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The Ancient Battlefield at Kalkriese

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Results of Excavations on the Oberesch Site

Since the rediscovery more than five hundred years ago of ancient reports of the “Battle of the Teutoburg Forest,” historians and local history enthusiasts have searched for the site that saw the Roman troops of Publius Quinctilius Varus conclusively defeated in battle by the Germanic forces in the year 9 AD (Mommsen 1885). But it wasn’t until 1987 that the findings of an amateur archaeologist armed with a metal detector gave rise to systematic excavation (Schlüter 1999; Wilbers-Rost et al. 2007). Interdisciplinary research has proved the existence of a military event in the bottleneck between the Kalkrieser Hill, a foothill of the Wiehen Hills, in the south, and the Great Bog in the north (fig. 1). Roman military remnants, as well as some unusual features point to a battlefield; the coin finds in particular link the site to the Varian disaster (Berger 1996).

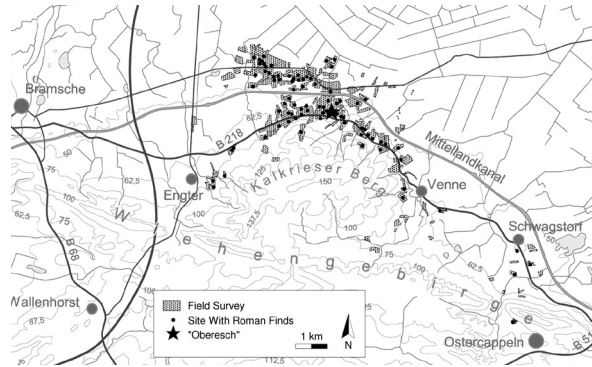


Figure 1: Study area of the “Kalkrieser” project.

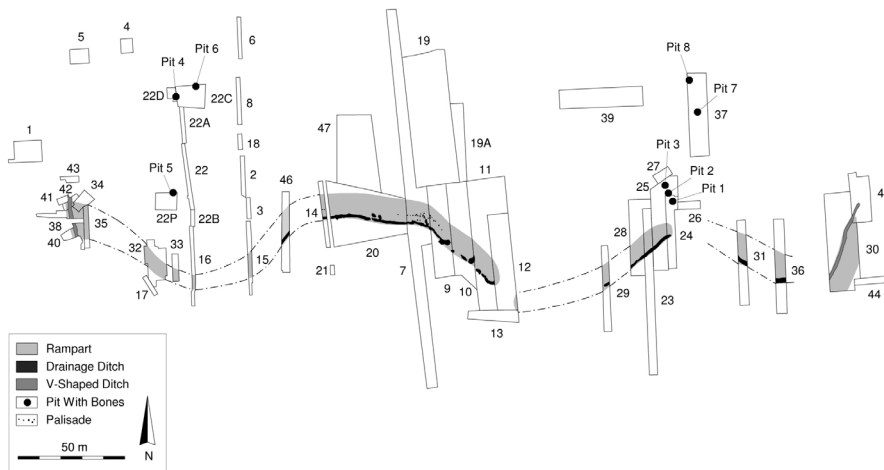


Figure 2: Kalkrieser, Oberesch. Excavation trenches up until 2009, showing the position of the rampart and the burial pits.

In a wide area covering at least thirty square kilometers, metal detection and excavations identified sites with remains of Roman military gear, especially in the dry sandy soil at the foot of Kalkriese Hill and on the edge of the bog. Between these two zones is an area of difficult terrain with damp, sandy soil called the Kalkriese-Niewedder depression. The Oberesch site is situated at the narrowest point of this strait, and excavations have been ongoing there for more than twenty years (Wilbers-Rost 2007, 2009). As well as approximately five thousand Roman finds, there have been some remarkable discoveries which shed light on the battle—for example, a turf wall that had evidently been planned and constructed by Germanic warriors shortly prior to the Roman arrival in order to better attack them (fig. 2). The wall had a height of around 1.5 meters and was around three meters wide; it extended almost four hundred meters in length and did not follow a straight line, but was curved in several places instead. Passageways afforded the Germanic attackers the opportunity of retreat behind the rampart.



Figure 3:
Mule skeleton in
trench 32, almost
completely
preserved by the
collapsed turf
wall.

The finds indicate intense clashes involving heavily equipped Roman legionaries, auxiliary troops, and a large baggage train. Among the discoveries were the remains of offensive and defensive weapons, tools, personal equipment, equipment used by medical officers and orderlies, horse-gear, fragments of wagons, but also fragments of luxury items such as glass and silver vessels, and probably even furniture (Harnecker 2008, 2011). The high number of Roman finds and the special features suggest that the Oberesch was a key site within the extended battle area.

Another group of finds included bones, both human and animal, which archaeologists had scarcely hoped to recover due to the poor likelihood of preservation in the sandy soil (Großkopf 2007; Uerpmann et al. 2007). Besides the teeth and isolated bone fragments from mules and horses, some more extensive portions of two mule skeletons (fig. 3) and one horse skeleton were excavated. Evidently, some sections of the turf wall collapsed during the battle itself and covered the cadavers, removing them from the attentions of both robbers and wild animals and leading to their preservation.

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Figure 4 (l):
Bone pit 1 (excavation trench 24, feature 3).

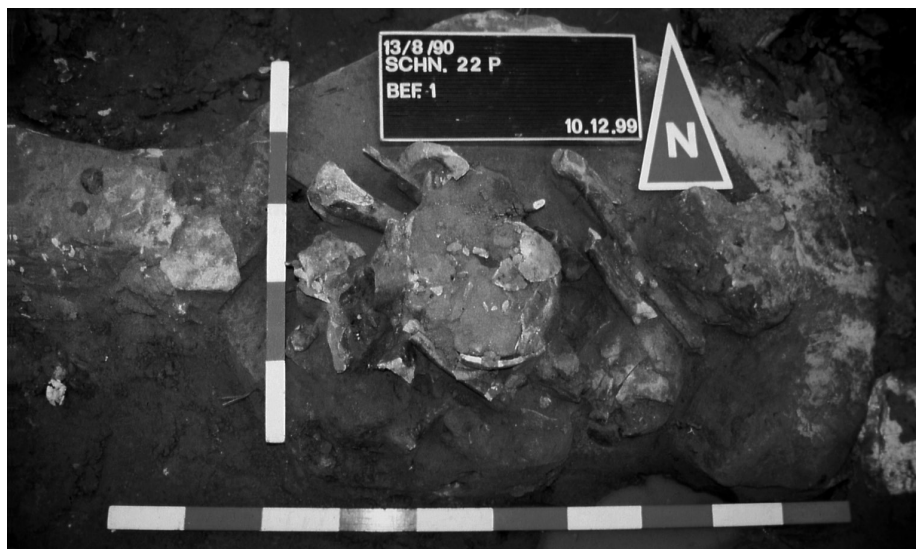
Figure 5 (r):
Bone pit 7 (excavation trench 37, feature 3).

Isolated human bones were also found at the surface; many more, however, had been put into pits, together with animal bones (fig. 4–5). From the absence of anatomical contexts it was immediately clear that the dead had lain on the surface for some time before they were finally buried. Written records of the time could help to explain this fact: Tacitus (*Annales* 1.60–62) reports that Germanicus visited the site of the battle with his troops in the year 15 AD, six years after the event, in order to bury the remains of the fallen. Thus there was an exciting link between the archaeological and anthropological findings and the historical record, a link that invited further investigation. These burial pits—we have found eight on the Oberesch site so far—have been the subject of some controversy, particularly since there are no other known burial finds of this nature. Some interpretations doubt that the Romans were the initiators of these burials, because the remains do not conform to what we know of Roman burial practice at this time (Zelle 2008).

It is, however, unlikely that the Germanic tribes were responsible for these pits. As the victors in this battle, they could afford to bury their own fallen in the traditional fashion; the fallen enemy could have been buried in mass graves shortly after the battle in order to avoid the stench of decomposing bodies and the risk of epidemics. After some years on the surface, the last remaining fragments of bones would have been easy to destroy through ploughing. There is no evidence of either of these practices, however.

In some of the bone pits it was possible to observe that some of the skeletal remains had been treated with a certain amount of respect, especially the human skulls (fig. 6). This also suggests that it was Roman legionaries who wanted to commit the remains of their fallen comrades to the ground. Likewise, the fact that it was mostly human bones in the pits, compared to the mixture of identifiable bones on the surface (Uerpmann et al. 2007, 144), points to a preference for collecting human remains for the burials.

Figure 6:
Bone pit 5 (excavation trench 22P, feature 1). Two human crania, positioned on several long bones and limestone pieces.



There are no signs that human remains were cremated, which would have been the usual practice for the Romans. However, after a number of years on the surface, the human remains would have been devoid of the flesh and fatty tissue needed to sustain a fire. It would have needed a considerable amount of wood to reduce these bones to ashes (Großkopf 2009b, 86). Since the land that Germanicus was passing through had not been subdued, it is unlikely that he would have had the necessary resources at his disposal. It was in fact acceptable to depart from tradition in the burial of those fallen in battle when circumstances dictated. The golden rule was that the dead should be covered with earth (Hope 2003, 85 ff.). This was achieved through the deposition of the bones in the pits.

The absence of burial objects, such as vials of oil, in the bone pits, is also unsurprising if we consider the improvised circumstances of the burial. The few Roman finds in the pits conform to our expectations as objects that remained on the battlefield after looters and plunderers had done their work. They were presumably pushed into the pits as they were being filled—nothing points to their being burial objects. It is in any case highly unlikely that Germanicus's soldiers would have been carrying burial objects with them during their military campaign in the year 15 AD. So in this point too, the departure from the customs of civil or peacetime military burials close to Roman camps was inevitable.

The lack of any sign of the grave mound mentioned by Tacitus (*Annales* 1.62.1), allegedly constructed by Germanicus, has also been the subject of discussion. Apart from the question whether such a mound, which was supposedly flattened relatively quickly by the Germanic tribes (Tacitus, *Annales* 2.7.3), could even be archaeologically proven, we need to bear in mind that Tacitus's assertion might have been a topos employed to demonstrate the extent of Germanicus's devotion to the fallen rather than a literal description of his actions.

From the archaeological perspective, there is thus no fundamental discrepancy between the bone pits on the Oberesch site and the written sources that describe Germanicus's burial act (Rost/Wilbers-Rost, forthcoming). Six years after the defeat itself, Germanicus was able to fulfil the duty under unusual conditions: the burial of the fallen. He covered the skeletons with earth and thus paid them his last respects. In the context of discussions about the interpretation of the burial pits, the osteological analysis and evaluation of the bone fragments are of great significance.

Birgit Großkopf

The Human Remains from the Oberesch Site

Most of the human bone fragments from the Oberesch site were discovered in pits located in close proximity to the wall (fig. 7). Only isolated bone fragments comingled with animal bones were present in these pits. Articulated, complete skeletons were not documented. The bones are fragmentary and exhibit signs of advanced decomposition, particularly, surficial erosion.

The eight bone pits that have been excavated so far are markedly different from each other. The surface areas of the pits vary in size from 40–60 cm to 4 m square. The three neighbouring bone pits (1–3) contained various amounts

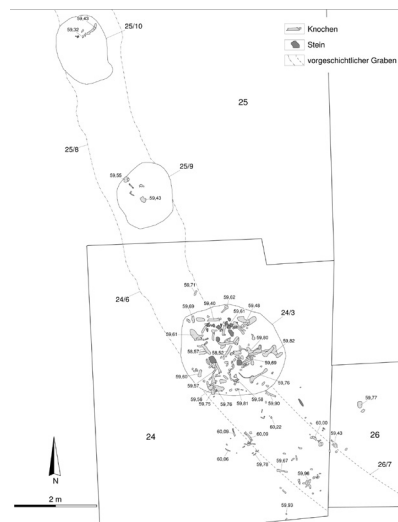


Figure 7: Bone pits 1, 2 and 3 (excavation trenches 24 and 25), showing different levels of bone content.

of fill material. While pit 1 contained numerous bone finds, pits 2 and 3 contained only a small number of fragments (fig. 7). The degree of bone preservation also differed significantly. In some bone pits there were pieces of limestone that were found in the soil and occasionally on the surface. Bone preservation was best when limestone was present. The bones in pit 5 belonged to two individuals and were sufficiently well-preserved to permit an estimate of stature (Großkopf 2007). Although the bones appeared stable and intact macroscopically, the internal bone structure displayed signs of significant decomposition. This poor level of preservation prevented DNA analysis. Even the best-preserved bones and tooth roots proved unusable to provide us with reproducible data.

Anthropological conclusions are therefore based only on evidence collected from isolated bones or bone fragments. The sexing of skeletons relies in part on specific features of the pelvic anatomy. Functional differences of the innominate bone are manifested as sex-specific morphological characteristics that in turn provide the most important criteria for an accurate sex differentiation. Due to the proportionally thin compact bone structure, preservation of pelvic bones at Oberesch was rarely sufficient to allow for sexing. However, skull bones also exhibit numerous markers of individual sex, and these are readily discernible, even from fragments. Long bones give us information primarily with regard to robustness and muscle development, however, they can provide additional information on the sex of an individual. The approximate age of death can be estimated morphologically based on the degree of skull suture ossification and diploe structure. Occlusal wear of the dentition is another criterion for approximating age at death. Results from the morphological examination were checked against those provided by the tooth cementum annulation method (Großkopf 1990). This histological technique for age estimations focuses on the analysis of tooth root cementum.

In addition to determining the age and the sex of those buried at the Oberesch site, a further step was to identify the minimum number of individuals. One of the first tasks was to group bone finds together in order to determine whether bones were fragmented prior to being buried in the pits. Considering the extent of fragmentation, this was an ambitious undertaking. Often, the only helpful characteristics were provided by unusual fragments or fracture edges. The advanced state of bone surface decomposition and erosion of broken edges (fig. 8) complicated this task further. Based on lower jawbone fragments, specifically a segment from near the left first molar, a minimum number of 17 individuals from the burial site was calculated. The number of other jaw and skull

fragments was slightly under 17. However, it should be assumed that these remains belong to more than the 17 individuals who can be identified from this fragment type. In bone pit 5, which contained the remains of two individuals, the fragment of a shoulder bone from a third individual was also found. Yet, the total number here must remain as two individuals for methodological reasons, since estimation of the minimum number of individuals was determined using a fragment of the lower jaw.

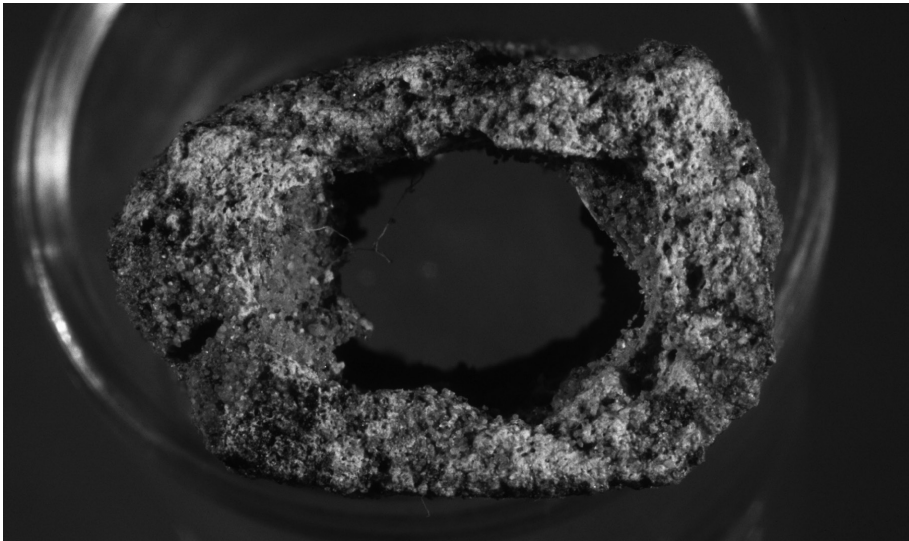


Figure 8:
Advanced
erosion on the
fracture site of a
long bone.

Evaluating anthropological data was also made difficult by the incidence of isolated bone fragments and the fact that animal bones were mixed in with the human remains in the bone pits. Conversely, the nature of the burial gives us some important clues to the situation after the defeat. If the fallen had been buried directly after the battle, we would have found mass graves with complete skeletons. Apart from a few exceptions, however, the Oberesch pits contain isolated bone finds. The burial must thus have been preceded by a period during which the dead lay on the surface during which skeletonization and decomposition of all soft tissue occurred, no doubt in part due to the activities of scavenger species. The bones likely remained on the surface for at least one to two years. It is unlikely that the corpses remained unburied on the ground for a period significantly longer than ten years, since forensic research has shown that after this length of time, taphonomic processes would result in their being almost no visible remains left (Morse 1983).

Figure 9:
Evidence of
blunt force to the
cranium from
bone pit 5 (item
number 24551).



The results of the anthropological analysis support the assumption that the bones recovered at this site are the remains of soldiers who fell during the Battle of the Teutoburg Forest. The bones (with one exception) are exclusively from male individuals who were between the ages of approximately twenty-five and forty-five years when they died. The individual skeletons show a high level of robustness

and there is no sign of any significant pathological changes that may otherwise have rendered them physically handicapped. Three of the skulls bore clear evidence of injuries caused by traumatic blows (fig. 9). Other possible injuries caused by blunt force could not be detected due to the heavy fragmentation of the bone remains.

The relatively small minimum number of individuals determined seems not to support the presumption of a large and historically important battle. It should be noted however that only a small area of the site has been excavated. Despite the well-preserved long bones of two individuals in pit 5, only one from each individual was buried there. The reason was perhaps because of lack of visibility due to vegetation cover or a thick layer of fallen leaves on the surface. This could have caused the apparent “disappearance” of bones. We can be certain that not all original bone remains were collected and buried.

The geochemical conditions at this site were far from ideal for the preservation of skeletal remains. This can be seen from a find of tooth crowns (fig. 10), which was all that remained of a complete skull. The entire bone substance and even the tooth roots had eroded. It must therefore be regarded as a stroke of luck that we were able to find any skeletal remains in this area at all. The finds from bone pit 7 illustrate very clearly how the remains continued to decompose significantly after their burial in the pits (fig. 11). Had it not been for the layer of turf, which was spread in some places up to a meter thick as part of medieval fertilizing practices, the remains would have been in an even poorer condition.

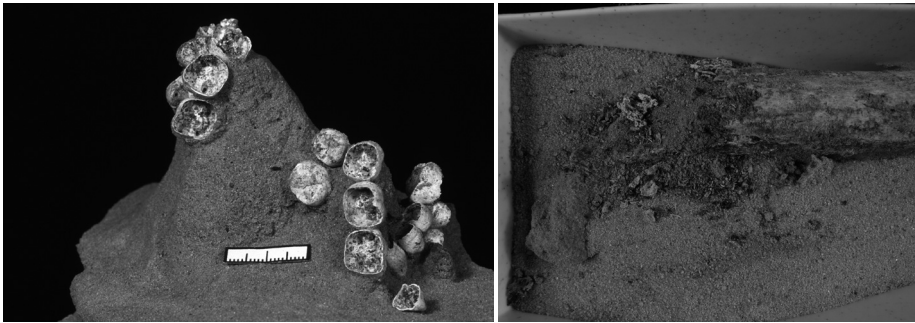


Figure 10 (l): Tooth crowns, the only remaining parts of a complete skull (item number 21209).

Figure 11 (r): Advanced decomposition of a long bone from bone pit 7.

Thus, analysis of the skeletal remains in the bone pits provides strong evidence for this area as the site of the “Battle of the Teutoburg Forest.” As already discussed, historical sources (Tacitus, *Annales* 1.62) describe how Germanicus and his legions “on the spot, six years after the disaster, in grief and anger, began to bury the bones of the three legions, not a soldier knowing whether he was interring the relics of a relative or a stranger.”

Achim Rost

Methods in Battlefield Archaeology: A Critical Analysis of the Distribution Pattern

The finds at the Oberesch site should not be considered in isolation, but as a segment of a much larger-scale military event (fig. 1). Furthermore, we should not forget that battlefields are never preserved in their exact state at the end of the fighting. To understand how the archaeological finds come to be the way they are, we need to conduct a systematic, critical analysis of the sequence of events that followed the battle, based on models of human behavior that can be developed from historical sources, including from more recent military conflicts (Rost 2008, 2009a, 2009b).

In the normal course of events, battlefields would have been plundered or at least tidied up; unlike with military siege events, we do not usually expect to find much archaeological evidence (e.g., traces of earthworks, entrenchments) from pitched battles. Thus, battlefield archaeology—a relatively new field of research—is usually concerned with objects left behind on the battlefield, often small fragments of metal. The mass graves to

bury fallen soldiers, for example those found in Wittstock (the site of a 1636 battle during the Thirty Years War; Grothe/Jungklaus 2009), number amongst the most striking legacies of pitched battles. Modern battlefield sites, with their enormous dispersal of spent firearm munitions, perhaps best represent our sense of what a battlefield should have looked like. But the evidence of military battles in ancient times tend to be rather thin on the ground, in particular when comparably “disposable” munitions, such as lead sling bullets, were not used. It has gradually become clear that the battlefield needs to be viewed as a category of its own in terms of archaeological research: conditions for the preservation of archaeological remains are very different from those for finds from settlements, graveyards, and cult sites. There is a distinct need to develop a new methodological framework for an appropriate interpretation of battlefield sites, including the sites of ancient battles.

It is remarkable to note that there have been around five thousand Roman finds on the Oberesch site, compared with only around five hundred military finds in the entire remaining area of the Kalkriese study, even though the excavated areas are of a similar size (Harnecker and Tolksdorf-Lienemann 2004).

Nevertheless, the analysis of excavations in Kalkriese has proved that the rate of recovery of military items is not linked to the intensity of the battle itself. A large part of the finds from Kalkriese are shown to be the result of a mixture of processes following the battle, including salvage and plunder, rather than direct relics of the fighting on the site. Ancient accounts of the military conflicts between Germanic tribes and Romans in the first decades after the birth of Christ have given us some points of reference regarding the behavior patterns of both parties. We know, for example, that the Germanic combatants were motivated to fight by the promise of plunder later (Cassius Dio, *Historia Romana* 56.21.4); elsewhere, we learn that the Roman army was trained to rescue their wounded even under dangerous conditions, and to bring their baggage train into safety (Tacitus, *Annales* 1.64.4).

The effects of these actions in terms of archaeological finds can be clearly seen from the sites at Kalkriese. The battle events on Kalkriese Hill look to have been a series of guerilla attacks by the Germanic tribesmen on the extended flank of the Roman army, which was moving from east to west in a long formation. The attacks came along a long, narrow stretch of land—at least 10 km in length—between the hill and the bog. It would

have scarcely been possible for the Roman legions to take up efficient battle formations in such terrain. Nevertheless, the Romans were initially able to fight off the attacks that came from points along the route several kilometers east of the Oberesch site. More intensive fighting occurred in the course of these attacks and must have resulted in increasing numbers of Roman losses, but it would be wrong to expect any correspondingly large-scale archaeological finds here: as long as the Roman army's usual procedures for medical care and transport of the wounded were functional, we can assume that neither dead nor injured soldiers remained in any great numbers on the battlefield; they would have been rescued, together with arms or equipment. Thus, the scarcity of Roman finds along this section of the extended battle area is logical.

The archaeological finds should be rather different in those areas where the Roman logistical operations disintegrated. The Oberesch site probably represents such an area: the dead and wounded, together with equipment and military supplies, remained on the site at the mercy of the victorious Germanic attackers. The numerous fragments, especially fittings from Roman legionary equipment (fig. 12)—fragments from helmets, clasps, isolated segments from the *lorica segmentata* body armor, buckles, and metal fittings from sword sheaths—allow us to assume that the defeated Romans were plundered directly on the battlefield. As the Germanic victors stripped the bodies of their enemies, these small parts became detached and remained on the site. Large numbers of smaller fragments of silver sheet and bronze plate, which are mainly concentrated along the site of the wall, show that parts of the Roman armor were in fact destroyed for scrap, within only the “valuable” metal taken away to be melted down and re-used. Fragments of the bronze frameworks of large Roman shields (fig. 13), items for which the Germanic people found no use as weapons, are good examples of this: the shields were collected at the wall (fig. 14); the frames were dismantled and, apart from some tiny, disregarded fragments, removed; the wooden parts of the shields, however, were left there to rot.



Figure 12:
A Roman
legionary at the
beginning of
the first century
AD. The shaded
parts indicate the
fragments found
in Kalkriese.

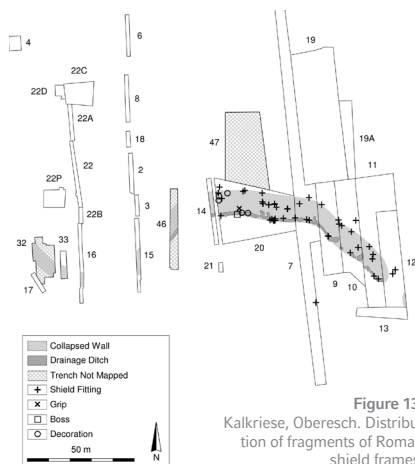


Figure 13:
Kalkriese, Oberesch. Distribu-
tion of fragments of Roman
shield frames.

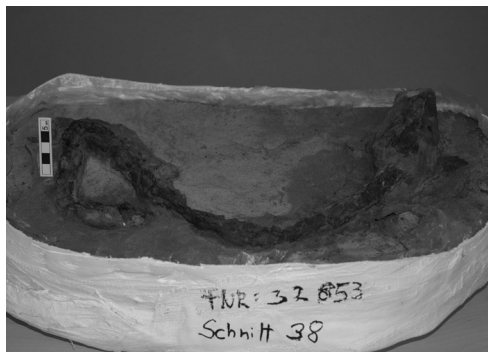


Figure 14:
A large fragment of a Roman shield frame,
from the Oberesch site, Kalkriese; most re-
covered fragments are much smaller.

Sites such as this one, where Roman military structure completely collapsed, also meant the death of those Romans who were part of wounded convoys from a previous attack, and who were thus not combatants in the battle at the Oberesch site. Their armour remained at the site, adding to the archaeological finds. Thus, the finds at a certain section of the battlefield should not necessarily be taken as an indication of the intensity of the battle at this section.

Figure 15 (l):
Silverwork from
a Roman sword
sheath (recon-
struction).



Figure 16 (r):
Roman silver
coins (denarii)
from a hoard
discovered in
Kalkriese in
1987.



West and especially northwest of the Oberesch site, the rate of archaeological finds dwindles again, but here there are some small groupings of valuable items; among others, the silver fittings from a sword sheath (fig. 15) and several hoards of Roman silver coins (fig. 16). Regarding their significance for the further development of the

battle, we can interpret these areas as zones of subsequent skirmishes, flight, and capture. Romans might have tried to hide valuable possessions before they fell into the hands of the enemy. Isolated items escaped the eye of plunderers more easily than in the central battle zone at the Oberesch. There must have been similar items there too, and far more numerous, but since they lay together with fallen soldiers they would have been easy for the victors to recover.



Figure 17 (l): Bone pit 1 (item number 18059). An anatomical grouping of lower arm, carpal, and metacarpal bones.

Figure 18 (r): Bone pit 1 (item number 18082). Three hands, reconstructed from the group of bones found close together.

By using archaeological evidence to reconstruct the different phases of the battle leading up to the ultimate and complete defeat of the Roman army, we were able to suggest some pointers for an interpretation of some of the groups of bone finds in pit 1, which seem to be exceptions to the observation of completely decomposed soft tissue (Großkopf 2007, 166f.). Thus we found one skull, complete with lower jaw and the uppermost cervical vertebrae, in almost its original anatomical context, besides a lower arm with ulna and radius and some hand bones (fig. 17), and in another part of the pit a concentration of hand and finger bones out of which we were able to reconstruct almost three complete hands (fig. 18). Since we were unable, in the context of the usual situation in the burial pits, to give anthropological or scientific explanations for these unusual groupings of finds, we suspect anthropogenic factors, such as gloves employed to protect the hands. But there is no evidence of gloves being part of the military equipment in the Roman army, and the groups of bone finds are from different parts of the body; however, both the lower arms/hands and the head and neck of a Roman legionary are in particular danger of injury in battle.

Figure 19:
Kalkriese, Ober-
esch. Surgical
instruments
made of bronze
(elevator and
scalpel handle)



Given the proven presence of military doctors and medical orderlies in Kalkriese (fig. 19), medical care should be considered a possible explanation for the preservation of certain skeleton parts (Rost 2009c). It is not unthinkable that Roman legionaries who had been injured further back, in the early part of this extended assault along the

length of the Roman flank, had had bandages applied to parts of their bodies. They would have been transported by the still intact military formations as far as possible, but would have lost their lives as the Roman army was defeated, and their remains would likewise have been plundered and left for scavengers on the battlefield. Some years later—by which time all soft tissue had decomposed and the last remaining bones were being gathered for burial in the pits—some of the linen bandages were perhaps partially intact. The plaster, or rather the ointments used by the Romans (Celsus, *De medicina*, 5.19) probably contributed to the preservation of these bandages. If the remains of these bandages were then used as a kind of bag to transport the bones to the burial pit and deposit them there, this would explain how some skeletal ensembles remained together. This example shows very clearly the ways in which archaeological and anthropological questions and answers can complement one another.

The interpretation of the archaeological evidence goes some way to both explain and relativize the unique nature of the finds at the Oberesch site. By drawing on the source-critical aspects—the effects of salvage and plunder, including body stripping and the scrapping of armour to recover valuable metals—we present a more favourable scenario for the analysis of the osteological finds from the burial pits at the Oberesch. The concentration of skeletal remains and fragments of military equipment on this segment of the extended battle area is probably due to the fact that a large part of the Roman army, including its system for medical assistance and logistics, collapsed here.

Conclusion

Battlefield archaeology is a relatively new subdiscipline in the field of archaeology, which has been able to develop in the last couple of decades due to the systematic use of metal detectors (Rost 2009a). For this reason, there is currently little experience in the evaluation of the significance of archaeological items excavated from the sites of armed conflict. Often, written accounts of “world-changing conflicts” provoke us by citing the huge number of battle dead and the loss of equipment, leading us to harbor expectations of a correspondingly large amount of finds in our excavations.

The analysis of the finds in Kalkriese has already shown the extent to which post-battle processes affected the archaeological preservation of military remains, not just contributing to their reduction, but also manipulating and influencing them in many other ways. In this context, the osteological analysis of the bones from the eight bone pits is highly significant. The reburial of battle dead is not unusual; however, we cannot usually draw reliable conclusions about the chronology of the processes following the battle using archaeological evidence alone. The fact that we were able to prove here that the bodies of those fallen in battle lay on the surface for a number of years before their burial represents an unusual preservation history, and, thanks to the putative link to historical written sources, initiates an exciting discussion.

The archaeological, source-critical considerations regarding the course of the attacks on the Roman army train give a plausible reason for the astounding concentration of the bone finds in one segment of the battle area; the lack of grave gifts in the bone pits could also be explained by reference to cultural and historical factors. On the other hand, scientific knowledge goes some way to explaining the fact that the skeletal remains were not cremated. Moreover, the delimitation of the time period during which skeletal remains were on the surface of the battlefield prior to being buried was only possible by means of osteological analysis. These include both anthropological and archaeozoological studies (Uerpman et al. 2007). Thus X-ray diffraction measurements on mule teeth showed that skeletal remains from the pits had had longer exposure to sunlight than the mules, which were covered soon after their death by the collapse of the turf wall.

By using the opportunity to apply different methodological approaches to the same questions, and to compare and discuss the results of the interdisciplinary analysis from different angles, we have been gradually able to foster an understanding of the sometimes unexpected patterns of finds excavated at the Kalkriese battlefield. The methods and theses that we have developed at Kalkriese in turn provide a basis for the examination of other historical, and not necessarily ancient, battlefields.

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