High Medieval Silver Mining and Non-Ferrous Metallurgy in Northern Siegerland, Germany An Interim Report

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Keywords
Middle Ages, Mining Archaeology, Argentiferous Fahlore, Minting

Abstract

In northern Siegerland, located in the ore-rich Mittelgebirge region of Germany, a mining landscape based on copper, lead and silver metallurgy developed in the High Middle Ages. Beginning at least in the 10th century AD, silver-rich fahlore was mined and smelted. The 13th century is interpreted by archaeologists as the height of mining in the region with multiple mines, smelting sites as well as an impressive mining settlement at Altenberg near Müsen (Hilchenbach). At the current state of research, the decline in this high medieval mining area began at the end of the 13th century. Since 2013, with cooperation partners from Altenberg & Stahlberg e.V. Müsen, the Deutsches Bergbau-Museum Bochum and the LWL Archaeologie für Westfalen, new interdisciplinary research has focused on the prospection and excavation of mines, mine tailings, charcoal pits and smelting sites as well as the re-investigation and re-evaluation of the mining settlement of Altenberg near Müsen. This research, which is still in the initial phase, has already begun to provide new information on aspects of the development and organization of medieval non-ferrous metal production in this region.

Introduction

The High Middle Ages in the Holy Roman Empire are characterized by the growth of urbanization and technology. Through these developments and because of the increase in population, the demand for metals grew strongly. Required to fuel the increasing level of monetization during this period, precious metals, particularly silver, were in high demand. As a consequence, regions with rich ore deposits came to the forefront, and because of the mining and metallurgy, these regions witnessed increased colonization and population growth.

Urbanization, monetization and metal production were closely intertwined. A fitting reference can be made to the "Macht des Silbers" or the "Power of Silver", a phrase Christoph Bartels and Christiane Hemker (2014, p.28) use to describe the special role of silver in the economic and political developments of the 12th and 13th century. The recent work on the ArchaeoMontan research project in the Saxonian and Bohemian Erzgebirge (Smolnik, 2014) as well as thanks to the long term research of the Department of Mining Archaeology of the State Office for the Preservation of Historical Monuments of Lower Saxony in the Harz Mountains (Bartels, et al., 2007; Klappauf, 2003) and the research in the Black Forest region by Institute of Prehistoric and Protohistoric Archaeology at Freiburg University (Goldenberg and Steuer, 2004; Straßburger, 2015) these relationships are beginning to be understood. The situation is different in Siegerland, a region in the German Mittelgebirge on the border between the states of North Rhine-Westphalia and Rhineland-Palatinate, a region in which in the last 30 years no archaeological research project about medieval mining took place. Since the year 2013, a research cooperation has begun to be developed between public and state organizations (Altenberg & Stahlberg e.V. Müsen, the Deutsches Bergbau-Museum Bochum as well as LWL-Archäologie für Westfalen) to explore the mining archaeology and to build upon the previous research in the northern Siegerland region (Garner, et al., 2014; Zeiler, et al., 2015a; Zeiler, et al., 2015b). The area of focus is between the Kreuztal-Littfeld / Hilchenbach-Müsen area and the Kreuztal-Ferndorf / Siegen-Wittgenstein district (North Rhine-Westphalia) (Figure 1). The following report will discuss the circumstances surrounding the project, the archaeological aims and the methodology and will provide some of the first preliminary results.

Natural and Geological Setting

Siegerland is a peneplain landscape of the Rhenish Massif with extensive high plateaus and deeply cut valleys (Figure 1). The level of yearly precipitation is high (900-1200 mm), the intensity of sunshine is low, the temperatures are low (7.5-8° C average annual temperature), and over 90 days per year the temperature is below freezing (Ministerium für Umwelt, 1990). The climate and especially the relief of the area have led to the overall low quality of the soil for cultivation. As a result, till now the region was never a region known for its agriculture. Additionally, Siegerland is surrounded by other high Mittelgebirge regions (Westerwald, Sauerland, Rothaar Mountains, Bergisches Land) and is therefore poorly accessible from the neighboring intensively settled areas, for example in the Rhine Valley. The primary reason for the settlement of the area, or seasonal occupation, was the ore deposits found there. The dominate sedimentary rock mainly comes from the lower Devonian period and were folded during the Carboniferous period (Siegen anticlinorium) and ascending hydrothermal solutions led to the formation of mineralizations and deposits (Fe, Pb, Zn, Cu, Au, Ag, Co, Ni) of the Siegerland-Wied mining district (Garner, 2010, pp.14-18; Kirnbauer and Hucko, 2011).

It is assumed that the earliest use of ore from this region were ochre and hematite used for the manufacture of pigments in the middle Neolithic period, 5th millennium BC (Baales, et al., 2014, pp.51-52). Since the Latène period (after the 4th century BC) until the modern era, the region has been known for its extensive iron industry. The focal point of the iron industry was in central Siegerland around the town of Siegen and had close relationships to the Celtic groups on the periphery of Hessia (Garner, 2010; Stöllner et al. 2009, pp.187-187; Zeiler, 2013, pp.120-144). In the northern part of Siegerland, the area of the cities of Kreuztal and Hilchenbach, the evidence for Iron Age occupation is quite thin. This clearly is due to lack of research in this area, however the current cooperation has revealed not only several Iron Age production sites (Garner, Golze and Zeiler, 2014), but also evidence for Iron Age copper-based metallurgy. Inferences to one such site were mentioned in earlier research (Krasa, 1960). In northern Siegerland (Olpe-Müsen area), next to the siderite-quartz gangues with the key iron oxide minerals (hematite, limonite, goethite) important for the Iron Age ferrous metallurgy, there are also vein-type mineralizations that can contain lead, copper or silver minerals as well (Kirnbauer and Hucko, 2011, p.257). Worthy of note, the historical documents of the last centuries continually mention remarkable quantities of silver-bearing copper ore in the form of fahlore (tetrahedrite), or even native silver, in the upper mining levels (Bartels, 2014). Bartels work provides strong arguments against the widespread view in archaeology and archaeometallurgy that silver-bearing galena was the main ore for the medieval silver min-

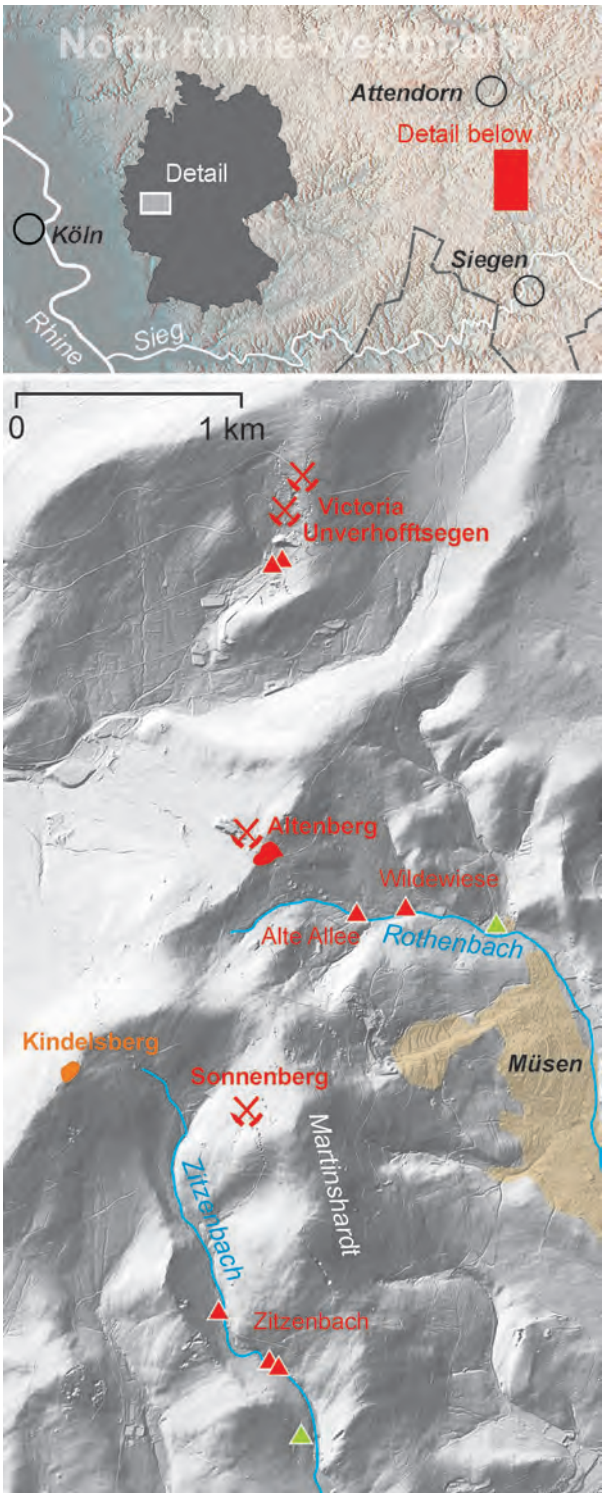


Figure 1: Map of the region of focus with locations of places mentioned in the text. Red: Middle Ages, Green: Iron Age. Triangle: Metallurgical Site. Illustration: M. Zeiler using DGM1 NRW base map and maps-for-free.com.

ing industry. Therefore, it can be assumed that the copper ore, particularly the silver-bearing fahlore, was the aim of the ancient miners.

Archaeological questions and methodology

At the current state of research, in northern Siegerland the beginning of medieval mining and metallurgy can be dated back to the 10th century AD based on the ceramic assemblage and radiocarbon dating, and the high point of production appears to be in the 13th century. After this high point, the decline of mining in the region followed quickly.

The aims of the research cooperation are to comprehensively record the mining landscapes of the region and to explore their individual components with interdisciplinary methods. It is already apparent that there were impressive technological advancements in smelting particularly in the 13th century, and special attention will be given to describe technical processes relating to smelting, but also mining and charcoal production. The goal of this project is to study the mining landscape in all aspects, to understand its inner workings and development, to examine the use of fahlore in medieval metallurgy and, finally, to formulate hypotheses about the organization of the mining industry and how this relates to the territorial affiliation and political situation of the time.

Prospections were designed and planned on the basis of digital terrain models and historical maps. As many of the potential medieval sites as possible are to be dated. This was and will be done primarily by coring to obtain material for a radiocarbon dating. Except

Figure 2: Slag from the excavation in Zitzenbachtal was separated by feature and measured in sectors (upper left), put in bags (lower left), and taken to the Stahlbergbaumuseum. There the slag was cleaned (upper right), and inspected for identification (lower right). Photos: M. Müller-Delvart and M. Zeiler, LWL-Archäologie für Westfalen.

Figure 3: Original medieval Shaft 2 with connecting medieval gallery. The medieval shaft was followed and expanded during later mining. Photo: P. Thomas, DBM.

for the excavations in the mines themselves, all archaeological excavations were preceded by a geomagnetic survey. The subsequent excavations were oriented on anomalies of the magnetogram as well as relief structures in order to understand the site as a whole. So far no complete excavation of an entire site took place. Instead, exemplary and representative sections of the sites were the focus in order to be able to effectively investigate a larger number of sites. Also, underground only parts of the mines were cleared away or investigated by shovel test pits.

During the excavation of smelting sites and slag heaps, the metallurgical artifacts were recorded in bulk or estimated statistically and representative samples were taken (Figure 2). Presently, the archaeometallurgical analyses of slag are being performed by Bastian Asmus. Wood samples from important archaeological features were taken for dendrochronological analysis at the laboratory of dendrochronology at the Universität zu Köln to be investigated by Thomas Frank. The identification of charcoal remains was carried out by Ursula Tegtmeier at the laboratory for archaeobotany at the Universität zu Köln.

Mining

As a rule, older mining areas were massively impacted or completely destroyed by post-medieval mining. For example, no Iron Age mines could be found up until now despite intensive prospection in central Siegerland (Zeiler, 2013, pp.123-125). Broadly speaking, the same usually applies for the long-forgotten medieval mining industry. Therefore, the discovery of three areas with mines dated to this period is remarkable. The mines can be dated to the 13th century on the basis of ceramic sherds, dendrochronology and radiocarbon dating.

The most well-known of the mining areas is the Altenberg near Müsen and mines were studied primarily by Gerd Weisgerber between 1971 to 1986 (Dahm, Lobbedey and Weisgerber, 1998). His extensive publications on the excavations can be called "a great step for science" (Stöllner, 2005, p.98) as he used never before practiced excavation techniques to study four vertical mining shafts in multiple campaigns. The shafts were partially elaborately timbered (Figure 3) and could be followed to a depth of 26 m in one case. The excavators were not able to reach great depths due to flooding by

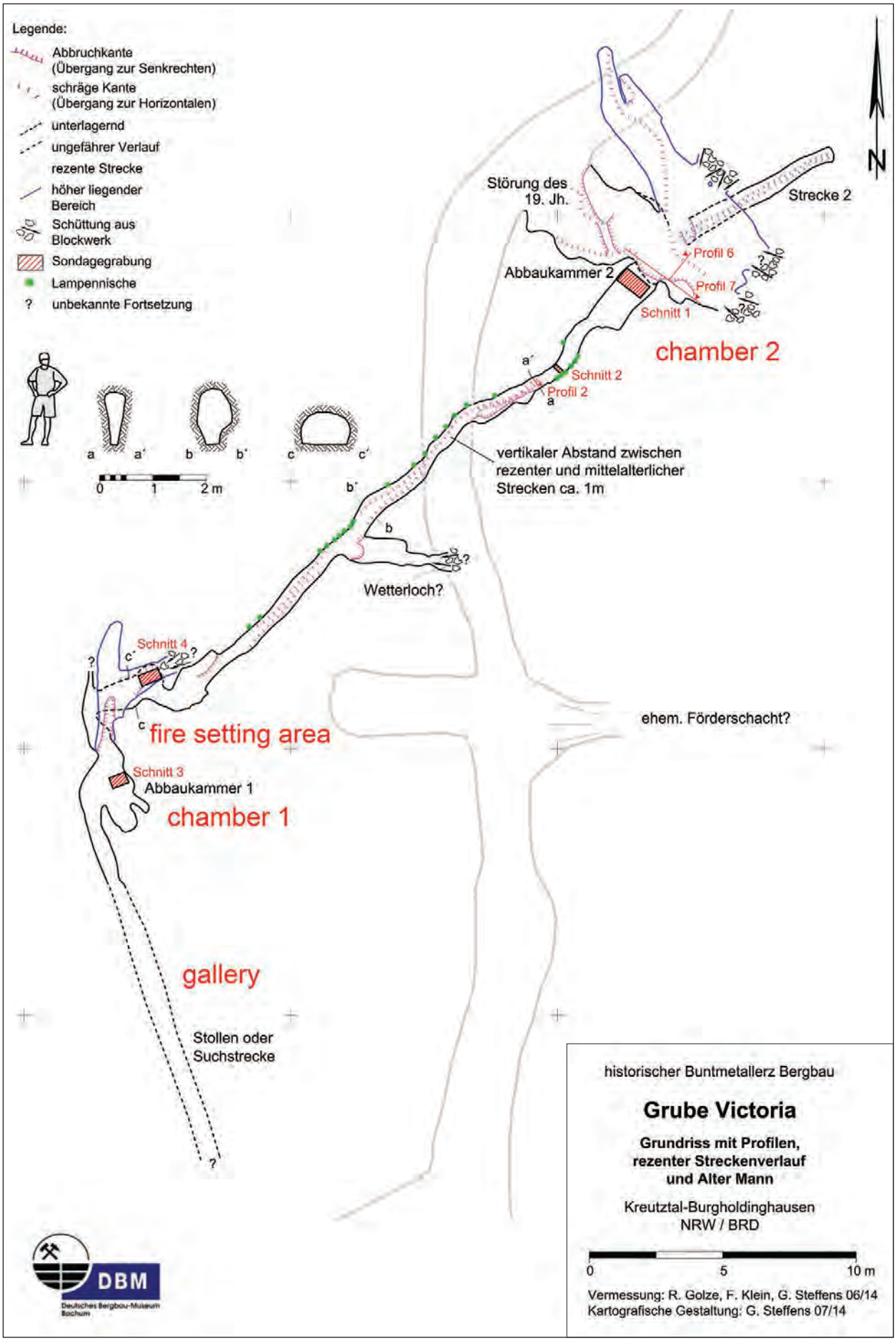


Figure 4: Ground plan of the medieval Alter Mann Victoria mine.

Figure 5: View of the supports in Chamber 2 of the medieval Alter Mann Victoria mine. Photo: P. Thomas, DBM.

groundwater, but they were still able to record portions of the small and narrow galleries that branched off from the shaft. The evaluation of texts from younger mining phases seems to indicate that the medieval mine could have been 70 m deep (Dahm, Lobbedey and Weisgerber, 1998, pp.134-183).

The mine and the settlement on the Altenberg operated for close to 100 years after around 1200 AD and was located at the junction of two tracts of lodes (Altenberger Main Lode and Prinz Wilhelm Lode). The Altenberger Main Lode is up to 40 m thick and found in an area of high compressive force. The lode consists of irregularly distributed siderite, argentiferous galena, sphalerite, pyrite and fahlore (Dahm, Lobbedey and Weisgerber, 1998, pp.134-136).

In 2014, in the framework of the research project, an ancient mine in the Heinrichssegen-Victoria (Alter Mann Grube Victoria) near Kreuztal-Burgholdinghausen was found (Zeiler, et al., 2015a; Zeiler, et al., 2015b). The medieval mine was cut by a more recent mine allowing access to a small part. The mine was studied within a week and was partially directed towards securing the mine for safety reasons. At this mine the ore veins consist of siderite with inclusions of lead minerals, copper minerals and fahlore.

The mine layout was on average 12 to 15 m under the surface and consists of a shaft, two chambers, and two galleries (Figure 4). Although it was neither possible to excavate the filled galleries and shafts to find the orig-

Figure 6: Section of the gallery with traces of fire setting in the medieval Alter Mann Victoria mine. Photo: P. Thomas, DBM.

Figure 7: Gallery, Stollen Unverhofftsegen, with small dimensions and lamp niches. Photo: P. Thomas, DBM.

inal mine entrance nor to excavate down to the floors of the chambers, the study of the mine did give insights into aspects of the mining operation. Initially the narrow galleries were set directly in the lode to study the ore veins. In the case of economically viable ore veins, the gallery was extended and widened to form the preserved chambers (Figures 4 and 5). In the survey of the mine, a platform was discovered, which was probably where a winch winder (*Haspel*) was located and two galleries diverge from this point. Though one ends just after a few meters, the other gallery led to another chamber (Figure 6). Before the chamber was reached, the profile of the gallery becomes asymmetric and shows signs that fire-setting was used to crack the rock (Figures 4 and 6). Also, the adjoining chamber shows signs of fire-setting. The next connecting gallery has even narrower dimensions than the one before (Figure 4). It is therefore assumed that it served as a dewatering gallery. The main movement within the mine and the extraction of ore was done through the shafts and the gallery that connect chambers 1 and 2. Some of the characteristic features of this mine are the narrow, round or oval-shaped gallery cross-sections, a high quantity of tool marks on the walls as well as small oval lamp niches. The medieval mine was much larger than this, as only a portion was accessible. In a neighboring mining area (Unverhofftsegen) another gallery was found with the same dimensions, mining tool marks and oval lamp niches (Figure 7). The archival

Figure 8: Cross-section of the gallery with balloon-shaped profile in the Stollen Mittlerer Sonnenberg Photo: R. Golze.

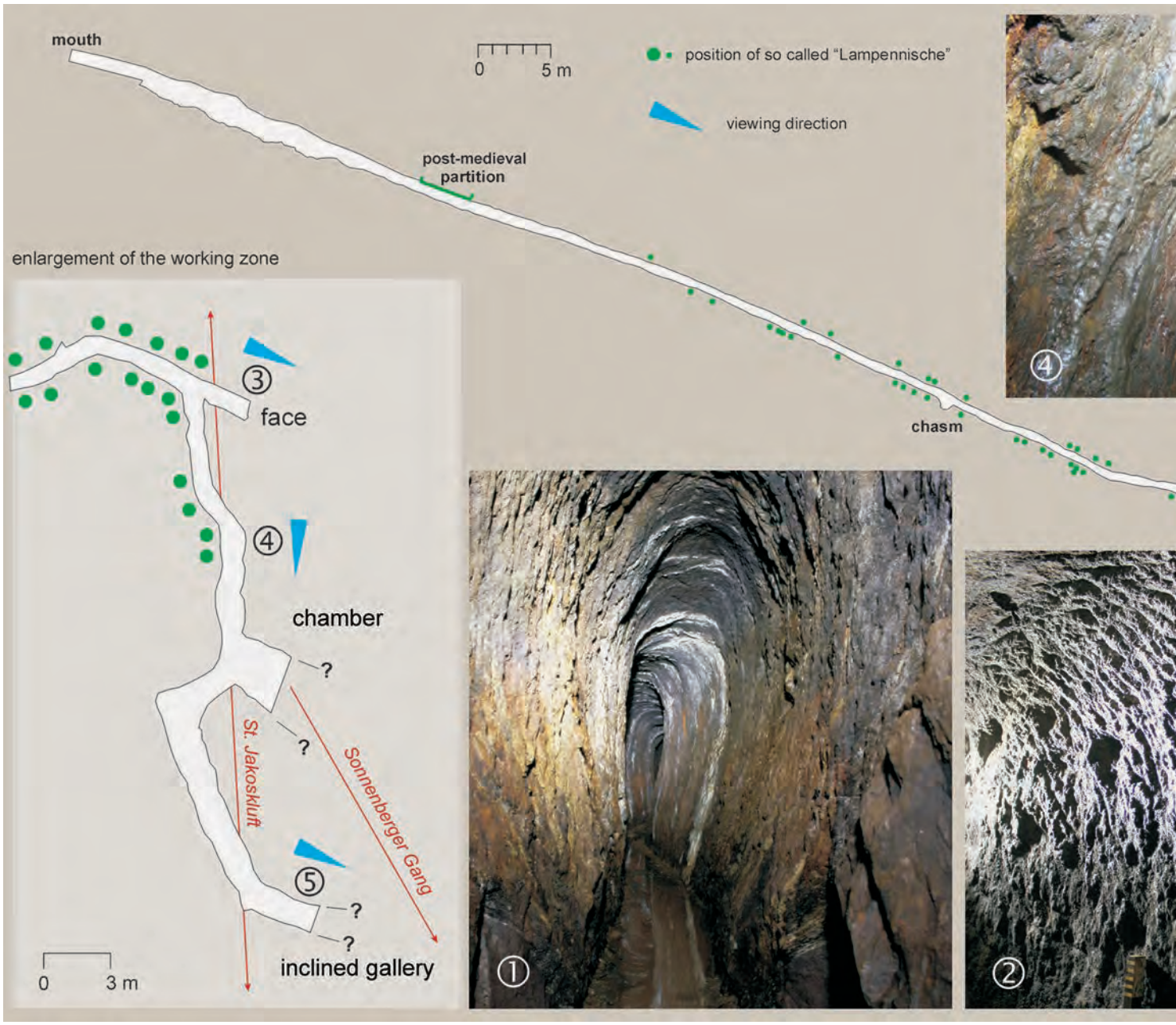
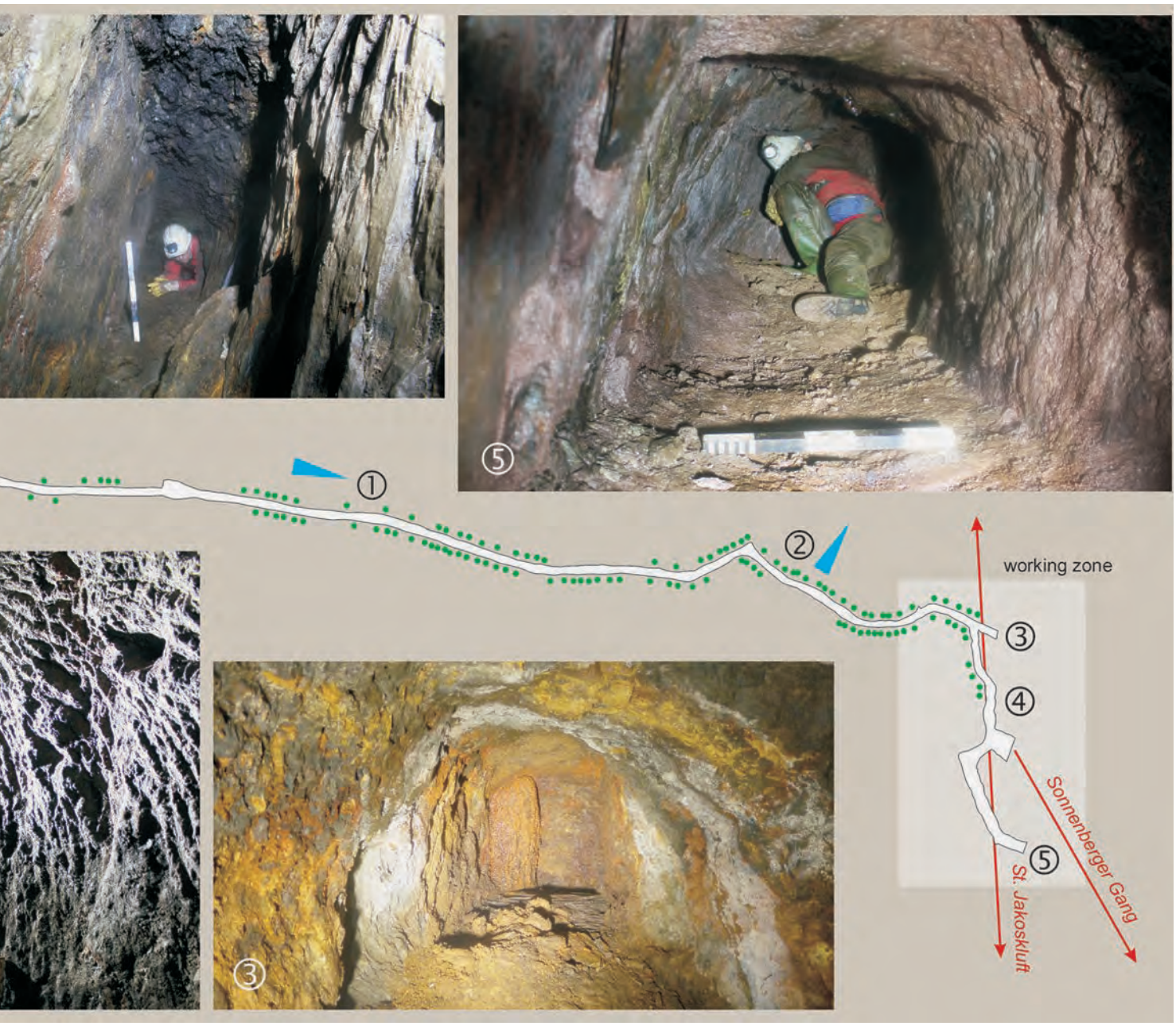


Figure 9: Stollen Mittlerer Sonnenberg: Ground plan and location of the ore lode. 1: Gallery cross-section with balloon-shaped profile. 2: Concentration of lamp niches. 3: End of the gallery. 4: Undercutting the ore lode. – 5: Steeply inclined gallery.

sources of the last centuries give indications that traces of medieval mining are to be found. Two very large alignments of collapsed mine shafts (*Pingenzüge*) can be found on the surface above and surrounding the Victoria and Unverhofftsegen mining areas (Zeiler and Golze, 2016), and due to the dating of ceramic sherds associated with the mining remains, it can be said that mining began at the latest in the 11th century AD (Zeiler, et al., 2015a; Zeiler, et al., 2015b).

Apparently, galleries with larger dimensions can be found dating to the 13th century. The third high medieval mining site is the mine of Mittlerer Sonnenberg, which was documented by the Altenberg & Stahlberg e.V. in 2015 (Figure 8 and Figure 9). The group also investigated a mine tailing heap near the mine entrance. In this heap of mining debris, a rim sherd of a rounded jar (*Kugeltopf*), which is soundly dated to the 13th century, was found (Golze and Zeiler, 2016).

The mine consists of a 1.6 m high and in all 260 m long gallery with a balloon-shaped cross-section (Figure 9), and the height of the gallery diminishes towards the end. With exception of the entrance area, the gallery is similar to the Grube Victoria with the same characteristic mining tool marks and oval lamp niches (Figure 9). Near a crevice in the rock (St. Jakobskluft), the gallery changes course and meets a crossing of the St. Jakobskluft and the Sonnenberger Lode where there is a chamber that ends in a steeply inclined gallery that is filled



Survey: T. Bilstein, M. Eberts, R. Golze, and T. Mockenhaupt (Verein Altenberg & Stahlberg e.V.). Photos and cartography: R. Golze and M. Zeiler.

with debris after a few meters. The excavation of the extraction chamber and the inclined gallery could not be undertaken. However, the vastness and preservation of the mine are impressive and have enormous potential for future research. The Sonnenberger Lode is up to 2 m thick and consists of siderite and galena with significant amounts of fahlore.

Smelting

Already with the investigations by Gerd Weisgerber, a large slag heap related to silver smelting had been discovered on the southern edge of the Altenberg near the Rothenbach Brook. Besides numerous smelting phases, the archaeologists could identify what appears to be a smelting furnace with a 50 cm diameter made of masonry and slagged bricks (Dahm, Lobbedey and Weisgerber, 1998, p.207). Interestingly, the smelting site is dated with a rounded jar (Kugeltopf) with a rounded spout which would be contemporary to the neighboring mining settlement or even slightly earlier than the foundation of the settlement. Not far downstream, there is an Iron Age smelting site for copper / non-ferrous metallurgy. Further away and uphill, an excavation took place in the Summer of 2016 in the area of the "Alte Allee": The members of the research cooperation uncovered a medieval copper / non-ferrous smelting site. The site

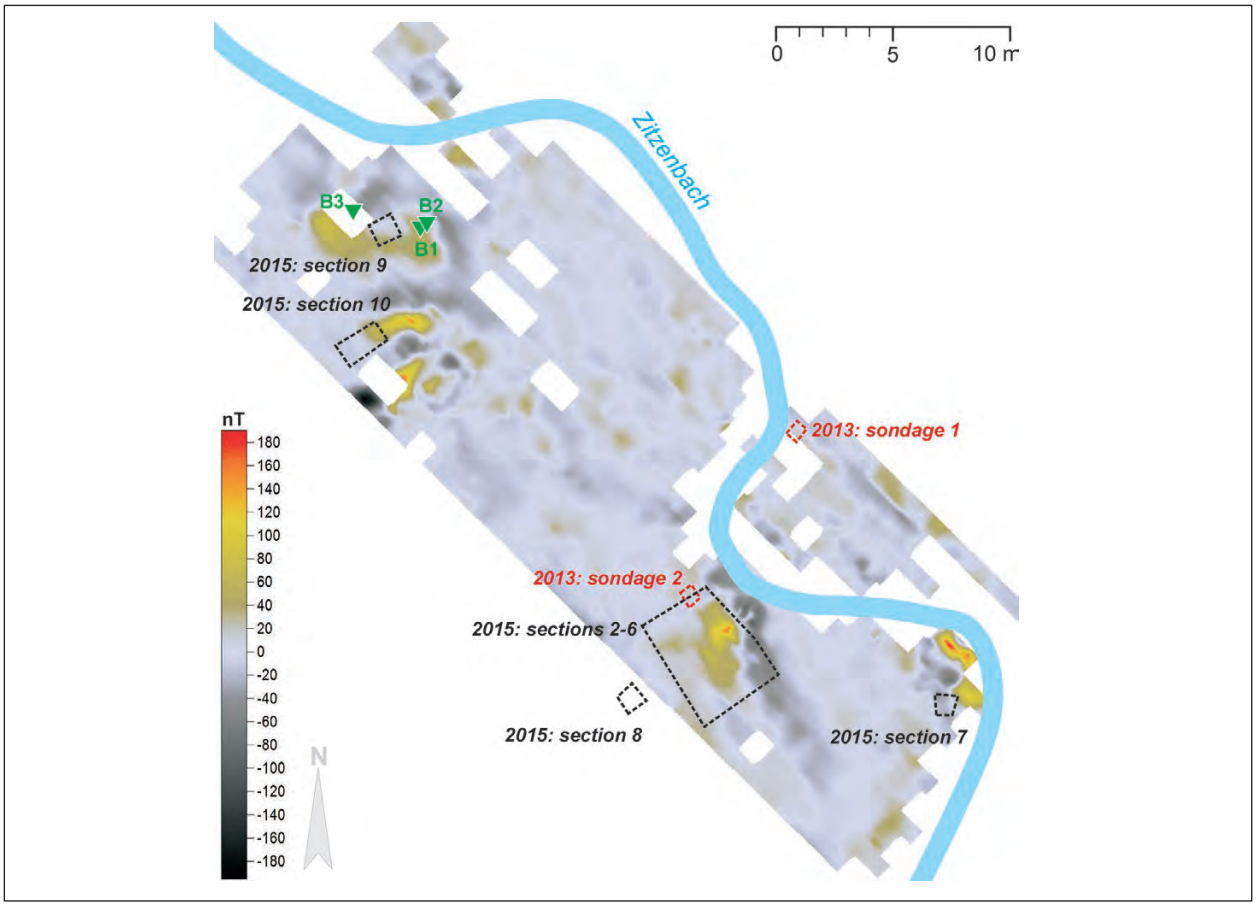


Figure 10: Magnetogram and excavation plans in the middle course of the Zitzenbach Valley. Survey: T. Riese, Posselt & Zickgraf Prospektionen GbR Marburg, and M. Müller-Delvart and T. Poggel, LWL-Archäologie für Westfalen. Cartography: M. Zeiler.

Figure 11: Magnetogram of the large slag concentration in the Zitzenbach Valley with meaningful anomalies. A: Headrace. G: Water wheel location. H. Slag heap. P: Location of a stamp mill or furnace. Survey: T. Riese (Posselt & Zickgraf Prospektionen GbR Marburg); cartography: M. Zeiler.

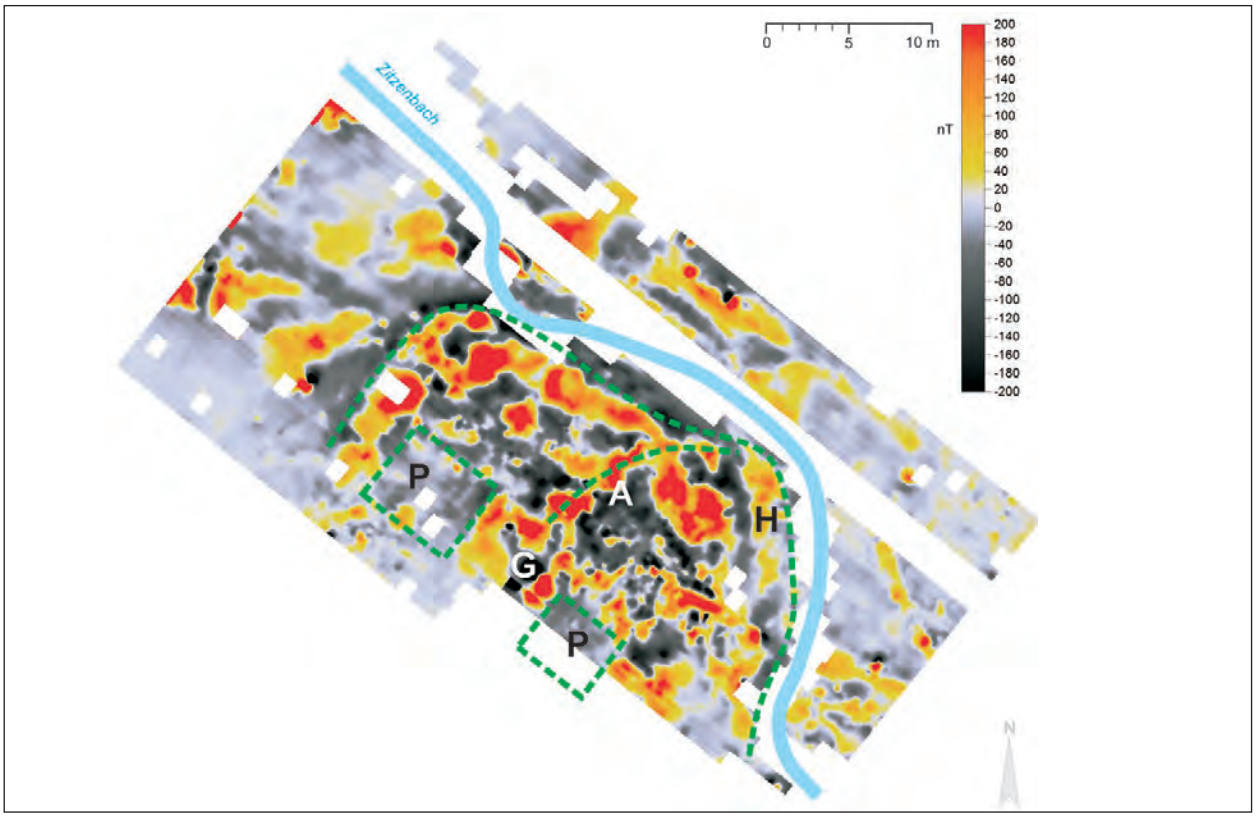


Figure 12: Modern charcoal production in Walpersdorf. Photo: M. Zeiler.

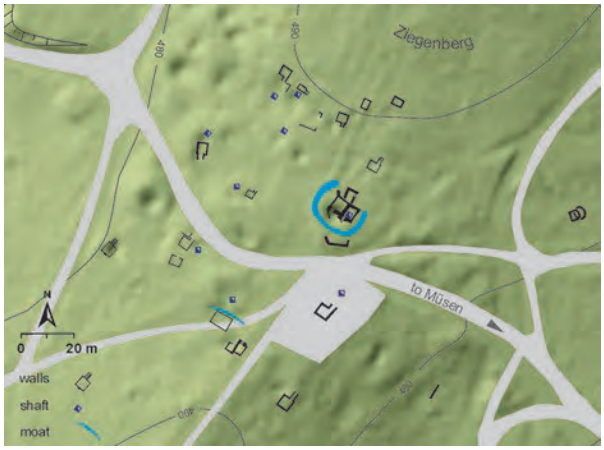


Figure 13: Overview plan of the relief and the ground plans of the excavated structures at Altenberg near Müsen. Illustration: M. Zeiler, excavations based on Dahm, Lobbedey and Weisgerber (1998).

was used later as a quarry, which is why many of the structures have not survived. What remained were massive foundation stones of a building and its tile floor. In the foundation of the building, sherds dated to the 13th century were found. The building was built on a terrace and beside a man-made trench. The upper trench appears to be the headrace for a water wheel, which would have been used to power bellows within the building to force air into the furnace structure. From the furnace structure itself, there are only a few stones with adhering slag. Downhill from the furnace, a slag heap was found, the slag of which is related to copper / non-ferrous metallurgy. Archaeometallurgical analyses are currently being performed.

In addition, the neighboring valley of Zitzenbach, north of Kreuztal-Ferndorf, there appears to be a similar situation. Prospection and geophysical investigations as well as excavations in 2015 revealed evidence of an Iron Age metallurgical site (ferrous) near the stream. Uphill from the stream, a high medieval copper / non-ferrous smelting site was found with a small furnace of the 13th century constructed of stone masonry (Figure 10). Further uphill from the stream, a large copper / non-ferrous smelter was found with ditches probably for a water wheel, but the dating of this site is not confirmed (Figure 11; Zeiler, et al., 2016). The archaeometallurgical analyses of the slag from both copper / non-ferrous metallurgical sites and the results of radiocarbon dating of the foundry are in progress, and these results will be compared to the analyses of the metallurgy at the Altenberg to draw first conclusions about the technology and its development in the 13th century. Based on the design of the furnaces and the presence or absence of water channels, secure dating of these furnaces will help to explore the technological shift from small furnaces to larger furnaces with water-powered bellows.

Charcoal production

Many charcoal pits have been excavated in Siegerland and its surroundings dating to the Early and High Middle Ages. They consist of a small pit (diameter around 1 m) and wood would have been placed in it, buried with earth, and finally set on fire to carborize the wood. Charcoal pits can be found in high concentration near

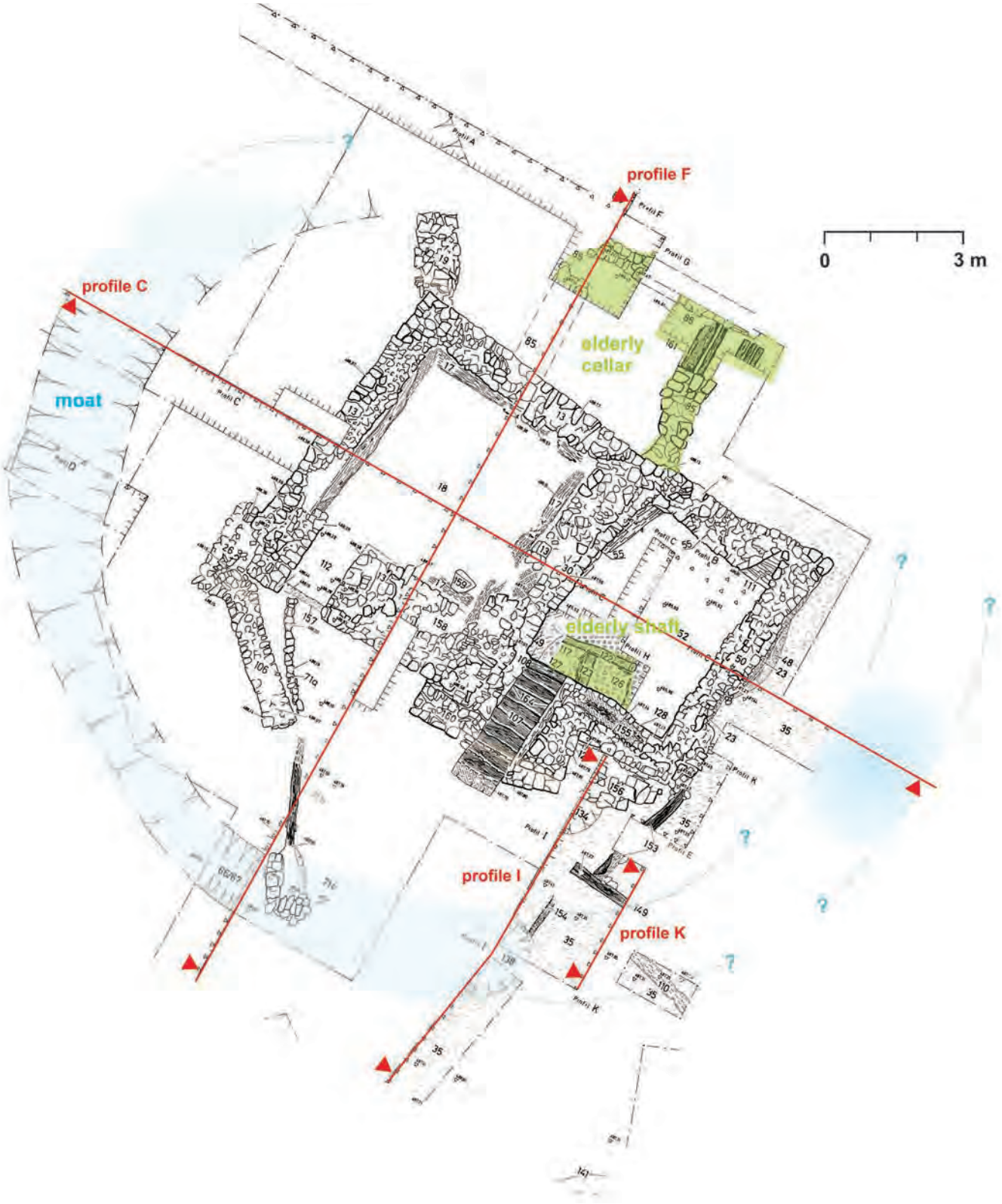


Figure 14: Plan overview of the archaeological structures in the area of the tower (*Fundstelle* 3). Illustration: M. Zeiler.

the iron smelting furnaces (*Rennfeueröfen*) of the Iron Age (Garner, 2010, pp.54-60). In the 13th century, however, there are no known charcoal pits. At the latest in the Renaissance period, charcoal kilns of large dimensions were constructed on artificial terraces, and the large quantities of charcoal could be produced with standardized quality (Figure 12).

Since the 13th century appears to mark a revolution in smelting technology, which led to large foundry with water-powered bellows, the demand for charcoal would have increased. These blast furnaces required much more fuel than the earlier smelting furnaces. It can be inferred that as early as the 13th century charcoal kilns would have been required to fulfill the need for

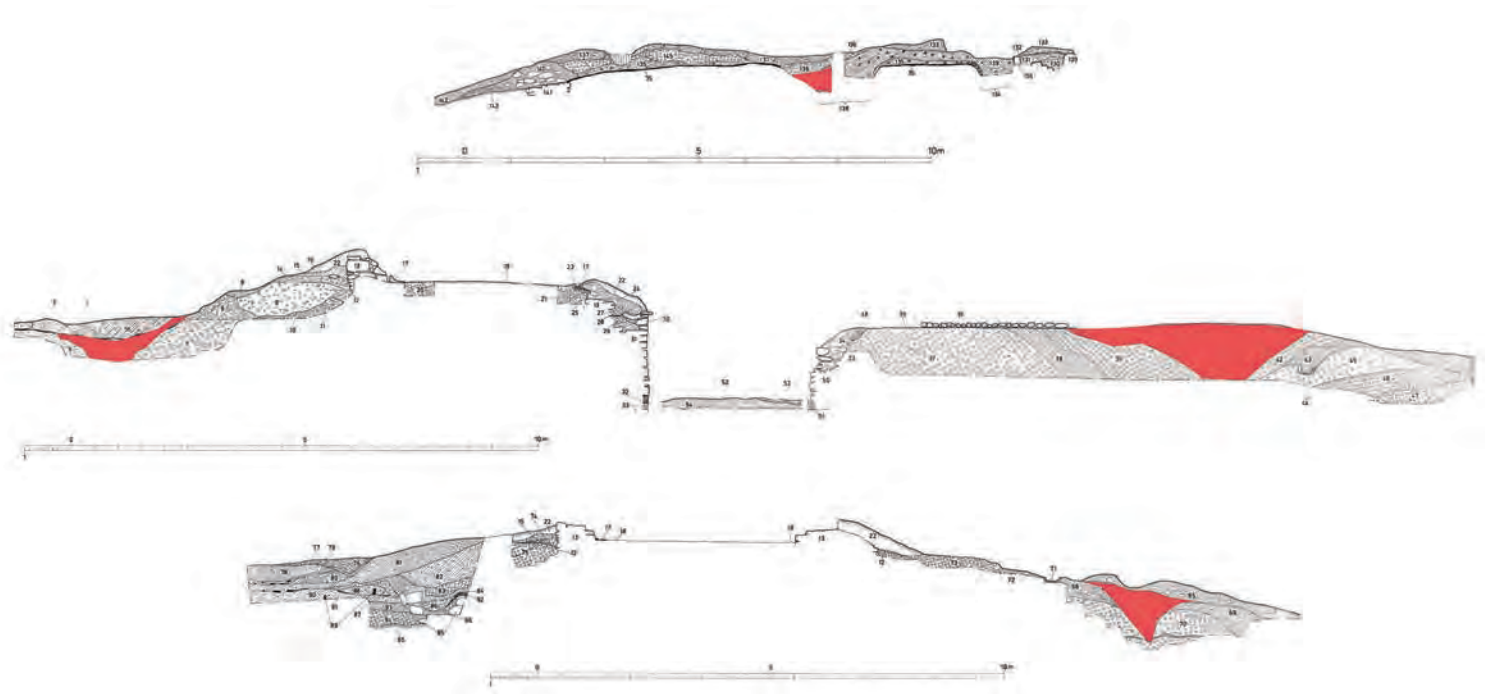


Figure 15: Filled in ditches or moat (red infill) from profiles I, C and F (from top to bottom) which are displayed in Figure 14. Illustration: LWL-Archäologie für Westfalen.

charcoal. In order to prove this hypothesis, systematic prospection and sampling of charcoal kilns is planned, and from the sample material radiocarbon dates will be obtained.

Settlement structures

Already mentioned, the mining settlement of Altenberg near Müsen was the focus of long-term large-scale excavation in the 1970s by Claus Dahm and Uwe Lobbedey (Figure 13). The excavation uncovered a settlement on a pass, and east and west of the settlement are stone quarries. The settlement area lies directly on the above mentioned Altenberger Lode, whose mines (shafts and mine dumps), ore beneficiation areas and the settlement features are closely entwined. Since the publication of the excavation in 1998, major advancements have been made in the study of German medieval archaeology (overview: Smolnik, 2014), and therefore, it makes sense to take another look at this settlement.

The entire site was not excavated, but only a portion. North of the settlement there is an ore beneficiation area and to the east and southeast the isolated structures and surface finds indicate that the settlement continues. The evident buildings were identified primarily by the ten cellars made of stone masonry. Such cellars are mostly known as architecture of the gentry, for example as found in the imperial cities (*Reichsstädte*) (overview: Hurst, 2008). Above the cellars, there is usually a stone masonry and rectangular building whose ground plan is much larger than the cellar. Evidence for tile stoves in the buildings of the Altenberg indicates the wealth of the inhabitants. Other features of the settlement are worthy of mention: The excavations uncovered two large baking ovens (though at first they were not recognized as such) as well as a leather workshop with evidence of shoe making, and, indirectly, the smithing slag found indicates that a blacksmith was working there. Human bones have been found in the filling of a shaft and this means that a graveyard must be close by. The bones are currently being investigated by Gisela Grupe of the Institute of Anthropology and Human Genomics of the LMU Munich.

Today, it can therefore be concluded that this was much more than a meager collection of miners huts in contrast to what older research suggested. The settlement was well outfitted and some of the inhabitants were apparently very wealthy. Because of the compact construction of buildings, some areas of the settlement show that there were problems with space due to the high population density.

The settlement was founded around the year 1200 AD, and from the beginning it was clear that the construction of the settlement and the placement of mine shafts were connected. At the latest, in the middle of the 13th century there was an interruption: the mining installations and buildings at the crest of the settlement were leveled and at this spot a fortified stone masonry structure or tower was built (Figures 14 and 15). This fortifica-

tion was fitted with a moat and controlled the settlement as well as the pass. As well, this fortress was furnished with a tile oven, which is characteristic for the fortifications and castles built by the noble class. The fortress is reminiscent of the central structure found at Düna near Osterode on the edge of the Harz Mountains (Klappauf, 1991, p.128 and 224). There, a small fortress was used to control the mining settlement. Further examples with the combination of mining settlements and fortifications that are contemporary to Altenberg near Müsen can be found in Germany, such as Essen-Rüttenscheid (Hopp and Khil, 2013, pp.6-7), or near the abandoned mines at Fürstenberg (Hoffmann and Balášová, 2014, pp.52-53). An example from the Czech Republic is known from Vyskytná near Jihlava (Hrubý, 2014, p.135).

Several coin hoards were found and a burnt destruction layer that marks the end of the settlement around the year of 1297 AD. It is thought that a catastrophic fire annihilated the settlement, but there is no evidence that the fire was a result of warfare or conflict. After this catastrophe, the ruins of the settlement were used as a quarry for robbing building stones. The settlement as well as the mines were abandoned.

Further settlements in close proximity, besides the still existing town of Müsen, are only known from the historical sources (such as Heiminghausen), but have not been located. Small scale ruins have been identified, however. No medieval settlements comparable to that at Altenberg have been found in the area.

Southwest of the Altenberg, there is the Kindelsberg hillfort on the summit of the mountain with the same name. Excavations in the last century have uncovered a medieval masonry construction, but there was no way to provide a concrete date to the structure. The hillfort could have controlled the entire mining region, and the dating of the fortress is important in understanding the mining landscape. Therefore, the fortress was subjected to coring to recover charcoal for radiocarbon dating, and hopefully in the near future questions about the dating of the hillfort will be answered.

Historical context

Due to the scarcity of historical sources in the High Middle Ages in this area or also for contemporary mines in general, it is only possible to examine the mining areas as part of a larger economic or political territory. Contemporary historical documents could not be found that specifically mention any of the mines or mining settlements. There are some sayings and stories about the mining ruins of Altenberg near Müsen, such as that the

Figure 16: Silver coin (*Pfennig*) from a coin hoard at Altenberg near Müsen: Archbishop Siegfried von Westerburg of Cologne (1275-97), place of minting Attendorn. Photo: H. Menne, LWL-Archäologie für Westfalen.

miners became rich and lost their fear of God and were then subjected to Gods judgement (Dahm, Lobbedey and Weisgerber, 1998, pp.8-15). Parts of these stories can be traces to typical miners stories of the 16th century and are a reflection of centuries of recollections of mining communities become rich through silver. Worthy of mentioning, one of the stories written down in the first quarter of the 18th century indicates that the silver mines were owned by the noble family of Kindelsberg and another document from 1824 said that there was once a town on Altenberg with a gate and a plaza for judiciary purposes (Dahm, Lobbedey and Weisgerber, 1998, pp.8-11). It is apparent that the historical sources mention a settlement with the municipal rights of a medieval town (Viereck, 1998), but it is uncertain if the medieval settlement found on Altenberg is this town. It is conceivable that there was a fortification wall that surrounded the mining village, which it may be possible to prove through archaeological investigations, but a wall is not necessarily a requirement of an officially recognized town.

Who controlled the mining settlement and the mining region? No contemporary historical documents clearly mention a castle on Kindelsberg, which is why it is now discussed as being "the 'novum castrum'" of Nassauian earls, as mentioned in a document from 1255 (Wagener, 2015, pp.94-95). This contradicts Andreas Bingener (2015, pp.133-134) who emphasizes the strong influence of the Cologne archbishops in the regions in and around Siegerland beginning in the 11th century AD (Bingener, 2000, pp.20-21). Additionally, the spectrum of coins found in the previously mentioned coin hoards found at the Altenberg settlement are primarily coins minted by the Cologne archbishop from mints at Attendorn and Siegen (Figure 16). Bingener therefore argues that the silver production in northern Siegerland was

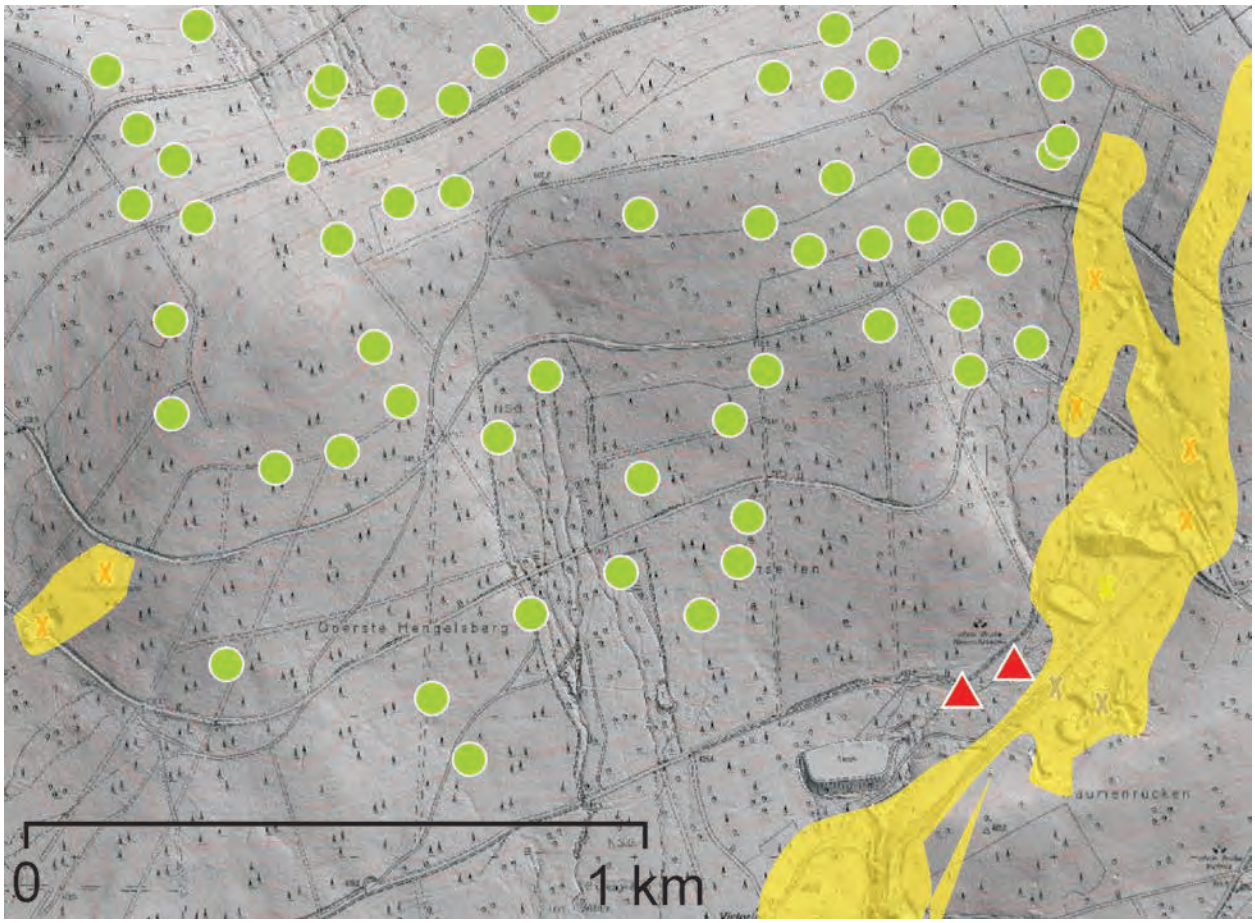


Figure 17: Map of northern detail of the region of focus at area Victoria (Figure 1) with slag heaps (red triangles), charcoal pits (green spots) and lines of Pingen (yellow polygon shapes). Illustration: M. Zeiler using DGM1 NRW base map.

not under the control of the Nassauian nobility, which was a rival of the Cologne archbishops, but that the archbishopric of Cologne was solely granted mineral royalty rights and was thus the true owner of the mines in Siegerland (Bingener, 2000, p.23). The first mention of the granting of mining rights to the Nassauian nobility was in 1298, which is contemporary to the destruction horizon of the mining settlement on Altenberg (Bingener, 2013, pp.132-134).

Conclusions

Up until now, the archaeological work in the region was funded mostly by the financial resources of North Rhine-Westphalia and with the limited budget resources of the cooperation partners. Although generally there are differing objectives of these groups, it was possible to bring several parties together to explore and evaluate medieval mining landscapes. This has led to the discovery of numerous slag heaps and charcoal pits and the identification of further elements of the settlement and mining ruins of Altenberg (for example Figure 17). Archaeological excavations were carried out in six locations, four of which were first surveyed with geophysical prospection techniques. Two mines were investigated both above and underground. Through the re-evaluation of the mining ruins at Altenberg near Müsen using current archaeological methods, new conclusions about the settlement are already being formed. The investigation of mining archives has brought valuable new insights into the identification of potential medieval mines that were encountered during post medieval mining phases.

The foundations for this ongoing study are either in their infancy or have not even begun yet. The archaeometallurgical investigation of slag and furnace features from smelting sites and the analysis of minerals / ore samples from smelting sites and mines are currently underway and will provide a basis for the understanding of the mining and smelting technology. The dating of numerous charcoal samples from the various charcoal pits may provide evidence for a high medieval charcoal industry in the region. The dating of charcoal from Kindelsberg will give concrete dates of the use of the hill-

fort for the first time. Anthropological investigations are planned to study the human remains from the Altenberg near Müsen settlement to give us some insights into the origin and health of the inhabitants. Most importantly, the combination of archaeometry, archaeology, and the historical record will be used to produce a new awareness of mining in the region. The use of archaeology and archaeometry can supplement the historical record, but the combination of techniques can also be used to formulate new hypotheses.

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