

Excavations at Garnhall on the line of the Antonine Wall

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ABSTRACT

Excavations at Garnhall, Cumbernauld, revealed a number of features associated with a reasonably well preserved section of the Antonine Wall. These included a series of pits on the berm between the Wall and its ditch, parts of a temporary camp, a stone platform attached to the Wall rampart back and what may be a Roman watch tower in an ideal position to act as an observation post and a signalling link between the Wall forts of Westerwood and Castlecary. The work was carried out by volunteers and students of the Universities of Manchester, Freiburg and Edinburgh, under the direction of the writer, assisted by Dr B Hoffmann.

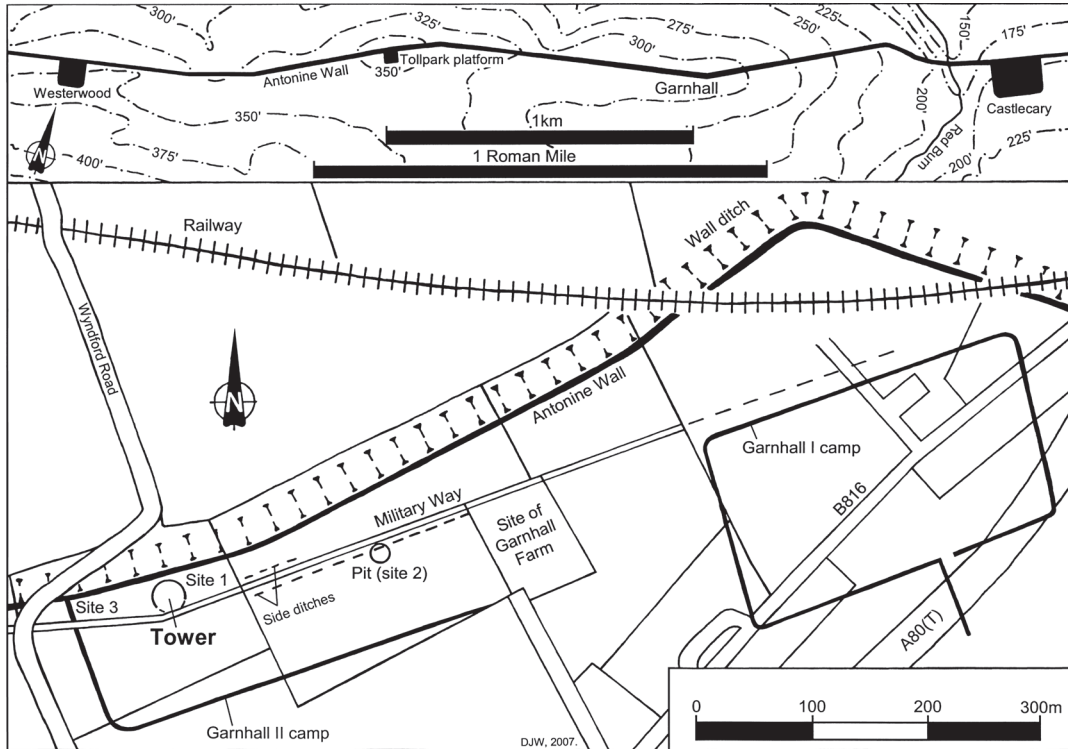
THE SITE

Garnhall (illus 1) lies on the Antonine Wall at NGR: NS 780 779, on an east/west running ridge to the east of Cumbernauld airfield. The name appears to derive from Garranhar (pony or copse field), rather than from an actual hall, and local historian Mr J Kirkhope kindly showed the writer 19th-century estate maps that showed a field (now built over) just to its south that was still marked as such. The position enjoys excellent views in all directions, with the ground sloping away steeply to the north. It lies between the Wall forts of Castlecary and Westerwood, which are not themselves intervisible, and its interest lay in the fact that it is the only point on the frontier line able to see both forts simultaneously, from the likely full height of a Roman tower. This makes it the only part of this sector from which a communications relay between the two could have been operated by means of a single site, using the largely visual signalling techniques available to the Roman army (Woolliscroft 2001: chapter 1) and the excavation was designed to investigate whether

the opportunity had been exploited by searching for possible signals installations.

The length of Wall from which such a link could have been operated is short, perhaps no more than 100–150m, and stretches either side of the dividing wall between the field in which the main excavations took place (illus 1: Site 1) and that to the east. Excavations by Hanson and Maxwell some years ago, just inside the eastern field, found nothing but the Wall itself (G S Maxwell pers comm), but a number of factors anyway made the western field a more likely target. Firstly, *c* 23m in from the eastern end of the field, the Wall makes a very slight turn to the north (too small to show in illus 1), and Antonine Wall installations often seem to be found around such bends (although of course there are many more such bends which lack them). The position is also slightly more central between the two forts and, lastly, for no obvious topographic reason, the Wall's road, the Military Way, swings south as it enters the field from the west (illus 2 & 4), as if to put itself farther from the Wall, so as to avoid some feature situated behind it.

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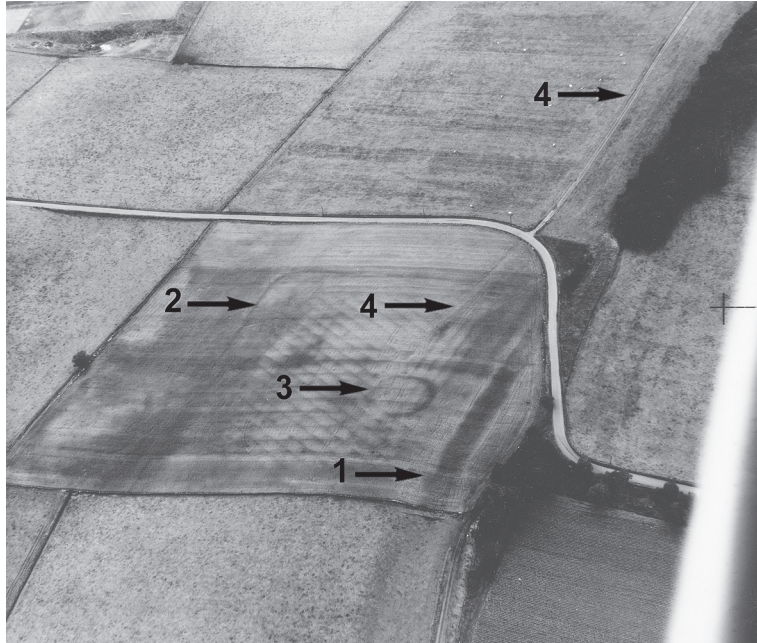
ILLUS 1 Garnhall location plan

As no tower system is currently known on the Wall, to compare with the turrets of Hadrian's Wall, it was initially suspected that there might have been a fortlet at this point. One would not normally expect such an installation here on spacing grounds, because the site is 2.33 Roman miles from Seabegs Wood, the nearest known fortlet to the east, and 3.35 Roman miles from Croy Hill fortlet to the west. There are, however, signs that what usually seems to have been a regular milefortlet series may show a $\frac{1}{3}$ Roman mile correction in this sector and, as the figures just quoted show that Croy Hill and Seabegs Wood are themselves around $5\frac{2}{3}$ Roman miles apart, a milefortlet remained a possibility in view of the site's signalling potential (Woolliscroft 1996: 160ff). It has, however, always seemed unlikely that the Antonine Wall would lack some form of tower system, given that towers

form such an ubiquitous feature on other Roman frontiers and, as the spacing figures quoted put the site close to a multiple of the $\frac{1}{3}$ Roman mile Hadrian's Wall turret interval from both of its nearest known fortlet neighbours, a tower was also a possibility.

SURVEY WORK

In 1991, three particularly informative air photographs of the site (CUCAP Negs: ADU73 (illus 2) & TV80, plus another from the collection of the late Prof G D B Jones (illus 3)) were brought to the writer's attention. The first showed the Antonine Wall ditch (illus 2: arrow 1) with the course adjustment mentioned above, the Military Way (illus 2: arrow 4) and the ditch of a temporary camp inside which the site was



ILLUS 2 Garnhall from the air: 1. The Wall ditch; 2. The temporary camp ditch; 3. The ring ditch; 4. The Military Way. Copyright reserved Cambridge University Collection of Air Photographs



ILLUS 3 The eastern possible Garnhall ring feature, from the air (arrowed). Photograph copyright G D B Jones

known to lie (illus 2: arrow 2). It also showed a circular feature (illus 2: arrow 3), albeit one that became markedly fainter towards the south. This appeared to be a ring ditch slightly over 25m in external diameter, situated close behind the Wall and occupying the space between it and the Military Way. As mentioned, the road swings a little to the south at this point and it began to appear possible that it was this structure that it was turning to avoid. The other pictures showed a similar, but slightly smaller, ring (illus 1: Site 2 & illus 3, arrowed) *c* 240m to the east (NS 782 779), although in this case, the feature appeared to intersect one of the side ditches of the Military Way. No surface indications survived at the western feature, but the eastern ring is still marked by a slight (*c* 20m diameter) circular depression.

Ring ditches are common in various archaeological periods and their presence here was no guarantee that they were either Roman, or in any way connected with the frontier. Nevertheless, given their close proximity to the Wall, they did seem worthy of greater attention. It has long been tempting to assume that any turrets on the Antonine Wall must be incorporated into the structure of the Wall, in the manner of Hadrian's Wall turrets. As a result, archaeologists have looked for further examples of the known enclosures and expansions, or for towers built into the Wall turf stack, perhaps along the lines of a fragmentary structure found by Bailey (1995) at the eastern end of Callendar Park, Falkirk. Such a configuration is far from universal, however, as the towers associated with other Roman frontiers are often separated from the line. The towers on the Gask system in Scotland, for example, can lie some way from the frontier road, but the Gask has no running barrier and a better parallel might be the towers on the non-stone sectors of the German Limes, which are free standing structures, usually surrounded by ring ditches, 20–5m in diameter. These are always set back slightly from the frontier line, and so the possibility existed that, if the Garnhall features were Roman, they might represent similar towers.

Possible support for this idea came from a probing survey in the western field. This suggested that the Wall's stone base entered the field from the east on a south-westerly course, parallel to the ditch and *c* 4.3m wide. Some 23m into the field, both the Wall and its ditch made the small turn to the north already mentioned, but the angle turned by the Wall appeared to be slightly greater than that of the ditch, thus causing the berm to narrow. Nineteen metres farther west, the Wall then made a further slight turn to the south to run parallel with the ditch once more, which gave the impression that the Wall, like the road, had turned to avoid the circular feature, suggesting that this may represent something that was planned or (perhaps more probably) in use at the time the Wall was built. It seemed most unlikely that such pains would be taken to avoid a native structure, but they might have been for a tower. At the same time, two concentrations of stone were found in the area east of the ring ditch, on a probed line 2m behind the Wall's south kerb. These lay *c* 18m apart at their closest and each was *c* 3m wide, with the more westerly concentration lying *c* 10m to the east of the ring ditch. They lay at either end of the stretch in which the Wall seemed to be closing with its ditch and could be traced north as far as the Wall itself, raising the possibility of fortlet side ramparts. The subsequent excavations were, however, to prove some of these results to be misleading.

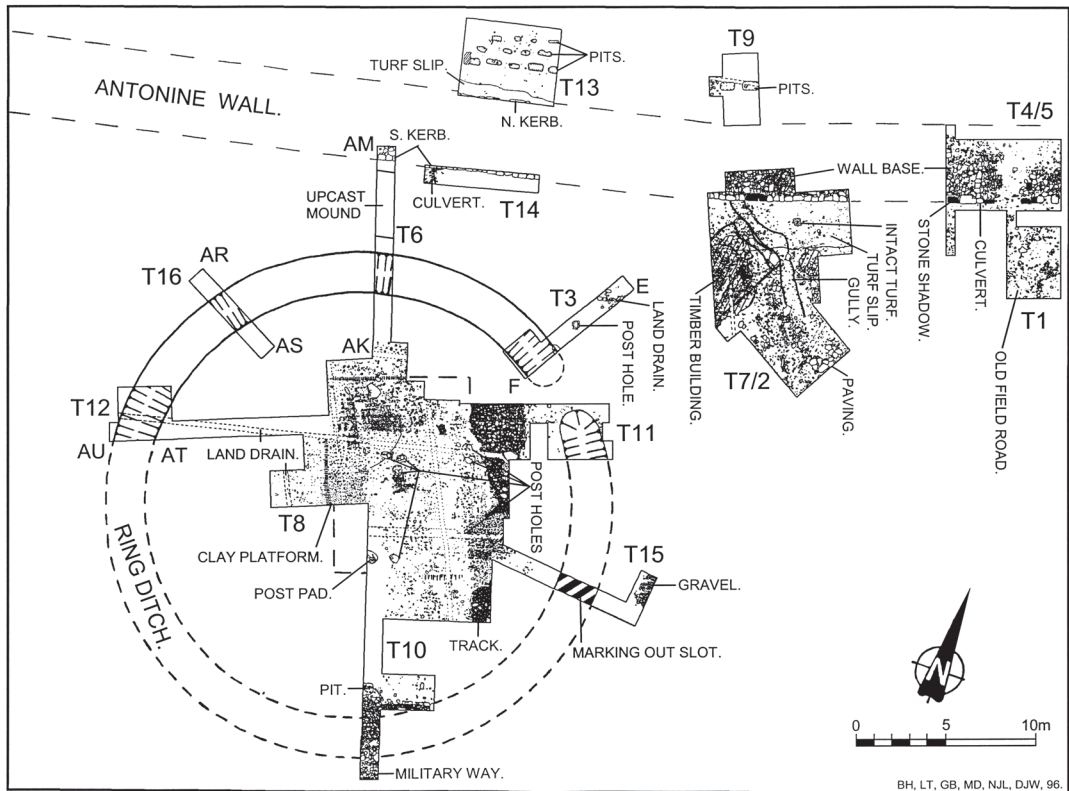
To supplement the aerial and probing evidence, three resistivity surveys were conducted. The only meter available to the project at the time, an elderly Martin-Clark five probe, proved to be poorly balanced, which resulted in severe banding in the images and renders them unsuitable for publication, but the results were of value nonetheless. The first covered most of the western ring feature and an area immediately to its east. This revealed the Wall base and Military Way as high resistance bands, along with indications of the ring feature itself. The latter were unusual in that the ditch also appeared as a band of high resistance, where

lower readings would normally be expected, thus suggesting a high stone content in the fill. Even more than the cropmark evidence, however, these indications became weaker towards the south and, indeed, became undetectable in the south-east.

The second survey examined the eastern ring feature (illus 1: Site 2), but added little beyond showing a circular area of low readings to correspond with the surface hollow, and an east to west running line of low readings which matched the aerial traces of the southern side ditch of the Military Way. The road itself was represented by a band of high readings, with indications that the ring feature had indeed cut into it, thus making it less likely that the ring was associated with the Wall. There was no sign of a ring ditch around

the hollow, even though the dark circular crop mark seen from the air appeared to imply one, although it is not unknown for Roman tower ditches elsewhere to be backfilled by digging into the interior, thus producing similar hollows (Woolliscroft & Swain 1991: 25).

The final survey (illus 1: Site 3) covered the intersection between the Wall and the temporary camp defences. It showed the Wall base as a band of high readings, with the camp ditch marked by a faint strip of low readings heading off to the south at right angles. To the east of the ditch, and parallel to it, was a band of higher readings which presumably indicated the remains of the camp rampart and, where this approached the Wall, a curious elongated area of still higher readings was detected, at least 11m long, with



ILLUS 4 Site 1: plan

its long axis running parallel to the Wall and extending back from it by *c* 2.5m. The proximity of the field boundary and a modern road made it impossible to survey more than a metre or two to the north of the Wall and much of the area that was available was masked by fallen and half-buried stones from the field wall. As a result, although no trace of the camp ditch could be detected on this side, and none was visible from the air, this cannot be taken as firm evidence of its absence.

THE EXCAVATIONS

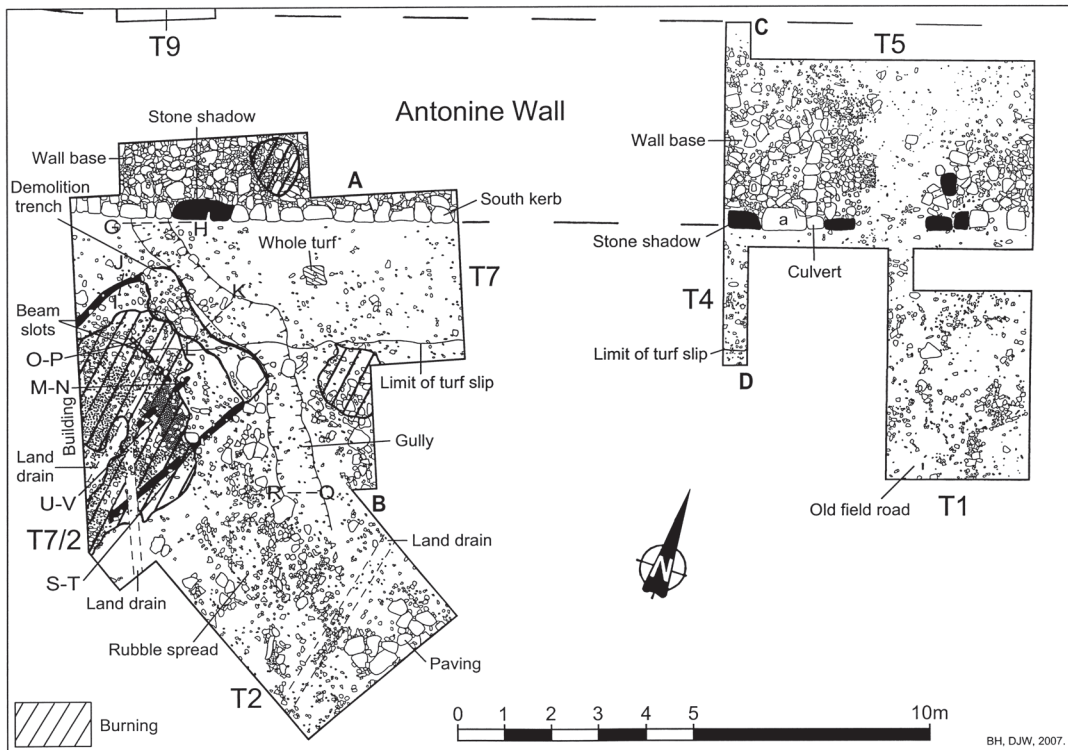
SITE 1: THE WESTERN RING DITCH

The Site 1 excavations fell into three principle areas, which are best dealt with separately.

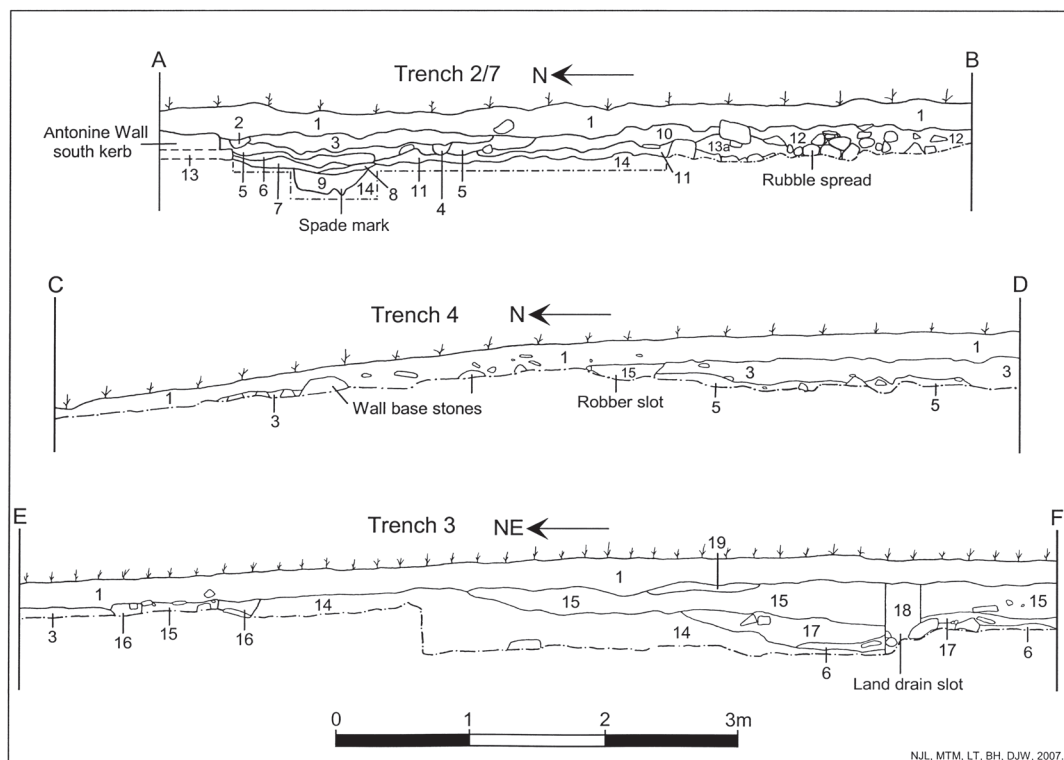
Area A: The East

Two groups of trenches were dug (illus 4 & 5). Trenches 1, 4 and 5 were located around the easternmost bend of the Wall, as shown by the probing survey, and should have taken in the eastern concentration of stones behind the Wall. They were designed to confirm the bend and to investigate the possibility of a fortlet rampart base. Trenches 2 and 7 (which were eventually amalgamated) were sited a little to the west, to further investigate the Wall base, with Trench 2 set back slightly from the Wall line to study any possible fortlet interior.

Trench 1 revealed a layer of cobbling lying immediately beneath the topsoil (illus 5). It was badly disturbed by the plough, but one or two small patches did survive substantially intact and here, at least, it consisted of a single



ILLUS 5 Site 1, west: plan



ILLUS 6 Trenches 3, 4 and 7/2: sections: 1. Topsoil; 2. Orange sand; 3. Orange/brown gritty clay; 4. Charcoal; 5. Grey/brown turf slip; 6. Pale grey to white turf fragments; 7. Orange/grey silt; 8. Gritty grey silt; 9. Pale grey silt; 10. Burnt daub; 11. Grey/brown silty loam; 12. Pale brown loam; 13. Brown loam; 14. Natural orange clay; 15. Grey/brown loam; 16. Brown clay with stone chips; 17. Grey loam; 18. Mixed brown loam and clay; 19. Gravel

layer of closely packed worn stones of fist size or slightly larger, mixed with a few more substantial stones and lying on a 0.35m thick layer of an orange/brown gritty clay. There was no sign of a rampart. The orange/brown clay layer was initially interpreted as natural, but later proved to overlie a layer of greasy grey clayey material, which deepened as it approached the Wall, and overlay its south kerb. This therefore appeared to be turf slip derived from the Wall superstructure, so that both the orange/brown clay and the cobbling post-date the Wall's collapse. Old estate maps in the possession of the land owner, Cumbernauld Development Corporation, show that there was once a north/south running field road at this point which can

probably be identified with this cobbling, but no datable finds were recovered.

Trenches 4 and 5 were dug, a little to the north of Trench 1. Trench 4 began as a narrow test slot, and located the south kerb of the Wall on a line running 1.3m to the north of Trench 1 and roughly parallel to its north baulk. The one south kerbstone within the trench had been removed, but the Wall base here was built from pieces of an iron-bearing sandstone and the missing stone had left a clear rust-coloured imprint in the soil beneath it. A narrow slot was found in section leading down to where the stone had sat (illus 6: Section C–D, Layer 15), but whether this was a deliberate robber cut dug to remove it, or a trace left by the stone being ploughed out was

unclear. It had, however, cut a layer of greasy grey/brown material, which stretched away to the south (Layer 5) and was probably turf slip, along with an overlying layer of orange/brown gritty clay, identical to that found in Trench 1 (Layer 3). The removal of the kerb stone must thus have post-dated the formation of both of these contexts. A 3.88m width of the Wall base had survived and was well preserved in the south. Farther north, however, it became progressively more plough damaged as the topsoil above it became shallower and, as there was no sign of the north kerb, even as stone shadows, it was impossible to obtain an accurate measure of the Wall's original width.

Trench 5 extended Trench 4 to the east (illus 5), and was eventually linked to Trench 1 by a narrow slot. The northern part of the Wall base continued to be badly damaged but, except in one small area towards the middle of the trench, the southern 2–3m remained well preserved, with several of the south kerb stones either present or marked by clear stone shadows. The Wall ran through the trench in a straight line, with no indication of the anticipated bend. As in Trench 4, the core was made up predominantly of closely packed, undressed, mostly iron-bearing stones of 0.15–0.25 metres cubed (rather smaller than in some places elsewhere, eg Bearsden cemetery), whilst the kerb stones consisted of roughly squared blocks of the same material, c 0.25–0.4m high and deep, and between 0.3m and 0.8m long. Most of the core material consisted of roughly quarried rubble, but a few geologically different stones had also been used, such as a number of water-worn cobbles, and the largest of the kerb stones (a in illus 5) appeared to be a semi-dressed glacial erratic. A line of larger flat stones passed at right angles from north to south, 1.65m from the west baulk, right through the Wall base, and presumably represented the base of a stone culvert. To the east, the Wall base was of a slightly different construction, for the core stones were noticeably smaller than those used farther west, with many no bigger than fist size, albeit some larger stones

were still present. The entire core to the east of the culvert, although not the kerb stones, also lay on a thin bed of gravel, which was absent to the west and it is not impossible that the drain may have acted as the demarcation line between two construction teams, using slightly different methods. That said it is equally possible that the difference shows little more than the result of two wagon loads of slightly differing material.

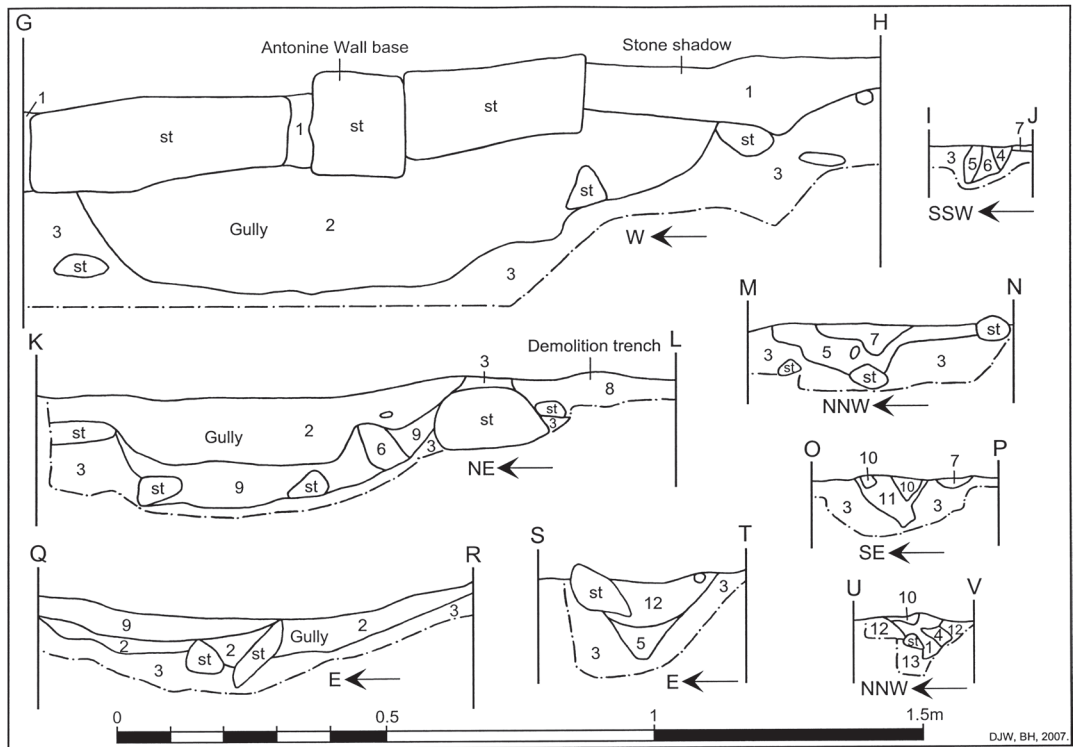
Just over 1m to the east of the culvert, the Wall base ended abruptly in a near straight edge, roughly at right angles to the south kerb, and was then entirely absent for c 1.5m except for a light scattering of gravel. It then reappeared, albeit in a somewhat poorer state of preservation. This gap gave initial hopes for a fortlet gate, perhaps providing a gap in the Wall that had been followed by the later field road, but closer inspection produced stone shadows for at least parts of the missing south kerb (black in illus 5), whilst a feature initially interpreted as a posthole c 0.7m north of the kerb, proved to be just a c 50mm deep shadow mark left by a large missing stone from the core. In fact, the area was deeply plough marked and the gap is probably just the result of plough damage, whilst the gravel, which was initially interpreted as metalling, was probably the ploughed up remnants of both the field road and the gravel bed on which this section of the Wall base sits. No datable finds were made and the Wall base here carried no trace of surviving turf work.

As expected, Trench 2 made no contact with the Antonine Wall, but it did reveal a heavy – if badly plough damaged – rubble scatter running north/south, roughly at right angles to the frontier line (illus 5). This consisted of similar sized or slightly smaller stones to those found in the Wall base to the west of the Trench 5 culvert (albeit not iron bearing) and, at first, it was thought that it might represent the remains of a somewhat narrower (2–2.5m wide) rampart base running south from the Wall itself. To the east of the rubble spread, the southern part of the trench contained a plough-disturbed area of stone flag paving, whilst in the north-west, a spread of

burned, organic rich, orange clayey material was found, which contained numerous pieces of carbonised twig and appeared to be daub.

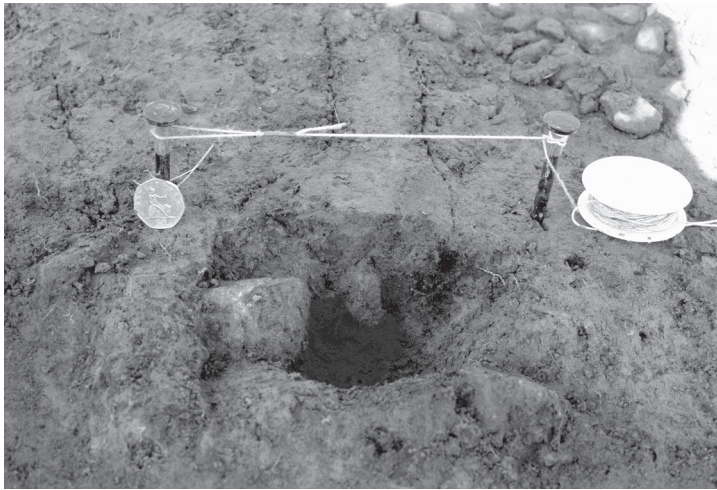
Trench 7 was opened a little way to the north of (and eventually joined to) Trench 2 to test the hypothesis that the rubble spread might have been part of a fortlet side rampart and, if so, to see if the feature made a junction with the Wall. The southern part of the Wall base was again found in an excellent state of preservation (and identical in construction to the western part of Trench 4/5) although, towards the trench's west end, it proved to make a very slight turn to the north, rather than the anticipated turn to the south. No extension of the Trench 2 rubble spread was uncovered, however. Nor did it appear likely

that anything had joined with the Wall and since been ploughed away, for the kerb stones were almost all still in situ and presented a blank face. Instead, what appeared to be a coherent complex of features was discovered in the western half of the trench. Firstly, a flat-bottomed slot, 3.5m long \times c 0.5m wide, was found with its long axis oriented north-west to south-east (illus 5 & 7: section K–L, Layer 8). This contained a dark grey silty loam with stone fragments and a few larger stones. At both ends of this feature, light beam slots (still holding scanty carbonised remains of timbers (illus 8)) ran off to the south-west at right angles, and so parallel to one another. These varied somewhat in size along their lengths, but averaged 0.15m wide and 0.1m deep (illus 5 &



ILLUS 7 Trench 7/2, sections through the gully and beam slots: 1. Dark brown loam; 2. Orange/grey silt; 3. Yellow/orange clay; 4. Charcoal; 5. Dark grey loam with charcoal; 6. Dark grey loam; 7. Charcoal and burnt daub; 8. Dark grey silt; 9. Grey silt; 10. Burnt orange daub; 11. Dark brown sandy loam; 12. Yellow sandy loam; 13. Grey gritty clay

7: sections I–J & S–T). The southern example ran perfectly straight, but the more northerly was less so, as it curved to the south towards its north-east end and thus presumably held a naturally bending branch, rather than a neatly sawn timber. Nevertheless, they formed a rectangular pattern with the end slot, which might thus represent a demolition trench for the removal of another beam, and the combination seems



ILLUS 8 Small burnt beam slot from the Trench 7/2 building, in section

likely to represent the foundations for one end and two sides of a structure. Both sides passed through the western baulk and time did not allow the trench to be extended to determine the full extent of the structure but 5.09m of its southern side were uncovered, to give a proven area of greater than 17.8m². The structure's interior had been damaged by animal burrows, modern land drains and ploughing, but patches of a gravel floor survived, along with what may be signs of internal partitioning. Two more similarly sized beam slots were located, one running parallel with the possible demolition trench (and 0.72m inside it) and the second parallel with the side slots (*c* 1m inside the southern example). The first was preserved to a length of 1.28m (illus

5 & 7: section O–P), and the second to 1.5m (illus 5 & 7: sections M–N & U–V), although in the latter case the slot ended in the disturbance caused by a land drain, and so may once have been longer. The gravel floor had been partly ploughed over these slots but, as none of the intact areas of flooring overlay them, it seemed at least possible (albeit not proven) that whatever structure they had held had originally projected through the floor, rather than belonging to a foundation or earlier phase. The structure had burned down, charring the side slots and forming a substantial layer of burned material which almost entirely covered the interior and stretched a little way to the south into Trench 2. This again consisted largely of orange clayey material, which probably represents daub from a superstructure, but this time, there were also substantial quantities of fine black purer charcoal, which could derive from the burning of a thatched or timber roof. This might

indicate that the structure had been a building, rather than a simple open-air raft or platform. A further patch of similar burning was found just over 1m to the east of the demolition trench, and so fierce had the conflagration been that the subsoil around the carbonised beams was scorched red. This was not true of the possible demolition slot fill, however. This consisted of a fairly clean dark grey silt which was not even scorched at its top (illus 7: Section G–H, Layer 8). It did however, contain some charcoal flecks and might thus represent the salvage after the fire of a still usable timber, followed by a silting process, which filled the resulting hollow, and in which small amounts of the burning debris were washed in.

To the immediate east of the demolition slot, ran a roughly cut and somewhat meandering gully, on average 0.8m wide, with a shallow, saucer-shaped profile just 0.15–0.2m deep and filled with an orange/grey silt (illus 5 & 7: sections G–H, K–L & Q–R, Layer 2). Only small sections of the feature were emptied of silt but here, at least, its channel had a fairly flat bottom with some gravel embedded into the natural clay. It stretched from the Antonine Wall base, which it underlay, c 8m south-eastwards into Trench 2, becoming progressively shallower to the south until it could no longer be traced due to plough damage. Towards its northern end it contained a small quantity of unburnt coal.

No datable artefacts were recovered from these features. Indeed the only find was a single square sectioned iron nail found amongst the fire debris inside the building, which does at least suggest a date between the Iron Age and the Industrial Revolution.

Nevertheless, a relative sequence can be provided. The gully may have been contemporary with the rectangular building, or at least dug whilst that structure was in use, as it respected its north-east end and, indeed, dog legged around it (albeit this could be coincidence). The gully had silted completely by the time that the building burned down, however, for its fill layers consisted wholly of clean silt, and the burning debris overlay this. The building must thus have outlived it, although it is difficult to estimate by how long. The gully did, however, cut through parts of the rubble spread farther south in Trench 2. If the gully was contemporary with the rectangular building, both should thus post-date this spread, although no other stratigraphic connection had survived the plough. The gully also proved to

be earlier than the Antonine Wall, as it passed beneath it with no provision, such as a culvert, made to accommodate it (illus 7: Section G–H, Layer 2 & illus 9). Instead there were clear signs that it had silted up completely before the Wall base was laid directly over its top.

Much of the Wall base stood on a well-consolidated brown loam, which differed from the layers immediately around it and did not



ILLUS 9 Gully in section passing beneath the Antonine Wall base

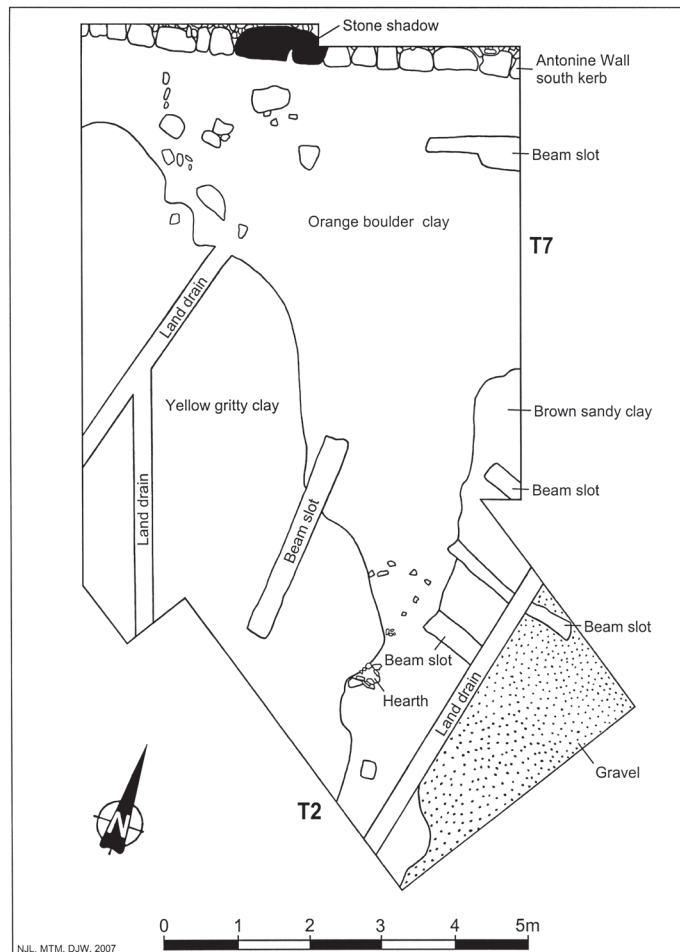
appear to have been deliberately deposited, if only because it was extremely homogenous. This presumably represents the original pre-Wall ground surface and its absence elsewhere can be assumed to result from turf stripping for the construction of the rampart. Illus 4 (Section –B) shows a typical view of the situation, in which this original turf (Layer 13) had been removed to within 0.1–0.15m of the Wall's south kerb, leaving a broad turf stripped depression, 3.6m wide, to the south, later filled by Layers 3, 5–8, 10 and 11. Yet the same section also shows that a small amount of what may have been the same material as that underlying the Wall base (Layer 13a), had survived over the Trench 2 rubble spread. If so, this would show that, as anticipated from its relationship with the gully, this too was earlier than the Wall, but the fact that parts of the

surface here were not removed might suggest that it had only been buried fairly shallowly at the time the Wall was constructed and thus failed to yield good building turf.

The position regarding the possible rectangular building was rather less certain, however, not least because plough damage left it far from clear whether it had been turf stripped. If, as suggested, the building was contemporary with the gully, then its construction would also predate the Wall but, unlike the gully, it is possible that it had not ceased to exist when the frontier was built which, given the likely life span of such a light timber structure, might suggest that it may not far predate the Wall. The evidence for this was somewhat indirect and came from the area just to the east, already mentioned, where a slight hollow had survived that was presumably created by turf stripping for the Wall. This had filled with a number of thin layers, all of which were sealed by substantial amounts of clean grey greasy material which appeared to derive from the Wall and which probably represented turf slip (illus 6: Section A–B, Layer 5) from its eventual collapse. One of these layers (Layer 10) was a clear band of burnt organic rich orange clayey material and charcoal, identical to the burning from the rectangular building, where, as stated, it almost certainly represented burnt wattle and daub. But this overlay a number of mud and silt deposits (Layers 8 & 11) which were laid down after the area had been turf stripped and so may represent trample associated with the Wall's construction and use.

Assuming that Layer 10 did also derive from the building fire, this makes it seem likely that the structure was still standing when the area was turf stripped and, indeed, that it did not burn down for some time after the Wall was built, although uncertainty obviously remains.

To the south of the Wall, the top layers of the turf slip were badly plough damaged and mixed with an orange/brown gritty clay material (Layer 3), similar to that seen in Trench 1. Towards the bottom of the slip, a layer of more completely preserved turf fragments had survived (Layer 6), including one fully intact turf which measured $0.44 \times 0.4\text{m}$ (illus 5).



ILLUS 10 Plan of the early features in Trench 7/2

A final point of note at this level was a circular area of burning, just over 1m in diameter, found on the Wall base itself in the north-eastern corner of a northward extension of Trench 7 (illus 5). This differed from the remains of the building fire to its south in that it contained only charcoal and wood ash, with no trace of daub. It rested directly on the stones of the Wall base core, which had been heavily scorched and blackened, and much of the burnt material was found in the interstices between the stones, where it had survived the plough. There was no sign of even the least skin of turf between the burning and the base stones, although turf had survived between the stones elsewhere. It thus appears likely that the fire, presumably a bonfire of some sort, took place whilst the Wall was under construction, at a time when the base was assembled but the turf superstructure had not yet been laid over it.

Trench 2 and the western part of Trench 7 revealed a number of earlier features underlying those already described (illus 10). In the north-east, a silted up slot was found projecting from the baulk and running roughly parallel to the Wall. This lay at the bottom of the turf-stripping depression mentioned above, but at least appeared to be a separate feature. It was mostly square in section, suggesting a beam slot, but if so the beam itself had clearly been dug out, since the slot was badly disturbed towards the baulk and what appeared to be a spade mark could still be made out in its side at one point (illus 6: Section A–B, Layer 9 & illus 11). The beam would have been 0.27m wide and the slot survived to a depth of

c 0.15m, but its length could not be ascertained as time did not allow the rest of Trench 7 to be excavated to this level. The slot had filled with silty material, suggesting that the site may have been abandoned for some time after the removal of the timber.

Some 4.1m to the south-west lay a second, heavier slot 2.9m long, 0.29m wide and surviving to a depth of 0.12m. This too was square in section and rectangular in plan, and appeared to



ILLUS 11 Trench 7, possible beam slot in section

be another beam slot. But it ran on a south-west to north-east alignment, which appeared to bear no relationship to the first slot or, for that matter, to either the Wall or the rectangular building above. To the south of this, beneath the gully, lay a small, rough hearth of scorched stones, beyond which, on the other side of a modern land drain slot, lay a substantial area of worn compacted gravel, whose northern edge had been removed by the drain in all but the south-west corner of the trench, and which extended beyond the excavated area. Charcoal from the hearth produced a 2 Sigma calibrated ^{14}C date of 210 BC–AD 60 and thus provides a *terminus post quem* for all of the later features.

Finally, in the eastern part of Trench 2, three lighter slots (0.14–0.23m wide and 50mm deep) were found crossing the line of the land drain on a slightly north-west/south-east alignment. These too seemed likely to be beam slots and they ran parallel to each other (c 0.65m apart), at an angle to the northern slot but roughly at right angles to the heavier slot to their west. The middle example was found on both sides of the land drain and was cut by it. It was 2.1m long, not entirely straight, and its south-eastern end was deformed as if the timber had been dug out. The resulting damage to the gravelled surface made it impossible to tell if the slot had originally been cut through it or overlain by it, although the former might be easier to envisage. The westernmost slot was not traced south of the drain, even when the gravel was removed to look for it, and only 0.6m of the eastern slot projected from the trench baulk. The flagging found in level 1 overlay the gravel surface and was separated from it by a thin (10–15mm) layer of brown humic soil.

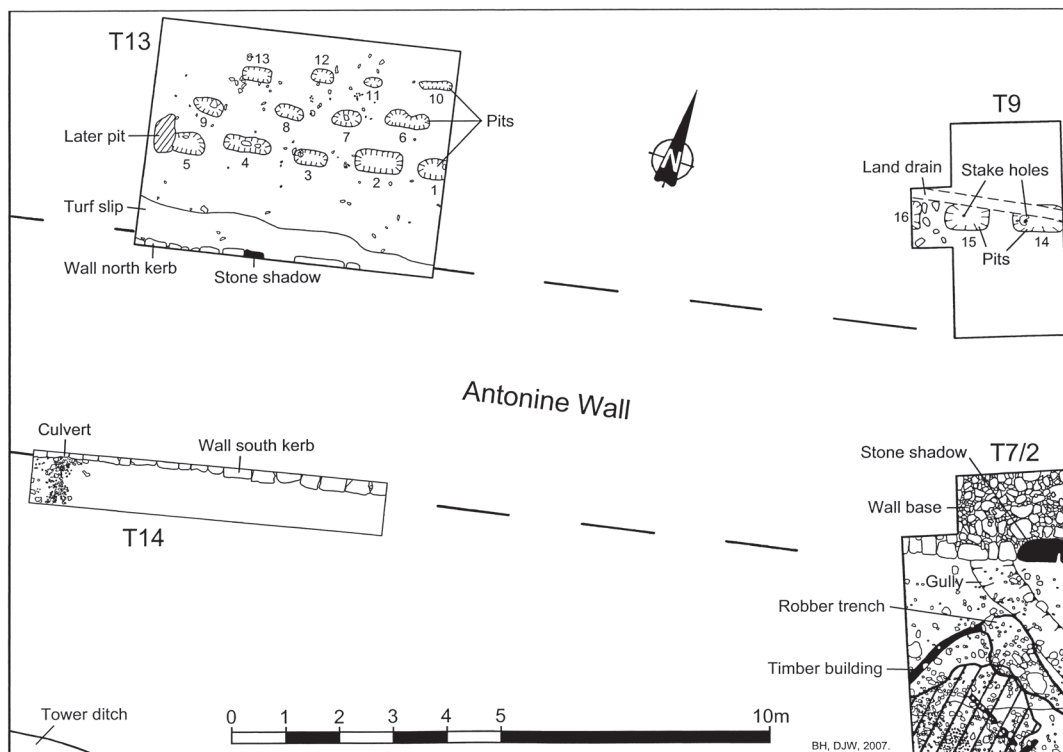
The stratigraphic relationships between these early features had been obscured by subsequent activity. They may well represent more than one phase of activity, but how the southern group of four slots related to each other, the hearth or the gravel layer, let alone to the northern slot, could not be determined. They were, however, all earlier than the features found above and they are certainly earlier than the Wall. For example, as already mentioned, the original turf (illus 6: Section A–B, Layer 13) had been stripped to a point just c 0.1m from the Wall's south kerb. Various layers of mud and silt had then formed in the resulting hollow (Layers 7, 8 & 11), probably trampled in by the turf strippers and the Wall's builders and operators. But, the pale grey silt (Layer 9) which filled the most northern beam slot was very distinct from and overlain by these layers (illus 11), which suggests that the timber had already been removed and the slot had silted up before the turf stripping took place. If so, this might explain why the slot, as preserved, is so shallow, since part of it may have been dug away along with the turf.

The more southerly timber features, along with the hearth and gravel layer, predate the rubble spread and paving which overlie them, especially as no signs of walls or foundation trenches were found, so that the rubble may not have come from a building. Whatever the case, the rubble also predated the Wall, for it was cut by the gully, which itself predates the Wall. Likewise, its northern end was overlain by burning from the possible rectangular building, which means that it also predates at least the destruction of that structure. It is worth repeating, however, that there was a brown loam layer (Layer 13a) overlying the least disturbed areas, which appeared to be identical to the buried soil underlying the Wall base, and the soil elsewhere amongst the rubble was a plough disturbed version of the same material (Layer 12). This might suggest that this area had grassed over by the time the Wall was built, but was not turf stripped. Possibly the Wall builders discovered a thin soil overlying the rubble and paving that provided poor turfs which were difficult to cut out and carry intact and so ignored the area, although this cannot be regarded as certain.

Area B: The Wall Berm

Three more trenches were dug to the north and west of Trench 7/2 to further study the Antonine Wall itself (illus 4 & 12).

Trench 9 made another attempt to look for the Wall's north kerb in order to obtain an accurate width measurement, and it was also designed to study the berm. Shortly before the excavation a series of pits had been found on the Wall berm at Callander Park, Falkirk (Bailey 1995: 582f) and it seemed worthwhile to see if such pits might also be present at Garnhall. In the event the Wall's north kerb proved to have been completely destroyed, along with any trace of turf slip, but a series of three sub-rectangular pits was found on the berm. These measured c 1m (east/west) by c 0.5m (north/south), where seen in full. They were separated by c 0.45m gaps and they ran in a line parallel to the Wall base's surviving south kerb. It should be admitted that there was no firm



ILLUS 12 The Wall berm pits in plan

stratigraphic evidence to prove that the features were contemporary with the Wall, although this does appear highly probable.

An attempt was made to record sections through the pits, but constant flooding from a nearby land drain made this impossible. Nevertheless, it was possible to establish that they were 0.15–0.2m deep, and two (at least) had well preserved (30–40mm diameter) stake holes in their bottoms. That in the centre pit lay close to the middle of the pit floor, whilst that in the easternmost pit lay towards its west end and, unlike its parallel, was stone chocked. A c 55mm thick layer of silt had formed in the pit bottoms, above which they had been completely filled in with a uniform layer of clay which closely resembled a disturbed version of the natural orange/brown boulder clay found throughout

this part of the site, except that it had a very slight pinkish tint. This would suggest that they had only lain open for a fairly short time before being deliberately backfilled. The stakes could not be seen penetrating the clay fill, which may thus represent a tidying up deposit, although such small features could have been missed in the very wet conditions. Nor had any signs survived that the features had earlier been re-cut to replace the stakes. Two of the pits had been damaged by the land drain, but fortunately this had been neatly cut so that the disturbance to the remaining parts of the features was minimal. The westernmost pit had suffered no such damage but it only just projected from the west baulk and time did not allow the trench to be lengthened to permit its total excavation. No further pit lines could be seen either to the north or south of those

excavated. Possibly none were to be expected any closer to the Wall, where they might have been a structurally destabilising influence. To the north of the known line, however, the ground surface had been so heavily plough eroded into the Wall ditch that any pits that may once have existed there could well have been totally destroyed.

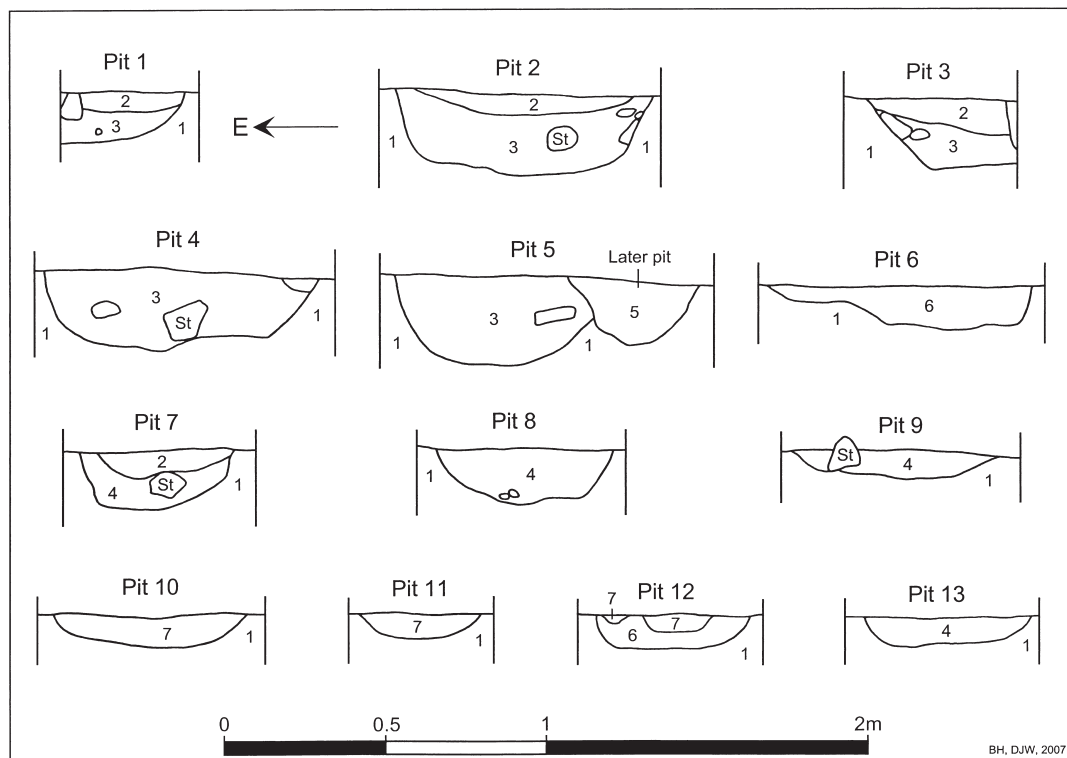
A larger area, Trench 13, was opened 10m farther to the west to see if comparable features could be found. This encountered a much better state of preservation and revealed not only additional pits but also, for the first time on the site, a more or less intact length of the Wall base north kerb, accompanied, and partly overlain, by a thin, narrow layer of slumped rampart material. Three rows of pits were uncovered (13 pits in all) arranged in a quincunx formation (illus 12 & 13). The individual pits were broadly similar to



ILLUS 13 Wall berm pits in Trench 13, half sectioned

those found in Trench 9, with the southernmost row surviving at much the same size and running 1.7m from the Wall kerb. The pit fills consisted largely of a grey/brown loam which was only slightly silty and may thus have been dumped rather than being the result of gradual silting (illus 14). There were no signs of re-cutting or cleaning. As a result it was harder to estimate the life span of these features, although it is possible that they may have been open for at least as short a time as those to the east. None of them showed signs of stake holes, however, despite a careful search. In this less-damaged area, the southernmost pits survived to depths of up to 0.28m, with the rows to the north becoming progressively shallower due to plough damage. By projecting the angle at which this shallowing took place (assuming that the pits would once have been all of much the same depth), and projecting it up to the base of the undisturbed turf slip, it is possible to estimate that the southernmost row had lost roughly 0.2m from their original depth, so that they might once have been in the region of 0.5m deep. The trench was taken far enough north to intersect the anticipated line of any fourth pit row, but none were encountered and it is possible that only three rows were dug. Since the northernmost excavated row had only survived to between 50mm and 70mm deep, however, and the plough damage again grew progressively worse towards the ditch, this must remain uncertain, for any more northerly rows may well have been completely erased. The westernmost of the southern pit line had been cut by a later, less regular pit. This was roughly the same size as the berm pits, but its long axis ran north/south, rather than east/west and it was both shallower and more rounded in profile. It also had a different fill of dark grey loam, similar to the modern plough soil (illus 12 & 14: Pit 5, Layer 5) and, although it cannot be proven, it may well be considerably more recent.

On the discovery of the intact stretch of north kerb in Trench 13, a parallel slot, Trench 14, was dug immediately to the south to look for the south kerb. Only the kerb stones themselves



ILLUS 14 Trench 13, sections through the Antonine Wall berm pits: 1. Natural boulder clay; 2. Mixed orange clay/loam with grey silty clay; 3. Grey/brown silty loam with dark grey patches; 4. Mid brown silty loam; 5. Dark grey loam; 6. Brown/grey silty loam; 7. Orange/brown loam

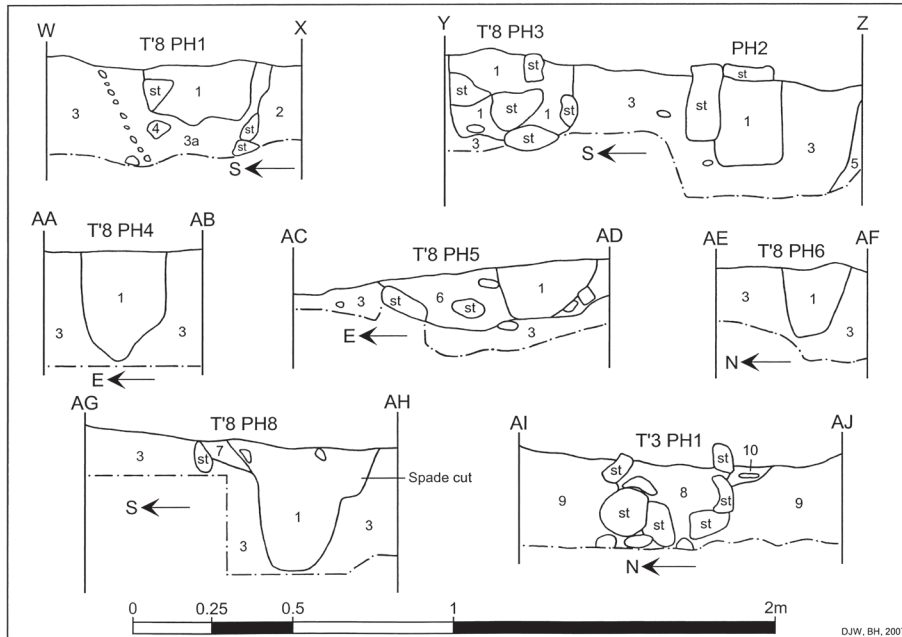
were uncovered, but these proved to be fully preserved and showed that the Wall base here measured 4.3m wide and ran on a slightly more northerly course than in Trench 7/2. The kerb stones themselves were identical to those found elsewhere on the site, except that the westernmost example was set 0.2m beneath the level of the others and so may well represent the mouth of a second culvert, 32.41m (110 Roman feet) to the west of that in Trench 5.

Area C: The Ring Feature: Ditch Sections

Six sections were cut by Trenches 3, 6, 10, 11, 12 and 15 (illus 4).

Trench 3 confirmed the existence of the ring ditch detected through aerial and geophysical

survey (illus 6: Section E–F, Layers 6, 15 & 17). It was found to be c 2.5m wide but its full depth could not be ascertained, as this would have entailed destroying a modern land drain which ran diagonally across the western end of the trench (Layer 18). Within the area revealed, the ditch had been filled with a pale grey (occasionally white) greasy, clay-like material (Layer 6), which may have been degraded turf, overlain by grey/brown loam (Layer 17) and finally by a thick deposit of brown loam (Layer 15). All of these layers contained large quantities of a similar iron-bearing sandstone to that used in the Wall base. Indeed, so much stone was present in the exposed upper part of the fill, and the ditch sides were so clear cut, that this layer



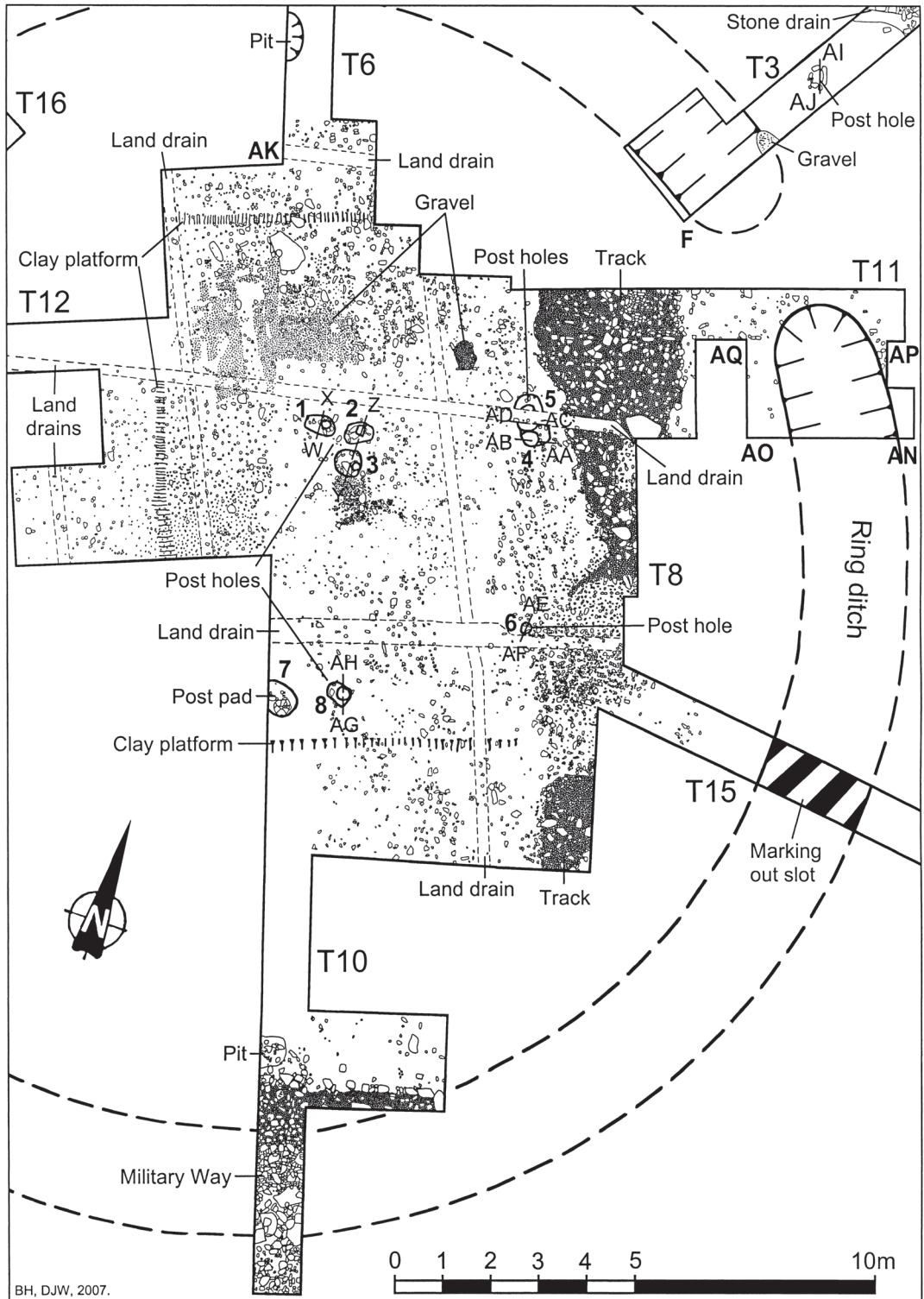
ILLUS 15 Tower area, posthole sections: 1. Grey/brown loam; 2. Orange/brown clay; 3. Natural purple/orange clay; 4. Dark brown clay; 5. Hard grey clay; 6. Yellow/brown gritty sand; 7. Mixed brown loam and clay; 8. Brown loam; 9. Brown loamy clay with sandstone flecks; 10. Brown loam with sandstone chips

was initially interpreted as a wall foundation (although this was not clear in the recorded section), and would certainly explain why the feature yielded such high resistance readings. The western 2m of the trench were extended 1m farther to the north in an attempt to work around the land drain and obtain a full section. In the event, however, this served only to confirm the picture already obtained, and the ironstone found in the fill here covered the ditch top with such a continuous layer of fused iron oxide and stone fragments that it initially resembled a sheet of corroded iron.

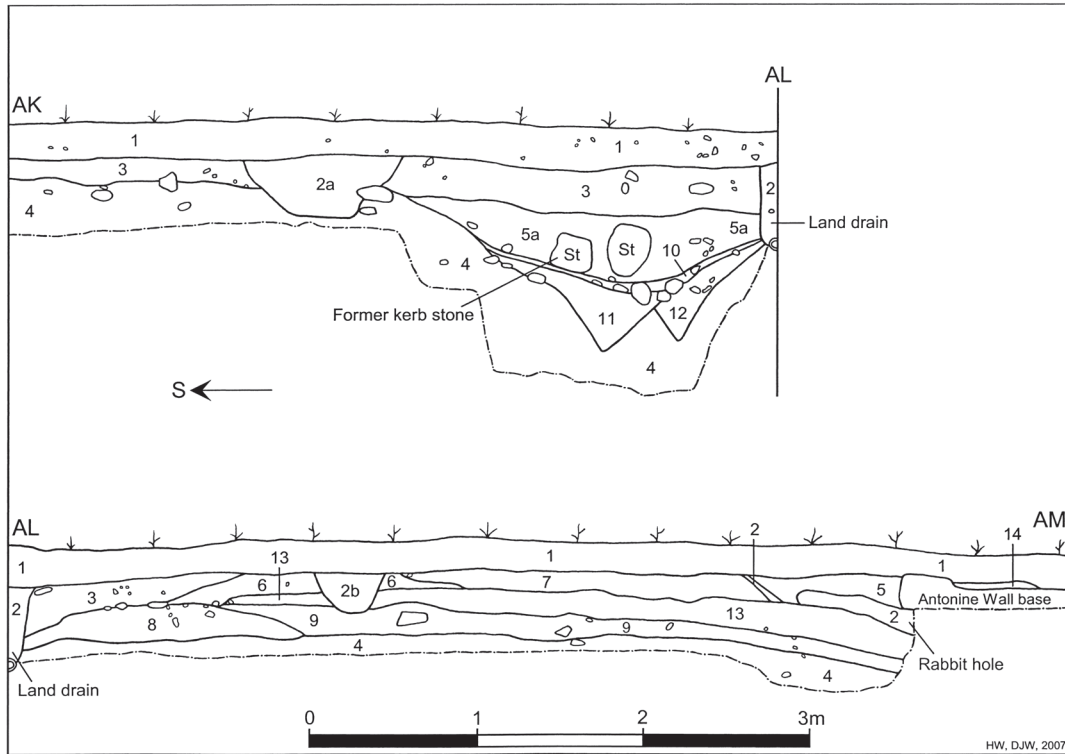
The trench also revealed a posthole (illus 15: Section AI–AJ & illus 16), which cut through a layer of brown loamy material (Layer 9) that spilt out from the top fill of the ditch and thus post-dated it. The stone packed pit, 0.41m in external diameter, was relatively well preserved

and had held a square post, 0.17m across. A thin oval patch of gravel was also found on top of the same loamy material a little farther to the west, directly over the ditch (illus 6: Section E–F, Layer 19), whilst, at the eastern end of the trench a loosely stone packed slot, 0.3m wide, was uncovered, which ran through the trench from east to west. The feature would have had virtually no structural strength and was thus interpreted as an old fashioned, pipeless stone land drain, rather than a foundation.

Trench 6 provided a complete section through the ditch near its closest approach to the Wall (illus 4, illus 17: Section AK–AM & illus 18), and provided a stratigraphic connection between the two. The ditch was V-shaped in section and had clearly been re-cut at some point during its operational life. The initial cut reached 1.05m deep below the modern ploughsoil and



ILLUS 16 Plan of the tower internal area



ILLUS 17 Trench 6, section between the tower ditch and the Antonine Wall: 1. Topsoil; 2. Dark brown loam; 3. Light brown loam; 4. Natural boulder clay; 5. Grey turf slip; 6. Dark grey loam; 7. Orange clay with loam; 8. Black loam; 9. Mixed loam & boulder clay; 10. Pale grey silty loam; 11. Pale grey silt; 12. Dark grey silt; 13. Brown loam; 14. In situ Antonine Wall turf

would have been *c* 1.5m wide assuming that its missing south side was roughly symmetrical to the surviving northern profile. It had filled with a dark grey silt (illus 17: Layer 12) to at least the current surviving depth of 0.58m before being truncated. The second cut was slightly larger at 1.08m deep (0.88m measured from the top of the modern subsoil) by 2.32m wide and was slightly asymmetrical, since its southern (inner) face was noticeably steeper than its counterpart. The primary fill was a pale grey silt (Layer 11), which was overlain by a thin layer of pale grey silty loam (Layer 10), probably a topsoil, which had then been generated at a relatively stable angle of rest. This had been covered with a thick layer of stones and greasy grey clayey material

(Layer 5a), identical to that found in large quantities elsewhere on the site slumped from the Antonine Wall, and so probably dumped turf and stones from the Wall. Later, ploughing had worked in a layer of brown loam topsoil (Layer 3) and broadened the very top of the ditch lip, especially in the north, to give a somewhat flared upper profile. Neither cut had a so called ‘ankle breaker’ bottom slot.

The northern lips of both ditch cuts had been damaged by a land drain, but the stratigraphic sequence between the ditch and the Wall was otherwise well preserved. First came a dome shaped layer of very dark grey, almost black, loam (illus 17, Layer 8), which was partially overlain by a mixture of disturbed boulder

clay and patches of loam (Layer 9). The latter stretched away to the north from the edge of Layer 8 to beyond the limit of excavation, in a thin spread, often less than 0.1m thick. These layers were interpreted as the upcast mound formed by the digging of the primary ditch cut, with Layer 8 representing the former turf and topsoil dug from the ditch top (which had been dumped very close to the outer lip) and Layer 9, the spoil from deeper down where the ditch was dug through clay. Layer 9 was overlain by a thin homogenous brown loam, suggestive of top (or plough) soil (Layer 13), which grew deeper towards the north. Above this was a broadly similar sequence, with another layer of dark grey



ILLUS 18 The ring ditch in section, in Trench 6

loam (Layer 6), set back rather farther from the ditch lip, overlain by a layer (Layer 7) of boulder clay mixed with loam and silt. These can be seen as the upcast from the secondary ditch cut, with Layer 6 again representing the topsoil, whilst Layer 7 latter was presumably dug from the partly silted remains of the initial cut, as well as from the natural boulder clay subsoil, hence its silt content. These upcast mounds proved particularly informative and presumably owed their preservation to their proximity to the Wall, since no trace of them survived elsewhere.

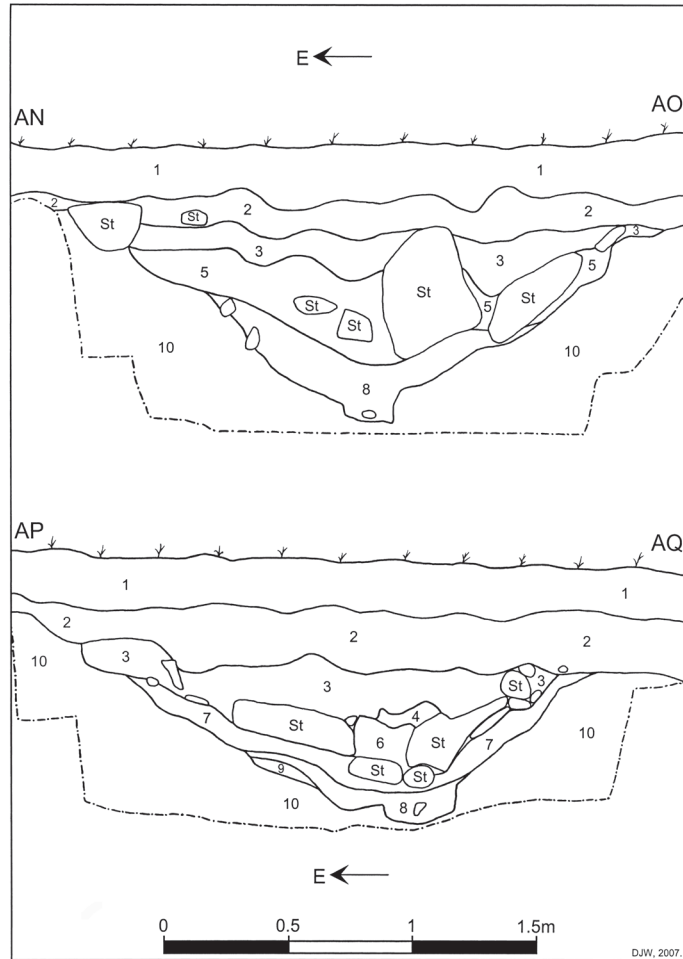
It was noteworthy that the primary upcast layers lay directly over the natural boulder clay (Layer 4), with nothing but a slight darkening of the topmost centimetre or two of the natural to indicate the presence of a buried topsoil. As a result, it was initially assumed that the area must have been turf stripped for the Wall's construction before the ditch was dug. However, Layers 9 and 13 both proved to pass beneath the Wall base (somewhat obscured in illus 17 by a rabbit hole: Layer 2). As a result, a reasonable time must have passed between the digging of the ditch and the construction of the Wall, especially given that Layer 13 was thick and homogenous enough to represent a plough soil. If the area had been turf stripped for Wall rampart material before the ditch was cut, this must thus have been done well before the base was laid, which seems improbable, albeit not impossible.

To judge from the depth of silt in the primary ditch, there was also a reasonable interval between the first and second cuts. There was, though, no direct stratigraphic connection between the second cut and the Wall, except that the northern tail of its upcast mound had been sealed by a layer of greasy grey clayey material, which appeared likely to be turf slip from the Wall's disintegration (Layer 5), deposited at some point after Layer 7 had time to develop a thin layer of humic topsoil (Layer 2). It is thus not possible to say whether or not the ditch had been re-cut when the Wall arrived. There was no sign that the area above either upcast mound had been turf stripped for the construction of the Wall's superstructure. Possibly the evidence has been lost, but it is not unlikely that whichever upcast mound was then at the surface would have been in no condition to produce structurally useful turf at the time the Wall was built.

The Wall base itself continued on the same alignment seen in Trenches 13 and 14 and was again in good condition, although only a tiny area was uncovered. All three of the kerb stones revealed were in their original positions and a thin layer of turf from the superstructure had survived (Layer 14). This state of preservation was somewhat surprising in view of the ploughing shown by the later history of the second ditch cut and the fact that some of the stones found in Layer 5a had probably come from the Wall base. Indeed one large semi-dressed stone was almost certainly a former kerb stone and this was badly plough scarred on what had once been its upper face, despite being found with this face pointing downwards, 0.64m beneath the modern surface and thus well below the range of modern ploughing. This would imply that the site must have returned to agriculture and the Wall become badly dilapidated when the ditch was finally backfilled (unless, somehow, this stone was shaped for use in the Wall, but then not used). All of this suggests that a significant time elapsed between the re-cutting of the ditch and its eventual obliteration.

Finally two pits were found, one immediately to the south of the ditch (illus 17: Section AK–AM, Layer 2a) and a second (rather smaller) cut into the upcast mounds, c 2m north of the ditch (Layer 2b). Their function was unclear but, although the southern example raised initial hopes that an internal palisade might be found inside the ring

ditch, or even rubbish pits from the temporary camp, both proved to have been cut from the modern ground surface and they are probably of no great age. Again, however, no datable finds were recovered.



ILLUS 19 Trench 11, tower ditch sections: 1. Topsoil; 2. Orange/brown loam; 3. Grey gritty loam; 4. Orange/grey gritty loam; 5. Pale grey turfy loam; 6. Dark grey gritty loam; 7. Grey silty loam; 8. Pale grey silt; 9. Grey silt; 10. Natural boulder clay

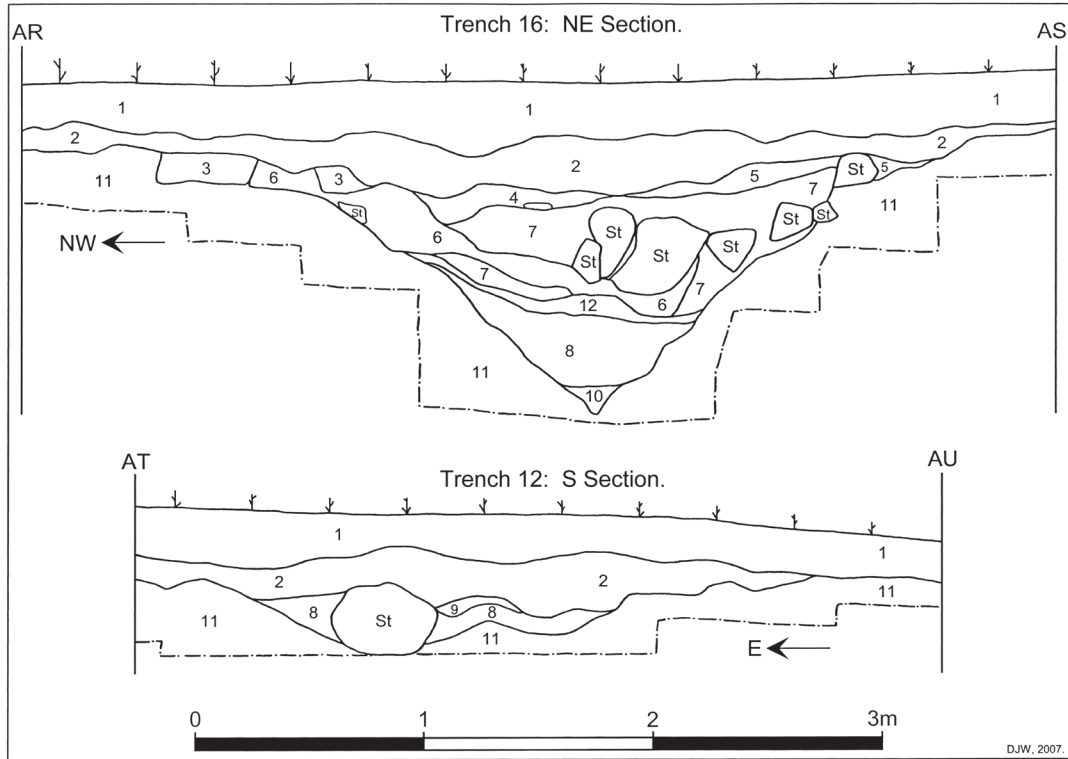
Trench 11 revealed an unexpected break in the ditch’s north-eastern quadrant, with a neatly semicircular butt end, suggesting a deliberate entrance which had not shown in the aerial or

resistivity data (illus 4 & 16). The ditch was sectioned along the southern side of the trench (illus 16 & 19: Section AP–AQ), which was then extended 2m farther to the south to obtain a second section (Section AN–AO) farther from the butt end which, it was assumed, would be more representative of the ring as a whole. In both cases, the ditch had a bottom fill of pale grey silt (Layer 8) above which lay layers of earth, turfy material and stones (Layers 4, 5, 6 & 7). These latter deposits had a random appearance which was difficult to reconcile with material laid down naturally under gravity and so probably represent dumping, especially given the presence of a number of large sandstone boulders, including one estimated at *c* 120kg. This trench did not show a clear buried topsoil horizon above the silt, but it can probably be assumed that the backfilling took place at much the same time as in Trench 6. Certainly, the upper fills contained similar layers of ploughed in topsoil (Layers 2 & 3). Not surprisingly, the section cut closest to the butt end revealed a shallower, much more flattened profile, just 0.65m deep and 1.8m wide, but the southern section showed the ditch to be more similar in size to that seen in Trench 6, at 0.85m deep below the subsoil top (1.1m from the modern surface) and 2.5m wide. It was also starting to become more V-shaped in profile, although still not as obviously so as in Trench 6. Both sections showed a bottom slot reminiscent of the so-called ‘ankle breakers’ often associated with Roman military ditches, but this never exceeded 85mm in depth and, given the softness of the boulder clay into which it was cut, it is not impossible that it was created accidentally during cleaning, rather than as a deliberate feature. There was also much less evidence for re-cutting of the ditch in this trench. No signs at all could be distinguished in the south, but in the northern section a distinctly different layer of silt detected on the eastern side of the ditch (Layer 9), may be a slight indication that an earlier line had existed, although this was far from definite. Certainly, the size of the Trench 11 ditch was much closer to that of the secondary cut in Trench 6 and it is

perfectly possible that a re-cut here could have destroyed all trace of the primary ditch. No signs of upcast mounds survived within the excavated area but, as the trench barely extended beyond the outer ditch lip, this need not be significant. A small fragment of slightly heat deformed blue/green Roman (but not more closely datable) glass was recovered from the principle silt layer (Layer 8) in the north, suggesting either that glass had been worked nearby or, perhaps more probably, that a fire of sufficient intensity to melt (or at least distort) glass had taken place on the site.

Time did not permit the trench to be extended to the north to reveal the width of the ditch break, but this cannot have been large since the ditch was found at its full width in Trench 3, only *c* 3m to the north, albeit again with a flattened profile, suggesting that the butt end lay nearby. It is noteworthy, however, that an entrance here would directly face the rectangular building in Trench 7/2 and, although the chronological relationship between these two remains uncertain, both have already been shown to pre-date the Wall.

Trench 16 sectioned the ring ditch in its north-western quadrant (illus 4 & 20: Section AR–AS) and, although again it showed no sign of a re-cut, it otherwise produced a similar picture to the (larger) second ditch phase in Trench 6: a *c* 2.5m wide V-shaped profile, 0.98m deep from the top of the subsoil (1.46m from the modern surface), with no real bottom slot. The fill pattern was also nearly identical to the second cut in Trench 6, with the ditch silting to a depth of *c* 0.45m (Layers 8 & 10) before acquiring a thin layer of grey loam, which sat at what appeared to be a stable angle of rest and may thus have been a buried topsoil (Layer 12). It was then again largely filled in with a mixture of stone (including large boulders), loam, clay and turfy material (Layers 3–7), which formed a random pattern suggestive of dumping rather than natural silting, before being finally obliterated with ploughed in topsoil (Layer 2). The water table was high all over the site and constant bailing was needed to obtain the sections in both Trenches 6 and 16. These



ILLUS 20 Tower ditch sections, Trenches 12 and 16. Garnhall, Site 1: ditch Sections. 1. Topsoil; 2. Orange/brown loam; 3. Grey clay/loam; 4. Dark brown gritty loam; 5. Red/brown loam; 6. Dumped grey clay; 7. Grey/brown loam/turf; 8. Grey/brown silt; 9. Mixed silt and orange loam; 10. Black/orange silt; 11. Natural boulder clay; 12. Grey loam

wet conditions resulted in excellent survival of organic materials and the bottom ditch silts in both trenches yielded large amounts of branch and twig fragments, much of which proved to be *Prunus spinosa* (blackthorn) off-cuts. As no root material was found, it appeared that this very thorny material may have been deliberately deposited in the ditch, possibly to increase its defensive value and a sample from Trench 16 produced a 2 sigma calibrated ^{14}C date of AD 110–330.

Trenches 10 and 12 were designed to run well into the interior, as well as sectioning the ditch (illus 4). Trench 12 proved to be archaeologically barren in the interior area, except for the track of a modern land drain and a fragment of first

or early 2nd-century decorated Roman blue glass bangle found at the bottom of the plough soil (see glass report below). The ditch as first found, produced a very shallow profile (illus 20: Section AT–AU), more so even than that of the butt end section in Trench 11. It was 2.04m wide, but only 0.61m deep from the modern surface (0.34m from the top of the subsoil) and its fill consisted almost entirely of grey/brown silt (Layer 8), aside from a single large boulder, suggesting that it had silted naturally, rather than being backfilled, before being finally obliterated by a slightly orange brown loam which seemed likely to have resulted from ploughing (Layer 2). The western end of the trench was extended 2m to the north to obtain an additional section and

here, the ditch appeared much closer to the full width and depth seen elsewhere, and proved to have been filled with the usual mixture of turfy material and stone. But, although the trench was excavated to a depth of *c* 0.7m, yielding further organic material, it was ultimately not possible to obtain a full section due to constant flooding and the danger presented by large boulders from the ditch backfill held only tenuously in place in the baulk by fragile waterlogged soil. Nevertheless, the additional data provided allowed the ditch's full circuit to be extrapolated and its diameter to be calculated at 26.7m externally, or 22.5m internally: a diameter over its centre line of 24.6m.

Trench 10 (illus 4 & 16) examined the point at which both air photography and the extrapolated circuit just mentioned, suggested that the ring ditch should intersect the Military Way. What were clearly the road's remains were found at its southern end, slightly terraced into the ground to counteract a natural slope to the south, and the consequently greater depth of modern soil over its northern end had allowed it to survive in an excellent state of preservation. Indeed, unusually (although no dating evidence was found), there were grounds for thinking that parts of the original Roman surface survived, in the form of a fine, very tough layer of worn rammed gravel, contained to the north by a kerb of larger stones. Farther south, however, the road had been subjected to progressively greater plough damage so that the trench presented what was in effect a horizontal section through its structure, showing a band of rather larger stones underlying the gravel layer, which in turn lay on a raft of substantial boulders of similar size to the blocks used in the Wall kerbs, albeit not dressed. Where the gravel surface had been destroyed, there were signs of later attempts at patching in the form of small dumps of small stones, resembling the maintenance patterns found some years ago in the field immediately to the east (Keppie & Breeze 1981: 239). There was no sign of a drainage ditch on the northern (up hill) side of the road and, although a shallow,

silt-filled pit was encountered immediately to its north, this did not appear suited to any structural role and may represent nothing more than the removal of a large stone embedded in the natural boulder clay subsoil. The road had obviously remained in use until relatively recent times, for the modern field gates in the vicinity are all placed on its line and old estate records show a toll booth operating at what is now the western field gate, up until the arrival of the railway. In fact the road is still the only way to cross the field in a wheeled vehicle when heavy rain makes the rest too soft to drive on and, a few hundred metres farther to the west, it remains in use as a permanent track past the site of the now demolished Tollpark farm (illus 2).

No sign of the ring ditch was found beneath the road and, as it did not seem appropriate to remove any more of the Military Way's fabric to investigate further, the trench was extended 3m to the east along the road's north side to examine the point at which the Military Way and the projected ditch line should intersect (illus 16). This still yielded no trace and nor was there any sign that the ring ditch had deviated to the north to avoid the road. The extension did, however, reveal more, well preserved remains of the Military Way's kerb and gravel surface, and enabled its approximate course to be determined. Its north kerb here lay 28m behind the Antonine Wall and the two ran on a slightly converging course towards the east. Time did not allow any part of the trench to be extended far enough south to determine the width of the road or to look for a ditch on its southern side, although the aerial indications do show a running ditch to the south of the road in the field to the east.

Trench 15 (illus 4 & 16) was designed to cut the ring ditch in its southeastern quadrant, where the aerial and resistivity traces became weakest. No ditch was encountered, but the trench did uncover a 2.26m wide, loam filled slot, cut *c* 0.12m into the natural boulder clay on exactly the projected line, suggesting that the ditch here had been marked out but never actually dug. Both the eastern and western ends of the trench

revealed gravel scatters. The western example will be discussed below, but time did not allow that at the trench's east end to be investigated further.

The absence of the ring ditch in Trenches 10 and 15 is somewhat perplexing. Once the full circuit had been projected it had seemed certain that the Roman road would pass over it, which would have supplemented the evidence for the feature predating the Wall, albeit whilst contradicting the idea that the road had swung south at this point specifically to avoid it. There is now, however, quite a body of evidence to suggest that much, if not all of southern half of the ring may never have been completed. As already mentioned, although the northern half of the circuit shows strongly on the air photograph, the cropmark showing the southern half is weak, and the south-eastern quadrant could not be detected at all in the resistivity survey. Moreover, the very shallow profile in Trench 12, which suggests that the ditch here might also be coming to an end, corresponds with the point at which the crop mark can be seen to fade and, as it would not face the probable entrance break in Trench 11, one might be disinclined to expect an additional entrance to lie at this point. Yet,



ILLUS 21 Trench 8, postholes 2 (right) and 3 (left) in section, with posthole 1 behind

the apparent marking out slot found in Trench 15 suggests that the ditch was originally intended to pass around a full circle and this slot may well have continued all the way round, thus explaining the faint, but still clearly continuing cropmark seen from the air. It is, however, so insubstantial that the slight terrace dug to level the Military Way would have utterly destroyed it in Trench 10, which might explain its absence in that area. These circumstances would make the re-cut found in Trench 6, and possibly Trench 11, particularly puzzling, however, for whilst it is perfectly possible to envisage any structure being abandoned unfinished, this feature may have been started but not finished twice, or at least half dug and then maintained. The fact that the entire ditch circuit may have been preceded by a marking out slot might, however, explain why the former topsoil was so well separated from the remaining ditch material in the primary upcast mound found in Trench 6, for it would represent a different construction event.

The Interior

Given the apparently unfinished state of the ring ditch, it would not have been surprising to find an empty interior, but excavation revealed a number of features (illus 4, 15 & 16: Trench 8).

Firstly, four groups of postholes were uncovered. In the northwest a close group of three postholes was found, each of which was of a slightly different design (illus 15: Postholes 1–3 & illus 21). Posthole 1 was lightly stone packed and consisted of a circular post 0.36m in diameter and surviving to 0.2m deep. It had been wedged against the eastern end of a 0.65m (east/west) by

0.4m (north/south) sub-rectangular pit. Posthole 2 held a stone packed, 0.22m-wide square post, surviving to a depth of 0.27m, in the centre of an irregularly shaped pit, 0.55m (east/west) by 0.4m (north/south). Posthole 3 held another stone packed post, approximately 0.18m in diameter, wedged against the southeast side of a near circular pit, 0.52m in diameter and 0.31m deep. Postholes 1 and 2 were well preserved with the stone packing still fully in place, suggesting that the posts had either been sawn off, at the end of their lives, or had rotted in situ. Posthole 3 was rather more disturbed, with many of the packing stones displaced into the post cavity, suggesting that the post had been levered or dug out, and its original shape could not be determined. None of the pits cut any of the others and there was no other stratigraphic evidence to show whether the three were contemporary (which seemed unlikely) or, if not, in which order they had been dug.

Two further postholes were found in the northeast (illus 15 & 16: Postholes 4 & 5) and this time, despite severe damage from a modern land drain, there was a clear stratigraphic relationship between them. Posthole 4 consisted of a round post, 0.27m in a diameter and surviving to a depth of 0.35m, set towards the south-western corner of a post pit 0.53m across, whose full original shape remained uncertain. Posthole 5 had been bisected by the land drain and was sectioned along the edge of the drain's slot, but enough survived to show that it took the form of a sub-rectangular pit *c* 0.57m (north/south) × 0.43m (east/west). Only the edge of the post pipe itself survived (illus 15, Section AC–AD, Layer 1), so its shape could not be determined, although its full original depth was probably greater than the 0.17m found. It did, however, remain clear that this posthole had been cut into the post pit of Posthole 4 and was thus later. The mean distance between the north-west and north-east posts was 4.02m.

In the south-east only a single posthole, Posthole 6, could be found. Others may easily have escaped detection, as the area was badly

disturbed by an unusually wide land drain slot and by overnight vandalism to the trench immediately after it was opened. The extent of the pit for Posthole 6 could not be determined with accuracy thanks to the surface damage. Constant flooding from heavy rain also caused difficulties and an initial section cut through the post itself collapsed in the waterlogged conditions, so that the final drawn section records a chord, rather than a full diameter. This, though, found the remains of a round post, at least 0.22m in diameter, surviving to a depth of 0.25m (illus 15, Section AE–AF). It lay 4.21m to the south of the mean position of the north-east group, and the three groups combined formed an approximate right angle. The two eastern groups also formed a right angle to the line of the Military Way.

A final posthole, Posthole 8 (illus 15: Section AG–AH), was found in the south-west. The circular post was 0.26m in diameter and 0.39m deep and was set at the north-eastern corner of a sub-rectangular pit, 0.46m wide and 0.56m long. The northern side of the post pipe showed a disturbance shaped like a spade cut, suggesting that the post had been dug out at the end of its life. Posthole 8 lay 4.01m from Posthole 6, but 5.09m from the mean position of the north-western group, thus leaving a south-east corner with such an obtuse angle that it might be doubted whether it and Posthole 6 could belong to the same structure. As already mentioned, however, no more southerly examples could be located in the south-east and so it is possible that these posts combined to form a building with a distinctly irregular, off square ground plan, covering approximately 18.67m² and set well to the east (and slightly to the south) of centre within the ring ditch. That said, we have seen that the area to the south of Posthole 6 may have had postholes destroyed, and the same is true of the area to the north of Posthole 8. This had again been badly disturbed by a wider than usual modern land drain slot, which was quite large enough to have destroyed one or more further postholes. Given the signs of possible post replacement farther north, therefore, it is far from impossible

(although ultimately beyond proof) that these posts represent a single structure, which had at least one rectangular phase, of approximately 4m × 5.1m, and at least one squarer phase, of around 4m × 4m. The round shape of the posts used in Postholes 1, 4, 6 and 8 might suggest that these do belong with each other and not with Posthole 2 with its square post but, again, as doubts remain whether all of the posts that once existed here were located, and the post shapes used in Postholes 3 and 5 remain unknown, this may be little more than coincidence.

Some 1.3m farther to the west of Posthole 8, a roughly rounded flagstone was uncovered, supported by a layer of smaller stones and set in a 0.4m diameter by *c* 0.17m deep pit. The flag had broken into triangular segments, obviously under pressure, and the feature was interpreted as a post pad. But no further examples were located within the excavated area and the existing pad was so different in form to the remaining postholes that it was difficult to believe that it came from the same structure. Its function and context thus remain uncertain.

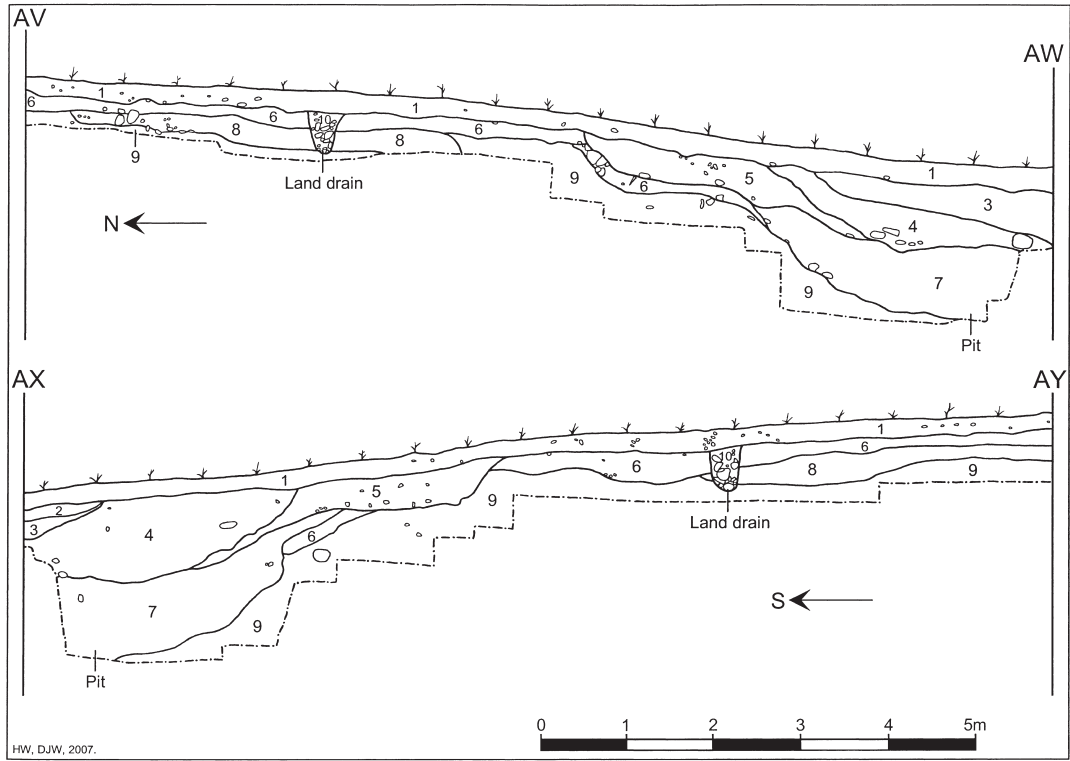
The posthole and pad features were all set into a raised, straight-sided clay platform, 0.17m thick and with roughly right angled corners. This measured 11.04m from north to south and 9.85m from east to west. Its eastern edge coincided with the start of a thick layer of densely packed coarse gravel and clay, *c* 2.9m wide, covered by a plough-damaged layer of rather larger, fist sized stones, with worn tops (illus 22). This appeared to be a robustly constructed track, running north/south, which ran to the east of, and parallel to, the posthole structure's east side and at right angles to the Military Way. A 12m length was uncovered within the excavated area, but its full extent remains unknown, except to say that it did not reach Trench 3, which lay across its projected line, *c* 1.58m farther to the north. It might be assumed that it led from the Military Way and that it may have served as an access path to the posthole structure, perhaps (as it passed beyond that structure) with its end lining up with the northern edge of the platform. If so, its total



ILLUS 22 The metalled track in Trench 11

length would have been around 17.8m, but it must be stressed that it was not traced this far by excavation, as time did not allow Trench 10 to be extended far enough east along the Military Way to investigate the likely junction point.

The platform carried a layer of fine pea gravel embedded in its surface, presumably as deliberate metalling and, although this had been badly scattered by land drains and ploughing, especially in the south, a number of well preserved patches still survived. Its stratigraphic relationship to the postholes was largely unclear except in the case of Posthole 3, where the gravel was well enough preserved that it was possible to see that it overlapped the post pit, but not the post itself, suggesting that it was only laid after the post was installed. As the gravel had been driven directly into the clay, with no intervening occupation layer, the two were obviously laid as part of the same building operation, which would imply that the platform was designed from the outset to carry the post structure, and Posthole 3 may thus have been part of the earliest phase of the seemingly multi-period structure. It was noteworthy, however, that the posthole



ILLUS 23 Site 2, sections: 1. Topsoil; 2. Dirty grey clay; 3. Mixed ash & slag; 4. Clean re-deposited clay; 5. Black ash and domestic refuse; 6. Mixed clay, sand and loam; 7. Grey silt; 8. Hard grey sand; 9. Natural boulder clay; 10. Rubble in brown loam matrix

structure lay to the south-east of the platform's centre point. A fragment of a Roman late 1st-, or 2nd-century yellow/green glass bangle and single sherd of Roman (but not more closely datable) vessel glass were found trodden into the surviving metallurg.

SITE 2: RING FEATURE II

The more easterly ring feature (illus 1, 3 & 23) is more easily dealt with. A narrow (12m × 1m) slot cut from just to the north of the feature to its centre, was sufficient to show that the site was a relatively modern clay pit, c 20m in diameter and up to 3m deep (it was not completely bottomed in the centre). Indeed some local

people believe it to be a capped mineshaft. This had, as predicted, cut into (and so post-dated) the Military Way, removing it altogether in the excavated area. The pit had partially filled with a glutinous grey silt up to 1m thick and containing 18th-century pottery (illus 23: Sections AV–AW & AX–AY, Layer 7). It was later used as a rubbish dump and became partially covered by a layer of domestic refuse (Layer 5): mainly coal ash, mixed with early 20th-century pottery and glass, with a few fragments of leather and a badly battered 1920s toy car. The centre of the feature had then been further backfilled by a c 1m thick layer of clay (Layer 4), followed by slag and yet more ash (Layer 3), to leave only the shallow surface depression visible today. It

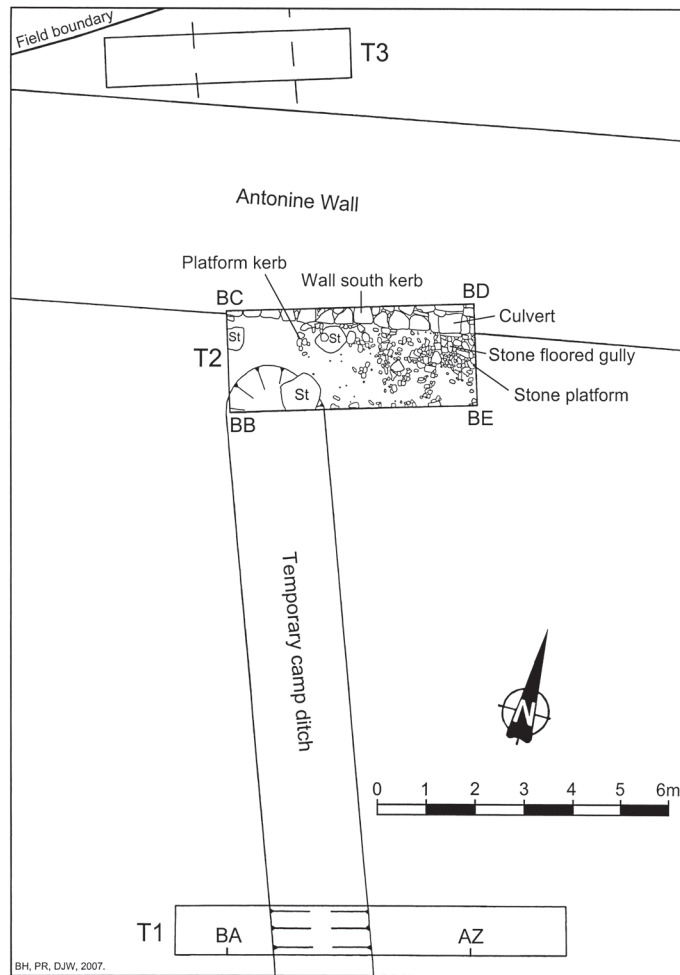
was this pattern of backfilling that had produced the apparent ring ditch visible in the Cambridge air photograph, because the clay deposit did not reach the edges of the feature, which had already been filled by the domestic material. This, more water absorbent, refuse layer had, thus, been allowed to reach all the way up to the base of the

identical to that found in Site 1, Trench 3, and was probably also a land drain.

SITE 3: THE GARNHALL II TEMPORARY CAMP

The areas described so far were all known from air photography to lie inside a temporary camp, which might be suggested as a construction camp linked to the building of the Antonine Wall. As currently known (illus 1), the camp measures 128m (north/south) × 351m (east/west): an area of 4.49ha (11.1 acres) but, as its eastern limit has never been located, its total extent remains unknown. Likewise, although modern maps show the Antonine Wall as the camp's northern boundary, there are faint aerial indications to suggest that it might have continued farther north. These are far from conclusive, however, and as the geophysical survey also failed to settle the matter, a programme of three trenches was excavated to make a more detailed study of the camp's defences and their relationship to the Wall (illus 24).

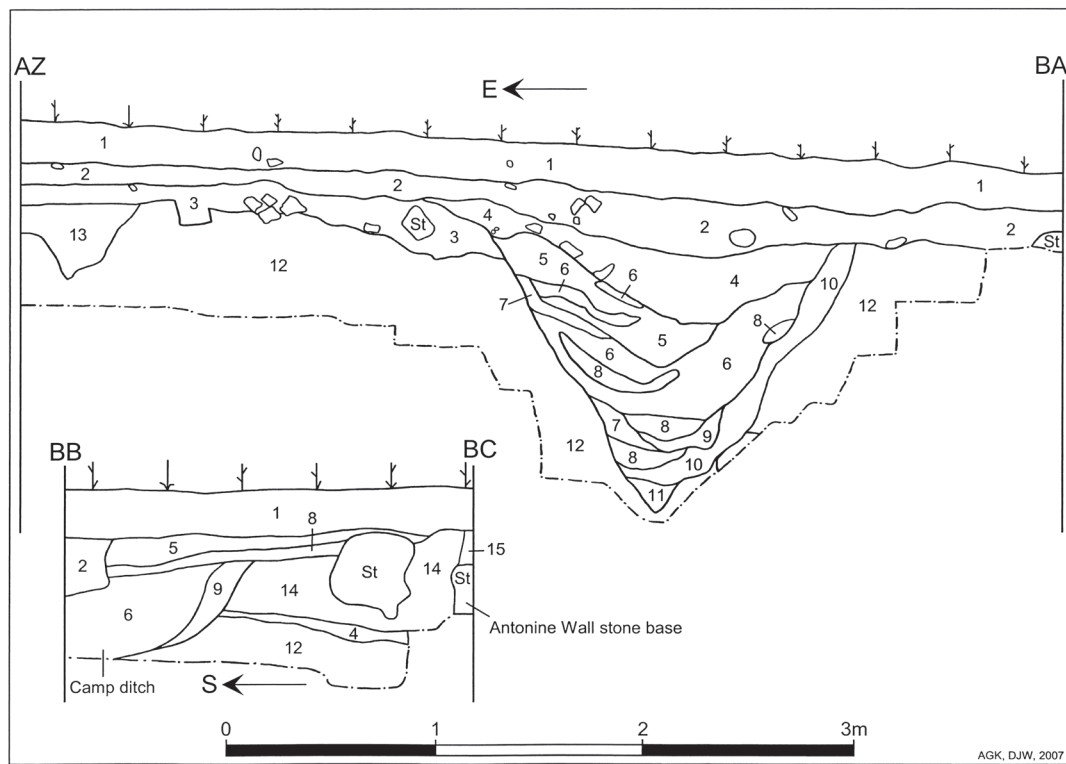
Trench 1 cut the camp ditch at a point 12m south of the Antonine Wall, to obtain a section well away from the frontier line itself. It revealed a normal Roman military style V-shaped ditch, 1.73m wide and 1.27m deep from the subsoil top (1.76m from the modern surface), although with barely



ILLUS 24 Plan of Site 3

modern plough soil in a ring around the edges of the feature, where it would naturally produce a positive crop mark. Immediately to the north of the feature was a rubble-filled slot (Layer 10)

the suggestion of a bottom slot (illus 25: Section AZ–BA). By comparison, the recently excavated ditch of the neighbouring camp of Garnhall I, a few hundred metres to the east, although similar



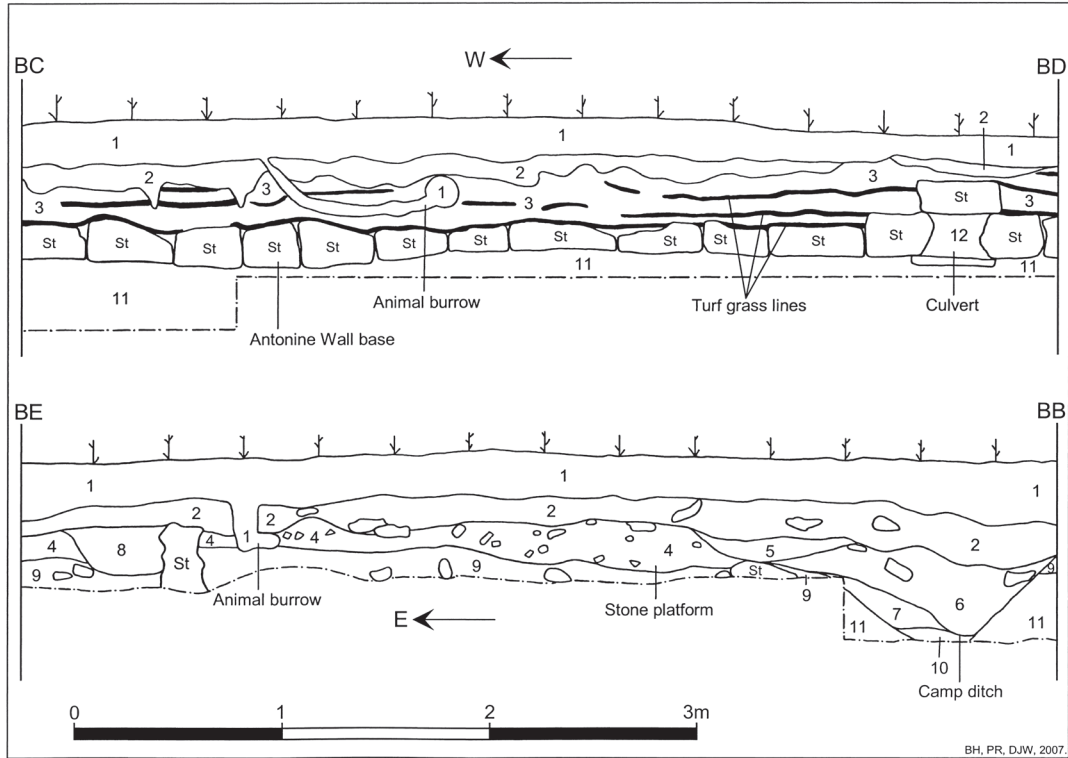
ILLUS 25 Site 3, sections through the temporary camp ditch: 1. Topsoil; 2. Brown loam; 3. Grey clay; 4. Dark grey clay; 5. Grey loamy clay; 6. Grey turfy loam; 7. Dumped boulder clay; 8. Turf slip; 9. Grey silty loam; 10. Grey loam; 11. Black humic silt; 12. Natural boulder clay; 13. Disturbed boulder clay; 14. Tumbled turf; 15. Laid turf

in width, was only 0.5–0.6m deep (Keppie et al 1995: 631ff). After just 0.14m of a glutinous black silt (containing quantities of tree bark) had formed in its bottom (Layer 11), the ditch had been filled with an assortment of clay, loam and turfy material, in well defined individual layers, that seem likely to have been dumped, which suggested that it had been deliberately backfilled not long after being dug. The trench reached 4m beyond the ditch's inner (eastern) lip, but no trace of surviving rampart material was encountered, despite the geophysical hints.

Trench 2 was designed to examine the intersection of the camp ditch with the Antonine Wall, along with the area of high resistance readings projecting from the Wall back. The

Wall base here was found in a better state of preservation than anywhere else on the site, with all of the kerb stones in situ, a stone culvert fully preserved, including its cap stone and, for the only time on the excavation, enough intact turf work from the Wall superstructure surviving to show strata (illus 24 & 26: Section AC–BD, Layer 3) with clearly visible, carbonised grass lines. This formed a deposit averaging 0.26m thick and, although somewhat disturbed by roots and an animal burrow, this was enough to preserve up to five layers of turfs, laid grass to grass, and with the bottom layer placed grass side down on the stone base.

Immediately to the south of the Wall was a raft of stones set in grey loam (illus 26: Section



ILLUS 26 Site 3, sections through the Antonine Wall and temporary camp ditch end: 1. Topsoil; 2. Orange/brown turf & loam; 3. Turf work; 4. Mixed loam & stone; 5. Mixed turf & orange loam; 6. Grey turfy loam; 7. Grey silty loam; 8. Dark grey loam; 9. Mid grey turf slip; 10. Dark grey humic silt; 11. Natural boulder clay; 12. Grey/brown silt

BB–BE, Layer 4 & illus 27). This began 1.4m from the western end of the trench with a set of larger stones, and extended beyond the excavated area to both the south and east, albeit becoming less well preserved towards the south. The resistivity survey would suggest total dimensions of *c* 2.5m (north/south) × 11–12m (east/west). It formed a butt joint with the Wall and overlay a thin layer of grey greasy material of similar consistency to the surviving Wall turf work and thus presumably turf slip or working debris from the Wall’s construction (illus 26: Section BE–BB, Layer 9). It was thus clearly secondary to the Wall. The culvert channel had been continued through this platform by means of a gully bottomed with small flat stones (illus

27), and this too passed beyond the excavated area to the south (Layer 8), again becoming progressively less well preserved. The raft was sealed by a thick layer of orange/brown ploughed material, mixed with what appeared to be more turf slip from the Wall (Layer 2), but showed no surviving sign of having carried a turf stack of its own. It yielded three fragments of Roman (but not more closely datable) coarse pottery, one of which had a rough X incised on its outer surface, although whether or not this was intended as an actual letter remains uncertain.

The stratigraphic position of the camp ditch was not what had been anticipated. It extended to within 1m of the Wall’s south kerb and terminated in a rounded butt end. Surprisingly,

however, it was clearly secondary to both the Wall and the stone platform, since it cut through both the western fringe of the platform itself (illus 26: Section BE–BB, Layer 4) and the layer of Wall turf slip or working debris on which it sat (Layer 9 & illus 25: Section BB–BC, Layer 14). Indeed, the shape of the butt end had been distorted in the east by a large boulder, which may have been previously incorporated

south, there was little in the way of primary silt. Instead, it contained large amounts of relatively loosely packed chunks of material similar to the in situ Wall turf, which suggested that it had been deliberately backfilled with turf (illus 26: Section BE–BB, Layer 6). Both its bottom silt (Layer 10) and an overlying layer of silty loam (Layer 7) showed some signs of having been cut into by a second, shallower and less symmetrical



ILLUS 27 Site 3, Trench 2. The Antonine Wall south kerb, culvert and surviving turf work, with possible stone platform in foreground

into the platform kerb and, as the stone bore considerable pick damage, it is possible that the ditch diggers had made some effort to hack through it. Flooding prevented the excavation of a full ditch section here, but an extrapolation of the known profile might suggest that only the bottom 0.10–0.15m were missed, in which case the ditch would have been V-shaped, 1.8m wide and c 0.6m deep from the subsoil top. As farther

V profile before being filled in (see also illus 26, Section BB–BC, Layers 6 & 9), suggesting that it may have been cleaned or re-cut at some point. If so, however, the re-cut must have been backfilled soon afterwards, since no detectable silt layer had time to form in its bottom.

Trench 3 was dug hard against the field boundary to the north of the Wall (illus 24), in an attempt to pick up the start of any northward

extension of the camp ditch. The ditch had approached to within 1m of the Wall in the south but, despite the fact that the northern trench extended half as far again in the opposite direction, nothing was found on the berm except for a thick layer of turfy material, presumably from the Wall's disintegration. The presence of the field boundary and, beyond it, a modern road, blocked any further study of the berm to locate either the camp ditch or more of the berm pits found elsewhere, and it was not possible to look still farther north, at the area beyond the Wall ditch to see if the camp might reappear there, since the ground lay on a different farm for which no excavation consent had been obtained.

INTERPRETATION

The site provided a wealth of archaeological deposits, but numerous questions still remain to be answered, especially given the scarcity of dating material.

Early structures

The early timber features, paving and metalling in Trench 7/2 mostly lack a datable context, except that they seem to represent several phases of activity, all of which pre-date the Antonine Wall. The hearth was ¹⁴C dated to between 210 BC and 60 AD, which suggests Iron Age activity, but this is less helpful than it might have been since no stratigraphic connection had survived between it and the trench's other early features. The beam slots might seem more at home in a Roman, rather than indigenous, context – especially given the parallel arrangement of the southern examples. Moreover, since the latter lie just south of the axis through the ring-ditch entrance, it is not impossible that the two are linked. Nothing can be said regarding the context of the more northerly slot, other than to notice its existence.

The Antonine Wall rampart

The lengths of Wall base uncovered were well preserved, but otherwise unremarkable, except

for the fact that the slightly different construction methods and materials used on either side of the culvert in Trench 4/5 might suggest that the drain may have served as the demarcation line between different loads of material, or even work gangs. If so, similar breaks are relatively common, indeed another is known at the far end of the next field to the east (Keppie & Breeze 1981: 237ff). No evidence of a fortlet was found on the site, although it is not impossible that one may still have escaped detection somewhere else in the vicinity, especially as the two fields dealt with here are the only spots in the immediate area whose recent land use has made them conducive to cropmark formation.

The stone feature behind the Wall line on Site 3 appeared to be a deliberately built structure, but it lacked a turf stack and thus seems unlikely to have been one of the expansions known from Croy, Rough Castle and Inveravon, especially given the shape and size (c 2.5m (north/south) × 11–12m (east/west)) suggested for it by the resistivity survey. It does, though, closely parallel the stone platform found some years ago, almost exactly $\frac{2}{3}$ of a Roman mile (874m, as opposed to 887.4m) to the west, at Tollpark (Keppie and Breeze 1981: 239), except for the fact that it showed no signs of burning.

The berm pits

The pits found on the berm in Trenches 9 and 13 resemble similar features found elsewhere on the Wall at Rough Castle and Callendar Park (Buchanan et al 1905: 456ff & Bailey 1995: 582f). Those at Rough Castle were located in a totally different position, to the north of the Wall ditch, but the Callendar Park examples form an exact match with Garnhall, and similar features have since been found on the berm of Hadrian's Wall at various points between Throckley and Wallsend (Bidwell 2005: 55ff). They may represent a version of the Roman pit trap defences known as *lilia* for, although as preserved at Garnhall, they might seem rather shallow, it seems likely that they were originally rather deeper, perhaps approaching 0.5m. This

may still not seem much of an obstacle, especially as only two of the 16 pits discovered showed signs of the internal spikes that are normally regarded as an integral part of such features but, when encountered unexpectedly, they might still have been enough to cause confusion and a few broken legs amongst an attacking rush. An alternative that has recently been suggested for the Hadrian's Wall examples (Bidwell 2005: 59ff) might seem more plausible, however, and the features may instead represent *cippi*. These were pits designed to secure branches designed to act as an entanglement, rather than as traps, and these again would have acted to slow down any attackers, thus keeping them caught for longer in a close range killing ground in front of the rampart. If the Wall was attacked by stealth at night, they might also cause attackers to trip and make noise, thus giving away their presence and triggering an alert. This explanation might explain why at least some of the pits were backfilled so soon after being dug, since the pits would only have needed to exist long enough for the ends of branches to be inserted and, just like a post pit, they would then have been filled in again to act as an anchor. Whatever the case, however, the Garnhall pits, like their Hadrianic parallels, do suggest that the Wall was originally designed to be a more actively military and defensive system (or at least a harder to cross protective shield) than recent thought on Roman frontiers has sometimes held, rather than being a largely symbolic, or simply bureaucratic demarcation line or customs barrier. Interestingly, recent work at Turret 11b showed that the Hadrian's Wall examples stopped in front of the tower, and the berm itself also narrowed here (Bidwell 2005: 69ff). At present such a phenomenon has only been seen in full at this one site, but there are a number of other turrets where the berm is known to narrow, even though no pits have yet been found (or looked for), so this may have been a more general pattern. If so, it is possible that the same design holds good on the Antonine Wall, in which case it might prove to be a useful pointer in any future search for tower sites, especially

as such berm narrowings might well be visible from the air.

The ring feature

The non-Roman date of the eastern circular feature and the fact that the western feature predates the Wall, might appear to rule out the possibility of semi-independent, ring ditched towers serving as Antonine Wall turrets. This remains far from certain, however, for the profile of the western feature's ditch (at least where fully dug and away from the entrance butt end), and the 2nd–4th-century AD carbon date for its bottom fill, coupled to the discovery of stratified late 1st- or 2nd-century Roman glass does at least date the site to the Roman period. It is, of course true that a V-shaped ditch, even one with a so called 'ankle breaker' slot, is not necessarily indicative of the Roman military in Scotland and northern England. For native sites sometimes had similar ditches, for example Cnoc a' Caisteil (Rideout 1987: 63ff) and Hartburn, which was thought to be a Roman fortlet prior to its excavation (Jobey 1973: 17). Likewise, Roman artefacts can appear on purely native sites. It is worth noting, therefore, that there are at least two large Iron Age homesteads known a little farther to the north, which are also surrounded by substantial ring ditches. These are West Plean (Steer 1956) and East Coldoch (Woolliscroft & Hoffmann, forthcoming), which lie, respectively, to the south and west of Stirling and the latter has also yielded Roman finds. From the air, the three sites all show at least a superficial similarity and, in fact, both West Plean and East Coldoch have been mistaken for Roman signal/watch towers in the past (Crawford 1949: 18 and Woolliscroft & Lockett 2002: 46) but, in the case of Garnhall Site 1, this does still seem to be a plausible identification. Firstly, there are marked differences between Garnhall and the two more northerly sites, although the latter have much in common with each other. Garnhall's ditch circuit is slightly smaller (26.7m, as opposed to 27.45m at West Plean and 31.6m at East Coldoch) but, more

importantly, its V-shaped profile contrasts strikingly with the flat-bottomed profiles of the others. Likewise, both of the two known Iron Age sites display large curved paved areas inside their ditch circuit (quite unlike the light path and metalled platform at Garnhall), along with clear roundhouse foundation slots, for which no equivalent was found at Garnhall. Secondly, the general pattern of a circular V-shaped ditch surrounding a post built timber structure or tower can be paralleled on many hundreds of Roman military sites throughout northern Europe, and Garnhall's 26.7m external ditch diameter lies well within the known size range for such structures, albeit towards the higher end. To give just local examples, Shielhill South, the largest of the Flavian towers on the Gask frontier, a little farther to the north, is only fractionally smaller at 25.98m (Woolliscroft & Hoffmann 1998: 446). Likewise, at perhaps 18.67m² (assuming that the missing posthole to the south of Posthole 6 actually existed) the Garnhall post structure would also fall within the normal size range for Roman timber towers being, for example, part way between the two largest Gask towers (Woolliscroft 2002: 92): Shielhill North (15.75m²) and Greenloaning (22.31m²). Even the Garnhall structure's off centre position and its possibly somewhat irregular shape and can be paralleled elsewhere, for example at Huntingtower and Greenloaning on the Gask frontier (Woolliscroft 2000: 498ff & *illus* 4; Woolliscroft & Hoffmann 1997: 561, *illus* 6) and Burgh-by-Sands I behind Hadrian's Wall (Woolliscroft 2009: 60ff). The size of its postholes is also fairly normal for a Roman tower, albeit some were rather shallow, but this again is a fairly common feature on Roman timber towers in Britain (eg Woolliscroft & Hoffmann 1998: 450ff) and one wonders whether we should consider identifying some of these sites as lower structures, such as block houses, rather than tall towers. Likewise, similar metalled areas or platforms are known in Scotland at Roman towers such as Greenloaning (Woolliscroft & Hoffmann 1997: 570ff) and

Beattock Summit (Maxwell 1976: 34f). The path from the Military Way leads to (and indeed past) the east side of the structure. Assuming that the two were contemporary, this might suggest that the entrance lay on this side, facing the entrance break in the (ultimately not completed) ring ditch (and incidentally the nearest Wall fort: Castlecary) and again this configuration might be paralleled on the Gask, where a beam slot founded projection from the tower at Westerton which also faces the ditch break, has been interpreted as the base of an entrance of some kind (Hanson & Friell 1995: 505).

The identification may not be conclusive, but if the site is a Roman tower, a number of interesting dating questions follow. Firstly, the possibility of a reasonably long time elapsing between the first ring ditch cut and the construction of the Antonine Wall makes it possible to argue for a pre-Antonine origin. This seems unlikely in view of the AD 110–330 carbon date, but a 2 sigma calibrated date does carry a 5% error that would still allow a remote chance of earlier activity, especially as the sample involved may well come from a re-cut. This is still more so when we consider the potential connection between the possible tower and the pre-Wall rectangular building in Trench 7/2. For the fact that the tower ditch's entrance break points towards the building (as might the tower's own entrance), rather than the Military Way does suggest that the two coexisted at a time before the road was built. For elsewhere, for example the Gask, towers actually built along a road almost always have their entrances oriented towards it. The building's general form and rectangular shape, coupled to the presence of a square sectioned nail in its burnt remains, might anyway be strong hints of a Roman date but, more specifically, its sleeper beam construction and possible internal partitions resemble a slightly wider Flavian building outside the Roman fort of Ribchester (Buxton & Howard-Davis 2000: 104ff). Given the known history of Rome's involvement in Scotland, this would mean that Garnhall could be Flavian and so might be of relevance to the vexed

question of Flavian activity on the Forth–Clyde Isthmus. It has already been noted that the feature is not out of keeping with other Flavian towers in the area, notably the Gask series, and there may have been other similarities. For example, the Gask towers had at least partly turf built ramparts inside their ditches, and it is not impossible that numerous patches of turfy material found around the Garnhall post platform could be the ploughed out remnants of similar defences. Indeed it might not be beyond the bounds of credibility to speculate whether such a tower might be part of an extended Gask chain, albeit it seems more likely that such a system would have reached the Wall line farther east at the Flavian and Antonine fort of Camelon. Alternatively, it could be pictured as part of a Flavian system on the Forth–Clyde line itself, whose existence has been postulated numerous times in the past (albeit largely thanks to a misunderstanding of Tacitus' *Agricola*, Chapter 23). The possibility of an internal rampart, of whatever date, might also explain the turf stripping of the area underlying the primary ditch upcast, which obviously took place before the ditch was dug. For, as the turf here seems unlikely to have been used in the Wall, it may be that it was taken to construct such a rampart. The Gask tower ramparts seem to have been built of turf revetted (or bottomed) ditch upcast (Robertson 1973: 19) and so used relatively small amounts of turf. The volume of the Garnhall upcast mounds roughly matches that of the ditches, however (allowing for a certain amount of plough off from the second cut's mound), which means that if there was an internal rampart, it may have been wholly of turf. If so, this would shed a certain light on the tower's building sequence, for it would suggest that the internal structures, including the postulated rampart, were constructed before the surrounding ditch was dug: an eminently sensible arrangement, since the interior would then have been much more accessible and easier to work in.

A wholly Antonine date might still seem more likely however, and is also easier to fit

with the available dating evidence. For example, despite what has just been said, the Trench 7/2 rectangular building may well still have been standing during the life of the Antonine Wall and the chances of such a lightly built structure surviving from Flavian times seem remote in the extreme. Moreover, there is evidence that, as on Hadrian's Wall, at least some of the small Antonine Wall installations were built before the curtain Wall reached them (eg Robertson 1957: 16ff). If the Garnhall tower was also built early in the Wall building sequence, there might thus have been a significant delay before the curtain arrived, and at least some of the soil overlying the initial ditch upcast could have been deposited by trampling and the dropping of construction turf when the rampart did finally come to be built, rather than forming through natural processes. Likewise, despite the fact that the Military Way crosses the projected line of the ditch, it would still remain possible that both it and the Wall may have been thrown slightly out of alignment by the need to avoid at least the internal structure (albeit their lines could be coincidence), and it seems most unlikely that such care would have been taken over a long abandoned Flavian tower. It is also rather easier to explain the unfinished state of the ring ditch in an Antonine only context because, once the Wall arrived, or even once it was known that it was to arrive, such defences might have been thought superfluous, and abandoned. The fact that at least part of the ditch should then be maintained seems less easy to explain, but even this could have been done for the sake of neatness.

Whatever the date of its origin, there are strong indications that the site was at least used in the Antonine period. Again, the lines of the wholly Antonine Wall and road are suggestive, but more so is the fact that the track leading to the tower runs parallel to it and seems to head straight for a right angled junction with the Military Way. It also runs right beside the clay platform on which the post structure itself sat, with no stratigraphic sign of any occupation or abandonment layer between the two. Moreover,

the up-cast from the ditch re-cut lies on the same stratum as the Antonine Wall and underlies turf slip from its disintegration, suggesting that the two were at least broadly contemporary. Interestingly, the second cut's upcast was also piled up over a much narrower area than that of the first. The two cuts would have yielded broadly similar volumes of spoil per metre of ditch dug (*c* 0.58m³ per metre for Cut 1, against *c* 0.48m³ per metre for Cut 2) yet, whilst the spoil from the first cut was spread thinly over a wide area which stretched under the Wall and beyond the limits of Trench 6, that of the second cut was restricted to a space just 3.6m deep. This could, of course, be coincidence, but it could equally be a sign that the ditch re-diggers did not want their spoil to encroach on the Wall area, which would hint that it was either present, or at least planned, by the time the re-cut was dug.

The writer has been unable to find parallels for a Roman timber tower being reused in a completely different period after a long abandonment (although reuse of larger sites, such as forts, was fairly common) and so, if the site did have an Antonine use, a wholly Antonine history might seem most probable. Nevertheless, it must be stressed that this remains conjecture, at least to a degree, especially whilst the site still stands alone along the Wall line. Garnhall does show the characteristics of a Roman watch tower and certainly appears to date to the Roman period. It also occupies an outstanding signalling site from which a number of major Antonine sites are visible, including Westerwood, Castlecary, Camelon and Rough Castle forts (but not Flavian Mollins), and pollen analysis (see below) shows an open contemporary landscape well suited to visual communications. But although this potential may have been exploited, and this may have been in the context of the Antonine Wall, the dating material found is probably not yet sufficient to provide a secure foundation date, because the glass fragments found appear to be equally at home in both the Flavian and Antonine periods and the ¹⁴C margin of error has already been mentioned. As a result, there is

insufficient evidence to settle the matter beyond doubt, and all that can be said with certainty is that there is a possible Roman tower at Garnhall whose primary phase predates the Antonine Wall; whose ditch re-cut up-cast lies on the same stratum as the Wall and which may have existed for long enough for some or all of its corner posts to have needed replacement (in one case twice) when the Wall's superstructure collapsed. The site might thus be a tower associated with the Wall, but until another such site is located it remains impossible to be sure.

If the site is an Antonine tower it would join the berm pits in providing evidence for a more powerful defensive stance. The defences of minor Roman military installations, such as towers and fortlets, have often seemed overly slight, and the ditches in particular can seem almost risible, as they are often shallow and relatively narrow. The large quantities of blackthorn off-cuts in the Garnhall ditch might suggest that such ditches were not just an end in themselves, however, but may instead have acted almost as pit traps, containing what amount to organic barbed wire entanglements. The site's high water table produced unusual conditions in the waterlogged ditch bottoms, ideal for the preservation of such material and it may well be the case that similar entanglements were a far more general provision on other such sites than we can now determine, because the material will normally have rotted away without trace. Indeed the very fact that the blackthorn was laid in a ditch like Garnhall's, whose defensive value must have been reduced almost to nothing by the fact that it was never finished, may suggest that such provision was so normal that it was done almost without thinking. The presence of off-cuts without root material also begs the question of where the parent plants may have been located and it is far from impossible that a blackthorn hedge was planted as a further defence around the interior, from which the ditch material was merely clippings. At present, there is no evidence either way, but thorn hedges, like barbed wire, can certainly make formidable defensive obstacles and could

have been especially so here if grown on or in association with a turf rampart. Indeed it may not be utterly absurd to speculate as to whether the Antonine Wall itself may have had such a provision.

Another long-standing question concerning Roman timber towers is how they were garrisoned. Stone towers, such as the turrets of Hadrian's Wall, can show deep layers of occupation debris, which suggest that their crews lived and ate on site. Timber towers, on the other hand, are often extremely finds poor and, as here, may not even show what might be thought essential features, such as hearths. Nor do the structures themselves appear very habitable and it is tempting to wonder whether their crews may have slept in nearby forts and only turned out to man their towers on a shift basis. If it was linked to a tower, however, the rectangular building in Trench 7/2 raises another possibility, for it may have acted as a small barrack for the garrison. As yet, there are no parallels for similar buildings outside other British towers, but this need mean nothing, as virtually no excavation has been done outside tower ditches to look for them. Moreover, there are parallels from other parts of the Roman world: notably at watch post 5/4, at Neuberg-Ravolzhausen on the German Limes, where such buildings are known outside the ditches of each of a series of three successive towers (Schallmayer 2006: 26f & 2007). This is thus an issue that deserves further investigation and it is to be hoped that future excavations on Roman timber towers will not restrict themselves so entirely to the area enclosed by the defences. This building might also provide other hints. As explained above, it does seem likely that it coexisted with the Wall and that this might provide an added dating pointer for the tower. Certainly there was no sign that it had been turf stripped during the construction of the Wall or ploughed before that, either of which could have been expected to have destroyed the lightly gravelled floor levels found. Moreover, burning that seems to have come from the building's destruction appears to overlie trample layers,

which might have formed during the Wall's construction and use. That said, however, it may be thought odd that there was no indication that any intermediate layer had formed between the building's destruction by fire and its subsequent burial by turfy material from the Wall. For, if the latter resulted from natural collapse of the rampart structure, a significant period of time could have elapsed between the two events. It is perhaps worth speculating, therefore (and it can be no more), whether both may have been linked acts of deliberate demolition. At first glance, this might seem out of the question. After all, parts of the Antonine Wall rampart survive to this day and so the Wall itself was evidently not systematically demolished. Nevertheless, this would still not rule out the possibility that some sections may have been slighted, either by the Romans themselves, or by local farmers, on or very soon after its abandonment and this might explain why the lower part of the slip layer, that had been protected from later ploughing was made up of larger, more cohesive turf fragments (including one complete turf) than might be expected through erosion.

The camp

As the temporary camp ditch was secondary to both the Wall and the later platform, it is clearly not a normal construction camp: yet it is still manifestly Roman. Until a few years ago it was thought that the Wall was abandoned briefly in the mid-Antonine period and so it might have been possible to envisage a construction camp used during a refurbishment phase following its reoccupation. This break has since been discredited, however (Hodgson 1995), and given the known history of Roman Scotland, the camp could be Severan, or part of some Antonine troop movement or major repair programme. It is not possible to determine which of these options is correct on current evidence but, if the camp is Antonine, it would suggest that the platform (and with it the Tollpark example), although secondary, was still relatively early in the Wall's development. Whatever the case, the fact that the

platform was allowed to be damaged by the camp ditch (albeit slightly) and then not repaired, might suggest that it had gone out of use, for whatever period, by the time that the ditch was dug.

Later features

Finally, in addition to the Antonine and pre-Antonine features, there was also a certain amount of post-Roman activity on the site. This included the clay pit (Site 2), the field road through Trench 1 and, probably, the posthole in Trench 3, although not enough is yet known about the latter to show what it might represent. A few sherds of green glazed Medieval pottery were recovered from various parts of the site, but these came exclusively from the plough soil and their distribution appeared random, so they may have been deposited through manuring.

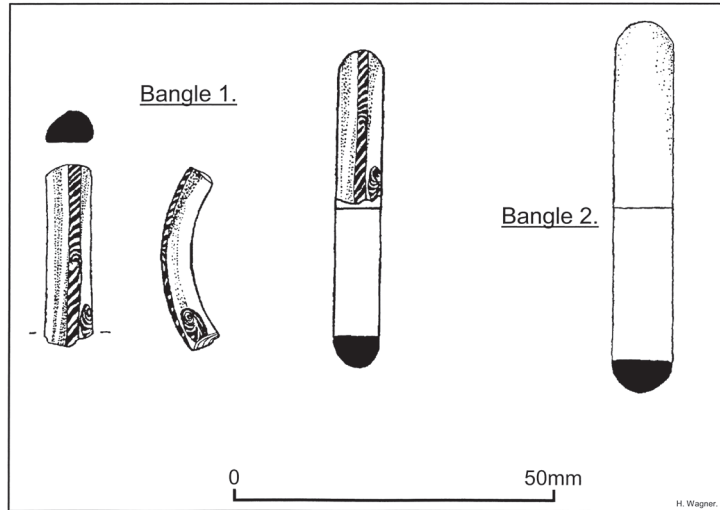
THE GLASS FINDS

Birgitta Hoffmann

The excavations yielded four fragments of Roman glass. Two of these were blue/green body sherds (one of which had been somewhat melted) about which little more can be said. But two fragments of Roman glass bangle were more informative.

Bangle 1 (illus 18)

Trench 12, bottom of turf and topsoil, just inside ring ditch. D-sectioned blue/green bangle. Central anti-clockwise cord (z twist) with little spiral marking the end of the cord and dark blue and opaque white spiral eye. Dull surface, scratched and bubbly.



ILLUS 28 The Roman glass bangles

H: 9mm; Diam (internal): 50mm; Diam (external): 66mm. Length of fragment: 32mm/56 degrees.

This form is of a widely known type. It comes from Kilbride-Jones Group 2ai (Kilbride-Jones 1938: 372ff and Price 1988: 342) and this combination of blue/green ground with dark blue and white trail is probably the commonest variety.

The majority of such finds come from native and Roman military sites in northern England and lowland Scotland, with comparatively few examples being found north of the Forth or south of the Humber (eg Dalton Parlours and Canterbury (Price 1990: 105, illus 79, 28) where the find derived from a deposit dating to AD 100–180). Finds from pre-Flavian deposits in Valkenburg and southern Britain point to this type as one of the earliest varieties. They seem to have been very popular in the Flavian period, but can still be found on Flavian/Trajanic sites, such as Castleford, Lease Rigg, Malton and York and on sites with a 2nd-century date (Kilbride-Jones 1938: 375 and Price 1988: 347). Reviewing the recent evidence, Price (1988: 347) argues for a possible production

centre 'in the vicinity of York', on the basis of a find concentration, and notes the close link between this type and the military presence in the region: a fact that is born out by the large amount of bangles encountered at Vindolanda and Newstead, but which contradicts Kilbride-Jones' earlier views of a native production (see Hoffmann 2003 for further discussion).

Bangle 2

Trench 8, clay platform metallurgy. D-sectioned bangle, yellow/green, dull, very bubbly. H: 11.5mm; Diam (internal): 70mm; Diam (external): c 85mm. L: 26mm/35 degrees.

This second bangle is quite unusual in both its fabric and its size. As to size, it should perhaps be seen in context with the plain blue/green bangle from Dalton Parlours (Price 1990: 105, illus 33, 79) which is also somewhat larger than normal (90mm instead of 40–50mm), along with a streaky dark blue and blue/green example from Castleford Site 12 and a small piece from Aldborough. It has been occasionally argued that undecorated bangles may be parts of Type 3 bangles, which broke at unfortunate points so that individual fragments might show no decoration. The yellowish green colour would thus link it to bangles of Kilbride-Jones Type 3H (yellow/green with trails) of which examples have been found at Milking Gap, Hartburn, Torwoodlee Broch (Kilbride-Jones 1938: 388ff), South Shields Fort and Malton (Price 1988: 352). The size of the surviving undecorated bangle fragments, which mostly exceed 30 degrees of arc of the original circle, suggests that this is not the case, as surviving Type 3 bangles rarely have such large undecorated sections. It thus seems likely that undecorated bangles form their own distinctive group within the Romano-British bangles. Undecorated bangles have been found in blue/green at Prestatyn, Ribchester, Elslack and Newstead, in dark blue at Corbridge, Castleford, Vindolanda and Newstead and in yellow-green in Newstead (2 examples)

(Hoffmann in preparation). The distribution may suggest that they were particularly popular at the end of the first and in the early 2nd century.

Bangles are not common site finds on the Antonine Wall, although there are examples of Types 1 and 3I from Camelton (Kilbride-Jones 1938: 367 & 389) and of Type 3F from Castlecary (Kilbride-Jones 1938: 350) and Rough Castle (Price 1988: 350). Although always described as bangles, the use of these objects is unknown. Very few have been found complete or in burials and their average diameter, of c 50mm, makes many of them too small to be worn as bracelets (Price 1988: 354).

GARNHALL BOTANICAL REMAINS

Susan Ramsay

INTRODUCTION

The archaeobotanical investigation of the site at Garnhall encompassed identification of charcoal, wood, other botanical macrofossils and pollen. By studying such remains it is possible to discover some aspects of the environment on and around the site during its occupation. Other Roman sites in the area which have published botanical reports include Bearsden and Bar Hill on the Antonine Wall as well as Mollins to the south. Pollen analysis of turfs from Bar Hill and Mollins (Boyd 1984a) pointed to them having been cut when the landscape was relatively cleared of woodland with some pastoral agricultural activity being undertaken. Some of the most significant finds at Bar Hill (Boyd 1984b) were the remains of what may have been an Iron Age *Crataegus* (hawthorn) hedge in one of the ditches. At Bearsden Fort, analysis of ditch silts proved them to be sewage and as a result it was possible to obtain an insight into the diet of the soldiers based there (Dickson 1989; Dickson & Dickson 1988).

Plant names follow Stace (1991) and Smith (1978) for mosses.

CHARCOAL

Charcoal was recovered from below the pre-Wall building in Trench 7/2. The charcoal was separated from its clay matrix by sieving, drying the material recovered followed by its examination under a low power binocular microscope to remove pieces of charcoal for subsequent identification. The charcoal was then identified using a Zenith direct illumination microscope. The results are shown in Table 1. Indeterminate fragments were those too degraded to assign to a particular taxon while unidentified fragments were too small to identify. When the charcoal was recognised on site it was considered to have been from the remains of a hearth. The taxa identified are consistent with this hypothesis with the charcoal probably representing firewood collected from a mixed deciduous woodland, presumably growing nearby.

Three charcoal fragments were also recovered from the Trench 8 post platform but these were not identifiable to any taxon as the structure of the charcoal was too badly degraded.

TABLE 1
Charcoal from Trench 7/2, Layer 2

<i>Taxon</i>	<i>No. of fragments</i>	<i>Dry weight</i>
<i>Betula</i> sp. (Birch)	4	1.4g
<i>Corylus</i> sp. (Hazel)	24	1.4g
<i>Quercus</i> sp. (Oak)	16	1.5g
Indeterminate	16	1.2g
Unidentified	0	2.6g

Wood

Wood remains were recovered from the ditch fills of both Trench 16 (Ring Ditch) and Site 3, Trench 1 (temporary camp ditch). The wood remains from Site 3, Trench 1 were all identified as *Betula* (birch) bark. It is not possible to say whether the bark had been used for a specific purpose or had been dumped into the ditch as

waste after being stripped from Birch wood used for building or other purposes on the site.

The most interesting finds came from the ring ditch bottom fill of Trench 16. Thirty-nine pieces (approximately 350g wet weight) of *Prunus spinosa* (blackthorn) type wood were identified. These were almost all pieces of roundwood and ranged from 20–120mm in length and 5–30mm in diameter. Several of the pieces showed evidence of cut surfaces and the shape of some of the larger pieces suggests that they may have been cut from managed bushes. This cannot be confirmed as no managed blackthorn reference material has been traced.

Prunus spinosa type (as defined by Schweingruber 1982) includes *Prunus spinosa*, *Prunus domestica*, *Prunus institia* and *Prunus cerasifera*. However comparison of the water-logged wood with reference material suggests that it is most likely to be *Prunus spinosa* (blackthorn) itself. This species grows to form a large and extremely thorny shrub. The thorns occur at the ends of small side branches growing out of the main branches. One thorn and several of the small side branches, minus thorns, were identified from the Garnhall samples.

Thorny branches of blackthorn were identified from a Roman deposit at Farmoor, Oxon (Robinson 1978). It was postulated that the blackthorn was growing in the form of hedges around small fields although the author makes it clear that the ‘most convincing proof of a Roman or earlier hedge would be to find a row of stumps and roots preserved as a result of a rising water table and to carry out radiocarbon dating on them’ (ibid: 156).

No root wood was found at Garnhall which suggests that if the samples had come from a hedge it was unlikely to have been growing in the ditch. It may be that branches of blackthorn were cut and placed in the ditch as an extra form of defence with the thorny branches making a very impenetrable barrier.

At Bar Hill, on the Antonine Wall, Boyd (1984b) found numerous branches, twigs and thorns of *Crataegus* sp. (hawthorn), another

thorny shrub. Many of these fragments had cut surfaces, unnatural forms or had evidence of scar tissue where branches had been damaged but had continued to grow. Boyd considered these growth patterns indicated interference in the growth of the hawthorns from which these branches had originated. He considered that this damage could have been caused by grazing animals, woodland clearance encouraging growth of hawthorn as a shrub rather than a tree or by management of hawthorn as a hedging plant.

Until adequate reference material of managed blackthorn is obtained it is not possible to determine whether the growth forms noted in the Garnhall wood samples are natural or the result of grazing or human interference.

Macroscopic plant remains

We analysed 200ml of organic sediment from the ditch bottom fill of Site 3, Trench 1 for macroscopic plant remains. The sample was sieved through meshes of 500 μ m and 150 μ m

TABLE 2
Botanical macrofossils from Site 3, Trench 1 (ditch of temporary camp)

<i>Taxon</i>	<i>Macrofossil type</i>	<i>Number per 200ml sediment</i>	<i>Common name</i>
<i>Calluna vulgaris</i>	twigs, leafy stems	12.1	heather
<i>Carex nigra</i>	nutlet	10	common sedge
<i>Carex ovalis</i>	nutlets	81	oval sedge
<i>Carex panicea</i>	nutlet	9	carnation sedge
<i>Cirsium palustre</i>	achene	1	marsh thistle
<i>Cyperaceae</i>	nutlet	20	sedge
<i>Danthonia decumbens</i>	caryopsis	7 + 2 fragments	heath grass
<i>Galium palustre</i>	fruit	1	common marsh bedstraw
<i>Glyceria fluitans</i>	caryopsis	4 + 12 fragments	floating sweet grass
<i>Hylocomium splendens</i>	leafy stems	abundant	moss
<i>Juncus bufonius</i> type	seed	110	toad rush type
<i>Juncus effusus/conglomeratus</i>	seed	460	soft rush/ compact rush
<i>Juncus</i> sp.	seed	20	rush
<i>Luzula sylvatica</i>	seed	3	great wood rush
<i>Lychnis flos-cuculi</i>	seed	8	ragged robin
<i>Montia fontana</i>	seed	1	blinks
<i>Plantago major</i>	seed	1	greater plantain
<i>Pleurozium schreberi</i>	leafy stems	occasional	moss
<i>Polytrichum commune</i>	leafy stems	frequent	moss
<i>Potentilla erecta</i>	achene	10	tormentil
<i>Prunella vulgaris</i>	nutlet	17	selfheal
<i>Ranunculus flammula</i>	achene	24	lesser spearwort
<i>Senecio aquaticus</i>	achene	12	marsh ragwort
<i>Urtica dioica</i>	nutlet	20	common nettle

and the plant material retained on the sieves was then examined under a low power binocular microscope. The results are presented in Table 2. Many of the species found are indicators of wet ground, in particular *Glyceria fluitans*, *Senecio aquaticus*, *Ranunculus flammula* and *Juncus* spp. and most of the other taxa prefer at least moderately damp habitats. The majority of the taxa identified could have grown in the waterlogged ditch itself or on damp grassland nearby.

Abundant remains of mosses were found in the sample. *Hylocomium splendens*, *Polytrichum commune* and *Pleurozium schreberi* were present to a greater or lesser extent but it is unlikely that these mosses would have grown in the ditch itself. As they were found in association with heather twigs and leafy stems it is more likely that the mosses were collected from nearby heathland, perhaps for packing or wiping purposes, and were subsequently discarded into the ditch.

Unlike Bearsden Fort there are no remains of food plants in the ditch sediment and so it is unlikely that the ditch was used for sewage disposal. However there are significant numbers of *Urtica dioica* (common nettle) nutlets in the sample, which would indicate some degree of enrichment of the ditch silts or soil nearby perhaps as a result of livestock being kept in the vicinity.

POLLEN ANALYSIS

Pollen analysis was undertaken on six samples from Garnhall. Four samples were taken from various depths through the ditch fill of Trench 16 (Ring Ditch), and samples were taken from both the drainage culvert silt and the turf layer from Site 3, Trench 2 (Antonine Wall).

Trench 16 (Ring Ditch)

The earliest silt sample (illus 13, Layer 10) shows an open, grassy landscape but with areas of scrubby woodland containing *Betula*

(birch), *Alnus* (alder), and *Coryloid* (probably hazel) but with little or no *Quercus* (oak). The trace occurrences of *Tilia* (lime) must represent long-distance transport of pollen since this tree type is not native to Scotland. *Calluna vulgaris* (heather) values are low while there are significant amounts of *Liguliflorae* (dandelion type), *Plantago lanceolata* (ribwort plantain) and *Ranunculaceae* (buttercup family) suggesting pastoral activity. As the ditch silted up (Layer 8) the percentage of *Poaceae* (grass) pollen more than doubled while the values for trees declined. This suggests that the scrubby woodland was being cleared and that the landscape became almost entirely grassland. If the tower had been used for signalling, as has been suggested, there would have been an uninterrupted treeless landscape across which a signal would have been clearly visible for considerable distances.

The sample which was considered to have come from an old land surface (Layer 12) has a very similar pollen spectrum to that of the upper silt layer. Again *Poaceae* (grass) predominates but there is an increase in *Calluna* (heather) which suggests that some of the cleared land was reverting to heathland either through a reduction in grazing pressure or a less intensive utilisation of the surrounding land.

The sample (Layer 7) considered to be from turf used to infill the ditch is consistent with the turf having been removed from an almost exclusively grassy landscape. The above results agree with a pollen analytical study of peat bogs in the Glasgow area (Ramsay 1995) which has shown that this part of Scotland was substantially cleared of woodland in the pre-Roman Iron Age and remained cleared throughout the Roman occupation.

Site 3, Trench 2 (Antonine Wall)

Pollen analysis of the turf overlying the stone base of the Antonine Wall again shows a very open, grassy landscape but with some evidence of scrubby woodland. It is very similar to the spectrum seen in the earliest ditch silt from the

TABLE 3
Pollen analysis of Garnhall samples, expressed as a percentage of the total pollen and spores

	<i>Trench 16</i> 70–71cm	<i>Trench 16</i> 97–98cm	<i>Trench 16</i> 115–116cm	<i>Trench 16</i> 125–126cm	<i>G3, Trench 2</i>	<i>G3, Trench 2</i>
Pollen taxon	Turf infill	Old land surface	Ditch silt	Ditch silt	Culvert silt	Turf
TREES						
<i>Alnus</i>	2.1	0.6	1.3	7.1	10.9	12.3
<i>Betula</i>	5.4	1.9	2.1	12.1	20.8	11.6
<i>Fraxinus</i>	–	–	–	+	–	–
<i>Pinus</i>	+	+	+	–	–	–
<i>Quercus</i>	+	+	–	+	0.6	0.9
<i>Tilia</i>	+	–	–	+	–	–
<i>Ulmus</i>	–	+	–	–	–	–
Total Tree Pollen %	8.2	3	3.6	19.6	32.3	24.8
TALL SHRUBS						
<i>Coryloid</i>	2.5	1.8	2.4	6.8	7.7	7.2
<i>Salix</i>	+	+	–	–	+	–
HERBS						
<i>Anthemis</i> type	–	–	–	+	+	+
<i>Apiaceae</i>	–	–	–	+	–	–
<i>Artemisia</i>	–	+	0.8	0.8	+	+
<i>Aster</i> type	–	–	–	0.8	+	–
<i>Brassicaceae</i>	–	–	–	–	+	–
<i>Calluna vulgaris</i>	2.5	8.8	1.5	1.6	3	0.9
<i>Caryophyllaceae</i>	–	–	+	+	–	–
<i>Centaurea nigra</i>	+	–	–	–	–	–
<i>Cerastium</i> type	–	–	–	+	–	–
<i>Cyperaceae</i>	–	–	–	2.9	+	2.1
<i>Filipendula</i>	+	+	–	+	–	+
<i>Galium</i> type	–	–	0.6	–	–	–
<i>Hornungia</i> type	+	–	–	+	–	–
<i>Liguliflorae</i>	–	+	–	1.2	+	+
<i>Plantago lanceolata</i>	0.7	1.8	1.1	3.6	+	0.9
<i>Poaceae</i>	79.0	80.8	80.4	34.5	16.3	43.7
<i>Polygonum aviculare</i> type	–	–	+	+	–	–
<i>Potentilla</i> type	+	–	–	+	+	–

TABLE 3 (continued)

Pollen analysis of Garnhall samples, expressed as a percentage of the total pollen and spores

	<i>Trench 16</i> 70–71cm	<i>Trench 16</i> 97–98cm	<i>Trench 16</i> 115–116cm	<i>Trench 16</i> 125–126cm	<i>G3, Trench 2</i>	<i>G3, Trench 2</i>
Pollen taxon	Turf infill	Old land surface	Ditch silt	Ditch silt	Culvert silt	Turf
HERBS						
<i>Ranunculaceae</i>	0.9	1.4	2.3	1.6	0.8	3.3
<i>Silene dioica</i> type	–	–	–	–	–	+
<i>Sinapis</i> type	–	–	–	0.6	–	–
<i>Sphagnum</i>	–	–	–	–	–	+
<i>Stellaria holostea</i>	–	–	–	–	+	+
<i>Succisa/Scabiosa</i>	–	+	–	0.9	+	+
FERNS						
<i>Polypodium</i>	0.9	–	1.5	2.9	3.4	2.2
<i>Pteridium</i>	–	+	+	–	+	+
<i>Filicales</i>	+	+	+	1.4	–	–
UNIDENTIFIED						
Crumpled	3.7	+	3.8	11.6	20.1	9.1
Degraded	+	+	0.6	6.7	13.4	3.8
Broken	+	–	0.8	+	–	–
Total pollen grains counted	760	624	531	647	797	579

(+) indicates less than or equal to 0.5% and pollen types follow Moore, Webb & Collinson (1991)

ring ditch (Trench 16, Layer 10) and it may be that they reflect the same landscape and vegetation.

The sample from the ditch culvert silt is more difficult to interpret as there is a high proportion (33.5%) of unidentifiable pollen present and the chance that differential preservation may have occurred. However the spectrum from this sample appears to reflect a landscape with moderate amounts of grass but with higher values for trees, in particular *Betula* (birch). This may mean that the water carried by the culvert was draining directly from an area colonised by scrubby

woodland and so had an increased load of tree pollen which was deposited in the culvert.

CONCLUSIONS

The pollen and botanical macrofossils indicate that during the Roman period Garnhall was surrounded by a relatively treeless landscape with damp/wet grassland being the dominant vegetation type. During the period of occupation of the tower it would appear that most of the remaining scrubby woodland was also cleared

and birch bark found in the ditch fill of the temporary camp (Site 3, Trench 1) suggests that local wood might have been used on the site. The landscape would have been ideal if the tower was indeed being used as a signalling post as there would have been little or no tall vegetation nearby to obscure signals sent either to, or from, the structure.

The most interesting finds were the large numbers of *Prunus spinosa* (blackthorn) branches from the ring ditch around the tower. These show evidence of being cut and may have come from managed bushes although this has not been confirmed. It is possible that these thorny branches were deliberately placed in the ditch as an added line of defence.

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