ARCHAEOLOGICAL RESEARCH AT VEIBRI: A LATE MESOLITHIC CEMETERY AND A MASS GRAVE FROM THE 13TH CENTURY AD

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INTRODUCTION

The Veibri site (Luunja municipality), situated in southern Estonia on a flood plain on the northern shore of the River Suur Emajõgi, became archaeologically interesting in 1997, when Andres Tvauri and Andres Vindi (both TÜ) discovered a settlement site[1] of Corded Ware Culture and the Middle Ages. In the same year, during the preliminary investigations led by Aivar Kriiska (TÜ), the borders of the settlement site were specified (Kriiska 1997) and the place was later scheduled as an archaeological heritage protection area (reg. no. 27195 in the National Register of Monuments). In 2003 Veibri attracted the interest of archaeologists again: Kalle Lange (MA) found human bones from the vicinity of the settlement site during an inspection (see Johanson *et al.* 2006–2011). The bones were exposed on the ground. The turf layer and part of the soil under it had been removed. The location of the site was not typical for cemeteries from historical or later prehistoric times. Therefore, it caught the attention of Stone Age researchers and their preliminary hypothesis interpreted it as a Late Neolithic grave. Salvage excavations were conducted at the site in 2006 (see Johanson *et al.* 2006–2011), which resulted in unearthing a quadruple grave (L[2] I – L IV), whereas, a few human bones were detected in the north-western corner of the excavation plot (L V) and in a trial pit (L VI[3]) *ca.* 20 m north-west from the excavation plot. The collective burial was dated by analyzing a sample from the corpus of the right radius (Radius dext. Corpus) of the adult (L II). The AMS dated the grave to the Late Mesolithic: 6090±45 BP[4] or 5210–4890 cal. BC[5] (Kriiska *et al.* 2007, tab. 1). The cultural layer on top of the grave was dated on the basis of pottery finds to the Late Iron Age and the Middle Ages, a few fragments of ceramics of the cultures of Narva and Corded Ware were also found.[6]

[1] Finds TÜ 568.
[2] L stands for 'luustik', an Estonian word for a skeleton.
[3] It turned out to be a mass grave excavated in 2010.
[4] Hela-1331.
[5] Calibrations are made with: Atmospheric data from Reimer *et al.* (2004); OxCal v3.10 Bronk Ramsey (2005); cub r:5 sd:12 prob usp[chron].
[6] Finds TÜ 1424.

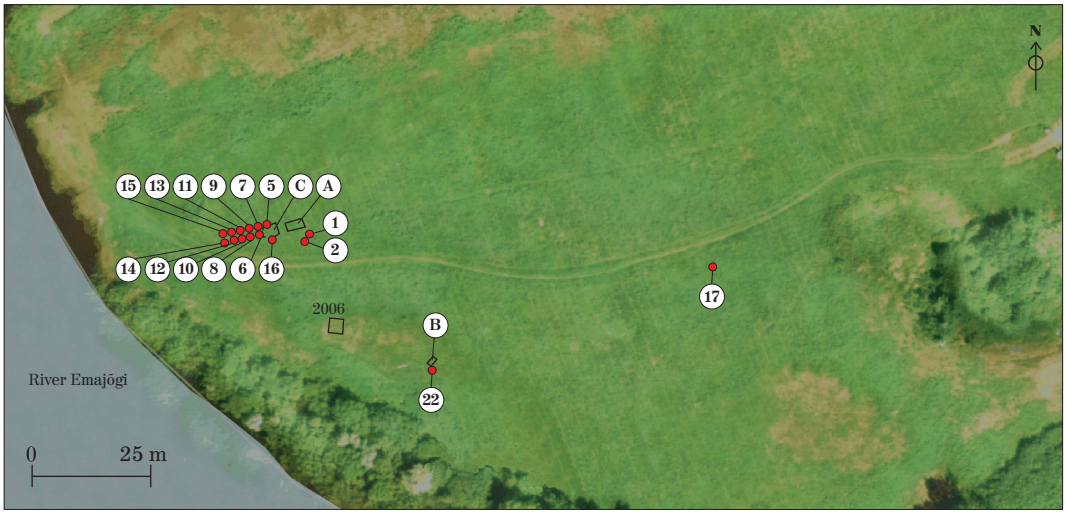

Fig. 1. The location plan of the Veibri site with the excavation plots of 2006, 2010 (A, B, C) and trial pits of 2010.
Jn 1. Veibri matmispaiga üldplaan 2006. ja 2010. a (A, B, C) kaevandite ning 2010. a proovišurfidega.
Drawing / Joonis: Martti Veldi

The 2006 excavations were aimed at rescuing the grave, in 2010 the research was initiated by scientific interest. The research results from 2006 suggested that a larger Late Mesolithic cemetery was located in Veibri. Therefore, the research aimed at determining its borders and characteristics. A survey with ground-penetrating radar was conducted and in order to interpret the reflections on the radargram three excavation plots were opened (for more detail see below; Fig. 1).

METHODS

Survey with ground-penetrating radar

Ground-penetrating radar (GPR) has proved to be a valuable asset in the sphere of archaeological prospecting. In Estonian archaeology it has not been used in the research of Stone Age, but it has been mainly used in historical archaeology (Vissak & Vunk 1996) the latest studies have been conducted at the settlement site of Jägala Jõesuu to locate the cultural layer (Kriiska *et al.* 2009). As an example of the current study, an extensive test programme with a GPR was used in the research of a Late Mesolithic site Skateholm II in Southern Sweden[7] (Bjelm & Larsson 1984).

The main aim of the research with the GPR was to establish the extent and structure of the supposed Late Mesolithic cemetery and give an overview of the general geological structures of the site. There were two reasons for choosing GPR for the survey: it is a non-destructive method and it enables to survey large areas. The survey itself was carried out in the first half of June before the excavations, as the site was flooded during spring. The area under research was *ca.* 1.4 hectares, whereas the measuring took place in 120 south-east – north-west-oriented and 30 to 120 m long profiles with the inter-profile length of

[7] The site comprised of graves and other sub-terra structures.

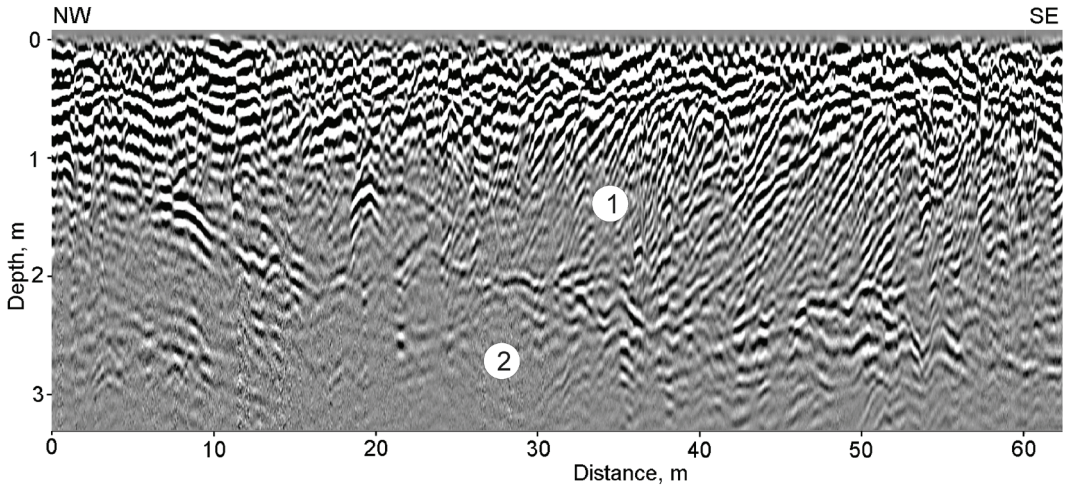

Fig. 2. Radargram near the Veibri mass grave. 1 – crossbedded reflections from river sands, 2 – reflections from the glacial sediments or the bedrock sandstones. The depth scale has been found using 16 for the value of dielectrical permittivity.

Jn 2. Georadari profiil Veibri leiukoha lähistelt. 1 – põimjaskihilised peegeldused jõeliivadelt, 2 – peegeldused glatsiaalse päritoluga setetelt või aluspõhja liivakividelt. Sügavusskaala leitud kasutades dielektrilise läbitavuse väärtust 16.

Drawing / Joonis: Jüri Plado, Alina Tšugai

ca. 2 m. The research was conducted with the GPR of Radar System Inc. (Latvia) on the frequency of 500 MHz. Measurements along the profile were made in every 5 cm. To avoid noise 4 signals were stacked in every measurement. In order to calculate the timescale into the depth scale, the value of dielectric permittivity used was 16, which corresponds to the velocity of electromagnetic waves 7.5 cm/ns. This value of permittivity was obtained using the hyperbolic reflections in cross-sections originating from the point sources (pebbles or metallic waste) and the so-called method of common transmitter (Daniels 1996). The processing and visualization of the cross-sections was conducted with the software-packet 'Prism-2'.

Archaeological excavations

Excavation plots were made in order to interpret the radargrams and to ascertain the characteristics of the site. Altogether three excavation plots (A–C) were opened. The first two (A and B) were selected according to the radargram images as possible sites of graves. As they did not contain graves and the anomalies on the radargram might have been caused by the 20th century cultivation activities, an additional section was made in accordance with the information attained from a trial pit in 2006. Therefore, an area of 16 m^2 was excavated. An additional 22 trial pits were dug on the flood plain with the aim of locating possible graves (Fig. 1). The cultural layer and the grave – treated as a single unit – were excavated with 10 cm thick arbitrary layers. All the artefacts and features were measured *in situ* with the electronical tachymeter Trimble 3600-series.

While excavating the mass grave, applications from archaeothanatology (for more detail see Duday 2009) were chosen, which focuses on the taphonomic features of the

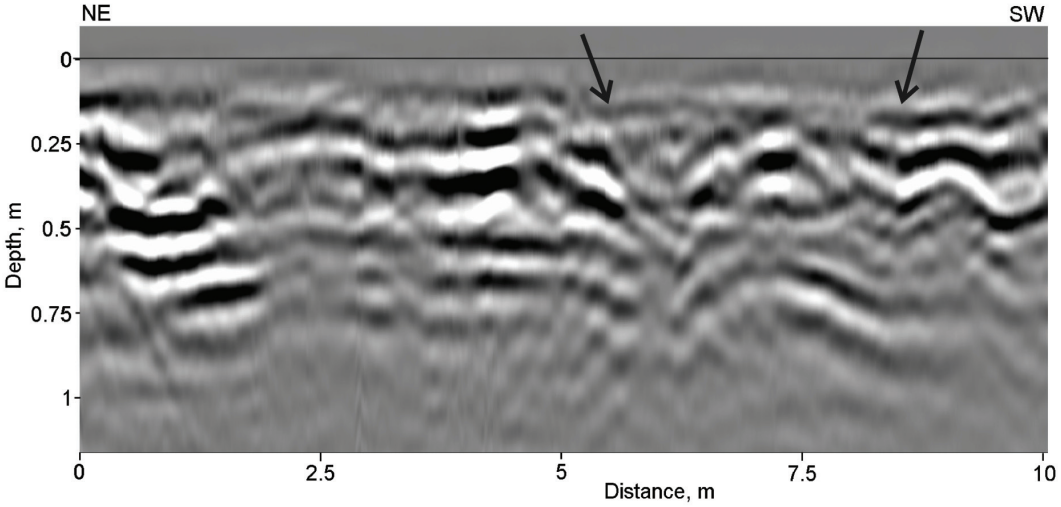

Fig. 3. Radargram of the mass grave before the excavations. Borders of the grave pit are marked with arrows. The depth scale has been found using 16 for the value of dielectrical permittivity.
Jn 3. Georadari profiil üle massihaua enne väljakaevamiste algust. Haualohu piirid tähistatud nooltega. Sügavusskaala leitud kasutades dielektrilise läbitavuse väärtust 16.
Drawing / Joonis: Jüri Plado, Alina Tšugai

grave. The approach combines knowledge about the natural processes of decomposition and decay of the human corpse with detailed archaeological fieldwork and analysis. This approach requires knowledge of both human biology and archaeology, which is why both an archaeologist and an osteologist worked concurrently at the Veibri mass grave. The method allows the archaeologist to reconstruct details in the mortuary practices that are usually not systematically described in conventional burial archaeology. The aspect that makes the excavation of a collective burial problematic is the presence of multiple skeletons in a very concentrated area. Therefore, it is important to acertain all the bones of each individual.[8] In doing this the whole grave was opened and after documenting the first layer of skeletons – description, photos and drawings – the next layer was cleaned and documented (see also Duday 2009, figs 90–92). Skeletons of the mass grave were numbered (I–X) according to their unearthing.

RESULTS OF THE FIELDWORK

General geological structure of the site and grave depressions in radargram

On the basis of the pattern of the reflections the applied methodology enabled to evaluate the type of the sediment. Directly under the soil layer lie river sediments – beige fine-grained sands exposed in the excavation plot, which on the radar image (Fig. 2) reveal reflections intertwined with each other. The reflections within the sands (No. 1 in Fig. 2) are mostly inclined towards north-west, implying that during the deposition of the sands the water was flowing from south-east to north-west. It is possible that the sands have

[8] Description sheet – filled both by the archaeologist and the anthropologist – was used for each individual in order to achieve comparability of the data.

deposited directly after the end of the last Ice Age when the flow of the current in the river was opposite to the present. Under the sands the radar image shows more horizontal anomalies with a slightly bigger wave length (No. 2 in Fig. 2), which correspond to either the glacial sediments or the sandstones of the bedrock (Middle Devonian series, Aruküla Formation).

Due to the so-called upper shadow area of the electromagnetic waves and its resolution, the usage of the equipment with the parameters described above did not enable to describe the upper layer adequately. Unfortunately, this layer, a few dozen centimetres thick, is archaeologically the most interesting one. This means that the possible Late Mesolithic burials could not be identified in the cross-sections. However, after the discovery of the mass grave with the soil drill, the radar cross-sections were composed for the grave that was still unearthed at the time. The object was the most obviously identified on the north-east – south-west-directed cross-section (Fig. 3), via the reflections deriving from the slopes and the bottom of the depression. The above mentioned reflections are blurred by the hyperbolic (with the upside down V-shape) reflections formed in the grave.

There are three aspects that need to be taken into account when planning further research to locate graves like the one in Veibri with the GPR. First, in order to be more precise in detail and decrease the upper shadow area, a higher frequency of electromagnetic waves should be used. Differently from our research in Veibri, where the highest (500 MHz) available frequency was used, an antenna of 900 MHz frequency was used in the Skateholm project (Bjelm & Larsson 1984). Second, the inter-profile length (optimal length is 0.5 m) should be reduced, and third, measurements should be conducted in the exactly measured grid on the conditions of small vegetation. Last but not least, care should be taken in interpreting the reflections on radargrams as solely grave structures, since the site has been used in different periods for different purposes (such as a field in the 20th century).

Mass grave of ten men

The *ca.* 4 m^2 grave, which contours we were able to detect at the height of 31.8 m a.s.l., was quadrangular in its shape and had a relatively even bottom. Its middle part was somewhat deeper than the edges. After the corpses were placed into the 50–70 cm deep grave pit, it was immediately filled with soil. The grave fill consisted of humus-rich soils that alternated with sandy soils (Fig. 4). Moreover, smaller spots of ochre[9] were detected in the grave fill, no bigger stones had been added. All the skeletons were preserved wholly (Fig. 5), but due to the characteristics of the soil and later cultivation activities the bones were rather fragmentary. The descriptions of the skeletons are given in the order of their emergence in the grave during its excavation:

The 1st skeleton (I) was situated in the central part of the grave depression directly on top of the 3rd and the 8th skeleton, with its skull turned towards north-east. Similarly to the majority of other skeletons, this had been placed into the grave in an extended supine position. Its legbones were forked, whereas the *tibiae* and the *fibulae*

[9] Ochre (the brittle variety of bog iron) is a natural dye stuff, which has been used in southern Estonia in order to produce yellow or red pigment (http://lepo.it.da.ut.ee/~arps/maateadus/MT_maavarad.htm; 27.05.2011).

Fig. 4. The grave pit filled with humus-rich soil. View from the north-west.
Jn 4. Huumuserikka pinnasega täidetud haualohk. Vaade loodest.
Photo / Foto: Mari Lõhmus

were directed towards the central axis of the body. Both arm bones were apart from the central axis of the body and were situated on top of the 3rd (the left arm) and the 5th skeleton (the right one). Its skull was sunk to a certain degree.

The 2nd skeleton (II) was situated in the southern part of the grave depression on top of the 4th skeleton, its skull staying above the pelvis of the latter. The right arm bones had been extended over the head. Left arm bones were located apart from the body, extending on top of the 5th skeleton and remaining under the 3rd and the 8th skeleton. Both legs were bent from the knees: *femora* directed outwards from the central axis of the body and *tibiae* and *fibulae* inwards. At the same time its right knee lay higher, remaining in the southern corner of the grave depression.

The 3rd skeleton (III) was situated in the central area of the grave depression, left of the 1st skeleton and partly below it. Its skull was directed towards north-west and it lied on its right side. Its arm bones were located laterally: the right arm bones were extended, remained under the 1st skeleton and laid over the 5th and the 4th skeleton.

Its left arm bones were slightly bent from the elbow and remained on top of the 7th and the 10th skeleton. Similarly to the 1st skeleton, the leg bones of the 3rd one were forked too, which is probably caused by the fact that both of them had lain on top of all the other dead bodies in the grave.

The 4th skeleton (IV) was situated along the eastern side of the grave depression and had been pressed against the edge of the depression. Similarly to almost all others its skull was directed to north-west. Arm bones were over the skull, whereas the left arm lay over the skull of the 6th skeleton and under the 8th skeleton. The *metacarpi* of the right hand were discovered from the test pit no. 7 of 2006. Since the skeleton was situated at the edge of the grave depression, it was inclined towards the central part of the depression.

The 5th skeleton (V) was situated along the western side of the grave depression in the bottom of the grave. The skeleton laid in a supine extended position, strongly inclined towards left or the central area of the depression. Its left arm bones were placed posterior and it was located next to the body with the palm directed upwards. The right arm bones were situated on the chest of the skeleton with *metacarpi* directly under the mandibula. Both leg bones were bent from the knees and the right femur lay across the left one.

The 6th skeleton (VI) was situated along the north-eastern side of the grave depression with its skull turned to south. Differently from the skeletons described above, the 6th skeleton lay in prone position with its skull turned right and transversely with all other skeletons. Its leg bones, slightly bent from knees, extended over the 10th skeleton and its left arm bones lay on top of the 8th skeleton and the *metacarpi* of the same hand on top of the 9th skeleton. While the left arm bones were located lateral from the body and extended over another skeleton. The right ones were situated tightly against the skeleton, whereas they were also pressed against the edge of the grave depression. The right arm bones laid posterior with the palm directed upwards and partly under the skeleton.

The 7th skeleton (VII) was situated in an extended supine position in the northern part of the grave depression, on the right side of the 10th skeleton and partly on top of the 9th and the 10th skeleton. Its skull was directed towards north-west. Its arm bones were located lateral, lying over the 10th skeleton (the left arm bones) and the 9th skeleton (the right one). Similarly to the 9th skeleton its *femora* were directed outwards from the central axis of the body and *tibiae* and *fibulae* towards the central axis of the skeleton.

The 8th skeleton (VIII) was situated in the central part of the grave depression and similarly to the 6th skeleton, it too had been placed in the grave in prone position, whereas it partly lay on top of the 5th and the 9th skeleton. Its facial *cranium* was in the bottom of the grave and the skull itself was located on its right side. The right arm bones laid parallel to the body, being slightly bent from the elbow towards the body in a way that its *metacarpi* remained partly under its pelvis. Similarly to several other skeletons its leg bones were forked as well: *femora* were directed outwards from the central axis of the body and *tibiae* and *fibulae* towards the central axis, with the heels relatively together.

The 9th skeleton (IX) was situated in the bottom of the grave depression, in an extended supine position with its skull turned towards north-west. His left arm bones, which

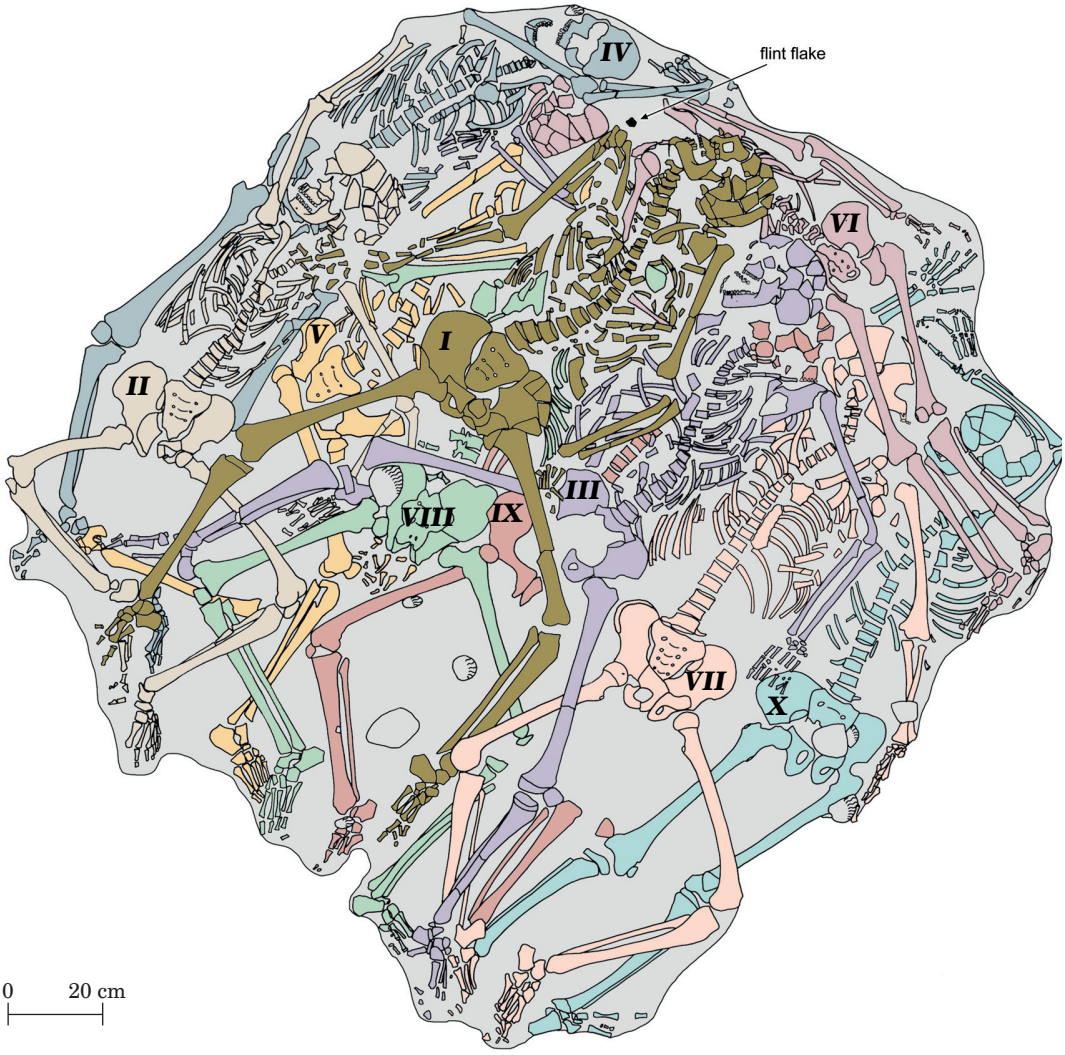

Fig. 5. The mass grave found in 2010.
Jn 5. 2010. aastal avastatud massihaud.
Drawing / Joonis: Kristel Külljastinen

lay posterior, were situated higher than the skull – the arm had been raised – and *radius* and *ulna* together with *metacarpali* remained under the 10th skeleton. The right arm bones were pressed tightly against the body and *metacarpali* were left under the pelvis. The femora were directed outwards from the central axis of the body, whereas *tibiae* and *fibulae* were again turned towards the central axis of the body. While being placed into the grave the legs of the dead have apparently been bent from knees and later, due to taphonomic agents, collapsed apart.

The 10th skeleton (X) was situated in the bottom of the grave depression, pressed tightly against the edge of the depression and with its skull turned to north-west.

Similarly to the 5th skeleton it too had been inclined towards the centre of the grave – in this case to the right. Both arm bones were located above the head, whereas the left bones were strongly following the edge of the grave depression. Both leg bones were unbent, both feet bones fallen on their lateral sides.

I skeleton (L I): its injuries and pathologies

Skeleton I belonged to a 40–45 year old male. The sex of the individual was identified by the sex characteristics on the pelvis and the cranium (Buikstra & Ubelaker 1994, 16–20), the age by the wearing of the symphysial face surface (White & Folkens 2005, 374–379). He had considerable marks of violence on the skull and the left *scapula* (Fig. 6). A sword wound (with the length of 93 mm) was located in the area of the *cranium*, the incision started from the left part of the *squama* of the frontal bone and continued on the right parietal bone (Fig. 6: 1). The wound bore no signs of healing; its edges were sharp and even. The surface of the cut on the fragments of the skull was of the same colour with the rest of the cranial bones, which confirms that it was not a cut obtained after death, but definitely a *peri mortem* wound. It means that the man died as a result of a blow.

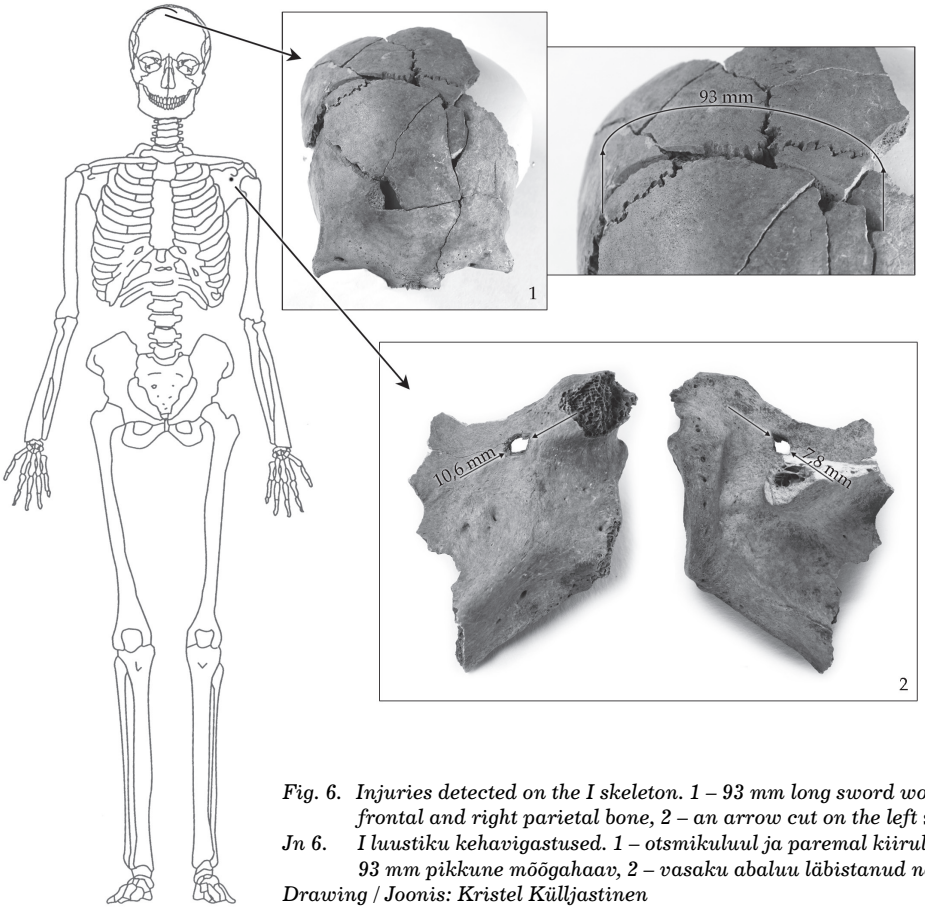

Fig. 6. Injuries detected on the I skeleton. 1 – 93 mm long sword wound on the frontal and right parietal bone, 2 – an arrow cut on the left scapula.
Jn 6. I luustiku kehavigastused. 1 – otsmikuluul ja paremal kiiruluul olev 93 mm pikkune mõõgahaav, 2 – vasaku abaluu läbistanud noole jälg.
Drawing / Joonis: Kristel Külljastinen

The fine and clean cut allows us to conclude that the tool used for the blow had a thin and a very sharp blade. The thickness of the mark of the blow – thicker on the left frontal bone – enables identifying the direction of the blow. In the current case the blow came from left. The blade had cut through the skull vault and invaded the soft tissues in the inside of the skull. Unfortunately, the entire extent of the skull cannot be established, since the preserved bones are very fragmentary (see above).

In addition to the cranial trauma the man had been hit by an arrow[10], which penetrated the upper part of his left *scapula*, under the *scapular foramen*. Some bone flakes had been detached from the front part of the *scapula* (Fig. 6: 2). The arrow did not penetrate the *scapula* entirely, but was stuck there, causing a rhomboid injury. The hole was finer (7.8 mm) at the entrance of the arrow and wider at its exit (10.6 mm), where the blow had struck bone flakes out of the *scapula*. The arrow was no longer in the *scapula* – it had been removed from the dead body either by the attackers or the buriers.

Judging by the character of the injuries found on the skeleton, certain conclusions can be drawn about the battle situation and the order of the injuries. The arrow, which hit the man's left *scapula* could have been the first hit. The rhomboid shape of the injury showed the direction of the blow. The arrow had hit the victim from behind, with a small inclination – indicating that the arrow came from above. After that the man probably fell down (for example on his knees) and got a sword blow to his head. This hit him on the top of his head, which suggests that the hitter might have stood above him. Otherwise the blow would have hit lower, e.g. the sides of his skull. The major force of the blow hit the right parietal bone and also the left frontal bone. This might be explained by the right-handedness of the hitter or the hand-to-hand combat. The area of the head is the main spot to attack in hand-to-hand combat, in order to cause maximal physical damage to the enemy (Manchester 1983, 59–60).

In addition to traumas during his lifetime the man had suffered from diseases that accompany the process of ageing, the features of which could be identified on the vertebrae. In order to determine the diseases two main publications of palaeopathology were used (Ortner & Putschar 1985; Steinbock 1976). The man suffered from *spondyloarthrosis* or the detritions of vertebral joints (on the thoracic and *lumbar vertebrae*) and *spondylosis* or vertebral rigidity (on the 9th–11th thoracic *vertebrae* and 4th–5th lumbar *vertebrae*). He also had the vertebral compression fractures in the lower area of the spine on the 10th and 11th thoracic *vertebrae*. The *talus* and the *calcaneus* of the right foot demonstrated signs of arthritis, which are formed after an injury when the joint becomes inflammatory. The injury had damaged the joint of *sustentaculum tali*. The given pathology might have caused the man slight discomfort, especially when pushing the limb away from the central axis of the body or bringing it towards it. Since the described joint was of modest mobility and the trauma was isolated, then it probably did not affect him a lot. The teeth of the man were relatively abraded, he had suffered from caries, periodontitis or the chronic infectious disease of tissues surrounding the teeth, *enamel hypoplasia* or stressmarkers and tartar.

[10] As the weapons that caused all the injuries have not been fully determined yet, the arrow here is the first interpretation, which might change in the course of thorough analysis.

Interpretation: the type of mass grave, its dating and parallels

When the remains of several individuals are found from a single grave depression, then according to the chronology of burying these can be classified either as buried simultaneously or as secondary burials. In the first case we are dealing with a 'catastrophe' or the so-called burials of 'catastrophe' (Duday 2009, 98). The people perished in the consequence of an outbreak of a disease (e.g. plague), natural disaster or a battle. In the course of the investigation a multiple burial was discovered from the excavation plot C, which yielded the remains of ten individuals who had simultaneously been buried into one grave (Fig. 4). According to the injuries the grave can be connected to a violent situation – a battle. The simultaneousness of their burying may be based on the following: they all have been placed to the grave immediately after death and their corpses are close or even on top of each other. This refers to a primary multiple inhumation burial[11], where the remains of ten men have concurrently been placed into a single grave. Hence, this is a single burial, where the buriers have manipulated with the dead bodies, placing the bodies into their last resting place where decomposition takes place (Duday 2009, 14, 25). The bodies have been placed into the grave one by one, yet it has obviously been a quick burial, which is demonstrated by the fact that the bodies have been put into the grave on top of each other. The 5th, 9th and 10th skeleton lay at the bottom, the 7th and the 8th skeleton lay on top of these, the 6th skeleton was situated on top of the 7th and the 8th and crosswise with these, the 4th skeleton lay in the north-western edge of the depression, the 2nd skeleton on top of it, the 3rd and the 1st skeleton were the uppermost burials. The bodies of the deceased have not been organized properly, as indicated by the varying body positions described above. The body positions suggest that some of them have been thrown into the grave (e.g. the 4th, the 6th, the 8th burial). There were no grave goods or dress adornments in the grave. Therefore it is possible that all the men were stripped before placement into the grave.

Initial anthropological analyses suggested that all men had perished in the course of combat, since almost all skeletons bore signs of violence. The traumas have been caused by the blows of sharp tools or weapons. The marks of blows were mostly on skulls, but also on limbs (e.g. *femora*) and the chest area (ribs).

The first cuts were determined in the course of excavation wherefore the initial Late Mesolithic date of the mass grave became doubtful. The suspicion was confirmed by the radiocarbon date obtained from the bones and other bodily injuries revealed while cleaning the skeletons (see above about the 1st skeleton). At the moment only a single skeleton has been radiocarbon dated: *ossa manus* of the 9th skeleton in the lower part of the grave depression was chosen for the date, which places the mass grave to the 13th century[12] (Fig. 7).

The closest parallel to Veibri find in Estonia is a mass grave from Salme in Saaremaa Island (see Peets *et al.*, this volume). As the research is only in the beginning, authors have no knowledge about similar cases from the same period in the neighbouring

[11] Multiple burial comprises of dead bodies that have been deposited in the same place simultaneously. Whereas here raises the question of what we call a burial.

[12] Beta-293557.

countries either. However, archaeology of war/battlefield is a promising field of study, which has arisen due to a lot of discovered sites during the last decades. There are many examples of common or mass graves known from other periods and elsewhere in Europe; whereas, only few of them will be mentioned here. The earliest known to the authors is a Neolithic mass grave in Talheim, Germany (see Teschler-Nicola *et al*. 1999) and an Eneolithic mass grave from France, Jean Courtin Roix (Duday 2009, 98–99, fig. 87); quite a lot of war graves from the Early Modern Ages have been excavated in Germany (e.g. Wittstock battlefield (1632) (see Special exhibition)), and Sweden (Kjellström 2005, 25). The closest by their date and location to Veibri mass grave are four common graves from Visby that were dug after the Visby battle in 1361 (Thordeman 1939, 49–68, 149 ff). Altogether 1085 individuals were placed into those four common graves (Thordeman 1939, 151). Whether and to what kind of historical battle, described in written sources, may the mass grave at Veibri be linked to, needs another source critical analysis and will be done in the future.

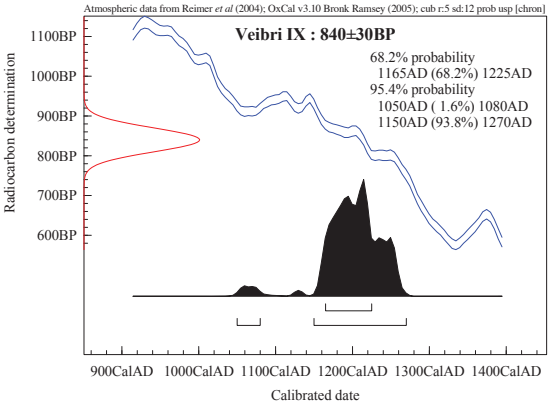

Fig. 7. Radiocarbon date of the mass grave found in 2010.

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CONCLUSIONS

The Veibri site has been used in different periods for different purposes. The northwestern part of the flood plain was first used as a burial site in the Late Mesolithic, whether it is a single grave or a cemetery still needs to be looked into. After that the eastern part of the flood plain was used as a settlement site during the Late Neolithic Corded Ware period. Also a cultural layer of the Late Iron Age and the medieval period has been identified on the territory under discussion, its characteristics have not been determined yet. In 2010 a mass grave of ten men was discovered that marks the place as a battle field from the 13th century.

The aims of the research in 2010 – to determine the borders and characteristics of the supposed Late Mesolithic cemetery – were not accomplished fully. Despite of the fact that anomalies at the radargram were detected, their causes cannot be distinguished from later activities at the site (e.g. battle field, 20th century cultivation) and thus cannot be interpreted solely as graves that belonged to the Late Mesolithic. No graves were located with trial pits either. In order to fulfil the aim further research is needed.

The discovered mass grave is without doubt a remarkable find. The archaeothanatological and palaeopathological research suggests that it is a primary inhumation grave (mass grave), where all individuals – ten men – were buried simultaneously after a violent death.

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REFERENCES

Bjelm, L. & Larsson, L. 1984. Applications of georadar in archaeological research. Results from a test at Skateholm, southern Sweden. – Meddelanden från Lunds universitets historiska museum, 1983–1984, 39–46.

Buikstra, J. E. & Ubelaker, D. H. 1994. Standards for Data Collection from Human Skeletal Remains. *Arkansas Archeological Survey Research Series no. 44.* Arkansas.

Daniels, D. J. 1996. Surface-Penetrating Radar. *Institution of Electrical Engineers Radar Series no. 6.* ERA Technology. London.

Duday, H. 2009. The Archaeology of the Dead. Lectures in Archaeothanatology. Oxford; Oakville.

Johanson, K., Lõhmus, M. & Jonuks, T. 2006–2011. Kiviaegse nelikmatuse päästekaevamised Veibri külas, Luunja vallas, Tartumaal 28. mai – 10. juuni 2006. Tartu. (*Manuscript in TÜAK.*)

Kjellström, A. 2005. A sixteenth-century warrior grave from Uppsala, Sweden: the battle of Good Friday. – International Journal of Osteoarchaeology, 15, 1, 23–50.

Kriiska, A. 1997. Aruanne arheoloogilisest inspektsioonist Ihastes (Tartu-Maarja khk.) 22.–27. sept. 1997. Tartu. (*Manuscript in TÜAK.*)

Kriiska, A., Lõugas, L., Lõhmus, M., Mannermaa, K. & Johanson, K. 2007. New AMS dates from Estonian Stone Age burials. – EJA, 11: 2, 83–121.

Kriiska, A., Rappu, M., Tasuja, K., Plado, J. & Šafranovski, J. 2009. Archaeological research in Jägala. – AVE, 2008, 36–52.

Manchester, K. 1983. The Archaeology of Disease. Bradford.

Ortner, D. J. & Putschar, W. G. J. 1985. Identification of Pathological Conditions in Human Skeletal Remains. Washington.

Rattas, M. 2006. Eesti maavarad. http://lepo.it.da.ut.ee/~arps/maateadus/MT_maavarad.htm. (27.05.2011.)

Reimer, P. J., Baillie, M. G. L., Bard, E., Bayliss, A., Beck, J. W. *et al.* 2004. IntCal04 terrestrial radiocarbon age calibration, 0-26-cal kyr BP. – Radiocarbon, 46: 3, 1029–1058.

Teschler-Nicola, M., Gerold, F., Bujatti-Narbeshuber, M., Prohaska, T., Latkoczy, Ch., Stingeder, G. & Watkins, M. 1999. Evidence of Genocide 7000 BP – Neolithic Paradigm and Geoclimatic Reality. – Collegium Antropologicum, 23: 2, 437–450.

Thordeman, B. 1939. Armour from the battle of Wisby 1361. Vol 1. Text. *Kungl. Vitterhets historie- och antikvitets akademien, 27.* Stockholm.

Special exhibition = Special exhibition at the memorial year "375 years Battle of Wittstock". http://www.1636.de/en. (06.07.2011.)

Steinbock, R. T. 1976. Paleopathological Diagnosis and Interpretation. Bone Diseases in Ancient Human Populations. Springfield.

Vissak, R. & Vunk, A. 1996. Archaeological surveys using Ground Penetrating Radar in Pärnu and Tartu. – TATÜ, 45: 3, 338–361.

White, T. D. & Folkens, P. A. 2005. The Human Bone Manual. Amsterdam.

ARHEOLOOGILISED UURINGUD VEIBRIS: HILISMESOLIITILINE KALMISTU JA 13. SAJANDI MASSIHAUD

Mari Lõhmus, Martin Malve, Jüri Plado ja Alina Tšugai

Esmakordselt äratas Veibri lammipealne arheoloogide huvi 1997. a, mil Andres Tvauri ja Andres Vindi leidsid põllumaalt nöörkeraamika- ja keskaegse asulakoha. Sama aasta sügisel täpsustas Aivar Kriiska asulakohtade piire ning paik võeti muinsuskaitse alla. 2003. a pälvis muistis uuesti arheoloogide tähelepanu, sest pinnase eemaldamisel avastati inimluid. 2006. a toimusid inimluude leiukohal päästekaevamised. Tekkis oletus, et Veibris pole tegemist üksiku matusega, vaid hilismesoliitilise kalmistuga.

2010. a uuringute eesmärgiks oli määratleda kalmistu piirid ja selle iseloom. Esmalt toimusid 1,4 ha suurusel alal georadariuuringud: kokku rajati 120 kagu–loode-suunalist 30–120 m pikkust profiili profiilidevahelise kaugusega ~2 m. Mõõtmisi teostati iga 5 cm tagant, kusjuures kasuliku signaali võimendamiseks liideti iga mõõtmise tarbeks neli signaali. Ajaskaala arvutamisel sügavus-skaalaks kasutati dielektrilise läbitavuse väärtust 16, mis vastab elektromagnetlaine levikukiirusele 7,5 cm/ns. Radargrammil olevate anomaaliate tõlgendamiseks avati kolm kaevandit (A–C) (jn 1). Kaks esimest (A, B) rajati radargrammil esinenud anomaaliate kohale, kolmas aga arheoloogilise teabe kohaselt oletatavale hilismesoliitilisele hauale. Sinna tehti radariga ka lisaprofiil (jn 3). Lisaks georadariuuringutele tehti haudade lokaliseerimiseks 22 šurfi (jn 1). Kasutati korriskaevamise metoodikat, luustike puhastamisel lähtuti arheotanatoloogia põhimõtetest, kombineerides arheoloogia ja antropoloogia teadmisi. Hauda käsitleti suletud kontekstina ning iga luustiku kohta täideti kirjeldusleht. Erilist rõhku pandi iga indiviidi luude tuvastamisele.

Georadariuuringute alusel oli võimalik rekonstrueerida uuritava ala üldgeoloogiline pilt. Vahetult mullakihi all paiknesid jõesetted: beežid peeneteralised liivad, mis radaripildis (jn 2) annavad üksteisega põimunud peegeldusi. On tõenäoline, et liivad on settinud vahetult pärast viimase jääaja lõppu, mil jõevool oli praegusele vastupidine. Liivade all olevad suurema lainepikkusega anomaaliad radaripildis vastavad ilmselt glatsiaalsetele setetele või aluspõhja liivakividele. Paraku ei võimaldanud ülalkirjeldatud parameetritega aparatuuri kasutamine adekvaatselt kirjeldada ülemise nn elektromagnetlainete varjuala ja oma resolutsiooni tõttu ülemist mõnekümne sentimeetri paksust arheoloogiliselt huvipakkuvat kihti. See tähendab, et matused jäid läbilõigetel identifitseerimata. Siiski, pärast massihaua avastamist mullapuuri abil koostati ala kohta radariläbilõiked. Objekt oli selgeimalt äratuntav kirde – edela-suunalisel läbilõikel (jn 3), lohu nõlvadelt ja põhjast pärinevate peegelduste kaudu.

2006. a šurfi nr 7 ja radargrammi (jn 3) alusel lokaliseeriti eeldatav hilismesoliitiline haud. Kaevamisel selgus, et u 4 m^2 haualohku oli asetatud kümne mehe surnukehad (jn 4). Võrdlemisi tasase põhjaga 50–70 cm sügav haualohk täideti huumusrikka pinnasega (jn 5) vahetult pärast surnukehade hauda asetamist. Matmine on olnud kiire, millele viitavad luustike asendid hauas. Need varieeruvad: esineb nii selili-siruli kui ka kõhuli indiviide ning surnukehad on asetatud ja ilmselt ka visatud üksteise peale. Esialgsete antropoloogiliste määrangute kohaselt hukkusid kõik mehed lahingutegevuses, millele viitavad luudelt leitud lõikejäljed. Täpsemalt on kirjeldatud vaid I luustikku, mis kuulus 40–45 aastasele mehele. Tema ajukoljul tuvastati 93 mm pikkune mõõgahaav (jn 6: 1) ning sellel puudusid paranemise tunnused, mis tähendab, et mees suri saadud löögi tagajärjel. Lisaks koljutraumale oli tema vasaku abaluu ülaosa läbistanud nool. Viimane oli abaluusse kinni jäänud, põhjustades sellele rombikujulise vigastuse (jn 6: 2). Tõenäoliselt oli seljatagant vasakusse abaluusse tabanud nool tema esimene vigastus, mille tagajärjel kukkus maha ning sai mõõgalöögi pähe. Lisaks kirjeldatud kehavigastustele oli mees põdenud vananemisega kaasnevaid haigusi: spondüülartroos ehk lülisamba liigeste jäikus ja spondüloos ehk lülijäikus. Samuti oli tal selgroolülide kompressioonimurrud ning parema jalalaba konts- ja kannaluu traumajärgse artriidi tunnused. Hammastel esines kaariest, parodontiiti, hüpoplaasiat ning hambakivi.

Kirjeldatud vigastused ei ole tekitatud kiviriistadega ning seega ei kuulu kümne mehe massihaud hilismesoliitikumi. Viimast kinnitas ka IX luustikult võetud luuproovi vanusemäärang, mis ajaldas massihaua 13. sajandisse (jn 7). Sarnaseid haudu võib leida Euroopast ning teistest perioodidest.

Hetke uurimistulemustele tuginedes võib öelda, et Veibris on tegemist kokku nelja eriaegse ja -ilmelise muistisega: hilismesoliitiline nelikmatus, hilisneoliitiline asulakoht (reg. nr 27195), hilisrauaaja ja keskaja asulakoht ning 13. saj massihaud.