Bullets, ballistas, and Burnswark

A Roman assault on a hillfort in Scotland

The ancient author Josephus once observed of the Roman military that 'their training manoeuvres are battles without bloodshed, and their battles manoeuvres with bloodshed'. The difficulty in distinguishing between these states is well illustrated by the residue from a Roman artillery barrage at Burnswark. Was this aimed at practice or suppressing defenders before an assault? **John Reid** reveals the latest discoveries at the site.

RIGHT Burnswark from above. The south camp with its three wide gates is visible at the bottom, the denuded hillfort is top centre, while the earthworks of the elongated north camp are just visible to the north. The areas that received a suppressing barrage from the camps are shaded red.

BELOW The south Roman camp at Burnswark. Positioned within 150m of the denuded hillfort entrances, the earthworks, including the three ballista platforms, show up well in the low light of a summer evening. The western entrance to the hillfort was at the bottom left of the photograph.

The brooding eminence of Burnswark Hill, Dumfriesshire, is an arresting sight. It rises to nearly 1,000 feet from the gentle surrounding countryside and is one of the most prominent landmarks of the Solway basin. On a good day, the panoramic views from the summit are breathtaking, while on a stormy day the hill exudes a strangely sinister appeal. But it is not just the daunting physical presence of Burnswark that has fired the interest of scholars over the last 300 years.

Crowning the tabletop summit are the denuded ramparts of a 17 acre hillfort, which is held in a vice-like grip by two Roman camps. Both of these camps feature design oddities. The northern one displays an unusually elongated form, while the south camp is more conventional in shape, but was furnished with three wide gateways on the hill-ward side. Each of these is shielded by a large tumulus-like earthwork, which are collectively known as the 'Three Brethren'. This configuration of Roman camps straddling a hillfort is unique in Britain, but attempts to understand its significance have provoked considerable controversy for over half a century.

Practice Camp or Siege Work?

For nearly two centuries the Roman earthworks were identified as siege camps, but in the 1960's a new theory emerged. This held that the camps were 'practice' works and helped to satisfy a growing desire to find tangible evidence for the Roman army's famous training regime. Further examples of this vogue include the camps at Cawthorn in Yorkshire and the earthworks surrounding the Scottish hillfort of Woden Law. Both of these sites have now been reassessed: the former is seen as an early Roman fort with adjacent temporary camps, while the latter appears to be a native earthwork complex.

It is not difficult to see how the practice theory arose. Many archaeologists in the 1950s and 60s were ex-military men with a grounding in the Classics and close associations with the training activities of the British Army. Indeed, the first to propagate the training camp idea was Kenneth Steer, then Secretary of the Royal Commission for Ancient Monuments of Scotland, and a real-life 'Monuments Man' with an army intelligence background. Unlike many archaeological musings influenced by zeitgeist, though, the practice interpretation of Burnswark has proved tenacious and entered the popular and academic literature as fact.

Previous investigations

Two major excavation campaigns have been mounted at the site. The first was conducted in 1898 on behalf of the Society of Antiquaries of Scotland, which involved surveying the earthworks and 'turning over' the site. Numerous lead sling bullets, stone ballista balls, and other elements of corroded Roman military hardware were found, all of which appeared to attest to a bitter conflict. The second major exploration came in the 1960s and was directed by the much-respected archaeologist George Jobey. In the 1978 publication of his work, Jobey came down firmly on the side of a practice work. He recognised that the stone rampart of the hilltop fortress had already been demolished by the time it was swept with missiles and reasoned that no self-respecting Roman general would besiege an unfortified

RIGHT Volunteers demonstrate the scale of just one of the three over-sized uphill facing gateways of the south Roman camp.

hilltop, even though the ancient literature suggests otherwise. A quantity of lead slingshot was found in the hillfort gateways, something that Jobey attributed to 'targets' being set up to create what was in effect a firing range.

Over the years the arguments in favour of both training and actual warfare have steadily multiplied. As is so often the case, many observations have proven susceptible to conflicting readings. The unique design of the Roman camps, for example, has been attributed to either clumsy practice work or the demands of battle conditions. An absence of a circumvallation isolating the hilltop has also been much remarked upon, but the significance of this is blunted by such blockading ramparts being identifiable at less than 20% of known Roman siege sites. There is also the hillfort itself, with some arguing that the 'easy' gradient leading to its gates eliminated any need to invest the defenders. Yet this is no minor settlement; the hillfort is the largest known in Dumfriesshire, while the slope leading up to it is comparable to many European sites.

It was against the backdrop of such competing assumptions that the Scottish Borders based Trimontium Trust decided to review the evidence and secure fresh data. This would be gathered using modern methods that have their origins in battlefield archaeology, reconstructive archaeology, and forensic ballistics. After a fruitful discussion with the landowner, Sir John Buchanan-Jardine, and in collaboration with the Dumfriesshire Council archaeologist, Andy Nicholson, a novel approach was devised. At its core was a systematic metal detector survey to identify lead sling bullets and plot their scatter.

Unlike many battlefields that lie below featureless arable land, however, our site lay directly on top of a fragile and eroding hillfort where mass-extraction of artifacts would hamper any subsequent archaeological investigation. We therefore proposed a non-invasive metal detection survey. This aimed to use the latest metal detecting technology to profile the nature of the metal targets without extracting the finds and then carry out highly selective test excavation to confirm the projectile scatter. This was made possible by the use of a high-quality reference detector, which was harmonised to the signals received from sling bullets from the 1898 Burnswark excavations held by the museum in Dumfries.

Of course, the use of systematic metal detecting is not new and has been around at least since the 1980s, when the pioneering work of Scott and Fox revealed what had really happened to General Custer and the men of the 7th Cavalry Regiment at the Little Bighorn. Indeed, metal detection represents the primary survey technique for

BELOW A line up of some of the ammunition recovered during the recent trial excavations at Burnswark. All the stone missiles were carved from what appeared to be local red sandstone. Core samples from the sling bullets are undergoing analysis for lead isotope ratios which may help identify lead sources.

identifying and determining the extent of battles that have taken place since the advent of gunpowder. The Roman lead sling bullets presented an ideal opportunity to investigate the true extent of the metal projectile scatter at a site that saw action at a much earlier date. The Burnswark Project was also designed to review the Roman camp morphology and how this related to the hillfort defences (or lack of them) and the wider landscape. It would also take a forensic look at the fabric and ballistic properties of the Roman missile assemblage.

In view of popular interest in the site and in line with the educational objectives of the Trimontium Trust, a successful Heritage Lottery Fund bid was made in 2014 for a volunteer supported community based archaeology project to comprise an excavation phase followed by a touring exhibition. The work commenced in 2015, and two trenches were carefully selected by preliminary systematic metal detection. Here, we were fortunate to be able to collaborate with Derek McLennan and Sharon McKee from Beyond the Beep, who head a group of expert detectorists based in Ayrshire.

Roman camp morphology

Despite classical references to the reduction of numerous oppida in southern England, no siege works have so far been identified elsewhere in the UK. This absence is conspicuous, given that numerous examples have been identified throughout mainland Europe and the Near East. This anomaly led us to question whether the Roman camps at Burnswark were siege works in the true sense of the word or rather an assault camp to the south and a blockade camp to the north.

This would explain a number of unusual features. Firstly, the south camp was aggressively positioned on the slope of the hill, within only 130-150m of the two south hillfort gateways. The three large openings in the camp face uphill (as opposed to single, narrow gateways in the other sides), suggesting an intention to allow the rapid movement of large numbers of troops from the camp towards the hillfort entrances. On the other side of the hill, the smaller, elongated north camp was set at a more respectful distance from the steeper and therefore more defensible north face of Burnswark. The position and irregular shape of the camp would work as a measure to block any attempt at flight from the single north hillfort gateway. At both camps the ditches facing the hill are of an order of magnitude greater than those along the other sides, again suggesting practical responses to a real threat.

ABOVE LEFT Sharon of Beyond the Beep, battles against a storm to mark her targets during an early detecting sweep. The same storm flattened the shelters we had erected on the summit.
ABOVE Roman projectiles were not the only ones on the hillside. Here unexploded Centurion (there's irony) tank munitions from the late 1940s, found by the detecting team, were destroyed on site in a controlled explosion courtesy of the Bomb Disposal Squad.
BELOW Three distinct morphologies of lead bullets, Type I (lemon), Type II (acorn) and Type III (small, with a mysterious hole) were identified. The Type III is a newly recognised form.

LEFT One of the sandstone ballista balls found on the hill fort rampart, with the south Roman siege camp in the background. Note the flattened surface for the ballista slider-slot and the prominent stonemasons peck marks.

Roman missiles

Burnswark is witness to a greater number and variety of Roman projectiles on a native site than anywhere else in Britain. Indeed, one has to travel to the Near East to find another site as rich in in-situ ballistic material. Prior to the current project, 130 lead sling bullets, nine trilobite iron arrowheads and 11 carved sandstone ballista balls had been identified. Of these, the lead sling bullets were recognised to belong to two main types. Stephen Greep, who published the first review of Roman sling bullets from the UK, characterised them as type I, essentially a lemon shape, and type II, which resembles an acorn. What was not fully appreciated at that time was that the rarer acorn-shaped bullets were almost exclusive to a 50-mile radius around Burnswark Hill. Averaging 50g, these beautifully cast bullets were predominantly recovered from the east and central south-facing hillfort gateways, with a handful also found in the south Roman camp. Whether these concentrations were due to targets in the former hillfort gateways, as Jobey thought, was hard to assess as these were just about the only areas of the hillfort he excavated. We hoped that our projectile distribution survey would provide a more accurate picture of their distribution.

Before turning to the field, though, a detailed study was undertaken of missiles from Burnswark held by the National Museum of Scotland and the Dumfries Museum. This produced a number of insights into the events that had played out on the hilltop. The range and shape of the carved stone ballista balls were particularly interesting. These red sandstone missiles, weighing on average 600g, were virtually all grapefruit-shaped and had at least one slightly flattened face. Alan Wilkins, an expert on Roman artillery, confirmed that the flat area would lie in the slider 'slot' of the torsion catapult and help stabilise the ball prior to shooting. He also observed that the stone shot were in the lightweight class compared to some of their larger brethren loosed in Judea. This suggests that they were selected not for their wall-smashing qualities, but their anti-personnel attributes.

A number of trilobate iron arrowheads were found during Jobey's investigation of the southern hillfort rampart, despite heavy corrosion caused by the very acidic soils. These were of a type in widespread use during the 1st and 2nd century and often associated with Arabian or Syrian archers serving in the Roman army.

It was an assessment of the slingshot that produced the greatest surprise. Some of the type I lemon-shaped bullets were significantly smaller than the others, many weighing less than 20g. We had identified a third, previously unrecognized, slingshot subgroup. Even more interesting was that these small shot contained a single circular hole, approximately 5 mm in diameter and about 5mm deep. What could it be for? Was it a hole for fixing to a device, inserting poison, or

BELOW Don, our slinging expert, at full cast with one of the replica slings. Dull grey lead shot stood no chance of being recovered from the rough hillside. To facilitate recovery of the replica bullets during off-site slinging experiments, they were sprayed day-glow orange. This produced only a marginal benefit in retrieving them from anything other than the shortest of grass.

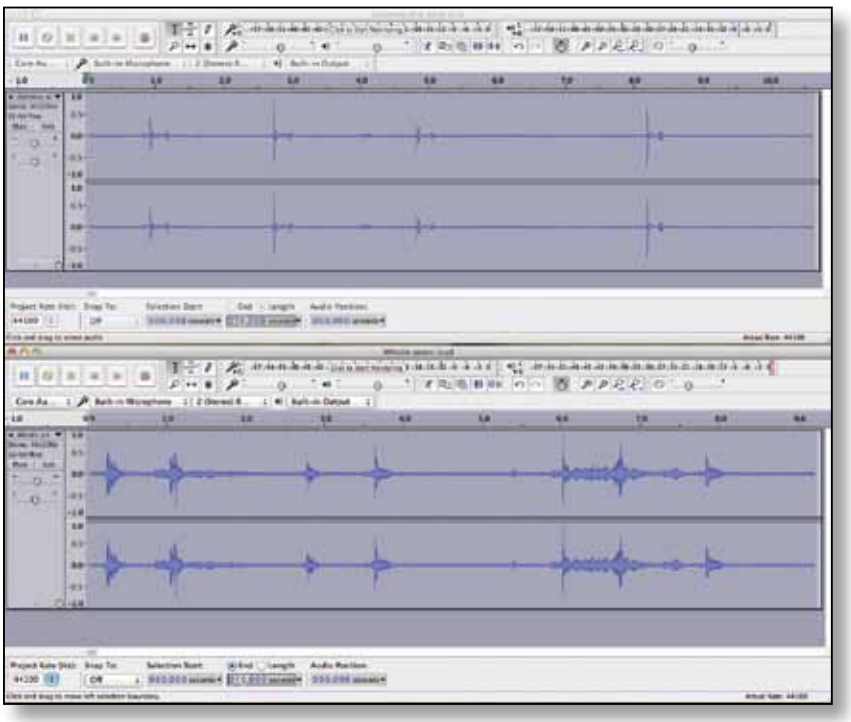
even a very symmetrical air bubble? Field testing replica slingshot soon offered another, equally remarkable, explanation for these cavities.

Slinging experiments

We undertook a ballistic assessment of the lead sling bullets previously found on the site in order to assess the performance of this ammunition. A number of replica bullets were cast in lead and high density clay, and one of our volunteers, an expert slinger, learned to weave slings from various materials. We found that the larger 50g bullets could be cast at least 200 metres depending on whether the low-trajectory direct (more accurate) or lob style (greater distance) of slinging was used. Other experimenters in the field have noted that a 50g Roman bullet propelled from a sling has only slightly less kinetic energy than a .44 Magnum!

On our rugby-field firing range a number of results quickly became apparent. Despite painting the bullets day-glo orange, finding the spent lead missiles was in most cases impossible as they buried themselves under the grass, confirming that the Romans would not have been able to recover many after the action. When our slinger was pressurised to shoot quickly, he showed a tendency to drop approximately 5-10% of sling bullets while loading. This phenomenon of 'dropped' ammunition has been noted by battlefield archaeologists across a number of time periods and theatres of war. It is almost certainly a product of stress and means that the scatter of bullets in the south camp at Burnswark could reveal where the slingers had been stationed at the start of the action.

Two extraordinary facts concerning the small bullets with holes (now dubbed type IIIs) also emerged. Firstly, they could be successfully slung in small groups of three or four to create a form of grapeshot. This had been independently confirmed by T Richardson in his work on Roman sling bullets at the Royal Armouries. Even more intriguingly, the mysterious holes proved to confer an aerophonic quality. In flight these lead shot whistled, or more accurately gave off a mechanical buzzing sound eerily reminiscent of an agitated wasp. Remarkable as it sounds, the simplest explanation for this design modification is that it represents an early form of psychological warfare. To put it another way, the Roman attackers valued the terror that hearing the incoming bullets would instill in the defenders.

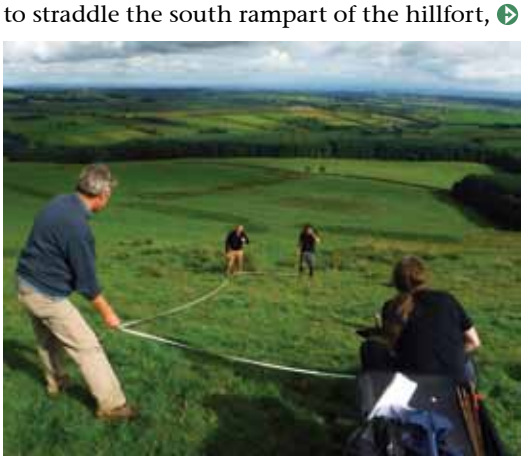


ABOVE Sound profiles of Type I (above) and Type III bullets (below) in flight. The Type III's holes cause an extended 'buzz'. To hear them for yourself, visit the CA website:

Projectile distribution

Out at Burnswark, the detecting team took seven days to survey the site. The metal targets identified were profiled and characterised by a master detector to ensure the accuracy of the results. GPS positions were recorded and mapped by Andy Nicholson. More than 2,000 new targets were identified, of which nearly 700 had the characteristics of lead sling bullets. We positioned our two 10x2m trenches so that the maximum number of potential sling bullets lay within the excavated area, in order to test the accuracy of our metal detector survey. The trenches were excavated over a course of three weeks by our volunteers, who were expertly supervised by David Devereux and Diane and Claire from Rathmell Archaeology.

Trench One, which lay within the hillfort, turned up its full complement of predicted sling bullets. Trench Two was deliberately positioned to straddle the south rampart of the hillfort,



RIGHT The optimum site for the two small trenches was dictated by the spread of detector signals, here indicated by the red flags.

west of the west gateway. It not only confirmed the presence of lead bullets but also produced two beautifully carved ballista balls and a roughly hewn stone sling bullet. As some previous commentators had suggested that no real action could have taken place without the presence of legionary troops, the discovery of one of their signature iron-tipped ballista bolts was also a source of some satisfaction.

Our dig confirmed George Jobey's conclusion that the missile barrage occurred after the destruction of the primary stone rampart, which encircled the hilltop. In areas where rampart and missiles coincided, the projectiles lay immediately on top of or within the tumble. All told, The Project achieved a 94% correlation rate of non-invasively identified to actual sling bullets in our excavated trenches. This provides a significant margin of confidence in our prediction of the projectile spread across the site.

ABOVE The accuracy of the detection survey is shown by the proximity of a marker flag to a partially excavated Type I bullet. Note the dark coloured corrosion caused by the extremely acidic soil. It is small wonder the so many bullets were missed by the early excavators (XXXX). Another find was a 600g carved sandstone ballista ball still in situ within the remains of the tumbled rampart (XXXX).

The assault on Burnswark Hill

So can Burnswark Hill still be considered a training facility? The evidence against this theory is growing ever more compelling. Close examination of the two Roman camps suggests that the earthworks represent a real-world tactical response to the terrain and the level of threat. Their shape and placement betoken their intended purpose of allowing a covering barrage, frontal assault, and rearward blockade.

The type of ammunition also appears to be significant. Rather than stone or clay shot that might be expected of 'expendable' training munitions, the use of carefully moulded lead shot would support lethal intent. The presence of aerophonic missiles also suggests a desire to fray the defenders' nerves, while the variety of missiles indicates the presence of a mixed force of auxiliaries and legionaries.

As Freeman and Pollard observed 'unstratified artifact distributions are the physical evidence for battles, revealing information on the location, extent and character of action'. In this respect the Project confirmed that there was a massive missile barrage at Burnswark. This was not just restricted to the gateways, but extended along a full half kilometre of native rampart. The simplest explanation for this distribution is that defenders on the hilltop were suppressed by a hail of sling bullets with an accurate range of 120m and the stopping power of a modern handgun, as well as ballista balls, ballista bolts, and arrows. This presumably covered an attacking force sweeping out of the three huge gateways and storming the hilltop. Such a combination of missile troops and conventional infantry is likely to have been brutally effective.

What now?

We believe the results of the Burnswark Project allow us to move beyond the practice theory. We may now perhaps turn our attention to when and why these cataclysmic events took place. Could the Roman action have been exemplary force in retaliation for an attack on the newly constructed Hadrian's Wall in the mid to late 120s? Or was it a bloodying of the troops in the early stages of the Antonine assault into Caledonia in the late 130s? The sparse dating evidence makes both scenarios possible. With these thoughts in mind, we plan further minimally invasive investigations within the camps and hillfort in order to unravel a few more of this enigmatic site's mysteries.

RIGHT Ballista expert Alan Wilkins', beautifully reconstructed Scorpion delighted the open day visitors.

SOURCE
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