The Ancient Quarrying and Mining District between the Eifel and the Rhine – a Summary of Research

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The district between Mayen on the edge of the Eifel and the river Rhine in the federal state of Rheinland-Pfalz has been of outstanding economic significance since prehistoric times. The products – primarily basalt lava saddle querns and later on millstones (fig. 1), tuff stone for building, and pottery – were traded throughout much of Europe. Therefore, the district has been the subject of research by the Römisch-Germanisches Zentralmuseum (RGZM) in Mainz and Mayen since 1997. A comprehensive research programme named "The origin and formation of an industrial landscape – the ancient quarrying and mining district between the Eifel and the Rhine" was launched to examine the wealth of evidence about the ancient mining economy in the region and its effects on settlement structure. At the same time the Vulkanpark Osteifel was created, which was devised both to protect and investigate the local heritage and to present it to the public.[1]

Fig. 1: Roman hand mill in use.

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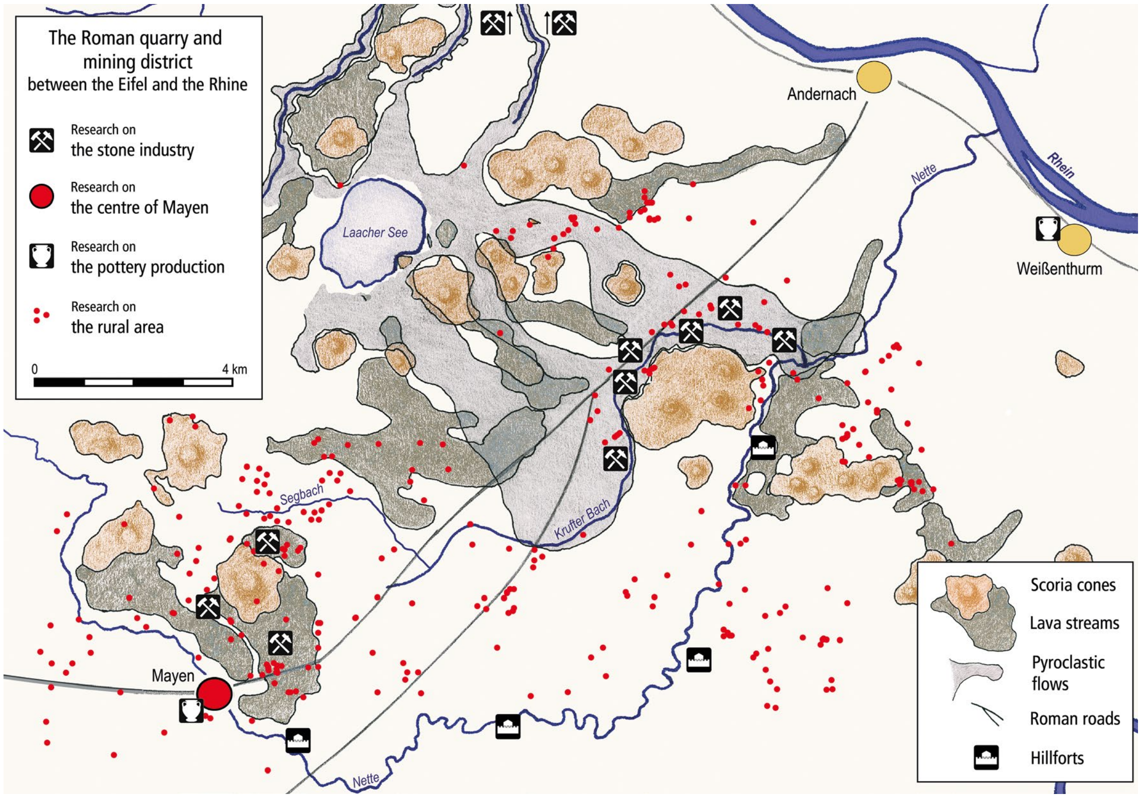

Fig. 2: The ancient quarrying and mining district between the Eifel and the Rhine.

Formation of the Raw Materials

The area west of the confluence of the rivers Rhine and Moselle (fig. 2) comprises much of the quaternary Eastern Eifel Volcanic Field with approximately 100 volcanoes.[2] Most of them are scoria cones that erupted about 400.000 and 200.000 years ago. Some produced molten lava streams. These cooled to form basalt lava deposits.

The highly explosive eruption of the Laacher See Volcano approximately 13.000 years ago is thought to have been the largest in the recent geological history of central Europe. During the eruption pyroclastic flows filled the bordering Brohl and Krufter Bach valleys. They cooled to leave tuff deposits up to 35 m thick. Wherever the powdery tuff subsequently came into contact with water, it solidified as tuff stone.

The region also possesses equally significant non-volcanic raw materials. The bedrock of the region is Devonian slate.[3] It is well suited for roofing and has been exported from the region ever since Roman times. Iron and lead ores are also of economic significance. Clay deposits[4] are mainly found on the left bank of the Rhine[5] and in the Mayen basin.[6]

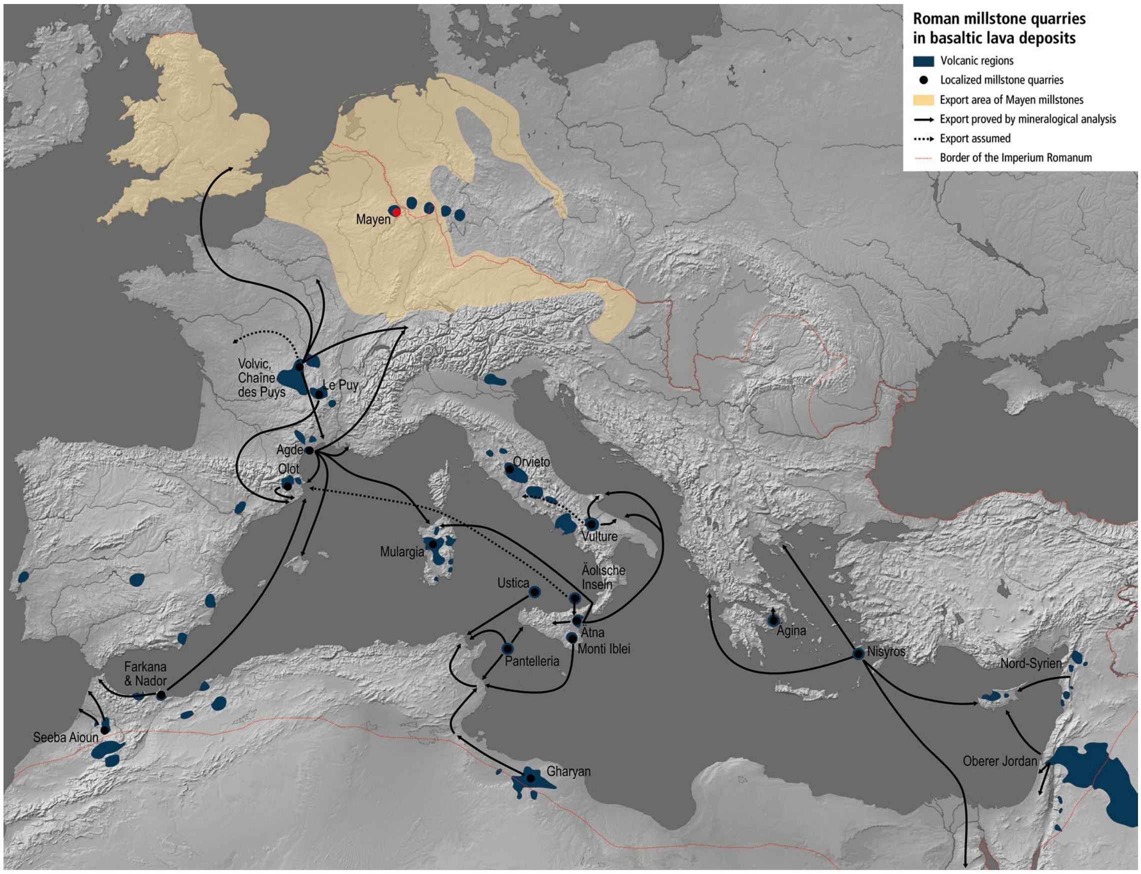

Fig. 3: Export area of basalt millstones in the Roman period, after F. Mangartz.

Ancient Industries

Among the branches of the stone industry, basalt quarrying has the longest tradition. Neolithic farmers were the first to detect the special quality of the basalt lava for the essential task of preparing cereals for consumption.[7] Some 7000 years ago, the first grain grinding stones were produced from the lava flows of the Bellerberg volcano near Mayen (fig. 2). The quality of the stone and the proximity of the river Rhine meant it was traded outside the region from an early date on. The introduction of the rotary mill during the Iron Age led to further expansion.[8] This technology transfer had an immense impact on the development of the mining district.

So, in the Roman period Mayen millstone became a leading export[9] throughout much of northwestern Europe (fig. 3). The Roman quarries around the Bellerberg volcano developed into the largest millstone production works north of the Alps. They were worked as opencast mines and systematically separated into parcels. In the years 1999–2000, Fritz Mangartz excavated one of the rare parcels, which are still preserved amid the modern mining areas. Both the estimated output and

Fig. 4: The so-called Ubiermoument in Cologne was part of the Augustian city fortification.

numbers of workers soared between the Late Iron Age and Roman times.[10] One reason for this was that the Roman state wasted no time in adopting the high-quality Mayen millstones.[11] Mineralogical analyses of millstones from the forts on the river Lippe and from the Augustan town of Waldgirmes in the federal state of Hesse reveal they were ordered to supply the Roman army during Augustus' Germanic campaigns.[12] This means the district received a major order, which promoted its economic development noticeably.

Another significant raw material is tuff stone, which was used as a building stone.[13] Since north of the Alps there is no pre-Roman evidence of it, it is likely that the tuff stone deposits were detected by specialists of the Roman army, who easily recognized the tuff as a stone known from the Vesuvius region. Again it was the emperor Augustus who impelled the economic use. Stone analyses[14] reveal that the local tuff stone was used to build the "Ubiermonument" in Cologne (fig. 4). This

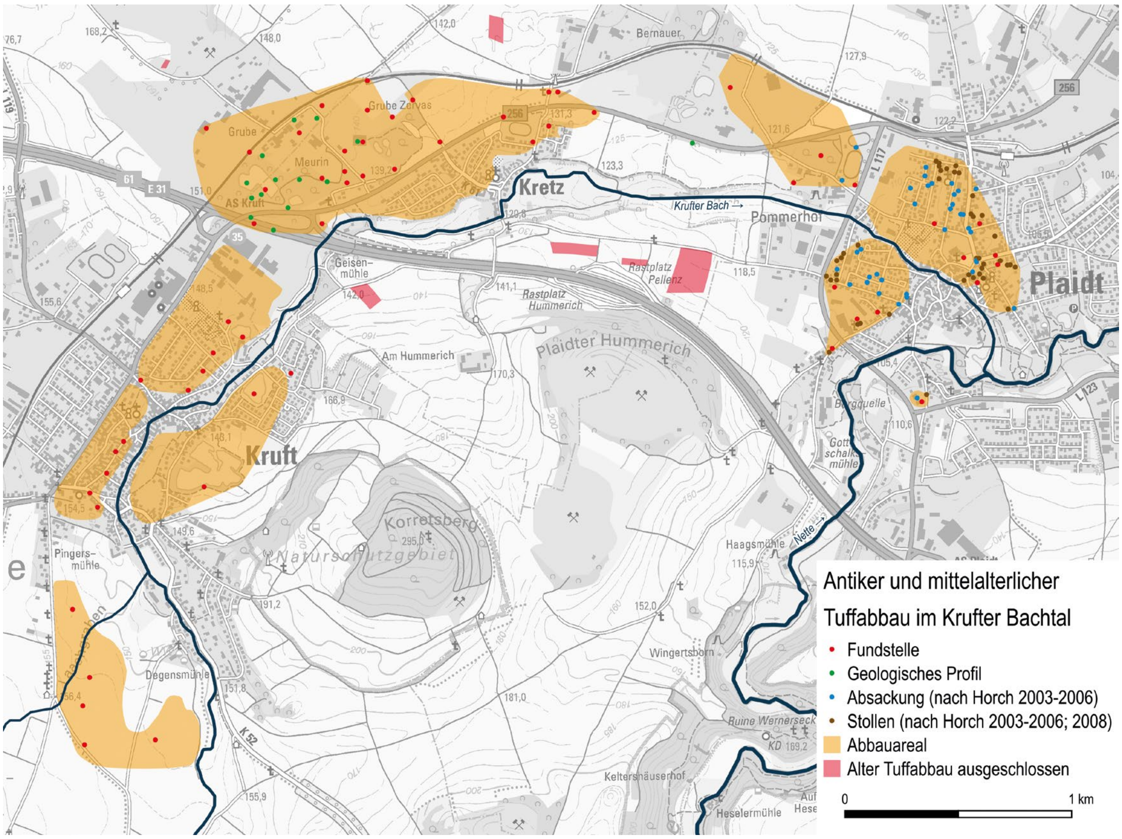

Fig. 5: The tuff mining area of Krufter Bach valley in detail. The red dots mark archaeologically confirmed mining sites, after Schaaff 2015.

tower was erected about 4–6 AD and is thought to be the oldest stone building in Roman Germany. It was part of the city wall of the *oppidum Ubiorum*, the earliest settlement on the site of what was later to be Cologne.[15] So the working of tuff stone marks the introduction of stone architecture north of the Alps. Later in the Roman period, the tuff stone of the Laacher See volcano was used in towns and forts along the Rhine, e.g. in the *Colonia Ulpia Traiana* near Xanten or in the Late Roman fort of *Divitia* in Cologne-Deutz. Total tuff production in the Roman period is estimated at approximately 2 million metric tons.[16]

Tuff stone was mined and the workings of the Krufter Bach valley have been examined in detail (fig. 5). Holger Schaaff excavated an area of 2500 m^2, which today is presented to the public under the name of Römerbergwerk Meurin (fig. 6). In many cases the military was in charge of its extraction. So, along with the tuff stone quarrying came the arrival of numerous quarry workers from the ranks of the military. Up to the times of Hadrian they left a great number of dedication inscriptions in sanctuaries amid the quarrying areas (fig. 7).[17] Besides the military mines, civilian enterprises were producing cremation ashes boxes made of tuff at the latest in the Tiberian era.[18]

Fig. 6: "Römerbergwerk Meurin", Roman tuffstone mine.

Comparing the basalt and tuff productions, several differences become clear. While basalt quarrying looks back on an indigenous tradition from the early Neolithic, tuff mining was unknown until the Roman occupation. The required knowledge about tuff stone came via technology transfer from the Mediterranean. Basalt was worked by civilian workers, tuff in most cases by the Roman army, at least in the beginning. The products as well differ very much from each other. The basalt saddle querns and millstones were essential for every-day use. That is why the production in the basalt quarries was ongoing. Tuff stone was a building material, which had to be provided at any time when building projects required it. Therefore the tuff mining was dynamic, performing a "just in time" production.

Pottery production is another significant ancient trade branch. The clay deposits had been exploited locally since pre-Roman times but it was not until the Roman period that they took on importance beyond the region. The potter's workshops at Weißenthurm on the Rhine (fig. 2) produced Urmitz Ware that supplied numerous forts on the *limes* in *Germania superior* until the middle of the 3rd century AD. The discontinuation of the production used to be attributed to the decline of the *limes*. Recent research[19], though, has shown that production continued at least into the first half of the 4th century. In the potter's workshops of Mayen, production increased from the Late Roman period onwards and long-distance trade developed which persisted to the Middle Ages.[20] Mineralogical analyses now make it possible to define the area over which the products were exported.[21]

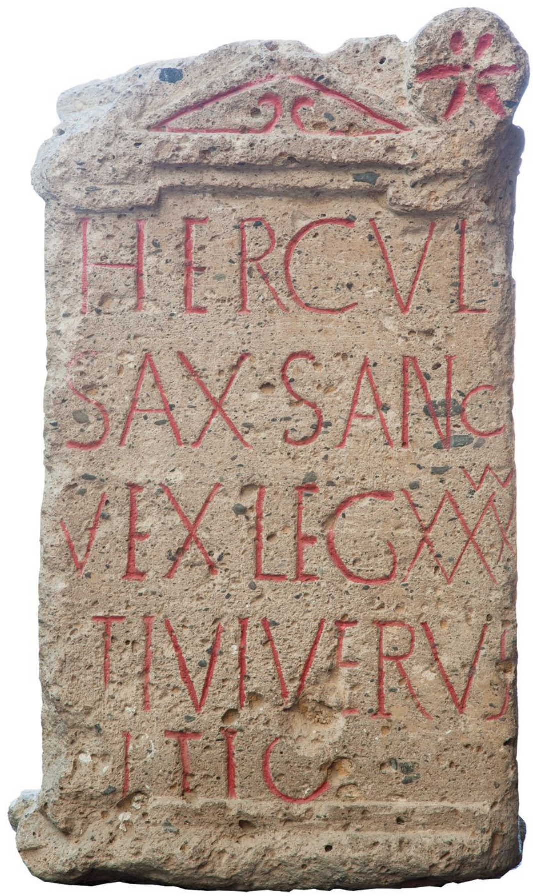

Fig. 7: Tuffstone altar dedicated to Hercules Saxanus.

The Mayen *vicus* – the Economic Centre of the District

From the Late Iron Age, the economic centre of the region was the *vicus* of Mayen.[22] It was located in a shallow basin astride the small river Nette. The nearest Roman basalt quarries lie at a distance of 500–800 m.[23] A group of seven millstone workshops was found within the *vicus*, where the half-worked millstones were brought for finishing.[24] The location of the millstone workshops on the opposite riverside from the quarries seems surprising at first. But on closer inspection, it becomes clear that they were concentrated in a limited area near the river Nette. So it is likely that after being transported from the quarries and completed in the *vicus*, the millstones were carried down the river Nette for sale.[25] The Roman potters' workshops are located east of the river Nette.[26] Metal processing and other crafts are represented locally.

The transformation of the indigenous settlement into a Roman *vicus* took place at the same time as the surge in millstone sales triggered by Augustus' Germanic campaigns. In order to handle the increasing workload, the population must have increased as well. In the Mayen *vicus* cemetery, Martin Grünewald observed the arrival of a group practicing Mediterranean burial rites for the early Flavian period.[27] The population of the *vicus* may be estimated, by comparison with the 19th century situation and with regard to the number of workers in the stone industry, at approximately 2000 or 2500 inhabitants.[28] That number remained stable until the 5th century at least.

In Late Antiquity, pottery production became a significant factor of the economy, especially after the warring incidents of 355 AD.[29] At this time the river Nette was protected by a string of four military hill forts (fig. 2).[30] Upstream, the string ends with the hill fort on Katzenberg, approximately 2 km southeast of the *vicus*. From about 300 AD to the middle of the 5th century, this fortification guaranteed the continuing production and distribution of the export goods.[31]

Rural Settlement in the Mining District

Two studies have been undertaken in order to determine whether the particular industrial character of the region influenced the rural settlement pattern (fig. 2). One compiles the Roman settlement sites in the vicinity of the basalt quarries and the Mayen *vicus*;[32] the other focuses on Roman settlement in the vicinity of the tuff stone mines.[33] In addition, the Segbach valley north of Mayen was explored as a case study, in order to find out how Roman agriculture enabled the industrial booms and what the effects on the environment were.[34]

Viktoria Baur found that the architecture and the grave finds indicate remarkable prosperity around Mayen. There is especially an extraordinary density of rich *villae*[35], which would be unusual in other regions.[36] Among them is the so far unexcavated axial *villa* of "Fraukirch". Known exclusively from aerial views, it has a walled courtyard area of 5.7 ha. The main building faces at least 12 adjoining buildings arranged in two rows. But *villae* of ordinary size as well show features which indicate prosperity, such as mural paintings, mosaics and plasterwork. In general, the rural settlement grew continuously from the Late La Tène period to the 2nd century AD. During the crisis in the 3rd century, the rural area around Mayen appears to have been only marginally affected by destructions. As in the Mayen *vicus*, there are indications of continuous development into the Early Middle Ages.[37]

Not far away, Segbach valley lies on the northern edge of the millstone quarry area amid the lava flows of the Bellerberg volcano. Prospecting and excavation focused on the "Lungenkärchen" and "Im Winkel" *villae*. The well-known settlement site of "Lungenkärchen" (fig. 8) has been recognised by Martin Grünewald as another axial *villa* that attests to considerable prosperity.[38] The complex consisted of a 73 m-long main building with a 40 m-long water basin in front and six outbuildings. Tomb monuments of the landowners were found nearby.[39] Surface finds range from pottery of the late La Tène period or early Imperial times to the second half of the

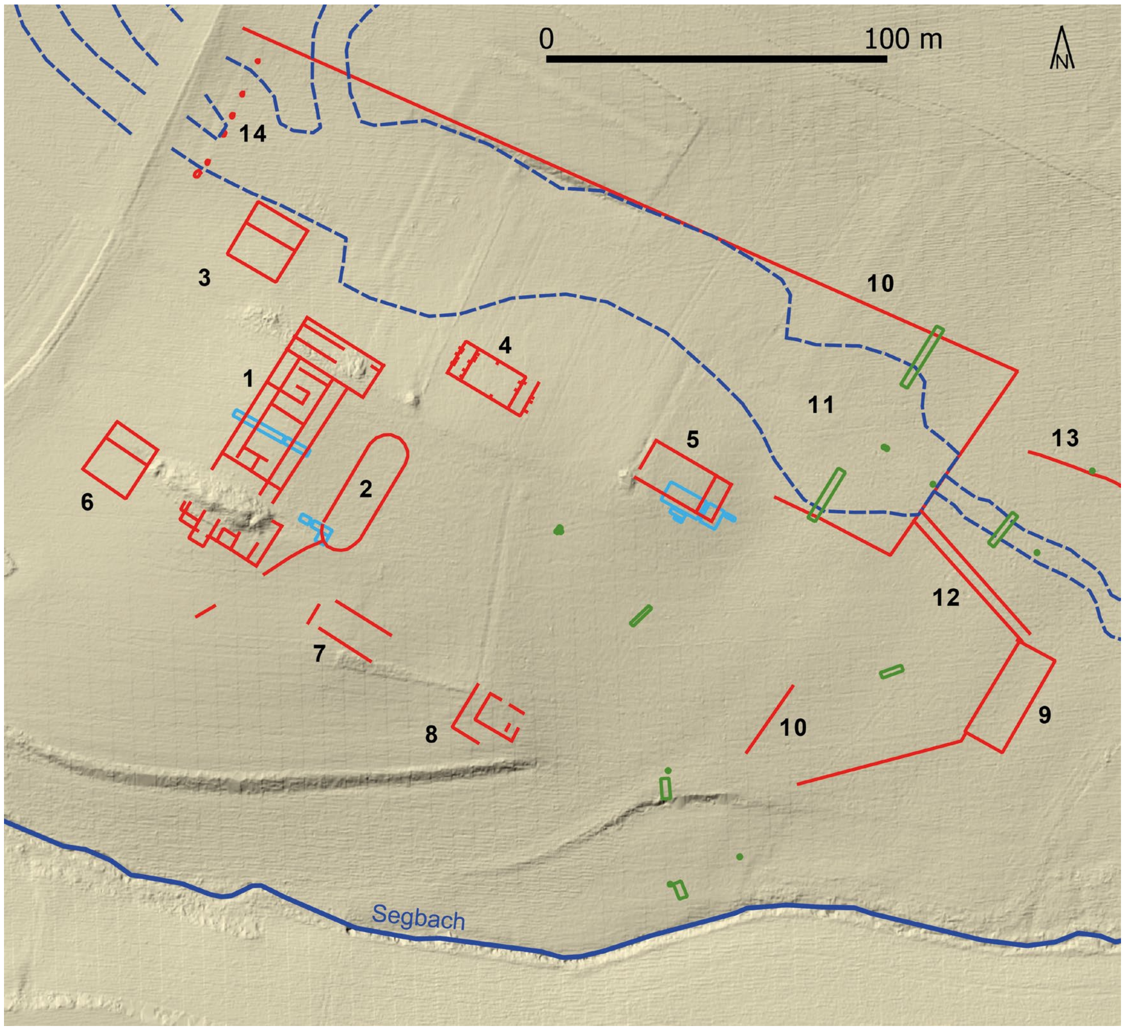

Fig. 8: Mendig, "Lungenkärchen", plan. Archaeological trenches (blue), geoarchaeological trenches (green). 1 main building; 2 ornamental pool; 3-8 annex buildings; 4 *horreum* (?); 5 stabling; 9 mill (?); 10 courtyard border; 11 reservoir (?); 12–13 mill channels (?); 14 aqueduct (?).

5th century. The *villa* worked an area of 100–120 ha.[40] As the proportions of the *pars urbana,* the *pars rustica* and the agricultural land indicate,[41] agriculture was not the sole economic basis of the *villa.* The owners had access to the rubble of the millstone quarries, which they used for construction. This suggests that the *villa* owners were also owners of millstone quarries.

The medium-sized "Im Winkel" *villa* was located just north of the millstone quarries.[42] Here, Stefan Wenzel determined an economic area of 46 ha.[43] The settlement existed from the Early Imperial period to the second half of the 5th century. 21 quern roughouts from the cellar of the main building show that its inhabitants, too, had access to the rubble of the quarries outside their front door. Stone waste from the quarries with discarded Late La Tène and Roman quern rough outs were found close to the settlement site.[44] This means the inhabitants of the *villa* were involved in the production of millstones. The *villa* burnt down in the second half of the 3rd century, but settlement on the place continued.

Around 300 AD,[45] a *burgus* was erected on a hill nearby and drains were created on an area next to that. According to the architecture and finds of military equipment, the *burgus* was a defensive structure with a military occupation;[46] at the same time it was a *horreum.*[47] Inside, a purified stock of dehusked spelt has been found.[48] Approximately 80 t of spelt could be stored in the *burgus.* So it could store far more cereals than the holding of the former *villa* could produce. If the per capita consumption was 1 kg spelt per person per day, as assumed for wheat,[49] this stock would have been sufficient for the daily rations of 218 people for one year. Presumably, the *burgus* secured the supplies for the workers of the nearby millstone quarries. Accordingly, millstone extraction must have continued at least up to the first third of the 5th century.[50] Extracted millstones could be stored on the drained area next to the *burgus* before being transported on the Segbach.[51]

A particularly striking connection arises also between other *villae rusticae* and the millstone quarries. Millstone roughouts occur at the well investigated sites of "Narrenborn", "Steinrütsch", and "Fraukirch", where they are used partly in the buildings' foundations.[52] This suggests that especially the more wealthy estates were inhabited by the quarry owners or quarry administrators.

As Ricarda Giljohann found, the fertile basin landscape in the vicinity of the tuff stone quarries was continuously inhabited from the late La Tène to the 5th century. Expensive tomb monuments made of Lorraine limestone indicate extraordinary wealth and a high degree of Romanization already in the middle of the 1st century AD.[53] Prestigious mansions are recognisable from the presence of tomb monuments, Jupiter's giant columns, *tumuli* with *dromos*[54] and also from qanat water conduits. For the most part, the water pipelines were found near the mining area and the rich graves were found directly within the mining area, so it is obvious that the extraction of and trade in tuff stone was the basis of the economy alongside agriculture. Two settlement sites, which are surely related to the processing of tuff stone, were excavated.[55] In the southeastern part of the Neuwied basin, *villae* are invariably simpler than in the tuff mining area.[56]

The region was affected by the political crisis of the 3rd century, but there was no final break-up of settlements. In the times of crisis and in years with crop failures, grain had to be imported from Britain. In the middle of the 4th century, large storage buildings were erected in Andernach, which ensured the continuity of the ceramic and stone industry.[57] The rural settlement returned to prosperity from Valentinian times onwards. The richest sarcophagus burials are found again in the mining area.[58]

How to Define Pre-modern Industries

Finally, we should turn to the question which criteria are characteristic for pre-modern industries. Undoubtedly, the first feature is a high quantity of the production. Millstones, building material and ceramic vessels were manufactured in an amount distinctly exceeding the local or regional demand. Furthermore, a standardised production process can be observed. Millstone manufacturing followed a determinate chaîne opératoire, beginning in the quarries and continuing in special workshops. Tuff blocks were produced in a technique, which is clearly visible by the working traces in the Roman mines. The third criterion is a supra-regional distribution of the goods. In the Roman period Mayen millstones provided a marketing area, which extended from Britain to the Alps. Along with the mills, in the same cargos pottery vessels seem to have been transported. Tuff stone from the district was used for building projects especially in Germania inferior where there was a lack of rocks. In the Middle Ages tuff stone trade reached to northern Germany and Denmark.

Certain preconditions are necessary to make an industrial development possible. The first, of course, is the availability of high-quality raw materials. The district's mineral deposits, volcanic and non-volcanic, guaranteed an enduring supply. But deposits and production sites also must be located in a favourable position. This is the case here in an open landscape close to the confluence of the rivers Rhine and Moselle. Further, to benefit from the above-named preconditions, a good infrastructure is essential. Besides the waterways, several important Roman roads run through the district.

In combination these criteria and preconditions can produce a development that leads to pre-modern industries. As we have seen, several factors reinforce the development, such as technology transfers, cultural change and, last but not least, the involvement of economy and power.

Notes

[1] Hunold – Schaaff 2010; Hunold 2011a.

[2] Steingötter 2005; Schmincke 2007; Schmincke 2008.

[3] Steingötter 2005, 301; Hunold et al. 2004.

[4] Steingötter 2005, 297.

[5] Friedrich 2012b.

[6] Redknap 1999, 52.

[7] Holtmeyer-Wild 2000; Mangartz 2006; Mangartz 2008, 6–10. 24–29.

[8] Mangartz 2008, 40–52; Wefers 2012a.

[9] Mangartz 2008, 52–107. 196; Mangartz 2012.

[10] Mangartz 2008, 93–97.

[11] Schaaff 2010.
[12] Gluhak 2010; Gluhak 2012; Wefers 2012b.
[13] Schaaff 2012; Schaaff 2015.
[14] Gluhak et al. 2012; Geisweid 2018.
[15] Trier 2014.
[16] Schaaff 2015, 193–199.
[17] Schaaff 2010; Schaaff 2015, 165–183. 201–211.
[18] Giljohann 2017, 140–141.
[19] Friedrich 2012a; Friedrich 2012b; Friedrich 2015; Gluhak et al. 2012, 40–45; Sibylle Friedrich in this volume.
[20] Grunwald 2012; Grunwald 2015; Grunwald 2016; Lutz Grunwald in this volume; Gregor Döhner – Michael Herdick – Anna Axtmann in this volume.
[21] Gluhak et al. 2012, 40–45.
[22] See Lutz Grunwald in this volume fig. 2; Oesterwind 2012; Glauben 2012; Köstner 2012.
[23] Mangartz 2012, 2–4.
[24] Mangartz 2008, 74–75; Glauben 2012, 89–90.
[25] See Stefan Wenzel in this volume.
[26] Redknap 1999, 23; Glauben 2012, 92–94; Grunwald 2012, 112–116.
[27] Grünewald 2011, 140–141. 199–201; Glauben 2012, 92.
[28] Hunold 2011b, 274–275.
[29] Grunwald 2016.
[30] Hunold 2011b, 284–294.
[31] Hunold 2011b; Hunold 2012.
[32] Baur 2012; Baur 2014.
[33] Giljohann 2012; Giljohann 2017.
[34] Giljohann et al. 2017.
[35] Baur 2012, 242–243; Grünewald 2012, 170–174.
[36] Henrich – Mischka 2012, 334–335 fig. 6.
[37] Baur 2014, 145.
[38] Grünewald 2012; Giljohann – Grünewald forthcoming.
[39] Grünewald 2012, 162; Oesterwind – Wenzel 2012, 358 No. 43; Giljohann – Wenzel 2015, 25–27.
[40] Grünewald 2012, 171–172.
[41] Roymans – Habermehl 2011, fig.1; Grünewald 2012, 172–173.
[42] See Stefan Wenzel in this volume fig. 5.
[43] Wenzel 2012, 154 fig. 17; Wenzel forthcoming.
[44] Dotterweich et al. 2012, 198 fig.12; Wenzel et al. forthcoming.
[45] Wenzel – Zerl 2014, 184; Chameroy 2012, 227.
[46] Wenzel 2012, 144 fig. 12, 1–6.
[47] Ferdière 2015, 25 no. 99.
[48] Zerl 2012; Wenzel – Zerl 2014, 186–192.
[49] Rothenhöfer 2005, 56; Junkelmann 2006, 66.

[50] Cf. Henning et al. forthcoming.
[51] Wenzel 2012, 146–150; Wenzel 2014; Dotterweich et al. 2012, 193–198; Stefan Wenzel in this volume.
[52] Baur 2014; Giljohann et al. 2017.
[53] Scholz 2012, 39.
[54] Henrich – Mischka 2012, 328–329.
[55] Giljohann 2017, 11–13. 35.
[56] Giljohann 2017, 15–17. 157–158.
[57] Brückner 1999, 131.
[58] Giljohann 2017, 145–151. 158.

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References

Baur 2012
V. Baur, Die ländliche Besiedlung im Umfeld der Basaltsteinbrüche und des vicus von Mayen (Lkr. Mayen-Koblenz) in römischer Zeit, in: Grünewald – Wenzel 2012, 235–246.

Baur 2014
V. Baur, Die ländliche Besiedlung des römischen Industriereviers Mayen (Diss. University of Cologne 2014) <https://kups.ub.uni-koeln.de/9103/> (25.1.2019).

Brückner 1999
M. Brückner, Die spätrömischen Grabfunde aus Andernach, Archäologische Schriften des Instituts für Vor- und Frühgeschichte der Johannes Gutenberg-Universität Mainz 7 (Mainz 1999).

Chameroy 2012
J. Chameroy, Fundmünzen aus Mendig, in: Grünewald – Wenzel 2012, 225–233.

Dotterweich et al. 2012
M. Dotterweich – S. Wenzel – R. Schreg, Landschaftsentwicklung seit der Römerzeit im westlichen Segbachtal bei Mayen (Lkr. Mayen-Koblenz) in der Osteifel. Erste Teilprojektergebnisse des DFG-Projekts ›Zur Landnutzung im Umfeld eines römischen Industriereviers‹, in: Grünewald – Wenzel 2012, 181–206.

Ferdière 2015
A. Ferdière, Essai de typologie des greniers ruraux de Gaule du Nord, RACFr 54, 2015, (online) <http://journals.openedition.org/racf/2294> (21.3.2016).

Friedrich 2012a

S. Friedrich, Die römischen Töpfereien von Weißenthurm am Rhein (Lkr. Mayen-Koblenz) und ihr Umland, in: Grünewald – Wenzel 2012, 263–278.

Friedrich 2012b

S. Friedrich, Die römischen Töpfereien von Weißenthurm am Rhein (Landkreis Mayen-Koblenz), in: P. Henrich (ed.), Der Limes vom Niederrhein bis an die Donau. 6. Kolloquium der Deutschen Limeskommission, 15./16. März 2011 in Mainz, Beiträge zum Welterbe Limes 6 (Stuttgart 2012) 38–47.

Friedrich 2015

S. Friedrich, Die römischen Töpfereien von Weißenthurm am Rhein, in: L. Grunwald (ed.), Den Töpfern auf der Spur. Orte der Keramikherstellung im Licht der neuesten Forschung. 46. Internationales Symposium Keramikforschung des Arbeitskreises für Keramikforschung und des Römisch-Germanischen Zentralmuseums Mainz vom 16. bis zum 20. September 2013 in Mayen, RGZM-Tagungen 21 (Mainz 2015) 27–35.

Geisweid 2018

J. Geisweid, Geowissenschaftlich-archäometrische Untersuchung zur Provenienzbestimmung von Tuffen der Osteifel und deren Verwendung in römischer und mittelalterlicher Zeit (Boppard 2018).

Giljohann 2012

R. Giljohann, Zur ländlichen Besiedlung im Umland der Tuffbergwerke zwischen Andernach und Mayen (Lkr. Mayen-Koblenz) in römischer Zeit. Ein Vorbericht zur Besiedlungsentwicklung in einer antiken Industrielandschaft, in: Grünewald – Wenzel 2012, 247–262.

Giljohann 2017

R. Giljohann, Die römische Besiedlung im Umland der antiken Tuffbergwerke am Laacher See-Vulkan, Monographien RGZM 140, Vulkanpark-Forschungen 12 (Mainz 2017).

Giljohann – Grünewald forthcoming

R. Giljohann – M. Grünewald, Chronologischer Abriss zu der Villa in Axialhofanlage von „Lungenkärchen“ bei Mendig (Lkr. Mayen-Koblenz), in: R. Giljohann – S. Wenzel (eds.), Römische Landnutzung im Segbachtal bei Mayen. Siedlungen am Nordrand der Mayener Mühlsteinbrüche, Monographien RGZM (forthcoming)

Giljohann – Wenzel 2015

R. Giljohann – S. Wenzel, Verwendung und Verbreitung von Lothringer Kalkstein zwischen Andernach und Mayen in römischer Zeit, Berichte zur Archäologie in Rheinhessen und Umgebung 8, 2015, 19–39.

Giljohann et al. 2017

R. Giljohann – A. Hunold – S. Wenzel, Rural Life and Industry between the Eifel and the Rhine, in: M. Reddé (ed.), Gallia rustica 1. Les campagnes du nord-est de la Gaule, de la fin de l’âge du Fer à l’Antiquité tardive, Ausonius Mémoires 49 (Bordeaux 2017) 125–152.

Glauben 2012

A. M. Glauben, Der vicus von Mayen (Lkr. Mayen-Koblenz). Alte Grabungen und neue Forschungen, in: Grünewald – Wenzel 2012, 87–98.

Gluhak 2010
T. Gluhak, Mühlen für das römische Militär. Geochemische Herkunftsanalysen von Mühlsteinen aus den augusteischen Lagern Haltern, Oberaden, Anreppen und Barkhausen, AKorrBl 40, 2010, 273–284.

Gluhak 2012
T. Gluhak, Provenienzanalysen der Handmühlen aus Hedemünden, in : K. Grote (ed.), Römerlager Hedemünden. Der augusteische Stützpunkt, seine Außenanlagen, seine Funde und Befunde, Veröffentlichungen der archäologischen Sammlungen des Landesmuseums Hannover 53 (Dresden 2012) 235–240.

Gluhak et al. 2012
T. Gluhak – J. Geisweid – W. Xu, Mineralogische Untersuchungen von Basalt, Tuff und Keramik als Erkenntnismittel für römische Landnutzung und Wirtschaftsstrukturen, in: Grünewald – Wenzel 2012, 25–47.

Grünewald 2011
M. Grünewald, Die römischen Gräberfelder von Mayen, Monographien RGZM 96, Vulkanpark-Forschungen 10 (Mainz 2011).

Grünewald 2012
M. Grünewald, Reiche Steinbruchbesitzer? Die villa in Axialhofanlage von „Lungenkärchen“ bei Mendig (Lkr. Mayen-Koblenz) im Kontext der römischen Landnutzung, in: Grünewald – Wenzel 2012, 159–179.

Grünewald – Wenzel 2012
M. Grünewald – S. Wenzel (eds.), Römische Landnutzung in der Eifel – neue Ausgrabungen und Forschungen. Tagung in Mayen vom 3. bis zum 6. November 2011, RGZM-Tagungen 16 (Mainz 2012).

Grunwald 2012
L. Grunwald, Die römischen und frühmittelalterlichen Töpfereien von Mayen (Lkr. Mayen-Koblenz). Eine zwischenzeitliche Standortbestimmung, in: Grünewald – Wenzel 2012, 111–129.

Grunwald 2015
L. Grunwald, Produktion und Warendistribution der Mayener Ware in spätrömischer und frühmittelalterlicher Zeit, in: C. Later – M. Helmbrecht – U. Jecklin-Tischhauser (eds.), Infrastruktur und Distribution zwischen Antike und Mittelalter. Tagungsbeiträge der Arbeitsgemeinschaft Spätantike und Frühmittelalter 8. Studien zu Spätantike und Frühmittelalter 8 (Hamburg 2015) 191–207.

Grunwald 2016
L. Grunwald, Mayen in der Eifel und die Herstellung der »Mayener Ware« von der Mitte des 4. bis in die erste Hälfte des 6. Jahrhunderts, AKorrBl 46, 2016, 345–361.

Henning et al. forthcoming
J. Henning – M. McCormick – T. Fischer, Decem Pagi at the End of Antiquity and the Fate of the Roman Road System in Eastern Gaul, in: P. Bidwell (ed.), Proceedings of the XXI International Limes (Roman Frontiers) Congress 2009 at Newcastle upon Tyne, BARIntSer (forthcoming).

Henrich – Mischka 2012
P. Henrich – C. Mischka, Römische Villen in der westlichen Vulkaneifel. Untersuchungen zur regionalen Raumplanung, in: Grünewald – Wenzel 2012, 327–342.

Holtmeyer-Wild 2000
V. Holtmeyer-Wild, Vorgeschichtliche Reibsteine aus der Umgebung von Mayen. Reibsteine aus Basaltlava, Vulkanpark-Forschungen 3 (Mainz 2000).

Hunold 2011a
A. Hunold, Das Erbe des Vulkans. Eine Reise in die Erd- und Technikgeschichte zwischen Eifel und Rhein (Regensburg 2011).

Hunold 2011b
A. Hunold, Die Befestigung auf dem Katzenberg bei Mayen und die spätrömischen Höhenbefestigungen in Nordgallien, Monographien RGZM 88, Vulkanpark-Forschungen 8 (Mainz 2011).

Hunold 2012
A. Hunold, Mayen und der Katzenberg (Lkr. Mayen-Koblenz). Spätrömische Höhenbefestigungen als Elemente der Landnutzung, in: Grünewald – Wenzel 2012, 99–110.

Hunold et al. 2004
A. Hunold – A. Punstein – W. Wagner – F. Wierschem, Rekonstruktion der römischen Moselschiefer-Dächer auf dem Katzenberg bei Mayen / Eifel, Anschnitt 56/1, 2004, 27–34.

Hunold – Schaaff 2010
A. Hunold – H. Schaaff, The Ancient Quarry and Mining District between the Eifel and the Rhine: Aims and Progress of the Vulkanpark Osteifel Project, in: J. H. F. Bloemers – H. Kars – A. van der Valk – M. Wijnen (eds.), The Cultural Landscape & Heritage Paradox. Protection and Development of the Dutch Archaeological-Historical Landscape and its European Dimension (Amsterdam 2010) 177–186.

Junkelmann 2006
M. Junkelmann, Panis militaris. Die Ernährung des römischen Soldaten oder der Grundstoff der Macht ^{3}(Mainz 2006).

Köstner 2012
E. Köstner, Stadt, Land, Fluss: rechtliche Aspekte der Landnutzung in der Eifel nach dem Gallischen Krieg, in: Grünewald – Wenzel 2012, 73–85.

Mangartz 2006
F. Mangartz, Vorgeschichtliche bis mittelalterliche Mühlsteinproduktion in der Osteifel, in: A. Belmont – F. Mangartz (eds.), Millstone Quarries. Research, Protection and Valorization of a European Industrial Heritage (Antiquity-21st Century). Colloque international Grenoble – 22 au 25 septembre 2005 – Maison des Sciences de l'Homme-Alpes, RGZM-Tagungen 2 (Mainz 2006) 25–34.

Mangartz 2008
F. Mangartz, Römischer Basaltlava-Abbau zwischen Eifel und Rhein, Monographien RGZM 75, Vulkanpark-Forschungen 7 (Mainz 2008).

Mangartz 2012
F. Mangartz, Römerzeitliche Mühlsteinproduktion in den Grubenfeldern des Bellerberg-Vulkans bei Mayen (Lkr. Mayen-Koblenz), in: Grünewald – Wenzel 2012, 1–24.

Oesterwind 2012
B. C. Oesterwind, Spätlatènezeit und frühe Römische Kaiserzeit in und um Mayen (Lkr. Mayen-Koblenz), in: Grünewald – Wenzel 2012, 49–72.

Oesterwind – Wenzel 2012
B. C. Oesterwind – S. Wenzel, Die Entwicklung des Siedlungsgefüges der Eisenzeit zwischen Mayen und Mendig, in: M. Schönfelder – S. Sievers (eds.), L'âge du Fer entre la Champagne et la Vallée du Rhin – Die Eisenzeit zwischen Champagne und Rheintal. 34. Internationales Kolloquium der Association Française pour l'Étude de l'âge du Fer vom 13. bis 16. Mai 2010 in Aschaffenburg, RGZM-Tagungen 14 (Mainz 2012) 337–363.

Redknap 1999
M. Redknap, Die römischen und mittelalterlichen Töpfereien in Mayen, Kreis Mayen-Koblenz, in: H.-H. Wegner (ed.), Berichte zur Archäologie an Mittelrhein und Mosel 6, TrZ Beih. 24 (Trier 1999) 11–401.

Rothenhöfer 2005
P. Rothenhöfer, Die Wirtschaftsstrukturen im südlichen Niedergermanien. Untersuchungen zur Entwicklung eines Wirtschaftsraumes an der Peripherie des Imperium Romanum, Kölner Studien zur Archäologie der Römischen Provinzen 7 (Rahden/Westfalen 2005).

Roymans – Habermehl 2011
N. Roymans – D. Habermehl, On the Origins and Development of Axial Villas with Double Courtyards in the Latin West, in: N. Roymans – T. Derks (eds.), Villa Landscapes in the Roman North. Economy, Culture and Lifestyle (Amsterdam 2011) 83–105.

Schaaff 2010
H. Schaaff, Steine für das Römische Reich – zu den Anfängen des antiken Steinbruch- und Bergwerksreviers zwischen Eifel und Rhein, AKorrBl 40, 2010, 265–272.

Schaaff 2012
H. Schaaff, Steine für den römischen Städtebau – Die Grube Idylle bei Kruft und Kretz, Anschnitt 64, 2012, 2–17.

Schaaff 2015
H. Schaaff, Antike Tuffbergwerke am Laacher See-Vulkan, Monographien RGZM 107, Vulkanpark-Forschungen 11 (Mainz 2015).

Schmincke 2007
H.-U. Schmincke, The Quaternary Volcanic Fields of the East and West Eifel (Germany), in: J. R. R. Ritter – U. Christensen (eds.), Mantle Plumes – a Multidisciplinary Approach (Heidelberg 2007) 241–322.

Schmincke 2008
H.-U. Schmincke, Volcanism of the East and West Eifel, in: T. McCann (ed.), Geology of Central Europe Vol. 2, Geological Society London (London 2008) 1318–1333.

Scholz 2012
M. Scholz, Grabbauten in den nördlichen Grenzprovinzen des Römischen Reiches zwischen Britannien und dem Schwarzen Meer, 1.-3. Jahrhundert n. Chr., Monographien RGZM 103 (Mainz 2012).

Steingötter 2005
K. Steingötter (ed.), Geologie von Rheinland-Pfalz (Stuttgart 2005).

Trier 2014
M. Trier, Das oppidum Ubiorum – Köln in der frühen Kaiserzeit, in: M. Trier – F. Naumann-Steckner (eds.), 14 AD. Römische Herrschaft am Rhein (Köln 2014) 46–55.

Wefers 2012a
S. Wefers, Latènezeitliche Mühlen aus dem Gebiet zwischen den Steinbruchrevieren Mayen und Lovosice, Monographien RGZM 95, Vulkanpark-Forschungen 9 (Mainz 2012).
Wefers 2012b
S. Wefers, Die Funde von Drehmühlen im Lager I von Hedemünden, in: K. Grote (ed.), Römerlager Hedemünden. Der augusteische Stützpunkt, seine Außenanlagen, seine Funde und Befunde, Veröffentlichungen der archäologischen Sammlungen des Landesmuseums Hannover 53 (Dresden 2012) 231–234.
Wenzel 2012
S. Wenzel, Villa und burgus von Obermendig „Im Winkel" (Lkr. Mayen-Koblenz) im Kontext der römischen Besiedlung des Segbachtals, in: Grünewald – Wenzel 2012, 131–158.
Wenzel 2014
S. Wenzel, Vom Steinbruch zum Fernhafen. Untersuchungen zum Schwerlasttransport auf kleinen Gewässern, in: H. Kennecke (ed.), Der Rhein als europäische Verkehrsachse 1. Die Römerzeit, Bonner Beiträge zur Vor- und Frühgeschichtlichen Archäologie 16 (Bonn 2014) 229–257.
Wenzel forthcoming
S. Wenzel, Villa und burgus von Mendig, »Im Winkel«, in: R. Giljohann – S. Wenzel (eds.), Römische Landnutzung im Segbachtal bei Mayen. Siedlungen am Nordrand der Mayener Mühlsteinbrüche, Monographien RGZM (forthcoming).
Wenzel et al. forthcoming
S. Wenzel – M. Dotterweich – R. Schreg, Mendig «Im Winkel» - Une villa liée aux carrières de meules de moulins, in: K. Boulanger – C. Kraemer – C. Moulis – V. Muller – L. Voinson (eds.), Pierre à pierre. Économie de la pierre en Lorraine et régions limitrophes (Ier av. J.C.-XVIIe s.) (forthcoming).
Wenzel – Zerl 2014
S. Wenzel – T. Zerl, Der Burgus von Obermendig, „Im Winkel" – Kornspeicher zur Versorgung spätantiker Mühlsteinarbeiter, in: J. Drauschke – R. Prien – A. Reis (eds.), Küche und Keller in Antike und Frühmittelalter, Tagungsbeiträge der Arbeitsgemeinschaft Spätantike und Frühmittelalter 7, Studien zu Spätantike und Frühmittelalter 6 (Hamburg 2014) 173–196.
Zerl 2012
T. Zerl, Ein Getreidevorrat aus dem spätantiken burgus »Im Winkel« bei Obermendig (Lkr. Mayen-Koblenz), in: Grünewald – Wenzel 2012, 207–211.