THE IRON SMELTING SITE IN VIRBALIŪNAI ANCIENT SETTLEMENT

ALGIRDAS ŽALNIERIUS, JONAS NAVASAITIS AND DAINIUS BALČIŪNAS

Abstract

In Lithuania, iron smelting furnaces dating back to the Roman Iron Age and the Migration Period have been found in 20 places, notwithstanding that iron slag was found in numerous archaeological excavations concerning those periods. The discovered furnaces are positioned in three groups on the northeastern outskirts of a former settlement. The investigated iron smelting structures with a shaft furnace and a slag pit under a hearth could have been built in Lithuania from the first century BC to the fourth or fifth centuries AD. The fact that there are no iron artefacts in dozens of household pits may be explained by their small quantity and their high value, when things are not easily thrown out.
A comparison of the pottery found in the settlement indicates that furnaces were built and used in the transitional period when coarse ceramics predominated: the fourth and fifth centuries were the boundary between the Late Roman Iron Age and the Migration Period.

Key words: iron smelting furnace, iron slag, brushed and rusticated pottery, Roman Iron Age, Migration Period.

Introduction

The authors of this article did not have the purpose of summarizing or systematizing archaeological objects related to iron smelting in Lithuania in the Roman Iron Age and the Migration Period. This requires more data and research into ancient settlements and hill-forts, because only there can remains of objects linked to iron smelting and working be found. And the process itself of weapon manufacturing that starts with making crude iron is poorly researched in Lithuania, and there is not much data about the technologies used. The study by J. Navasaitis dedicated to Lithuanian iron published in 2003 is perhaps the only comprehensive and resumptive study on iron smelting in Lithuania from the oldest prehistoric times to the early 20th century (Navasaitis 2003). Thus far, the main sources about metal weapons and house wares used from the oldest times are largely finds uncovered only in burial sites, and Lithuanian archaeology concerning the period before the formation of the state basically gives its attention to research of burial grounds, and the life of the Baltic tribes is judged merely by their graves (Žulkus 1997, p.14). Even if burial customs can give a lot of information about the level of the material culture and the social relationships of any community, they always show more or less only a showy and ostentatious side of life, which often differs from the daily one.

Iron slag is found in many researched hill-forts and settlements of the Roman Iron Age (Michelbertas 1986, pp.206-208; Tautavičius 1996, p.31ff.). However, at the present time in Lithuania, the remains of iron smelting furnaces dated to the Early Roman Iron Age up to the tenth century have been found only in 19 sites (Fig. 1), where the remains of 50 iron smelting furnaces were uncovered (Navasaitis 2003, p.54ff.). Nine furnaces were found in six hill-forts, and 41 furnaces were unearthed in 13 ancient settlements. Up to now, only a few underground parts of better-preserved iron smelting furnaces have been uncovered (Kereliai hill-fort, Paplienija settlement). Usually, in many iron smelting sites only fragments of one or three underground parts of furnaces are found, and only in Lieporiai ancient settlement (Šiauliai district) have 20 parts of furnaces, dated to the fourth to sixth centuries, been unearthed (Salatkienė 1994, pp.64-73; 1998, pp.91-99). The upper parts of the furnaces will very likely never be found, as the shafts that stood overhead were destroyed while bringing out the smelted iron and their remains were spread around the furnaces. In the territory of Lithuania there are at least three types of iron smelting furnaces known (Navasaitis 2003, p.54, Fig. 4.4).

Iron smelting was a long and labour-intensive process that started with mining bog ore, and washing, drying, milling and burning it. In the second stage, metallurgical fuel (ie charcoal) was prepared. Charcoal was used for iron smelting since the oldest times. During the period considered, charcoal was made by torrefying wood in pits without oxygen. In the third stage, clay for building iron smelting furnaces was mined and prepared by tempering it with silica. After the furnaces had been built and dried out, the preparation for smelting iron ore was over. This was a direct process of iron smelting, and could proceed at a temperature of 1100–

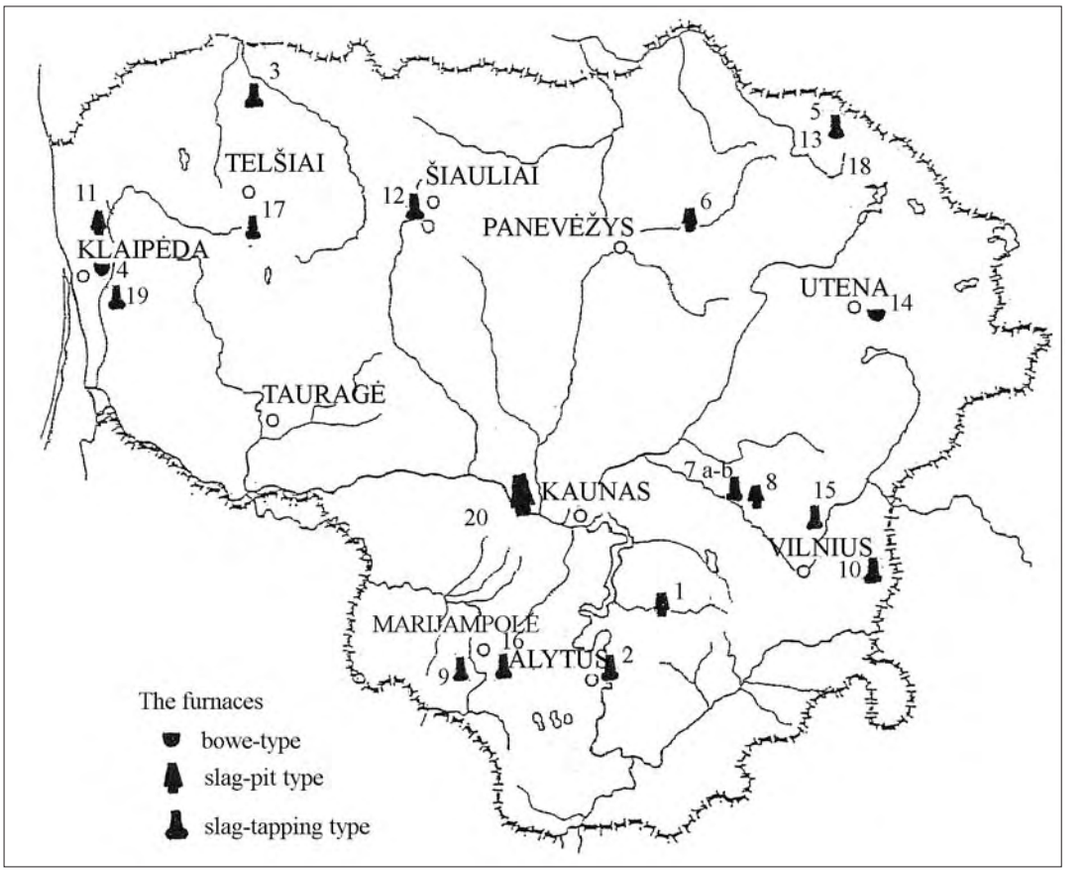

Fig. 1. Distribution of furnaces in Lithuania and their technological aspects: 1 Aukštadvaris hill-fort (Trakai district); 2 Bakšiai settlement (Alytus district); 3 Daubariai settlement (Mažeikiai district); 4 Eketės hill-fort (Klaipėda district); 5 Juodonys settlement (Rokiškis district); 6 Kereliai settlement (Kupiškis settlement); 7a Kernavė, Pajauta valley (Širvintos settlement); 7b Kernavė, Semeniškės settlement (Širvintos district); 8 Kernavė, Semeniškės settlement (Širvintos district); 9 Kumelinys settlement (Marijampolė district); 10 Lavoriškės settlement (Vilnius district); 11 territory of Lazdininkai cemetery (Kretinga district); 12 Lieporiai settlement (Šiauliai); 13 Moškėnai– Laukupėnai hill-fort (Rokiškis district); 14 settlement at Narkūnai hill-fort (Utena district); 15 Nemenčinė hill-fort (Vilnius); 16 Nendriniai cemetery (Marijampolė district); 17 Paplienija settlement (Telšiai district); 18 Petrešiūnai hill-fort (Rokiškis district); 19 Žardė settlement (Klaipėda district); 20 Virbaliūnai settlement (Kaunas district) (after Navasaitis 2003, Fig. 4.4; supplemented by the authors).

1250^{0}C. In Lithuania this iron smelting technology was used from the times of the Roman Iron Age, or perhaps even earlier (Navasaitis 2003, pp.45-50).

Virbaliūnai iron smelting site is the first one found in central Lithuania and complements our knowledge about the initial stage of ironware and weapon manufacturing, all the more as the best-surviving remains of an iron smelting complex were uncovered. Therefore, the main purpose of this article is to introduce as thoroughly as possible the uncovered Virbaliūnai iron smelting complex through an archaeological approach. Processes related to building furnaces and iron smelting, as well as technological issues, are discussed by J. Navasaitis and A. Selskienė in this volume.

The location of the Virbaliūnai iron smelting site

Virbaliūnai ancient settlement is situated in a valley on the River Nemunas right bank by a slope of the upper terrace, about 1.5 kilometres northwest of the Kulautuva settlement boundaries and about 500 metres northeast of the current bed of the Nemunas. The settlement is named after the village of Virbaliūnai, which is situated on an upper terrace of the River Nemunas. At present, in the area of the former ancient settlement, there is a flat meadow, gradually lowering southwestwards from the foot of the upper terrace slope. During an archaeological investigation of the site for a projected gas main, an area of 1,033 square metres was investigated. The surviving cultural layer of Virbaliūnai ancient settlement is about 55 metres in width and about 175 to 180 metres in length. It lies in a strip of the Nemunas right valley, between the former wash and the right slope of the riverbed, and covers an area of about one hectare.

Virbaliūnai ancient settlement was established on the second flood plain terrace of the Nemunas valley. The original surface of the terrace was comprised of sand and sandy loam, closer to the slope of oxidized gravel.

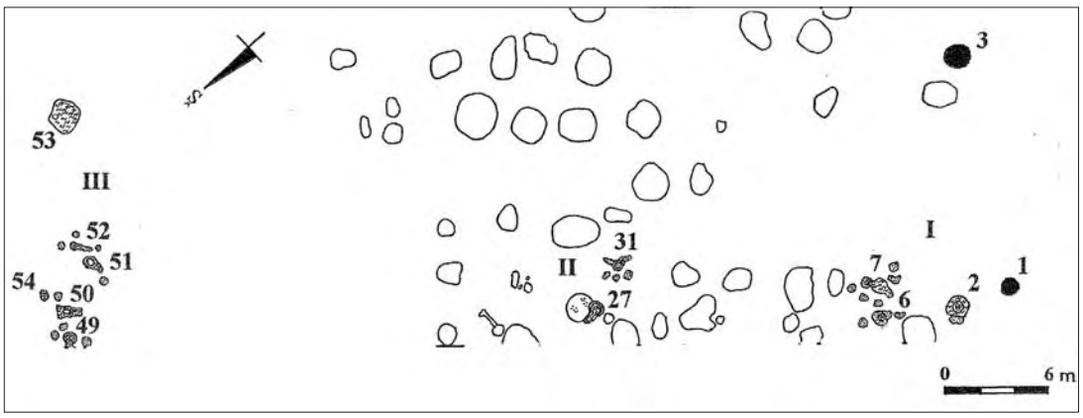

Fig. 2. Location of furnaces, pits with charcoal and pits belonging to the settlement in the excavated area of the Virbaliūnai ancient settlement (drawn by Žalnierius).

The cultural layer of the abandoned settlement was also supposedly constantly ploughed, until it was covered with layers of earth leached from a ravine of the Nemunas slope. Archaeological objects from the ancient settlement, uncovered under the deposits, prove this, as their surviving surface matches the surface of geological layers. Overall, 57 archaeological objects linked to an ancient settlement both from the Roman Iron Age and the Migration Period were found. There are nine iron smelting furnaces, two pits for charcoal burning, one pile of clay for the furnaces, two post–holes, 11 open hearths or fireplaces, one pit for provisions (?) and 31 pits of indefinite purpose (Fig. 2).

The bigger part of uncovered household pits is in the central part of the researched site, which covers an area of about 400 square metres. At the present time, it is impossible to trace a more definite order or system of pits. Eight hearths out of the 11 uncovered were concentrated in an area of 44 square metres, northeast of the first group of iron smelting furnaces. Supposedly, there were wooden laften structures in the settlement. However, prints of clay daub that are usually found in researched settlements in the Kaunas district and in the neighbouring settlements of Lentainiai and Jaučiakiai were not found anywhere (Vaškelis 2005, pp.59-61; Žalnierius 2005, p.75ff.). Currently, it is difficult to say exactly what the chronological link between the structures that stood in the settlement and the iron smelting furnaces is. However, the household pits related to buildings are quite close to the first and second groups of the furnaces, and contain bits of iron slag. This might prove that the buildings were built after the iron had been smelted and the furnaces had been destroyed.

The researched area of Virbaliūnai ancient settlement should be grouped chronologically into two areas. The northeastern part of the researched area, located closer to the right slope of the Nemunas, considering the archaeological finds and traces of the human activity found, could be dated back to the Bronze or Roman Iron Age. The ancient settlement, situated in the central and southwestern part of the researched area, and the uncovered archaeological objects could be dated from the end of the Late Roman Iron Age up to the ninth or tenth centuries (Žalnierius 2006).

Smelting furnaces

The most important and interesting finds at the Virbaliūnai settlement are the remains of underground parts of nine iron smelting furnaces (Žalnierius 2006; Žalnierius, Balčiūnas 2006, pp.69-81). The iron production site in Virbaliūnai is the first one excavated in the central part of the country. The furnaces make three separate groups located towards a northeast and southwest direction, and lie in one strip closer to the northwestern slope of the researched area (Fig. 2). The first group is comprised of three furnaces, F2, F6 and F7, found in the southwestern part of the researched area and located in a plot of 21 square metres (Fig. 3). The first group also includes two pits for charcoal burning, 1 and 3. The second group (furnaces F27 and F31) was found in the central part of about 15 square metres of the area (Fig. 4), and the third group, comprised of four furnaces, F49, F50, F51 and F52, was unearthed in the northeastern part of the area and is located in a plot of about 20 square metres (Fig. 5). Each furnace consisted of a shaft base, a slag pit and a channel that led to the slag pit (Plate VII.I). The purpose of the channels is not proven yet. Very likely, the channels could have been designed for the faster drying of the furnace base and the overhead part of the structure. After a furnace had dried out, the air duct and the channel pit, which was near the walls, were filled up with dry earth mixed with charred wood particles. In the majority of furnaces, the walls and pits of the channels have also survived. All the slag pits of the furnaces were found filled up with pieces of iron smelting slag and dark earth mixed with burnt charcoal. The plan and sections of the furnace F52 are shown as an example in Fig.6.

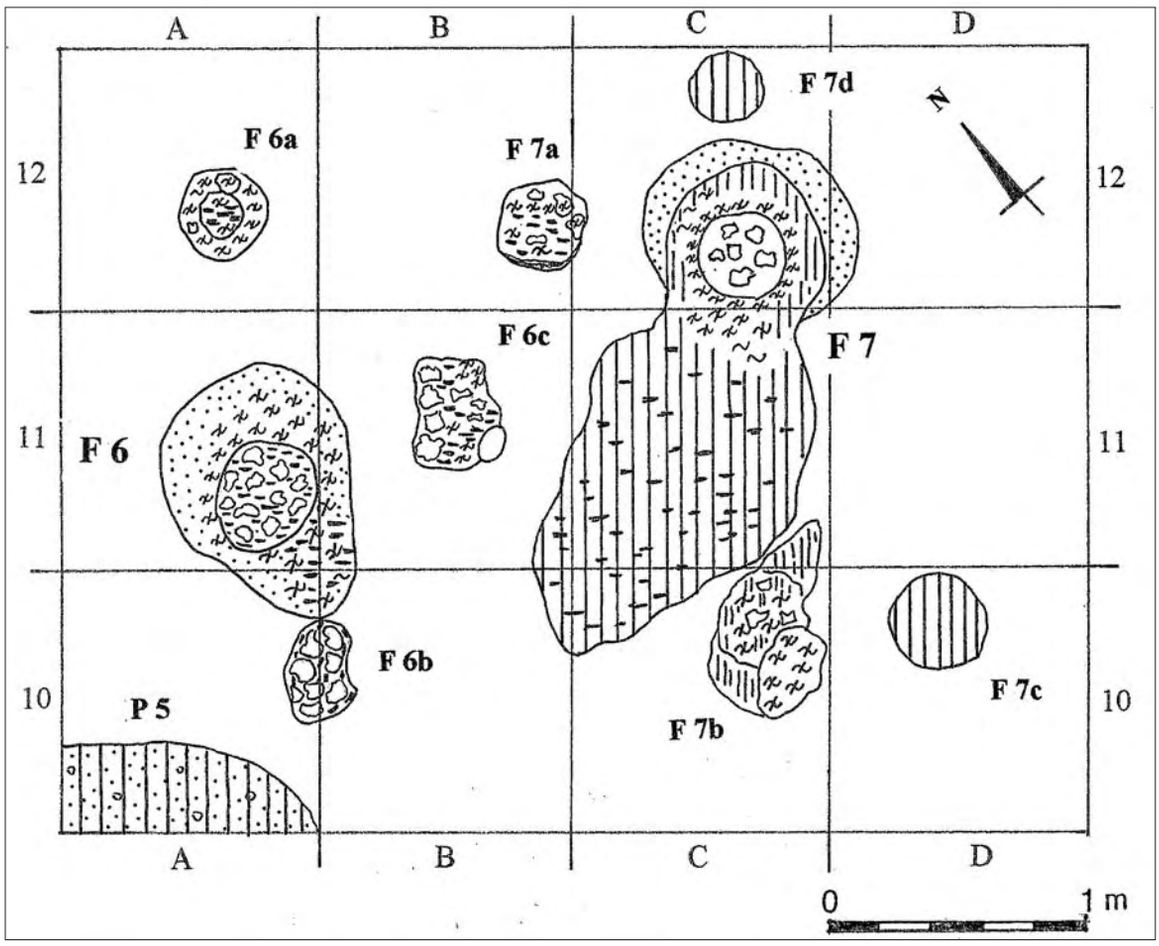

Fig. 3. Plan of the first furnace group: F6 and F7 furnaces; F6a-c and F7a-d piles and pits with slag and pieces of burnt clay; P5 the pit belonging to the ancient settlement (draw by Žalnierius).

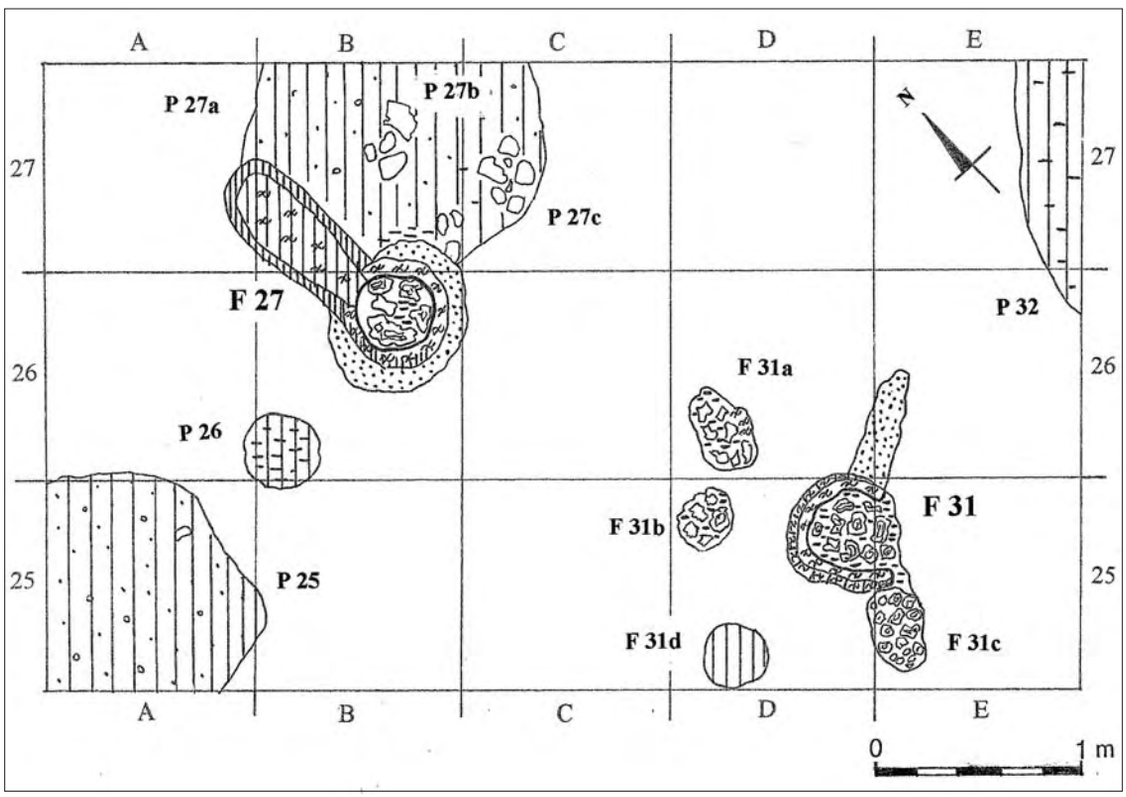

Fig. 4. Plan of the second group of furnaces: F27 and F31 furnaces; P27a pit; P27b and P27c piles of broken stone; P25, P26 and P32 pits belonging to the ancient settlement (drawn by Žalnierius).

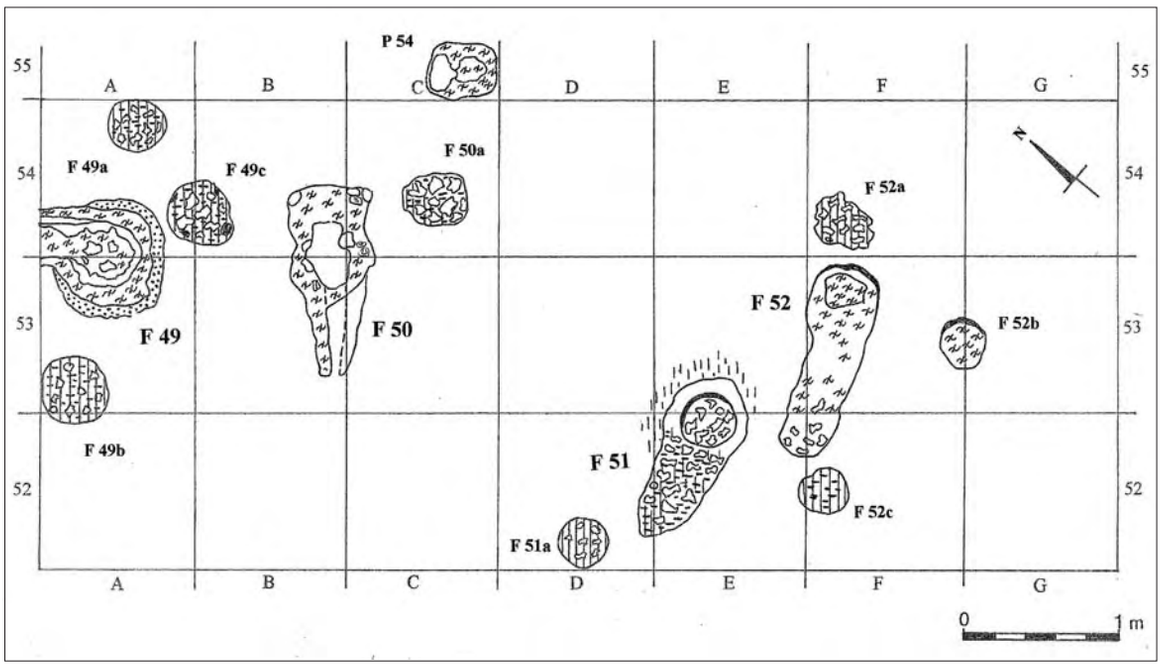

Fig. 5. Plan of the third group of furnaces: F49, F50, F51 and F52 furnaces; F49a-b pits with slag; F 49 and F51a pits with slag; F52a pile of slag; F52b-c pits with slag and burnt clay; 49c and 54 unidentified objects (drawn by Žalnierius).

Furnace F52 is one of the best surviving furnaces in the site. There is a base **1** of the furnace, a pit for slag to flow in **2**, the channel **4** with walls at the furnace base, and an air duct **3** leading to the slag pit **2**. The furnace was built in a pit with slanting sides, tapering southwestward, 50 to 55 centimetres in width and up to 21 centimetres deep, dug out of sand. For the channel **4** an oblong small pit tapering southwestward, with rounded sides, up to 40 centimetres in width and 15 to 17 centimetres deep, was dug out. The pit lowered towards the base of the furnace. After the furnace had been dried out, the duct and the channel were filled up with dark earth **6** mixed with charred wood particles and fine bits of slag.

The base of the furnace was built of a mixture of clay and sand. The clay in the base is burnt through and is red, in some places black. The sides of the dug-out pit were covered with the mixture, shaping the base after the pitch of the pit. In the middle of the pit, a slag pit **2** of an irregular form, 30×35 centimetres in diameter and with vertical walls, was made. The thickness of the base walls in the northeastern side is 11 centimetres, in the southeastern and northwestern sides nine to ten centimetres. Removing slag pieces off the slag pit **2**, it was established that up to the bottom of the foundation it was filled up with lumps of tap slag and black earth mixed with charred wood particles. Larger lumps of slag **7** lay in the upper part of the slag pit. Above the air duct the width of the foundation is 25 centimetres. The width of the clay walls **5** of the channel near the foundation is 15 to 18 centimetres. The walls are narrowing southwestward, and beside the rounded tip they are about six to seven centimetres in width. The air duct **3** is ten to 11 centimetres in width and seven to 12 centimetres in height.

Beside furnace 52, a small pile F52a and two pits F52b and c of slag and burnt-through clay were also found. The heaps were piled up both on the surface of the ground and in specially dug out small circular pits of 30 centimetres in diameter and 20 to 25 centimetres deep. Beside the furnace, a bit of clay with an imprinted green slag of non-ferrous metal on one side was found. It might prove that non-ferrous metal was also smelted, but in another part of the settlement, and the slag turned up accidentally near the furnaces.

About 5.3 metres southeast of the furnace 52, pit 53, of an irregular circular form, 180 centimetres in diameter and 20 to 24 centimetres deep, dug out from the same surface of the horizon, was found. In the pit there was a heap of brownish clay, about 160×170 centimetres in size and about 20 centimetres in height (Fig. 2:53). Under the clay, at the bottom of the pit, a layer of burnt charcoal was uncovered. Supposedly, the clay stored in the pit was intended for building furnaces and had been brought from the upper terrace of the River Nemunas.

The majority of the furnaces found in the site bear a resemblance to the furnace F52. The main parameters of the remains of all excavated furnaces are shown in the table.

In summary, the diameter of the pits dug out for the iron smelting furnaces is from 40 to 100 centimetres, the depth from 19 to 46 centimetres, the length with

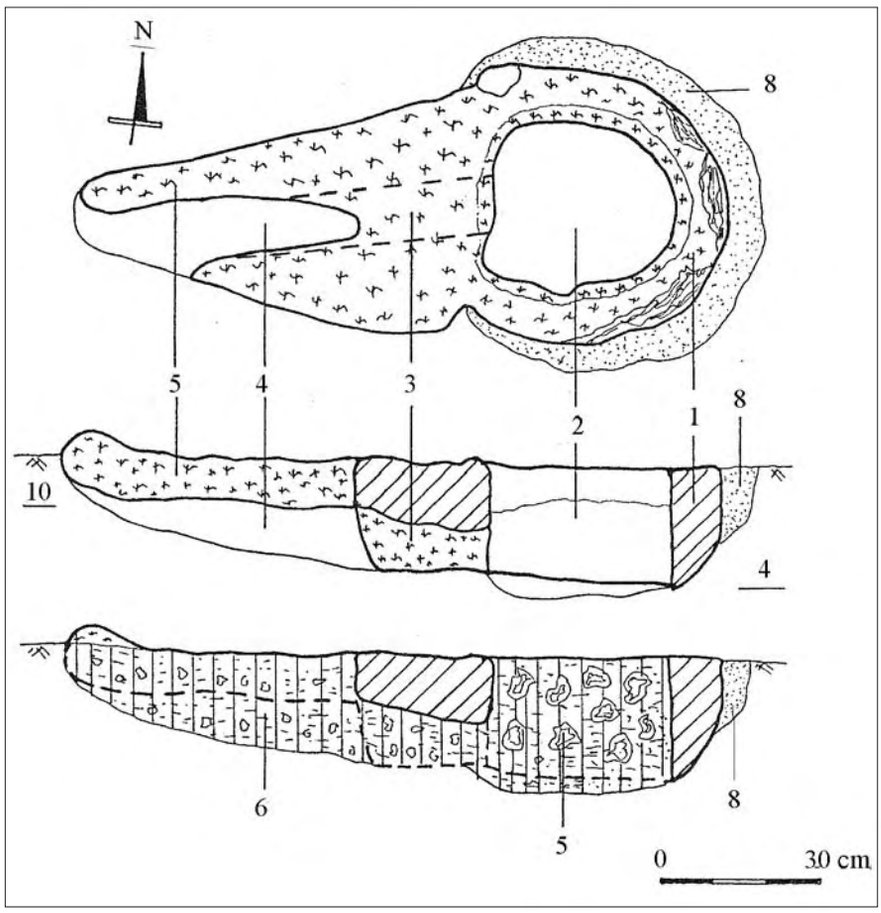

Fig. 6. Furnace 52, plan and cross-section: 1 furnace base; 2 slag pit; 3 duct; 4 channel; 5 channel walls; 6 earth with small slag pieces and charcoal; 7 large slag pieces, burnt clay and charcoal; 8 burnt red sand (drawn by Žalnierius).

Table. The main parameters of the remains of excavated furnaces

Furnace	Depth of furnace remains, cm	Furnace or base external diameter, cm	Furnace internal diameter, cm	Furnace or base walls thickness, cm	Cross-section of a duct to a slag pit, cm	
					width	height
F2	46	98-100	55-60	18-19 up to 37	ca.15	ca.15
F6	25	ca.72	ca.33	20-27	ca.15	ca.10
F7	28-30	ca.55	31-32	11-15	ca.17	ca.18
F27	ca.19	55-58	ca.35	ca.8	12-13	n.s.
F31	ca.17	55-60	ca.38	7-11	n.s.	n.s
F49	30	ca.60	38-40 irregular shape	5-17	n.s.	n.s.
F50	30	(45-55)x74 irregular shape	25x44 irregular shape	6-15 up to 21	11-12	18-20
F51	26	49-50	28-29	9-12	11-12	12-13
F52	21	50-55	30-35 irregular shape	9-11	10-11	7-12

n.s. – not survived
Table prepared by Navasaitis

the channels 96 to 130 centimetres. The outer diameter of the shafts' foundation is 50 to 60 centimetres, the diameter of the slag pit 28 to 40 centimetres. The thickness of the bases is from five to 27 centimetres and sunk into the ground from nine to 25 centimetres. All the furnaces are very similar to each other; only furnace F2 is distinguished for its larger dimensions. This furnace was built in a pit with slanting sides dug out in sand of about one metre in diameter. The surviving depth of the remains reaches 46 centimetres (Fig. 7). The outer diameter of the base is 98 to 100 centimetres. The walls of the slag pit on the southeastern and northwestern sides are vertical. On the eastern and western sides, at a depth of ten to 12 centimetres from the surviving surface, the walls were widened by eight to ten centimetres. The pit's diameter in its upper part above the widened place is 57×60 centimetres, below it the slag pit **2** is in the form of an irregular rectangle with rounded corners and 40×60 centimetres in size. The base **1** of the furnace was formed at a different depth: on the southeastern side, its bottom is at a depth of 21 centimetres, on the northwestern side 32 centimetres. The width of the base is also unequal: on the eastern side its width is 18 to 19 centimetres, while on the southern and southeastern sides its width is up to 37 centimetres. In the lower part of the base, the mixture of clay and sand contains small, flat field boulders 5×7 centimetres in size and pieces of iron slag. Under the base, there is a pit **5** of about 25 centimetres in depth, filled with bits of slag and burnt charcoal mixed with earth. It was established that in the upper part of the slag pit there were large, up to 15 centimetres in an irregular form, pieces of slag **6**. Some slag lumps were baked to the top edges of the pit. Below in the pit, there was a layer **7** about 20 to 22 centimetres thick, of slate-coloured earth with traces of charred wood particles mixed with smaller pieces of tap and light slag. At the bottom of the pit a layer **8** ten to 12 centimetres in thickness, of dark grey-coloured earth with a rich temper of burnt charcoal, was found. The layer contained fine bits of slag up to three centimetres in diameter. On the northwestern side of the furnace base, an air duct **4** and a small channel **3** with slanting sides on the outer side of the foundation were found. The width of the duct itself was about 15 to 18 centimetres; however, its vault has not survived.

Neither burnt-through clay nor pieces of furnace shafts, remaining after the used furnaces, were found on the geological sand. The ruins that remain there, were very likely scattered when the plot was ploughed.

The channels of the furnaces are directed to the southwest and northwest, to the prevailing wind directions. Other furnaces that have been found in Lithuania did not have such drying channels and the nearest furnaces by their construction were found at Kereliai hill-fort (Grigalavičienė 1995, p.105), Lazdininkai (Kalnalaukis, Kretinga district) and the Pajauta valley in Kernavė (Navasaitis 2003, p.63ff.).

Seemingly, people who smelted iron in Virbaliūnai settlement were already familiar with the negative impact on health of the gas that was emitted during the process of iron smelting. At least, they considered its impact, as the iron smelting furnaces had been specially built on the eastern side of the ancient settlement, where the prevailing western winds would blow the gas and smoke emitted during the iron smelting process beyond the settlement's boundaries and not pollute the environment. If our presumption is right, then iron smelting furnaces should be looked for on the leeward sides of ancient settlements.

Dating the site

About 225 centimetres southeastward of furnace F2, a pit **1** in the form of an irregular circle was found. The pit's diameter is 80×98 centimetres, and depth 30 centimetres (Fig. 2). The pit is filled with earth with an abundant amount of burnt charcoal turned into soot. Only a few small bits of field boulder stones and three pieces of tap iron slag were found. Probably, it was a charcoal-burning pit. In another pit **3** about 120 centimetres in diameter and 50 centimetres in depth, whose bottom was filled with a layer up to seven centimetres in thickness with charred wood particles, a bit of tap slag was found. The function of the pit is unclear. Very likely, it was intended for charcoal burning. Bits of charcoal taken from the layer of charred wood particles were researched in the laboratory of Radioisotope Research of the Institute of Geology and Geography. In accordance with C^{14} activity, it was established that the bits of charcoal submitted for research date to 1180 +/- 40 years, and the calibrated date is 860 years +/- 60 years.

Neither in the furnaces nor in their surroundings were any artefacts found, except for some flint flakes, which got in accidentally. Neither in the furnaces nor in the researched area of the settlement or in the household pits surviving in the geological layers, was an iron artefact, or at least a fragment, found. Probably, in the existing light and permeable ground, iron artefacts, if they were there, simply rusted and just fell away as the area of the settlement was constantly ploughed. This concerns only artefacts that might be in the layer of the settlement. As for the fact that no artefacts were found in the household pits, let us suppose that there were not many iron artefacts, and they were valued and not thrown away. This impedes a more precise dating of

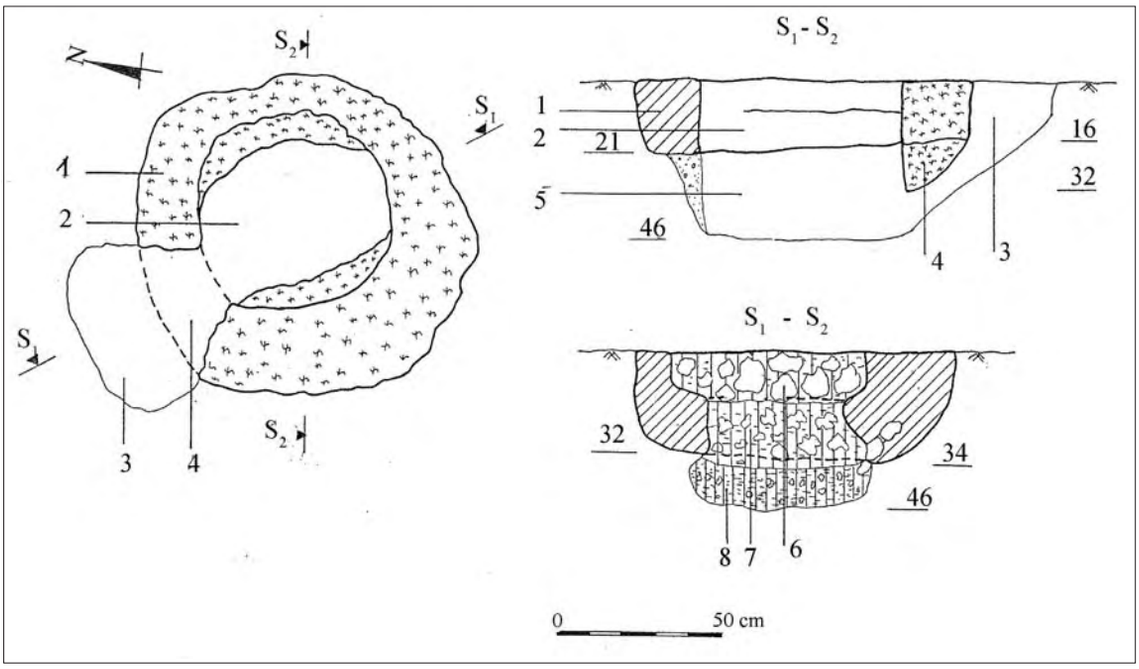

Fig. 7. Furnace 2, plan and cross-section: 1 furnace base; 2 slag pit; 3 channel; 4 air duct; 5 slag pit; 6 large slag pieces; 7 earth with small slag pieces and charcoal; 8 earth with burnt charcoal and bits of slag (drawn by Žalnierius).

the iron smelting complex, the more that the uncovered hearths that were situated in buildings near the second group of furnaces are at a distance of one to three metres, and they were supposedly made after the furnaces had been used and destroyed.

The estimated date of the charcoal is 860 years +/- 60 years, and the application of the date for the furnaces raises serious doubts, as the supposed charcoal burning pit is related to the furnaces merely because a bit of iron slag was found there. But such bits were found in all uncovered household pits of various purposes. However, a comparison of ceramics found in hearths and household pits gives more information and references for a more precise dating of the furnaces.

Dismissing nine furnaces, where no finds were found except iron smelting slag, archaeological objects of ancient settlement potsherds of household ceramics were found in 21 pits. In four pits of the 21 there were only brushed ceramics, in ten pits there were only rusticated ceramics, and another four pits contained potsherds of brushed and rusticated ceramics. In three pits only potsherds and fragments of miniature pots with smooth and polished surfaces were found. Potsherds of miniature pots were also found in a pit with brushed and rusticated ceramics, and in five pits only with potsherds of rusticated ceramics.

Following the present established dating of brushed pottery, in Lithuania brushed ceramics were used till 350 or 450 (Michelbertas 1986, pp.79 and 188). As a comparison of the found ceramics in the settlement showed, the furnaces had been built and used in the transition period when rusticated ceramics came to dominate. Thus, the furnaces may be dated to the fourth and fifth centuries, the point between the transition phase from the Late Roman Iron Age to the Migration Period.

The iron smelting devices found in Virbaliūnai settlement are ascribed to a type of shaft furnace with a slag pit under a hearth and, according to J. Navasaitis, they could have been built in Lithuania from the first century BC up to the fourth or fifth century AD (Navasaitis 2003, pp.55ff.).

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GELEŽIES LYDYMO VIETA VIRBALIŪNŲ SENOVĖS GYVENVIETĖJE

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Santrauka

Virbaliūnų senovės gyvenvietė yra Nemuno dešiniojo kranto slėnyje, apie 20 km į vakarus nuo Kauno (1 pav.). Tyrinėtame 1033 m^2 gyvenvietės plote buvo rasti 57 archeologiniai objektai, sietini su senojo ir vidurinio geležies amžiaus senovės gyvenviete. Tai 9 geležies lydymo krosnelės, 2 anglių degimo duobės, 1 rudnelėms skirto molio krūva, 2 stulpavietės, 11 atvirų židinių ar ugniaviečių ir 31 neaiškios paskirties duobė (2 pav.).

Aptiktos geležies lydymo krosnelės trimis grupėmis yra išsidėsčiusios šiaurrytiniame buvusios gyvenvietės pakraštyje. Šalia jų buvo rasta dvi medžio anglies degimo duobės ir molio krūva, skirta krosnelių statybai (2 pav.). Išliko tik požeminės krosnelių dalys. Tai nesudėtingas įrenginys, kurį sudaro duobė apvaliu dugnu ir nuolaidžiais šlaitais, išdrėbtais molio ir smėlio mišiniu, kad suformuotų virš žemės paviršiaus buvusios krosnelės šachtos pamatus. Pamatų viduryje esanti daugiau ar mažiau apvali vertikaliomis sienelėmis duobė buvo skirta geležies lydymo proceso metu susidarančiam šlakui subėgti. Prie krosnelių šonų iš tokio paties molio ir smėlio mišinio yra suformuoti į galą siaurėjantys atsikišimai su kanalu viduryje, per pamatų sienelėje esančią angą besijungiančiu su krosnelės vidumi. J. Navasaičio manymu, šis įrenginys buvo skirtas greitesniam iš šlapio molio nudrėbtos krosnelės išdžiovinimui. Visos tyrinėtos krosnelės buvo naudotos geležiai lydyti, o virš žemės paviršiaus buvusios lydymo šachtos nugriautos išimant išlydytą geležį. Šalia krosnelių rasta specialiai iškastų duobelių, į kurias buvo supilta dalis išsilydžius geležiai likusio lydymo šlako gabalų (3–8 pav.; VIII: 1–6 iliustr.).

Krosnelėms iškastų duobių skersmuo siekia nuo 40 iki 100 cm, gylis – nuo 19 iki 46 cm. Šachtos pamatų skersmuo yra 50–98 cm, šlako duobės skersmuo – 38–44 cm. Pamatų storis yra nuo 5 iki 25 cm, į žemę jie įgilinti nuo 9 iki 27 cm. Visų krosnelių konstrukcija panaši, tik viena krosnelė išsiskiria didesniais matmenimis. Gyvenvietėje rasti geležies lydymo įrenginiai priskirtini šachtinės krosnelės, turinčios šlako duobę po žaizdru, tipui. Pasak J. Navasaičio, Lietuvoje jos galėjo būti statomos nuo I a. prieš Kristų iki IV–V a.

Nei pačiose krosnelėse, nei jų aplinkoje nebuvo rasta nė vieno radinio, išskyrus kelias titnago nuoskalas, kurios čia pateko atsitiktinai. Nei krosnelėse, nei tyrinėtoje gyvenvietės teritorijoje ir geologiniuose sluoksniuose išlikusiose ūkinėse duobėse nerasta nė vieno geležies dirbinio ar bent jo fragmento. Galbūt lengvame ir pralaidžiame vandeniui grunte geležiniai dirbiniai, jeigu ten jų buvo, tiesiog surūdijo ir nuolat ariant gyvenvietės teritoriją savaime sunyko. Taip atsitikti galėjo tik su gyvenvietės sluoksnyje galėjusiais būti radiniais. Kadangi jų nerasta ir keliose dešimtyse ūkinių duobių, galima daryti prielaidą, kad geležies dirbinių nebuvo daug, jie buvo vertinami ir retai išmetami. Tai apsunkino nustatyti tikslesnį geležies lydymo krosnelių naudojimo laikotarpį.

Metalo šlako buvo rasta senovės gyvenvietės tyrinėtoje teritorijoje aptiktų įvairios paskirties ūkinių duobių didesnėje dalyje. Pagal radioaktyviosios anglies metodiką nustatyta, kad medžio anglių, rastų spėtinoje medžio anglių duobėje, amžius yra 1180 m., kalibruotas amžius – 860 m. Tačiau šią spėjamą anglių degimo duobę su krosnelėmis sieja tik tai, kad joje rastas geležies šlako gabaliukas, todėl šios datos taikymas krosnelėms ir jų datavimas IX a. kelia rimtų abejonių. Papildomos informacijos ir nuorodą tikslesniam krosnelių datavimui teikia židiniuose ir ūkinėse duobėse rastos keramikos palyginimas. Atmetus 9-ias geležies lydymo krosneles, kuriose nerasta jokių radinių, 48-iuose archeologiniuose objektuose buitinės keramikos šukių buvo rasta 21-oje duobėje. Iš jų 4-iose buvo tik brūkšniuotoji keramika, 10-tyje tik gruoblėtoji keramika ir 4-iose duobėse rasta ir brūkšniuotos, ir gruoblėtosios keramikos puodų šukių.

Pagal šiuo metu nustatytą datavimą, Lietuvos teritorijoje brūkšniuotoji keramika buvo naudota iki 350–

450 m. Kaip rodytų gyvenvietėje rastos keramikos palyginimas, krosnelės buvo statomos ir naudojamos pereinamuoju laikotarpiu, jau įsigalint gruoblėtajai keramikai, todėl jas galima datuoti IV–V a. – senojo ir vidurinio geležies amžiaus riba. Atrodytų, kad Virbaliūnų gyvenvietėje geležį lydę žmonės jau žinojo neigiamą metalo lydymo metu išsiskiriančių dujų poveikį sveikatai, bent jau atsižvelgė į jų nemalonų poveikį savijautai, nes geležies lydymo krosnelės buvo specialiai statomos rytiniame senovės gyvenvietės pakraštyje, kur vyraujant vakarų vėjams geležies lydymo metu išsiskiriančios dujos ir dūmai buvo nupučiami tiesiai už gyvenvietės ribų.