fig. 7: 3), a candlestick (Fig. 7: 4), a handle from a metal artefact (Fig. 7: 5), five nails and a piece of flint.

The layer contained numerous manufacturing remains of leather artefacts of different size and shape, mostly just strings, and also a few remains of bone and antler processing. The only pottery fragments are two very tiny sherds of ordinary wheel-thrown vessels. This fact gives evidence of the colonial character of the food culture of the earliest inhabitants of the castle: ordinary wheel-thrown ware is numerous both in the 13th century cultural layers of Viljandi (Valk 1993), located in the distance of 25 km, and in the medieval rural settlements of Viljandi County. Also a potter's kiln from the middle and second half of the 13th century has been found in Viljandi (Tvauri 2001).

The exceptionally high concentrations of animal, bird and fish bones, fragments of wooden bowls, and leather scraps enable us to interpret the midden layer as a deposit of household and table waste. The three radiocarbon dates taken from top and middle of the midden with a date from the compressed organics 1 cm below it (Fig. 2B: I–III; Table 1: 1–4) gave similar results, with their overlapping part between 1265 and 1279 AD.[2] Modelling of the radiocarbon dates, using a Poisson-process depositional model (OxCal 4.2) (Bronk Ramsey 2008), suggests that the midden formed sometime between cal. AD 1266–1290 (Fig. 8; Table 1). However, the current working hypothesis argues for the midden being deposited as a distinct depositional event over a relatively short time period; having a big waste pit in the courtyard of a functioning castle seems unlikely for practical reasons. The hypothesis can be tested by examining the microstratigraphic traces for the presence/absence of soil forming and post-depositional processes.

[2] All dates in the text are calibrated (95.4% probability) into calendar years, using OxCal 4.2 programme and IntCal 09 calibration curve (Bronk Ramsey 2009). Samples were processed at Glasgow University radicarbon laboratory (nos 1–7) and at Tallinn Technological University radiocarbon laboratory (no. 8).

Fig. 4. *Artefacts from the midden. 1 – Dice-like artefact, 2 – gaming piece (chessman?), 3 – cord fragment, 4, 5 – gaming pieces (?), 6 – fragment of headbrush (?), 7 – whetstone, 8, 9 – ornamented objects (antler and bone), 10 – bone toggle (?), 11 – worked and natural rib of the bream from two sides.*
Jn 4. *Esemeid jäätmekihist. 1 – täringutaoline ese, 2 – mängunupp (malend?), 3 – nöörijupp, 4, 5 – sarvest mängunupud, 6 – luust peaharjaplaadi (?) katke, 7 – luisk, 8, 9 – ornamendiga ehisplaadikesed (sarv ja luu), 10 – vurriluu (?), 11 – latika töödeldud ja loomulik roie kahest küljest.*
(TÜ 1929: 400e, 432, 420, 375, 405, 426, 386, 373, 379, 374, 416.)
Photo / Foto: Heiki Valk, Lembi Lõugas

Fig. 5. *Wooden pegs with cut marks from the 13th-century midden. 1 – supposed peg to calculate taxation duties, 2 – peg with cut marks.*
Jn 5. *Sisselõigetega puupulgad 13. sajandi jäätmekihist. 1 – oletatav puust magasipulk, 2 – sisselõigetega pulk.*
(TÜ 1929: 394, 411.)
Photo / Foto: Kristel Külljastinen

Fig. 6. Ornamented pieces of birch bark.
Jn 6. Kaunistustega kasetohutükid.
(TÜ 1929: 450, 451.)
Photo / Foto: Kristel Külljastinen

Fig. 7. Iron artefacts from Karksi castle.
1 – hook from horse harness (?), 2 – needle, 3 – hammer's (?) wedge, 4 – candlestick, 5 – handle from a metal tool.
Jn 7. Raudesemeid Karksi linnuselt.
1 – päitsete katke (?), 2 – nõel, 3 – haamri(?) kiil, 4 – küünlahoidja, 5 – tööriista käepide.
(TÜ 1929: 397, 443, 415, 396, 372.)
Photo / Foto: Heiki Valk

The absence of such traces would strengthen the hypothesis that the midden represents deposition as a single event. Conversely, the presence of soil forming processes could suggest hiatuses between distinct depositional events taking place over a longer period of time. These samples are currently being prepared in the thin section laboratory at the University of Reading. From the upper 10 cm of the midden, two bracteates – a penny of Tartu bishopric and a Danish penny minted in Tallinn, both from between *ca.* 1265 and 1322 AD – were also found, one of them somewhat worn from circulation.[3]

EARLIEST TRACES OF ACTIVITIES

Under the midden there followed a 10–15 cm thick layer, composed of compressed organic remains (Fig. 2: 13) with some brick fragments towards the base of the unit. The only find from it was the bottom of a near stoneware jug, dating not earlier than from the 1250s–1260s and not later than from the end of the 13th century (Fig. 9).[4] The radiocarbon dates from the upper and lower parts of the layer of compressed organics (Fig. 2B: IV, V; Table 1: 4, 5), when modelled, suggest the layer probably formed no earlier than 1232 AD. The layer is highly compacted, consists of matted herbacous material and wood, greatly of the same matrix as the midden, but differs from it by the lack of the massive quantities of anthropogenic material. Micromorphological analysis of the layer will help to determine whether this context formed naturally *in situ*, comprises dumped material or perhaps a combination of the two.

Under the compressed organics there followed a layer of disturbed pink clay of uneven thickness (Fig. 2: 14). In the central and western part of the trench the clay was almost sterile, but in the eastern end it was mixed with soil and contained some wood chips. As water entered the trench, the character of the deeper layers under the midden and compressed organics under it was studied mainly by trial pits and coring. The thickness of the layer of clay, partly disturbed with soil, varied from *ca.* 20 cm

[3] Identified by Ivar Leimus (AM).
[4] Personal comment by Erki Russow (AI).

Table 1. Radiocarbon samples from Karksi Castle (Trench 1).
Tabel 1. Radiosüsinikuproovid Karksi linnusest (kaevand I).
Composed by / Koostajad: Alexander Brown, Heiki Valk

A. Modelled data / modelleeritud andmed							
No. / Nr	***Sample no./ Proovi number***	***Radiocarbon date / Radiosüsinikuaastad***	***Cal AD / Kal***	***Unmodelled calibration ranges (AD) / Modelleerimata kalibreerimisvahemik (95.4%)***	***Modelled calibration ranges (AD) / Modelleeritud kalibreerimisvahemik (95.4%)***	***Dated material / Dateeritud aines***	***Location / Asukoht***
Modelled boundary top / Modelleeritud vahemiku ülempiir 1272–1293							
1	GU28488	724±26 BP	1239–1379	1239–1299 (93.9%), 1371–1379 (1.5%)	1272–1290	hazelnut fragment	midden
2	GU28487	697±26 BP	1265–1385	1265–1306 (78.1%), 1363–1385 (17.3%)	1272–1288	hazelnut fragment	midden
3	GU28486	771±26 BP	1219–1279	1219–1279	1272–1279	leather	midden
4	GU28485	694±29 BP	1265–1388	1265–1310 (72.2%), 1360–1388 (23.2%)	1272–1284	bulk organic peat	top of peat
5	GU28484	767±28 BP	1220–1280	1220–1280	1272–1280	bulk organic peat	bottom of peat
6	GU28483	754±28 BP	1221–1285	1221–1285	1272–1280	birch bark	disturbed clay
7	GU30638	677±27 BP	1272–1389	1272–1315 (58.5%), 1355–1389 (36.9%)	1272–1280	birch bark	layer of compressed organics
Modelled boundary bottom / Modelleeritud vahemiku alampiir 1272–1280							

B. Unmodelled data / Modelleerimata andmed						
No / Nr	***Sample no. / Proovi number***	***Radiocarbon date / Radiosüsinikuaastad***	***Cal AD / Kal***	***Calibration ranges (BC/AD) / Kalibreerimisvahemik (95.4%)***	***Dated material / Dateeritud aines***	***Location / Asukoht***
8	Tln 3486	386±55 BP	1436–1638	1436–1638	secondarily used log	pit, cutting the lower pavement and midden

in the western end of the trench to *ca.* 1 m in its eastern part. In addition to wood chips, from this layer some patches of leaves, hay and disturbed natural soil were found. A radiocarbon sample from a birch bark fragment from this context gave the result 1221–1285 AD (Fig. 2B: VI; Table 1: 6). From the clay also a tiny brick fragment was found.

Under the clay in all parts of the trench a layer full of well-preserved organic remains could be observed both in the test pit and in several cores (Fig. 2: 15; D). This layer contained irregularly thrown trunks of young spruces and birches (≤ 7–8 cm in diameter; with well-preserved white bark and with spruce branches with green needles), moss, leaves and branches/twigs of trees (predominantly spruce, birch and lime; also pine, oak, great willow and alder), as well as different kinds of grass and weeds.[5] Radiocarbon analysis from a birch bark fragment in the layer (Fig. 2B: VII; Table 1: 7) indicates to the period 1272–1315 AD, after modelling – to 1272–1279/80. In the bottom

[5] A sample of macro-remains from this layer was analysed by Ülle Sillasoo (TLÜ).

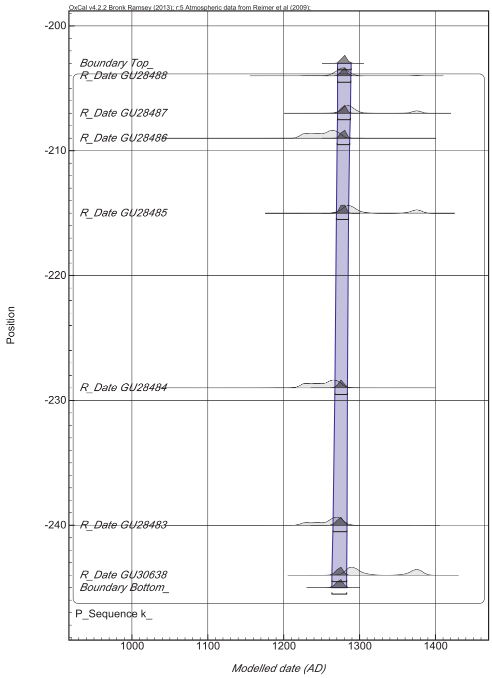


Fig. 8. *Modelled age-depth curve from the radiocarbon samples of the lowest cultural layers of Karksi Castle.*
Jn 8. *Karksi ordulinnuse varaseima kultuurkihi radiosüsinikudateeringute modelleeritud vanuse-sügavusekõver.*

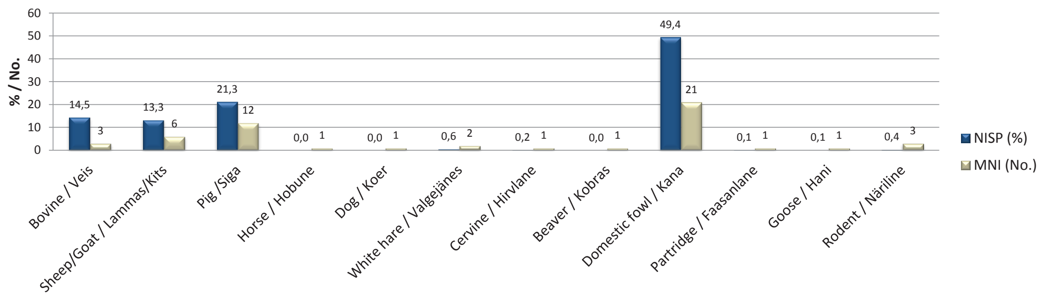
Fig. 9. *The bottom of a near stoneware jug.*
Jn 9. *Varakivikeraamilise kannu põhi.*
(TÜ 1929: 433.)
Photo / Foto: Heiki Valk

of the outer edge of this layer several stones with the diameter of 10–15/20 cm, resembling an irregular pavement – a supposed temporary platform for filling the central part of the basin, were found. Under this layer of organics and muddy soil grey clayish ground with no traces of human activities (Fig. 2: 16) was revealed both in the trial pit and in the cores. Probably, excavations had reached the ground level of pre-castle times here.

MAMMALS AND BIRDS

By the time of writing the article approximately half of the animal bone assemblage from the black layer of 13th century rubbish has been identified and analysed. For identification the reference collection of the Institute of History and Archaeology of the University of Tartu was used. In addition to the skeletal material illustrative material by Ernits (2000), Schmid (1972), Barone (1999) and Ernits & Saks (2004) were applied. Sheep and goat bones were separated with the help of Boessneck *et al.* (1964).

Out of 3221 mammal and bird bone specimens, 2491 (77.3%) could be identified to species, the rest of the bones remained somewhat unclear or unidentified. Among domestic stock the most numerous were pig (*Sus scrofa domestica*) bones, followed by cattle (*Bos taurus*) and sheep/goat (*Ovis aries/Capra hircus*) (Fig. 10). Although the minimum number of individuals (MNI) does not reflect the real number of animals slaughtered and utilised in the castle during the formation period of the midden, it still gives some comparison for the abundance of species. Based on the MNI there were at least three bovines, six sheep/goats (min. two sheep and one goat) and twelve pigs in the material. Two individuals of a white hare (*Lepus timidus*) were represented mostly



Species / Liik	*NISP*	*NISP (%)*	*MNI (No.)*
Bovine / Veis	360	14.5	3
Sheep/Goat / Lammas/Kits	332	13.3	6
Pig /Siga	530	21.3	12
Horse / Hobune	1	0.0	1
Dog / Koer	1	0.0	1
White hare/Valgejänes	15	0.6	2
Cervine / Hirvlane	5	0.2	1
Beaver / Kobras	1	0.0	1
Domestic fowl / Kana	1231	49.4	21
Patridge/Faasanlane	3	0.1	1
Goose / Hani	2	0.1	1
Rodent / Näriline	10	0.4	3
	2491	100.0	

Fig. 10. The distribution of mammal and bird bone specimens by species from the 13th century midden of Karksi Castle. Number of identified specimens (NISP=2491) and minimum number of individuals (MNI).

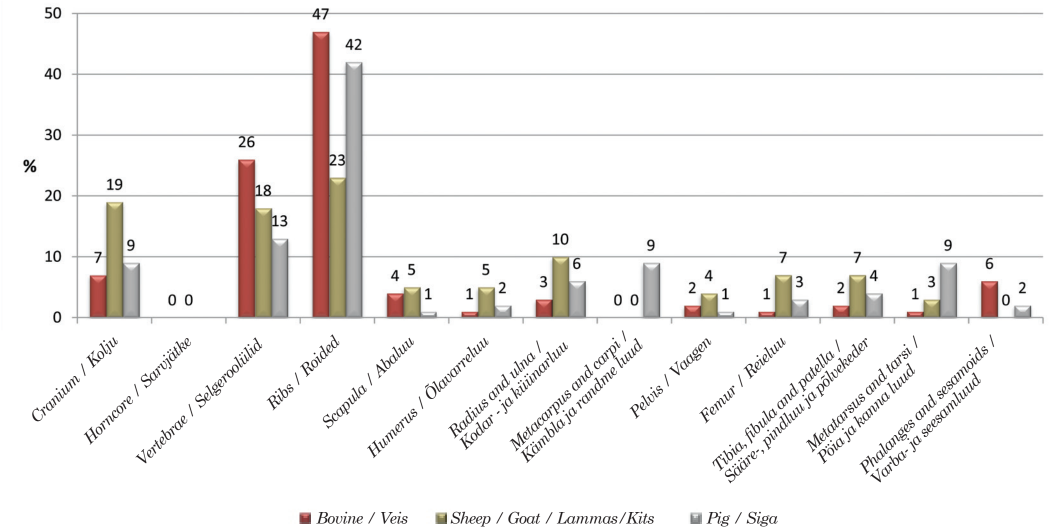
Jn 10. Looma- ja linnuluude liigiline jaotumus Karksi ordulinnuse 13. sajandi jäätmekihis. Määratud luuleidude arv (NISP=2491) ja minimaalne isendite arv (MNI).

Drawing / Joonis: Eve Rannamäe

with limb bones. The most consumed species however was chicken (*Gallus gallus domesticus*) forming more than 40% of all the material. Of course the fragile bird bones tend to fracture more easily and therefore to increase the number of bone specimens, but the MNI of domestic fowl was also the highest – 21 individuals. Two other bird taxa were also present – a partridge (Family *Phasianidae*) and a goose (*Anser sp.*). A horse's (*Equus caballus*) rib fragment, a dog's (*Canis lupus familiaris*) canine and a juvenile beaver's (*Castor fiber*) radius were single finds and carried no apparent cut marks. A few bones of a rat (*Rattus rattus*) and some other mouse (*Order Rodentia*) originate most probably from post-depositional natural processes.

The animal bones in the Karksi assemblage are mostly food waste because of the representation of the body parts, as well as cut marks on bones. Most of the domestic mammal bones derived from meatier body parts such as ribs, vertebrae and upper parts of limbs (Fig. 11). From domestic fowl there were mostly bones from limbs (scapula, radius, ulna and tibia) and sternum. Bones were overall well preserved, although the avian bones were to some extent quite fragmented. There were traces of cutting and chopping on 22% of the bones and only a few pieces derived either from bone or antler processing. Despite the scarcity of the remains of the rodents, many bones in the whole assemblage carried gnawing marks. In total 23% of all the bones had been chewed, either by dogs, rodents or people. This suggests that the waste from food processing and consumption was, for a time, accessible to rodents and other scavenging animals, and contributes to the idea of an open midden in the courtyard area.

Based on the fusing of epiphyses (method by Silver 1969), cattle remains belong to fully grown animals. Age could be determined for three separate individuals: of under 3.5–4 years, 3.5–4 years and over 5 years. Sheep and goats were slaughtered at a



Skeletal elements / Skeletiosad	*Bovine/ Veis (%)*	*Sheep/Goat / Lammas/Kits (%)*	*Pig/Siga (%)*
Cranium / Kolju	7	19	9
Horncore / Sarvjätke	0	0	–
Vertebrae / Selgroolülid	26	18	13
Ribs / Roided	47	22	41
Scapula / Abaluu	4	5	1
Humerus / Õlavarreluu	1	5	2
Radius and ulna / Kodar- ja küünarluu	3	10	6
Metacarpus and carpi / Kämbla ja randme luud	0	0	9
Pelvis / Vaagen	2	4	1
Femur / Reieluu	1	7	3
Tibia, fibula and patella / Sääre-, pindluu ja põlvekeder	2	7	4
Metatarsus and tarsi / Pöia ja kanna luud	1	3	9
Phalanges and sesamoids / Varba- ja seesamluud	6	0	2

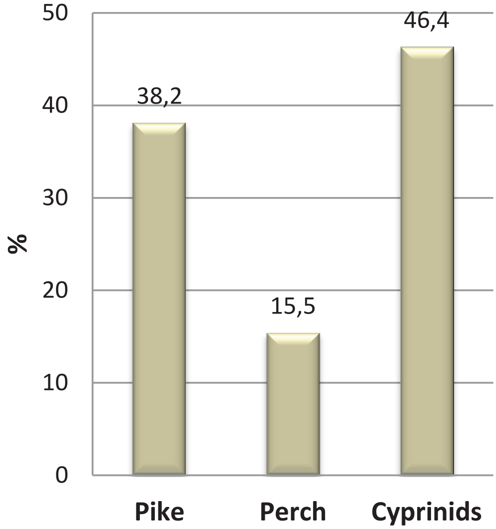
Fig. 11. The percentage distribution of cattle, sheep/goat and pig bone specimens by bone element from the 13th century midden of Karksi Castle.
Jn 11. Veise-, lamba/kitse- ja sealuude jaotumus skeletiosade kaupa Karksi linnuse 13. sajandi jäätmekihis.
Drawing / Joonis: Eve Rannamäe

somewhat younger age: out of six individuals one was about 6 months old, four were between 6 and 21 months old (based on the data of tooth eruption presented by Schmid 1972), and one sheep was over 3–3.5 years old (based on epiphyseal fusion). Pigs seem to have been slaughtered mostly between the ages of 1–2 years, but a few were also a bit older – one individual even over 3.5 years. Judging by the few existing mandible fragments, it could be possible that this older individual was a sow. Amongst the pigs at least two individuals were especially tiny, probably new-born piglets. Some of their bones also carried cut marks, indicating they were consumed for food. Domestic fowl bones, among them a few that could be identified as chicks, were also cut and chewed. In addition to fowl meat there were also many egg shell fragments in the dark layer, but their precise taxonomic association is yet to be identified.

FISH

Fish bones and scales were well preserved: not only the bones of large fish, but also those of small fish were present and they are not fragile when touching and handling. Although a wet sieve was used when collecting the bones, its mesh was large enough (*ca.* 4 mm) to lose small fish vertebrae. Regardless of that a valuable collection of fish bones has been obtained. Out of 549 fish specimens 207 were identified. Those that remained unidentified were mostly fragments of ribs and fin rays.

Preliminary results of the fish bone analyses (Fig. 12) show that from the black layer of 13th century rubbish the most exploited fish (46.4%) come from the group of cyprinids (*Cyprinidae*). From cyprinids only a few bones and species were identified: the most common here is bream (*Abramis brama*), followed by roach (*Rutilus rutilus*), ide (*Leuciscus idus*) and tench (*Tinca tinca*). The size distribution varies from small to quite large fish. As mentioned before, small bones of fish could have been missed, thus the estimation of the size of the smallest one would be speculative, but the largest bream in this material was approximately 45 cm long. The other heavily exploited fish species is pike (*Esox lucius*) (38.2%). Here the largest specimen comes from a *ca.* 100 cm long individual. Also perch (*Perca fluviatilis*) is abundant (15.5%), the largest fish being approximately 35 cm long.



Species / Liik	*NISP*	*NISP (%)*
Pike	79	38.2
Perch	32	15.5
Cyprinids	96	46.4
	207	100.0

Fig. 12. The distribution of fish bone specimens by species from the 13th century midden of Karksi Castle. Number of identified specimens (NISP=207).
Jn 12. Kalaluude liigiline jaotumus Karksi linnuse 13. sajandi jäätmekihis. Määratud luuleidude arv (NISP=207).
Drawing / Joonis: Eve Rannamäe

Among the fish bones a rib of bream, which has been sharpened and polished from the lower part and was probably used as needle or awl (Fig. 4: 11), must especially be noted. Fish bone is not a frequent raw material for tools, but larger specimens with more compact bones could be used in this way. In summary, it is clear that a range of freshwater fish deriving from nearby rivers and lakes were exploited by the castle community in the 13th century.

POLLEN AND MACRO-REMAINS

Samples were taken from Trench 1 for macrobotanical, geoarchaeological and palynological analyses. A total of ten bulk samples, each weighing a minimum of *ca.* 5 kg, were taken for macrobotanical analyses from Trench 1: six (nos. 225, 226, 228, 230, 232 and 236) from the midden (Fig. 2: 12), three (nos. 233–235) from the layer of organics under the clay (Fig. 2: 15) and a further spot sample (no. 240) from the clay layer underlying the peat (Fig. 2: 14). Bulk samples were wet-sieved to separate plant remains from sediment. For each bulk sample an accompanying set of samples were taken for geoarchaeological analyses (including ICP-OES i.e. inductively coupled plasma optimal emission spectrometry, loss-on-ignition, particle size) that will aim to characterize the organic, mineralogical and elemental components of the sediments. A monolith sequence was sampled (Fig. 13) through the midden, peat and underlying clay (Fig. 2A: E, samples no. 241 and 242). From this sequence, samples were taken for micromorphological analysis, focusing in particular on the midden, with the aim of understanding the formation processes of this layer.

Eight samples were also taken from monolith tin 241 for palynological assessment, one sample from the sediment directly overlying the midden, three from the midden, three from the peat underlying the midden and a single sample from the clay underneath the peat. Assessment of these samples indicates variable preservation and concentrations of pollen in the midden and underlying peat. Assessment involved counting 250 land pollen grains, and substantially less in cases where concentrations were poor. No pollen was preserved in the sediment overlying the midden (-193 cm) or from the sample from the base of the midden (-212 cm). Of the remaining six samples (Table 2), counts of 250 were possible from only four samples with reduced counts from the remaining two. Samples will be counted to 500 land pollen grains during the final analysis, but the current assessment provides a good indication of the relative composition of the pollen assemblages and their preservation and concentration.

Fig. 13. Sampling the monolith sequence.
Jn 13. Monoliidiproovide võtmine.
Photo / Foto: Aleksander Pluskowski

Pollen concentrations are low within the clay underlying the peat (Fig. 2: 14), dominated largely by Poaceae (grasses) with some cereal-type pollen. Macrobotanical samples from the clay (sample 240) produced only remains of *Betula*, mostly dowels (roundwood) cut at the ends, most likely intentionally placed to fill in the natural wet depression. The low concentrations and limited diversity of the pollen prevents any detailed discussion based on the plant remains.

Pollen was best preserved in the peat overlying the clay (Fig. 2: 13) and shows a trend for decreasing arboreal pollen from the base of the peat and increasing values for Poaceae and cereal-type pollen. The high frequencies of cereal pollen, reaching *ca.* 40% at -229 cm, are too high to derive

Table 2. Pollen data from Karksi Castle (Trench 1, monolith 241). All pollen percentages are expressed as a percentage of total land pollen, except fern spores, which are expressed as a percentage of total land pollen + fern spores.
Tabel 2. Karksi linnuse õietolmuanalüüside tulemused (kaevand I, monoliit 241). Kõik õietolmuprotsendid väljendavad protsenti õietolmuterade koguhulgast, v.a sõnajalaeosed, mille protsent on arvutatud õietolmuterade ja sõnajalaeoste koguarvu suhtes.
Composed by / Koostaja: Alexander Brown

PERCENTAGE DATA	*Midden*	*Midden*	*Peat*	*Peat*	*Peat*	*Clay*
Depth (cm)	-202	-207	-215	-220	-229	-231
Betula	(4)	6.0	1.2	-	5.2	-
Picea	(3)	0.8	3.6	0.8	4.8	(1)
Pinus	(8)	6.7	2.4	1.6	15.7	(1)
Corylus avellana-type		0.8	0.4	-	0.4	-
Quercus	(1)	1.2	0.8	-	0.4	-
Tilia		1.2	-	0.4	0.4	-
Alnus	(3)	5.2	-	-	2.4	-
Salix	(1)	2.8	0.4	-	0.4	-
Sambucus nigra	-	0.4	-	-	-	-
Calluna vulgaris	-	1.6	0.4	-	0.4	-
Ericaceae	-	12.3	-	-	-	-
Avena-Triticum-type	(6)	2.4	9.6	26.9	23.7	(10)
Hordeum-type	-	0.4	1.2	3.2	2.8	(4)
Cerealia undiff.	-	6.0	6.8	6.3	13.3	-
Secale	-	-	4.8	4.7	6	(6)
Poaceae	(4)	2.4	47.6	42.7	11.2	(39)
Cyperaceae	-	-	0.4	-	-	-
Ranunculus	-	0.4	4.0	2.0	1.2	(1)
Cannabis type	(1)	-	-	-	-	-
Chenopodiaceae	-	0.4	-	0.0	-	-
Caryophyllaceae	-	-	0.4	0.4	0.4	-
Agrostemma githago	-	-	-	0.4	-	-
Lychnis flos-cuculi	-	-	0.8	-	0.4	-
Polygonum aviculare	(1)	-	-	-	-	-
Rumex acetosa-type	-	2.4	0.4	-	-	-
Hypericum	-	0.4	0.4	-	-	-
Sinapis-type	-	8.3	-	0.8	0.4	-
Trifolium	-	1.6	2.8	2.0	1.2	-
Rosaceae	(3)	8.3	2.0	0.8	0.8	-
Filipendula	-	6.7	2.8	-	1.6	-
Potentilla	-	-	0.4	0.4	-	-
Fabaceae	-	1.2	-	-	0.4	-
Vicia-type	-	-	0.4	0.4	-	-
Epilobium	-	3.2	-	-	-	-
Cornus suecica	-	-	0.4	-	-	-
Apiaceae	(1)	6.7	3.6	2.8	0.8	-
Apium	-	0.8	-	-	-	-
Plantago lanceolata	-	-	-	-	-	(1)
Campanula	-	0.4	-	-	-	-
Valeriana dioica	-	0.4	-	-	-	-
Cirsium	-	0.8	0.8	0.8	-	-
Centaurea nigra	-	2.4	0.8	2.4	2.8	-
Aster-type	(1)	1.6	-	-	0.4	-
Lactuceae	-	1.2	-	0.4	1.6	-
Artemisia-type	-	1.2	-	-	1.2	-
Anthemis type	-	1.2	0.4	-	-	-
Pteropsida (monolete) undiff.	-	0.4	-	-	-	-
Indeterminables	-	10.7	7.1	7.3	6.4	(2)

from nearby agricultural fields, and most likely reflect pollen transported on cereals/cereal waste processed and/or deposited in the future area of the High Castle. Given the high frequencies of cereal pollen it is probable that a proportion of Poaceae pollen derives from common millet (*Panicum miliaceum*), indistinguishable from Poaceae in the pollen record. Arboreal pollen forms only a minor component of the pollen assemblage in the two peat samples above -229 cm, suggesting a largely cleared landscape within the vicinity. There is insufficient sample resolution at present to determine whether this reduction in arboreal pollen was rapid or more gradual, but further analysis of samples at 1 cm intervals should help to answer this question. There are occasional pollen grains of a range of herbaceous plants indicative of disturbed, grazed and cultivated ground, including *Agrostemma githago* (corncockle) and Apiaceae (carrot family). Pollen of grassy, open ground and wetland are suggested by Ranunculaceae (buttercups), *Trifolium* (Clovers), Rosaceae (rose family) and *Filipendula* (meadowsweets). Plant macrofossils include several fragments of *Corylus avellana* (hazelnuts) but otherwise only single remains of seeds of crop and ruderal weeds, including *Galium spurium* (false cleavers), *Polygonum lapathifolium* (pale persicaria), *Fallopia convolvulus* (black bindweed) *Spergula arvensis* (corn spurry), *Melandrium album* (White Campion), *Chenopodium album* (white goosefoot) and *Vernonica* sp. (speedwells). Single seeds of wetland plants were also recorded, including *Carex* spp (sedges), *Ranunculus acris* (meadow buttercup) and *Scirpus sylvaticus* (wood clubrush). Insect remains of the Anobiidae family were also noted in the sample. Several species are noted as pests, boring into wood or living in waste materials.[6]

The pollen assemblage from the peat contrasts with the only sample preserving pollen from the overlying midden (Fig. 2: 12), characterized by the higher diversity of herbaceous plant taxa and lower values for cereal-type pollen and particularly Poaceae (grasses). The comparatively low levels of Poaceae pollen from the midden may be a result of the poor preservation quality of pollen and low corrosion susceptibility of grass pollen (Havinga 1984). Notable also are the increased values for arboreal pollen and the high percentages for Ericaceae (heather), almost completely absent in the underlying sediments. The herbaceous pollen comprises a range of plant taxa of similar habitats to the underlying peat, but includes higher frequencies of Rosaceae, *Filipendula*, *Sinapis* type and Apiaceae suggestive of wet, open and grazed ground. The significant decrease in Poaceae and increase in Ericaceae and arboreal pollen is more difficult to interpret in the context of a single sample, particularly from an archaeological deposit where the balance between pollen derived from the local vegetation and that introduced by human agency is more difficult to determine. Interpretation of the pollen data is made more difficult because of the lack of an immediate off-site pollen sequence for comparison. However, additional samples from the peat and midden will help to determine whether there is a consistent change or fluctuations in the pollen signal between the two contexts likely to reflect the local vegetation or the influence of anthropogenic factors. For example, waste material dumped into the midden may produce sudden spikes in discrete pollen taxa, such as the increase in Ericaceae, perhaps reflecting specific activities and depositional events.

The potential contribution of pollen from food plants stored and/or consumed in the early phase of the castle is emphasized here in particular, since many of the pollen

[6] Personal comment by Elżbieta Kaczorowska (University of Gdańsk).

family and genera include edible plant species or those of economic value. For example, pollen of *Sinapis*-type may represent useful plants such as *Sinapis alba* (mustards) and *Sinapis arvensis* (charlock). Pollen of Apiaceae (carrot family) may represent a range of species reflecting the cultivation of vegetables (e.g. carrots, celery and parsnip) and the use of herbs (e.g. dill, fennel and parsley). Pollen of the Rosaceae family includes a wide range of edible fruits including apples, pears, plums, cherries, strawberries and raspberries. Strawberries and raspberries are likely to have been growing naturally on site, as they still do today, rather than necessarily representing cultivated plants; seeds of both plants occur within the midden (see below). Seeds of fruit trees are not as yet evident from the macrobotanical record from Karksi. The cereal pollen may reflect the nearby processing and/or storage of cereals, although macrobotanical remains of cereal grains are conspicuous by their absence from the midden (see below).

Plant macrofossils from the midden (samples 225, 226, 228, 230, 232, 236) indicate a range of habitats. Damp/wet areas are suggested by seeds of *Carex, Filipendula ulmaria* (meadowsweet), *Prunella vulgaris* (selfheal), *Scirpus vulgaris* (wood clubrush) and *Eleocharis palustris/uniglumis* (common spikerush/slender spike rush). *Corylus avellana*, *Rubus idaeus* (raspberry) and *Fragaria vesca* (wild strawberry) may equally represent the remains of naturally deposited or deliberately collected edible fruits. Plants of ruderal (disturbed) habitats are represented by single seeds of *Polygonum lapathifolium*, *Plantago major* (Greater Plantain) and *Viola arvensis* (Field Pansy).

Interpretation of the preliminary macrobotanical and palynological results from both the peat and overlying midden indicate the inclusion of plants no doubt growing in localized damp environments, emphasized by the waterlogged nature of the sediments. However, the absence of cereal remains, or seeds of weeds closely associated with cultivation, is interesting given the comparatively high value for cereals in the pollen record; this may reflect the different taphonomic processes and source areas for pollen and macrobotanical remains. Cereal remains tend not to survive in the macrobotanical record unless accidentally charred, and food waste is unlikely to yield unprocessed cereal grains. The pollen record may therefore be the only record of the presence of cereals within the castle. Other than *Secale* (rye), which is wind-pollinated, well-dispersed and produced in large quantities, the majority of cereal pollen is self-pollinated – and therefore produced in small quantities, with large grains that travel only very short distances from source. Cereal pollen is therefore typically found in only small quantities in pollen assemblages, even adjacent to agricultural fields. The cereal pollen in the Karksi samples is largely of the *Avena-Triticum* group, with smaller quantities of *Secale* and *Hordeum* type pollen. Such large percentages for the latter group of cereal pollen are therefore very unlikely to reflect nearby cultivated fields. When taken with the other cereal pollen types, the high percentages may reflect the storage or processing of cereals within the castle. Examination of potential storage contexts may in future prove more fruitful for cereal remains. More detailed interpretation of the palynological and macrobotanical data must await the results of a more thorough examination of the samples currently in progress. Nonetheless, the preliminary macrobotanical and palynological results emphasize the significant potential of plant remains to contribute towards our understanding of plant use, and demonstrates the potentially wide ranging habitats and resources exploited by early post-conquest communities.

REMAINS OF TIMBER CONSTRUCTION

In the eastern part of the plot, in the area where numerous stones with the diameter of 10–20 cm were discovered in 2011, a pit with the width of *ca.* 1.1 m in its upper part, cutting through the black midden almost perpendicularly to the trench, was discovered (Fig. 2: 17). In the bottom of the pit a log with a rectangular section of 22 × 25 cm was unearthed (Fig. 2: 18; 14). Its southern end stretched into the trench at a length of 135 cm. The log that was carefully axed originated from some earlier timber construction. Its secondary use was shown by a diagonally (45°) cut dowel with the depth of 10 cm and length of 37 cm. In the log there was also a drilled hole (diameter 3.5 cm) that contained the fragment of a peg that had linked it with another log during its primary use. As the log was in a horizontal position and carefully packed with stones with a diameter of 15/20–30 cm from both sides and from the end, it was evidently not incidentally thrown into the pit, but served as the foundation of some longer timber construction that remained mainly in the profile, i.e. out of the trench area. The radiocarbon date taken from the outermost year rings of the tree (Table 1: 8) gave the result 1437–1638 AD. As both pavements were broken in the area of the log, the construction for which it was secondarily used can be dated, probably, to the Post-Medieval Period.

Fig. 14. Log of secondary use as the basis of some timber construction from a Late Medieval or Early Modern Times pit in Karksi Castle.
Jn 14. Puitkonstruktsiooni alustoeks olev sekundaarselt kasutatud palk hiliskeskaegsest või varauusaegsest sissekaevest Karksi ordulinnuses.
Photo / Foto: Aleksander Pluskowski

CONCLUSIONS AND INTERPRETATION

On the basis of excavation results of 2011 and 2012 the general stratigraphy and chronology of activities in the main courtyard of the High Castle of Karksi can be outlined. The place for the castle was determined, evidently, by the natural valleys crossing and running into the deep Karksi-Halliste ancient valley. These valleys determined both the area for the main castle and its large outer bailey. When the place was chosen for the construction of the main castle, there was a shallow basin-like depression in the area. The diameter of the basin was at least 7–8 m and its depth stretched at least 0.7 m deeper than the surroundings. Most likely, the area was wet, being fed by underground spring waters, and it maybe even formed a small pool in rainy seasons. The first activity of the castle builders, once between 1272 and 1280, was cutting young trees and bushes and throwing them into the natural depression to fill it. Judging by the age of the trees it seems likely that they had grown on land that had become deserted as a result of the crusades but that had been a cultural landscape before. Consequently, the basin was filled with clay, taken, probably, from the re-shaped slopes of the castle hill.

Due to its weight, the clay compressed the organic sediments below it. As a result of this process of auto-compaction, the area of the basin continuously formed a wet depression in the courtyard of the future High Castle. Within this area an organic peaty layer formed, starting not earlier than 1272 based on the radiocarbon model. Judging by internal differences in pollen contents (the share of arboreal pollen is different in its bottom and higher parts), the peat was formed not as a result of decomposition of organic material dumped at one moment, but over a longer period of time. The presence of some brick fragments in the clay below it indicates that the construction of the stone castle had begun before the formation of the peat already. These brick pieces give evidence of activities in the surroundings also during the formation of the peat as a result of gradual natural process. Thus, there existed a time gap of several years between the first construction works (filling the original wet basin with cut wood and the layer of clay) and the beginning of intensive occupation activities in the High Castle. This means that the construction works of the castle were greatly ‘frozen’ for that period for some reason.

Being still muddy and unpleasant, when intensive occupation activities were launched in the High Castle area, the area of the basin needed to be filled again. Thus, it began to function as a place of rubbish disposal (including remains of food and leather processing). Probably, then midden was formed during a short period of time. This is shown also by the considerably low number of animal individuals among the bone material, when considering the large total number of analyzed animal bones. Judging by the similar results of the radiocarbon dates taken from the midden, peat and organic remains in the clay, the time span since the earliest works in the castle area up to the formation of the top part of the midden was rather short. The overlapping parts of the three calibrated radiocarbon dates from the midden indicate to the period 1265–1279 AD, after modelling – to 1272–1279. This date is, however, in contradiction with the general chronology of the radiocarbon dates (compare calibrated dates of samples no. 1–3 and no. 7 in Table 1). If the formation of the stratigraphically earliest layer (Fig. 2: 15) had begun only after 1272, there seems to have been insufficient time for the peat-like layer (Fig. 2: 13) to form, prior to the deposition of the midden (Fig. 2: 12). It cannot be excluded that the peat-like layer is also a dumped deposit, although it lacks the archaeological inclusions recorded from the midden. This hypothesis will be tested through the micromorphological analysis currently underway. If the layer appears to be dumped, the contradiction between radiocarbon dates disappears and the midden, i.e. the beginning of intensive occupation activities can be dated to the 1270s already. Two coins from the upper part of the midden show that the top of the midden has formed no earlier than in the second half of the 1260s.

The traces of the pre-castle basin could clearly be observed in the profiles of the trench – all the layers followed the original relief of the ground, being somewhat sunk in the area of the central part of the basin (Fig. 2), including both medieval pavements. Thus, the sinking caused by the gradual process of peat formation and decay of organic matter had continued also after the construction of the pavements.

As the midden dates from the last third of the 13th century, but the lowest layers studied in 2011 and maybe also the top layers studied in 2012 seem to be from the 15th century, a part of the cultural layers, has evidently been removed when constructing the lower pavement. The layers with rather low concentration of finds between the sand under it and the midden cannot be interpreted as a result of continuous activities during a period of more than a hundred years, including the whole 14th century. Evidently, all layers formed in the 14th century, and probably not only those, were removed from the courtyard once some time before constructing the lower pavement.

The chronology of primary construction activities in Karksi enables us to make suggestions also about the construction history of Viljandi Castle – the central Order Castle of the region. The start of intensive occupation activities in Karksi Castle, judging by the modelled calibration ranges and the stratigraphical sequence of samples (Table 1) presumably in the 1280s or early 1290s, enables us to suggest that the first stage of the construction works had ended in Viljandi by that time already. The end of one stage of major works enabled the Order, maybe also after a certain time span needed for accumulation, to direct resources to the construction of new power centres.

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13. SAJANDI KULTUURKIHT KARKSI ORDULINNUSEL

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2012. aastal jätkusid kaevamised Karksi ordulinnuses, eelmisel aastal avatud, kuid kultuurkihi oodatust suurema paksuse tõttu lõpetamata jäänud ja talveks konserveeritud I kaevandis pealinnuse õuel. Kultuurkihi põhjani uuriti läbi 8,5 m^2 suurune ala (jn 1; 2). Konserveeritud kaevandi profiilidest, ülemiste sillutiste tsoonist varisenud pinnasest leiti ammunooleots, luuflöödi ja päästiku katke. Pärast pinna puhastamist jätkus 2011. aastal paljandunud punane liivsavi (jn 2: 9), mille all tuli nähtavale hallikas, laaste ja kokkupressitud rohtu sisaldav leidudeta pinnasekiht (jn 2: 10). Edasi paljandus üle kaevandi pinnaveest märg 15–20/25 cm paksune must kultuurkiht (jn 2: 12), mis sisaldas rohkelt laaste, oksi, pähklikoori, looma-, linnu- ja kalaluid ning arvukalt pähkli- ja veidi munakoori. Leiti puu- ja tohtnõude katkeid (jn 3), luuakonts, täringutaoline puuese (jn 4: 1), puust mängunupp (jn 4: 2), kolm nöörijuppi (jn 4: 3) ning arvukalt nahkesemete tootmisjääke. Märkimist väärivad lõigetega pulgaotsad (jn 5), millest mõned (jn 5: 1) võivad pärineda maksukohustuste täitmise jälgimiseks kasutatud magasipulkadest, ja ornamendiga kasetohutükikesed (jn 6). Mustast kihist saadi ka kaks sarvest mängunuppu (jn 4: 4, 5), luunõel või -naaskel (jn 4: 11), oletatav peaharja luuplaadi katke (jn 4: 6), kaks ornamendiga ilustatud luuplaadikest (jn 4: 8, 9), vurriluu (jn 4: 10), luisk (jn 4: 7), käiakivi katke ja rauast tarbeasju (jn 7). Asjaolu, et leiti vaid kaks väikest lihtkedranõude kildu, annab tunnistust 13. saj linnuse asukate hoopis teistsugusest söögilauakultuurist, võrreldes keskaegse Viljandimaa maa-asulate ja keskaegse Viljandi linnaga. Laastude, looma-, linnu- ja kalaluude ning naharibade suur kontsentratsioon ning üksikud luu- ja sarvetöötlemisjäägid näitavad, et kiht on tekkinud pühkmetest ja olmejäätmetest. Kolme musta kultuurkihi ülaosast võetud süsinikuproovi kalibreeritud tulemuste ühisosa jääb aastatesse 1265–1279 (tabel 1, 1–3). Dateeringut toetavad kihi ülaosast leitud Tartu piiskopkonna brakteaatpenn ja Tallinnas vermitud Taani penn (mõlemad u 1265–1332). Musta kihi mikrostratigraafia, paiknemiskontekst ja loomaluude kogumi eripära (väike isendite arv) lubavad arvata, et see kiht on tekkinud lühikese aja vältel.

Jäätmekihi luuleidudest on käesolevaks ajaks määratud umbes pool – ligi 3770 luud või luutükki. Loomaluude seas domineerivad koduloomadest (jn 10) sea-, suur- ja väikekariloomade luud, kuid kõige arvukamalt leidus kanaluid. Kodulooma- ja kanaluud kujutavad endast söögijäätmeid, valdavalt liharohketest kehaosadest (jn 11); 22% luudest on lõikejälgedega, kuid luu- ja sarvetöötlemisjäätmete hulk on väike. Veised olid tapetud vähemalt 3,5 aasta, väikekariloomad enamasti 6 kuni 21 kuu, sead valdavalt 1–2 aasta vanuses. Hästi säilinud kalaluude seas (jn 12) domineerivad karplased, haug ja ahven. Musta intensiivse kultuurkihi all paiknes 10–15 cm paksune samalaadse koostisega, kuid leidudeta ja aktiivse inimtegevuse märkideta, üksnes üksikuid tellisetükke sisaldav tumehall turbataoline mass, mis on tekkinud kokkupressitud orgaanikast (jn 2: 13). Ainsaks leiuks siit oli 13. sajandi II poole varakivikeraamilise kannu põhi (jn 9). Kultuurkihi all olev kokkupressitud orgaanikakiht on selle eri osades leiduva õietolmu erineva koostise põhjal tekkinud pikema aja vältel, osalt nähtavasti loodusliku protsessi tulemusena. Kihi üla- ja alaosast võetud süsinikuproovide (Tabel 1: 4–5) ühisosa jääb 1265. ja 1280. aasta vahemikku. Stratigraafiliselt varasema ladestuse moodustas kas puhta või mullaseguse, laaste sisaldava roosaka savi kiht (jn 2: 14), millest leiti üks tellisetükike. Selle täitekihi paksus oli kaevandi idaotsas ligikaudu meeter, kaevandi lääneosas vaid u 20 cm. Kaevandisse tungiva vee tõttu uuriti intensiivse musta kultuurkihi all olnud turbataolisest kihist varasemaid ladestusi, enamiku kaevandi ulatuses ka ülalnimetatud savikihti, vaid proovišurfide, profiilitranšee ja mullapuuri abil. Savikihis leidunud rohu ja puulehtede pesast võetud süsinikuproov andis tulemuseks ajavahemiku 1221–1285. Savikihi all paiknes 10–20 cm paksune, tugevalt kokkupressitud orgaanikakiht (jn 2: 15), mis sisaldas puulehti, rohtu ja oksi, sh rohelisi kuuseoksi, samuti korratult lebavaid noorte kuuskede ja kaskede tüvesid (läbimõõt kuni 7–8 cm) ning sammalt ja veidi umbrohuseemneid. Orgaanikamassist võetud süsinikuproov (Tabel 1: 7) viitab pärast modelleerimist ajavahemikule 1272–1279/80. See dateering annab ajalise alampiiri ka kõigile sellest hilisematele ladestustele. Sügavamal algas inimtegevuse jälgedeta savikas sinakas pinnas (jn 2: 16), mis näib endast kujutavat algset looduslikku maapinda ning mis sisaldas puursüdamikes setteviirge.

Kaevandist võeti kümme vähemalt 5 kg massiga pinnaseproovi makrojäänuste analüüsiks ja geoarheoloogilisteks uuringuteks, samuti kaks monoliitset pinnaseproovi (jn 13) kultuurkihi mikrostratigraafia ja mikromorfoloogia uurimiseks ning õietolmu-uuringuteks (tabel 2).

Kultuurkihi all turbataolises kihis oli õietolm hästi säilinud. Puude õietolmu oli nimetatud kihi ülaosas, võrreldes kihi alaosaga, väga vähe, mis viitab maastiku avanemisele. Seevastu suurenes kihi ülaosas kõrreliste ja teravilja õietolmu hulk. Praeguse uurimisseisuga ei saa veel öelda, kas puude osakaal väheneb järk-järgult või on tegemist järsu murranguga. Teraviljade õietolmu kontsentratsioon turbataolises kihis on liialt suur selleks, et olla sinna tuulega kandunud: see õietolm võiks pärineda lähedusse töötlemiseks või kasutamiseks toodud taimedelt (nt õlgedest). Rohttaimede õietolmu oli vähe. Makrojäänustest leiti rohkelt pähklikoori, samuti üksikuid umbrohu- ja niiskuslembeste taimede seemneid.

Jäätmekiht sisaldas mitmesuguste rohttaimede, kuid vaid väga vähe kõrreliste õietolmu, võimalik et viimase halvema säilivuse tõttu kuivemas pinnases. Märkimist väärib, erinevalt turbataolisest kihist, kanarbikuliste õietolmu suur ja teraviljade õietolmu väike hulk. Jäätmekihist leiti õietolmu, mis võib viidata toiduks kõlbulike taimede − juurviljadest porgandi, pastinaagi ja selleri, aedtaimedest sinepi, tilli, apteegitilli ja peterselli kasvatamisele. Leiti ka roosõieliste sugukonna taimede – siia kuuluvad näiteks õuna-, pirni-, ploomi- ja kirsipuud, maasikad ja vaarikad – õietolmu, kuid enamasti polnud seda võimalik liigi tasandil määratleda. Jäätmekihi makrojäänuste seas oli nii niiskete kasvukohtade liikide kui ka maasika- ja metsvaarikaseemneid, ent teraviljaleiud puudusid.

Kaevandi idaosa lõikas ristsuunaliselt sissekaeve (jn 2: 17), mille põhjas oli ristkülikukujulise lõikega, ligi 135 cm ulatuses kaevandisse ulatuv palk (22 × 25 cm) (jn 2: 8; 14). Kuna palk lebas horisontaalselt ja oli nii külgedelt kui otsast tihedalt kiilutud sissekaevet täitvate 15–30 cm läbimõõduga raudkividega, on ilmselt tegemist mingi konstruktsiooni alustalaga. Et kaevandi profiilis oli palgi kohal lõhutud nii ülemine (hiljem osaliselt taastatud) kui ka alumine sillutis, pärineb rajatis keskaja lõpust või varauusajast. Diagonaalne, 10 cm sügavune ja 37 cm pikkune tapipesa ja palki teise samalaadsega liitnud salapulga jaoks puuritud auk koos pulgatükiga annavad tunnistust varasema ehitusdetaili sekundaarsest kasutusest. Palgi välimistest aastaringidest võetud süsinikuproov andis tulemuseks ajavahemiku 1436–1638.

2011. ja 2012. a uuringud annavad ülevaate linnuseõue üldisest stratigraafiast ja kronoloogiast. Pealinnuse asukohaks valitud paigas on enne linnuse rajamist olnud vähemalt 7–8 m läbimõõduga ja kuni 70 cm sügavune märg lohk, kuhu linnusekoha ettevalmistamise käigus, mitte enne 1272. aastat, on loobitud noorte puude tüvesid, oksi ja rohtu. Seejärel on süvend täidetud savi ning savi-mulla seguse pinnasega, millele on, nähtavasti osalt looduslike protsesside tulemusena tekkinud turbataoline orgaanikakiht. Seega on esialgsete mullatööde järel ehitustööd mõneks ajaks peatunud või olnud väheintensiivsed. Esmase täitematerjali vajumise tõttu on vesine lohk linnuseõuel püsima jäänud ning pärast intensiivse elutegevuse algust pealinnusel on see täidetud olmejäätmetega (köögi- ja söögijäätmed, pühkmed, nahatöötlemisjäätmed, laastud). Jäätmekiht on tekkinud millalgi 13. sajandi lõpuveerandil, enne 1293. aastat, nähtavasti väga lühikese aja vältel. Märkida tuleb teatud vastuolu erinevate dateeringute vahel. Kui jäätmekihist (jn 2: 12) võetud süsinikuproovide kalibreeritud tulemuste ühisosa jääb ajavahemikku 1265–1279, pärast modelleerimist aastatesse 1272–1279 (tabel 1: 1–3), siis sellest sügavamal olevast ning seega linnuse rajamisajast varasema lombi esmase täitmisega seotud taimejäänuste kihist (jn 2: 15) võetud proov (tabel 1: 5) viitab inimtegevuse algusele mitte enne 1272. aastat (tõenäosus 95,7%). Vastuolu dateeringute vahel kaob, kui turbataolise kihi käimasolevate mikromofoloogiliste uuringute käigus peaks ilmnema, et see kiht pole ladestunud mitte pikema aja vältel, nagu võib oletada õietolmu põhjal, vaid ühekorraga.

Karksi linnuses alanud ehitustööde peatumist võis tingida ressursside koondamine Viljandi linnuse kui piirkonna keskse linnuse väljaehitamiseks. Intensiivse elutegevuse algus Karksi linnuses ilmselt 1280. aastatel või 1290. aastate alguses lubab kaude oletada, et Viljandi linnuse väljaehitamise esimene etapp oli selleks ajaks lõppenud: see asjaolu võimaldas ordul eraldada vahendeid uute võimukeskuste rajamiseks.