

HISTORY BEHIND A NAME: NAGYKOVÁCSI, AN IRONWORKING VILLAGE Traces of ferrous metallurgy between the medieval villages of Kovácsi and Solymár

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As a result of several years of fieldwork and a community archaeology programme, traces of an extensive iron processing centre between Nagykovácsi and Solymár were uncovered. The area is mostly forested, and many extraction and production areas are still visible on the surface. The site was surveyed by teams of the Ferenczy Museum Centre (FMC) and the Közösségi Régészeti Egyesület (KRE) [Community Archaeology Association]. It contributes greatly to our knowledge of the specific profession-related villages of royal service people as the name of the related settlement, referring to a place of ferrous metallurgy, is first mentioned in a late Árpád Age document.

Keywords: ironworking, iron processing, Middle Ages, community archaeology, archaeology of industrial development

The village of Nagykovácsi is located 6 kilometres away from Budapest. In the Middle Ages, it was approximately 10 kilometres from the royal centre of Óbuda. It is separated in the north from the neighbouring

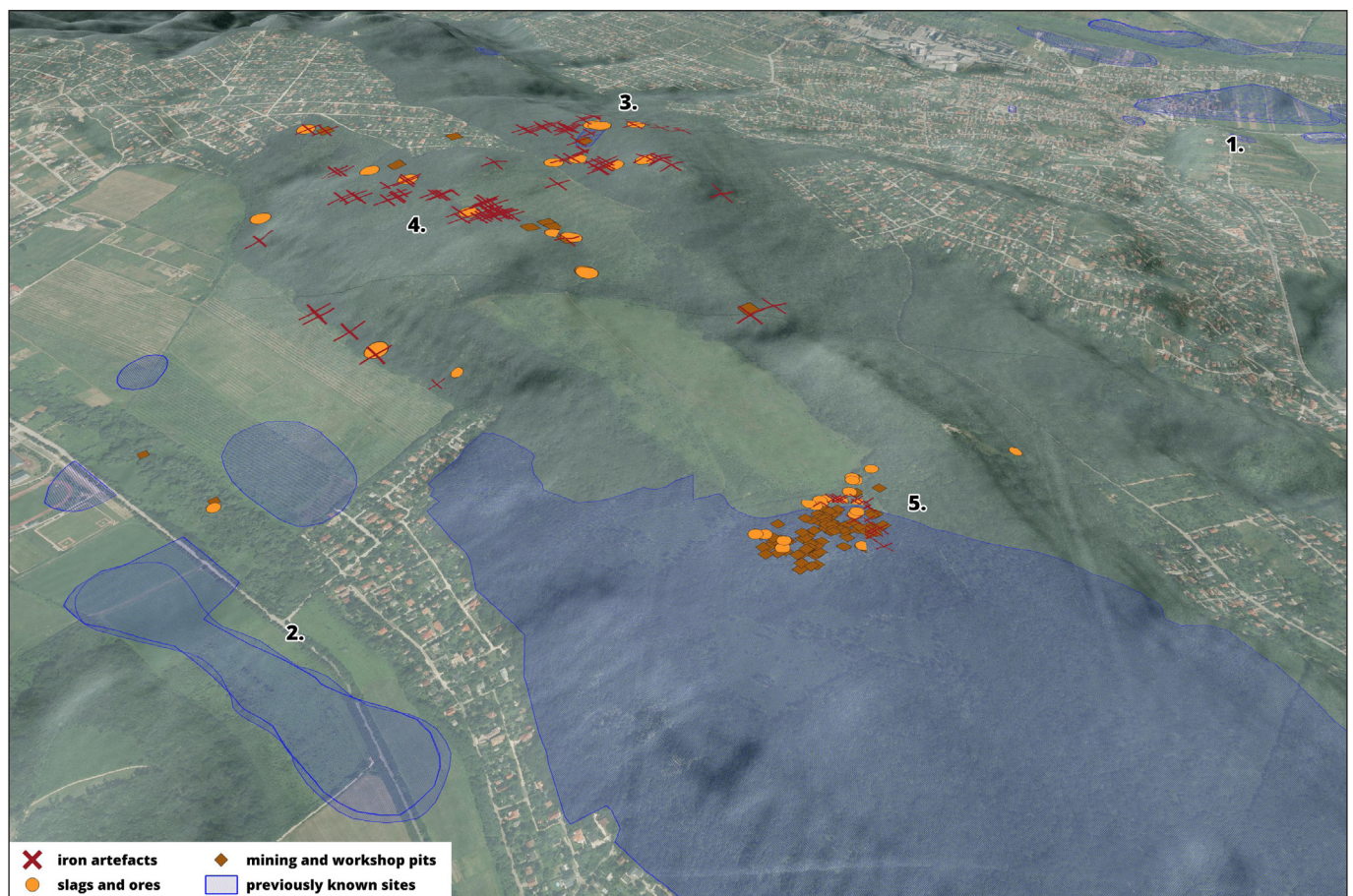


Fig. 1. Metallurgical features around Solymár, Nagykovácsi, and Remeteszőlős. Legend: 1: medieval Solymár; 2: medieval Kovácsi, 3, Solymár, Kerek Hill, 4: Nagykovácsi, Zsíros Hill, 5: Remeteszőlős, Remete Hill (by László Rupnik)

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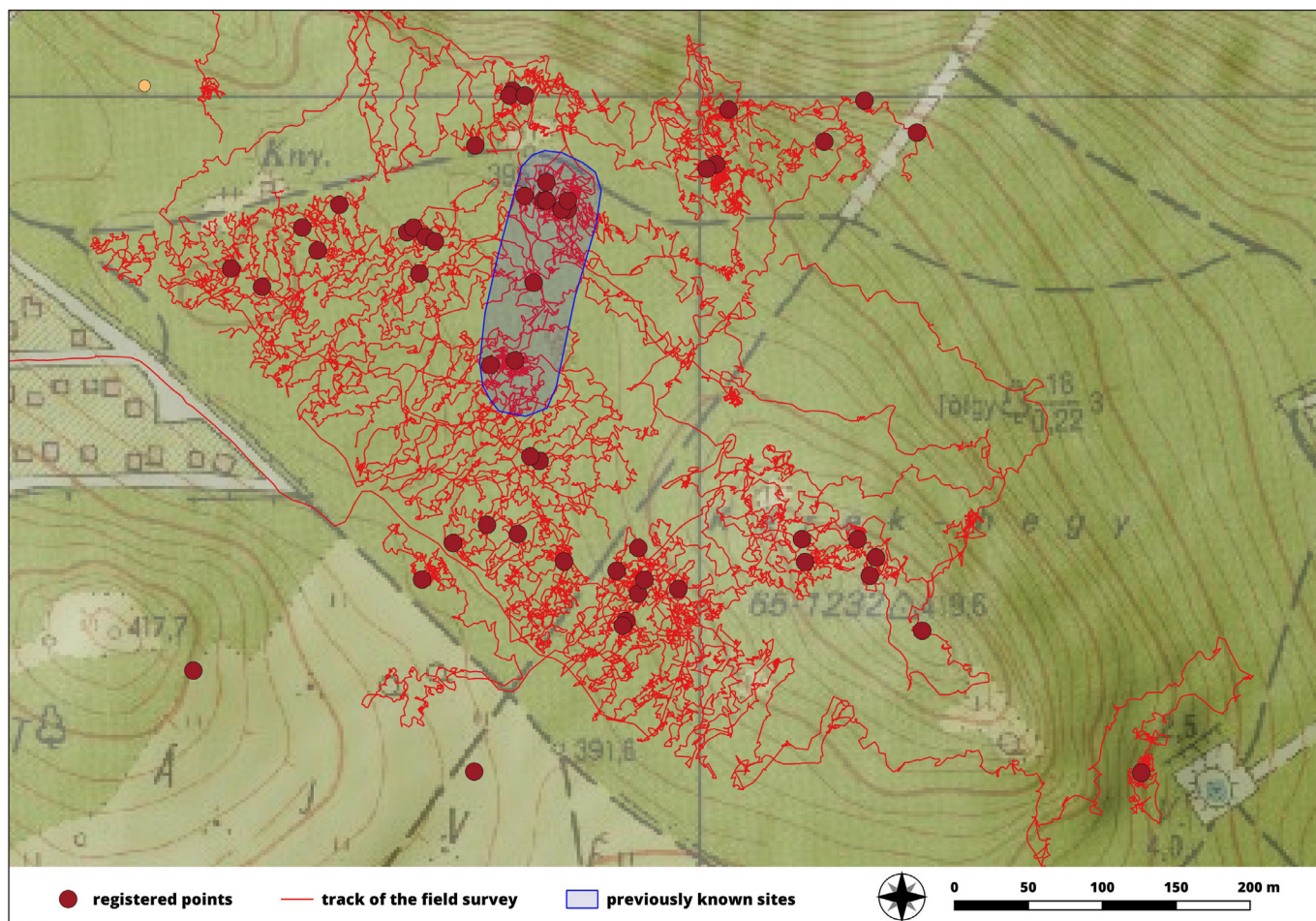


Fig. 2. Find scatter on Solymár, Kerek Hill (by László Rupnik)

Solymár by a forest covering the Kálvária Hill (Kálvária-hegy), the Kerek Hill (Kerek-domb), and the Zsíros Hill (Zsíros-hegy); this natural demarcation likely was the border already in medieval times. As no medieval document describes the borders of the village, they cannot be identified with certainty. The metallurgy-related archaeological phenomena presented here are scattered in the border of the two settlements, Solymár and Kovács, 1.5–2 km away from the respective medieval settlement sites. This paper is a preliminary survey report calling attention to the well-preserved and diverse archaeological record of an Árpád Age (and possibly partially late medieval) ironworking site in the forested area.

The at least 180–200-hectare forest extends from the Remete Ravine (Remete-szurdok) at Remeteszőlős to the Kerek Hill at Solymár (Figs. 1–3). Pieces of slag indicating metallurgical activity in the area were found approximately 1 kilometre from the core area discussed here during a field walking campaign in the 1970s (site 12/3; MRT 7, DINNYÉS *et al.* 1986, 121).

The recent research project and previous observations have also revealed the remains of other landscape use patterns in the area. A large quantity of diverse (bright purple and pinkish, light) slag is scattered in the Remete Ravine outside the focus area. According to locals, this specific area was used for lime burning in the 19th and 20th centuries; the report is corroborated by the traces of intensive limestone quarrying observed on the spot. In addition, vaulted brick structures, possibly bloomeries, and remains of older-looking furnaces were found on the hillside.

The present research project developed from an interest in local history, aiming to identify and survey the site. This paper is based mainly on the observations made by the author, who, in agreement with FMC, conducted a prolonged site prospection campaign there (even with a metal detector) and reported regularly on his findings to the archaeologists of FMC. Other volunteers also participated in surveying the area, and with time, the focus gradually shifted to the large ironworking site.

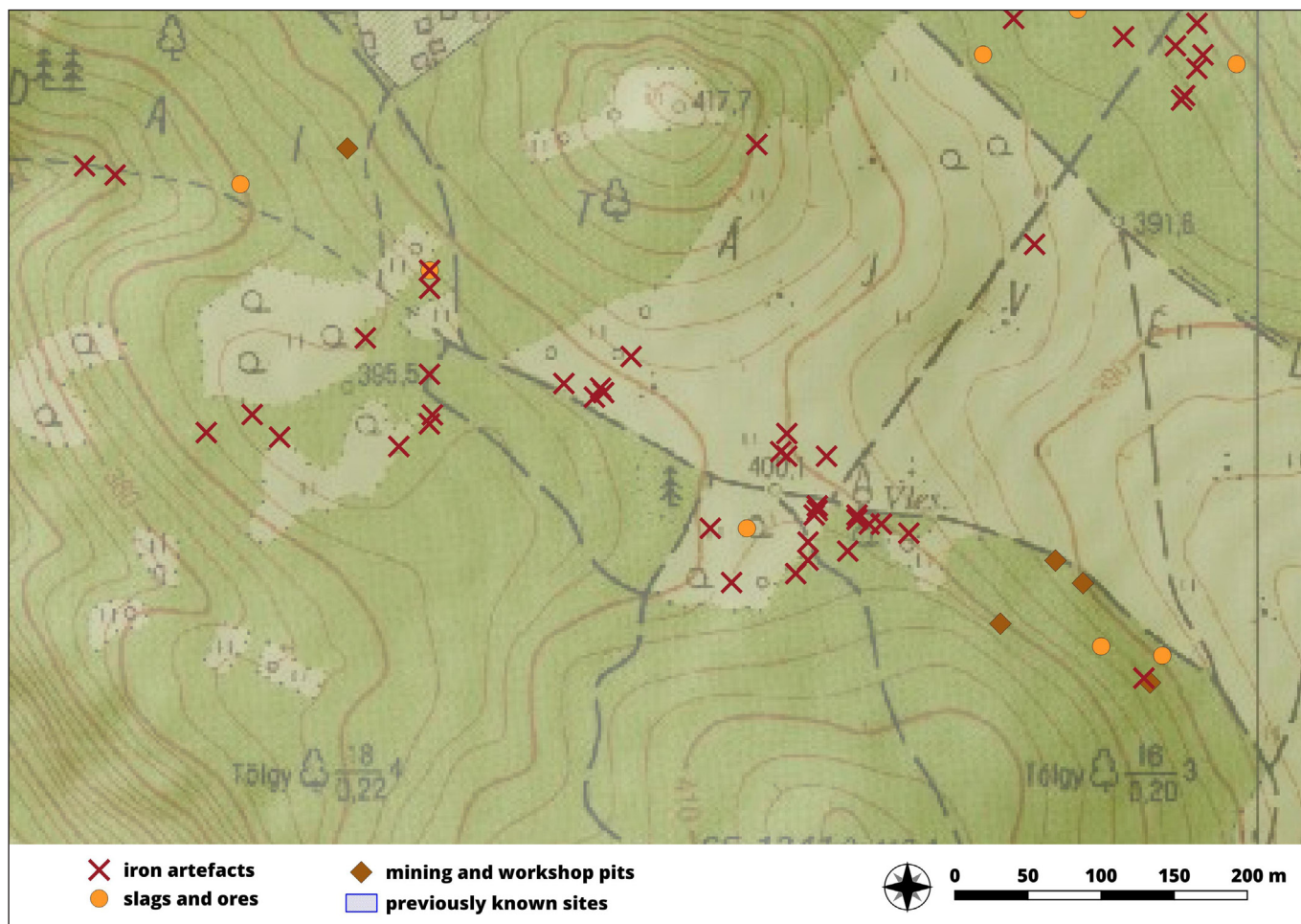


Fig. 3. Find scatter on Nagykovácsi, Zsíros Hill (by László Rupnik)

Characteristic ‘paint burning’ pits were observed at the edge of the study area. These 19th-century features were used by the local Swabian population to produce paint by firing iron-bearing soil. Most such pits were found on the Solymár side, especially in the area of the Kálvária and Kerek Hills, while on the Nagykovácsi side, they concentrated in complex depressions consisting of multiple pits (PUSZPÁN 2012).

SOLYMÁR, KERÉK HILL/NAGYKOVÁCSI, ZSÍROS HILL - JEGENYE HILL

The northern part of the archaeological site, near Kerek Hill, was discovered in the autumn of 2022. Apart from a survey later that year in December, there was no archaeological survey in the area. During this survey, two working pits with smelting furnaces were discovered, and their area was examined using metal detectors. FMC archaeologists and KRE volunteers collected a considerable amount of iron slags and some iron objects (Figs. 4–12) in the wider area of the two pits, discovering horseshoes, nails, spurs, knife fragments, linchpins, a spearhead, and a horse bit (Fig. 13). Some artefacts could be dated to the Árpád Age but most to the 14th–15th centuries, while a few—brooches, mounts, and coins—to the Iron Age and the Roman Period. Some artefacts, such as the horse bit, show similarity with some 10th–12th-century objects from Novgorod and the Kyivan Rus (Novgorod, Kyiv, Chernigiv, Sestovici, Vahrusevo, *etc.*; KORSUN 2008, 89; KARGER 1958, 589). A 0.5 m high waste heap, 3 m in diameter, comprising diverse (tap and bloom) slag fragments, pieces of burned lime, and smelting furnace wall fragments were found four metres north-west of the E-W-oriented working pit of Kerek Hill (working pit No. 2) (Fig. 4).

The two large features are 80–90 metres apart; their general appearance and character are so very different that they were likely created in different historical periods. The larger pit (working pit No. 1) is north-south oriented, i.e., perpendicular to the other (working pit No. 2). It is considerably larger than its analogy

in Somogyfajs, which, based on the slag concentration along the bottom and the edge of its southern long side likely also came with similarly positioned bloomeries (dug onto the southern sidewall; GÖMÖRI 2000, 153). The similar scatter of slag along the southern side of working pit No. 1 implies a similar arrangement.



Fig. 4. Iron ore from Nagykovácsi, Zsíros Hill



Fig. 5. Iron ore from Nagykovácsi, Zsíros Hill



Fig. 6. Furnace wall and tap slag fragments from Solymár, Kerek Hill



Fig. 7. Iron ore from Remeteszőlős, Remete Hill



Fig. 8. Furnace wall and tap slag fragments from Remeteszőlős, Remete Hill



Fig. 9. Iron ore, roasted ore, and slag fragments from Remeteszőlős, Remete Hill



Fig. 10. Furnace wall fragments from Remeteszőlős, Remete Hill



Fig. 11. Iron ore fragments from Solymár, Kerek Hill



Fig. 12. Iron slag ('mosser') from Solymár, Kerek Hill



Fig. 13. Cheek bit from Nagykovácsi, Jegenyé Hill (Sestovici Type II, 9th–11th centuries)



Fig. 14. Ore roasting pit

Small heaps of tap and bloom slag were observed on the top of the working pit; these may be the waste of a previous smelting session cleaned from the bloomery before it was used again. One of the heaps contained amorphous lumps of almost pure iron



Fig. 15. Deposit of fragmented and roasted ore pieces

(Fig. 11), while two pieces of mosser (a type of hammering slag with high iron content) were found on the bottom of the working pit at a depth of ca. 30 cm (Fig. 12).

Five shallow pits and depressions, possibly for ore preparation, were observed on the hillside above the working pit (Fig. 14). A thick layer of small limestone fragments covered the bottom of one. They were not burnt but had a pinkish discolouration that could result from exposure to heat as several similar but white limestone pieces were scattered around the pit. These pieces did not contain ore; their exact role is unknown and did not appear in every depression. The limestone layer was perhaps used for insulation during ore roasting. The area around the pits has burnt black soil with slag pieces and small non-magnetic splinters of iron blooms or sponges that probably flaked off during hammering. The soil of the large working pit is very compact, sticky, consisting of iron oxide-stained grey clay. During snowmelt or periods of heavy rain, water does not easily seep through it but pools in puddles at the bottom and stays there for days. As this specific type of soil appears only at the bottom of the working pits, it may be connected to metallurgical activity.

Part of the study area is located near residential areas (the forest near Hidegkúti, Bakony, and Mecsek Streets in Nagykovácsi) and is covered in recent construction debris and other types of waste. Nonetheless, pits and pieces of ore, both scattered and in deposits, could be observed even on these sites (Fig. 15). Besides, the soil under the leaf cover is packed with iron-bearing stones and burnt pieces of clay.

REMETESZŐLÓS, REMETE HILL

This location holds the traces of the most extensive network of medieval metallurgical activity. Near the path of the Blue Trail (a major walking route across Hungary), the forested northern side is spotted with dozens of ore extraction, roasting, and smelting pits (Fig. 16). The FMC team and KRE volunteers exam-

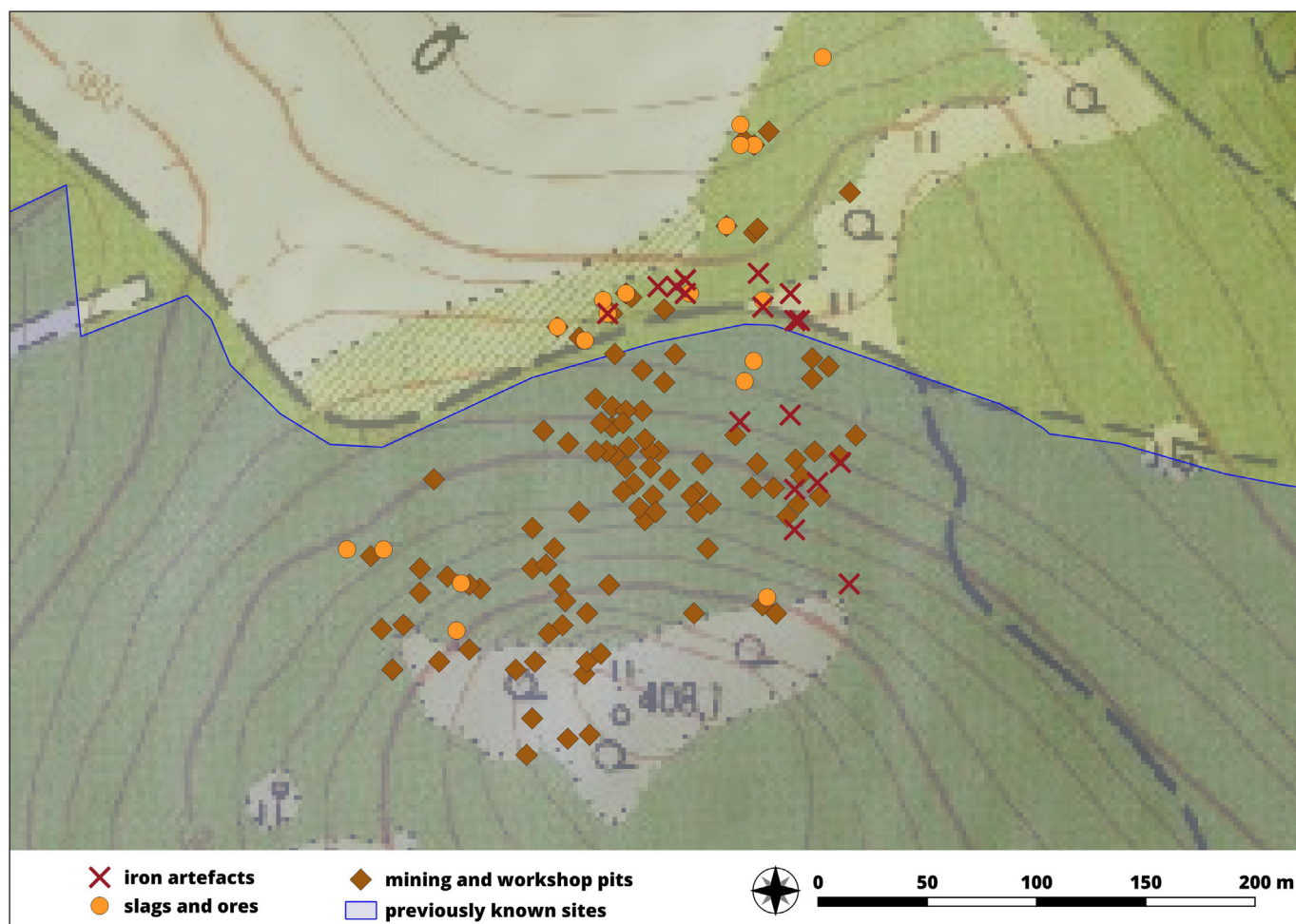


Fig. 16. Find scatter on Remeteszőlós, Remete Hill (by László Rupnik)

ined this area in March 2021 and registered and documented all working and ore extraction pits visible at the time. Since then, several more such features and related structures with identical finds were discovered in the close area. The slag deposits next to some pits contained 14th–15th-century Steyr- and Nuremberg-type knives with full or tapered tangs (HOLL 1995, 167). Slag and bloomery wall fragments were often scattered on the surface or in the leaf cover.

The area can be interpreted as an industrial complex, with exploited ore sources in the hilltop region, ore roasting pits on the slopes, and smelting sites at the foot of the hill. Most pits are surrounded by clearly noticeable heaps of waste material. The features representing almost all phases of the *chaîne opératoire* cover the northern slope from the hilltop to the meadow called Kovácsi erdőföldek. The half-exploited extraction pits and the heaps of ore amongst them showed that the place had been abandoned suddenly. The waste deposit next to the top of the hill, near the chimney of Öcsi Cave, also contains iron ore; however, it is mixed with soil excavated from the cave by explorers in the 1970s. A semi-circular dry stone wall, akin to a spring enclosure, engirds its bottom.

The traces of iron production seem to be connected by a clearly recognisable network of pathways in the forest, along which further pieces of slag and ore were collected from the surface. These paths are accompanied by sometimes quite long strings of iron ore and limestone deposits, some of which appears as a relatively high heap in the forest.

NUMBER AND TYPOLOGY OF THE REGISTERED FEATURES

The features detected over the approximately 200-hectare area could be classified into four main types, which sometimes cannot be separated. We have found five smelting pits, 42 ore extraction pits, 22 roasting pits, three ore deposits, 21 unidentified pits, and eleven limestone quarries (many of which, as the ore fragments scattered around them indicate, likely contained iron ore once).

Working pits came in diverse sizes: some ore extraction and smelting pits extended to 30 × 25 m and were up to 8 m deep, while some roasting pits were only 1–2 m in diameter. However, most pits were for quarrying and roasting iron ore and were 3–5 m in diameter. Ore extraction pits were found in the largest number, and only a few could be connected with smelting—in many cases, the original function could be deduced from size.

Ore extraction pits are concentrated in three distinct areas, where the ore was probably formed by hydrothermal mineral deposition in the dolomite bedrock, such as limonite (goethite, hematite, jarosite) and possibly magnetite. One of the three is a large quarry, which was mostly mined for limestone (Solymár, Kálvária Hill, *Fig. 17*), the second is a series of dozens of extraction pits (Remeteszőlós, Remete Hill), while the third is a former creek bed (Nagykovácsi, Zsíros Hill), where ore is also scattered in a zone along the actual stream bed for about a hundred metres east of Kálvária Blvd. – Völgy Street in Nagykovácsi and 50 m west of the hiking path starting at the turn of Hidegkúti Road. No ore-bearing rock was found between the two parallel zones, about 250 metres apart, but ore deposits in small heaps, sometimes in rows, were also found here. The size of the ore fragments ranges from nut to human head. The large ones often bear facets, i.e., traces of fragmentation in preparation for smelting. However, only two roasting pits were uncovered in the area; the closest known smelting pits were found 500–600 m in the east at Kerek Hill. As the bedrock of the hill range is dolomite, the iron ore concretions are rather conspicuous on the surface. Interestingly, not every metallurgical feature is part of a complex: e.g., there



Fig. 17. Iron ore and limestone quarry, Solymár, Kálvária Hill

are lonely roasting pits away from the features related to other production phases at different points of the study area.

In summary, the metallurgical phenomena include several limestone and ore quarry pits, roasting pits, raw material deposits, working pits, and venues of smelting. In lack of excavation data and relying only on surface observations, their classification is challenging. The smelting furnaces show the closest similarity to the bloomeries unearthed at Imola, Somogyfajsz, and Harka, but the link cannot be proven (GÖMÖRI 2000, 242). They may also be similar to the 10th-century bloomeries unearthed by János Gömöri in Sopron-Potzmann-dűlő (GÖMÖRI 2000, 175).

CHRONOLOGY

The main issue concerning the discovered features and the close area is dating. None of the previously mentioned finds came from smelting pits or waste deposits but from their vicinity. No pottery, coin, or find of dating value was collected from the surface, probably due to the leaf litter. Similar industrial archaeological sites indicate that working pits are scarce in finds on the surface due to erosion but contain metal and pottery finds from a depth of 40–60 cm downwards. János Gömöri made similar observations (GÖMÖRI 2000, 196). However, many artefacts found between the features may indicate their age. Unfortunately, the collected find material does not comprise large furnace wall fragments, tuyeres, or other age-specific technological traits. Charcoal pits are also missing; only a few pieces of charcoal were found in the waste deposit of two working pits. The slag pieces found near the smelting furnaces, the furnace wall fragments, and the charcoal finds could also be used to determine the age of the features, but that would require archaeometric analyses.

Some information can be gathered about the settlement and its chronology from the charters mentioning the medieval Kovácsi. King Ladislaus IV donated the village to the nuns of Margaret Island in the 1270s, which means that after that, the village was no longer home to service people of the royal estate (MRT 7, DINNYÉS *et al.* 1986 121). The settlement remained inhabited until the Ottoman conquest, appearing in documents as *Koachi*, *Kowachy*, *Keszikovácsi*, *Alsó- Felsőkovácsi*, and *Kiskovácsi*. In summary, medieval documents are insufficient to specify the age of the metallurgical features on the hillside. However, a gen-



Fig. 18. The joint team of FMC and KRE on a field survey

erally accepted industrial archaeological approach may help determine the site's age: from the mid or late 13th century, the significance of piston bellows powered by water increased in iron production; therefore, metallurgical complexes were established near watercourses. The pits in the study area, however, are hundreds of metres away from any creek, and even the ravines and temporary watercourses are too far. This complex was established on the ore outcrops in the hill range (which also suggests that the technology was quite rudimentary), and water did not play a significant role in its life. Despite having searched intently for mining tools near the pits, none was discovered, which may also indicate that the applied mining and smelting technologies were quite primitive, production relying on easily accessible ore in outcrops and human-powered bellows.

CONCLUSIONS

The variety of metallurgical features in the extensive metallurgical complex that has persisted undisturbed since medieval times bestows its importance on the area near Nagykovácsi and Solymár. Many features are visible on the surface even today, and their original shape and function of most can be deduced. Besides, several of them include traces of metallurgical activity under the leaf cover, which would be impossible in an area under cultivation.

The features are also suitable for drawing more general conclusions. As the result of the research, a village named Kovácsi (the name translates to 'of ironworkers/ironsmiths') was identified as a medieval ironworking site specialised in mining and ore processing, a significant finding because the question of whether these names actually refer to places of iron processing and whether the inhabitation can be linked with the local iron resources or was only a venue of processing of imported ores and pre-processed iron have been subject to debate for long. Previously, only the excavations led by Ilona Valter at Csátár ('a settlement of shield makers') proved a link between such a toponym and the specialisation of the settlement in a Hungarian context (VALTER 1979). The two settlements named 'Kovácsi' (Nagykovácsi and Pomáz-Nagykovácsi puszta) between the royal centres of Óbuda and Esztergom are important because their research sheds light on many aspects of this topic. Both Árpád Age villages were parts of the royal estate, as proven by them having been given away by the king as gifts; Nagykovácsi lost its former status in the 13th century, while Pomáz became a possession of the Cistercian monks in the 12th or 13th century. This paper describes an extensive medieval iron mining and processing complex near Nagykovácsi, but there is no way to discover similar traces under the built-up area of the modern village (especially without knowing where the medieval village was) and learn whether the processing of the produced iron continued in the village or was taken elsewhere. Some evidence of metallurgical activity (iron blooms) was also discovered in Pomáz, but significantly less is known about the neighbouring iron extraction sites there (LASZLOVSZKY 2009; LASZLOVSZKY *et al.* 2013, 8). Excavation in the medieval settlement yielded evidence of blacksmithing (REPISZKY 2003). The end of the royal service for the two settlements may have been due to the collapse of the royal service system, the depletion of natural resources, or a combination of the two.

The obtained results have outlined various directions for future research. One is an in-depth study of the different features, including another survey aimed at their more comprehensive identification and categorisation. The collected finds will be conserved and documented, and metallurgical evidence will be subjected to an archaeometric analysis. The last phase is a comparative evaluation of the finds and features of Pomáz-Nagykovácsi puszta.

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