

A Geophysical Survey of the Roman Fort at Bewcastle, Cumbria

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The outpost fort of Bewcastle is unusual, being hexagonal in plan and situated in a non-defensive position to the north of Hadrian's Wall. The report of the geophysical survey examines the interior of the fort and comments on the apparent lack of a *vicus* and other features surrounding the fort itself.

THE fort at Bewcastle, along with those at Risingham, High Rochester, Birrens and Netherby, formed part of the final concept of the Hadrianic Frontier comprising outpost forts located to the north of Hadrian's Wall. Bewcastle fort is situated some 9.6km to the north of the Wall and is linked to that at Birdoswald by a road commonly referred to as the Maiden Way. A geophysical survey of the fort using magnetometry techniques was carried out during the summers of 2000, 2002 and 2003.

The fort is unique in that it forms an irregular hexagon, some 2.9ha in outline occupying a plateau overlooking Kirk Beck. Overlying the fort to the south is the church and churchyard of St. Cuthbert, whilst to the north, Demesne Farm and the remains of Bew Castle straddle the defences and the northern portion of the fort. The fort is surrounded by higher ground on all sides apart from the west where there are open views down the valley.

Today, the remains of the Norman Bew Castle, probably originally built in timber soon after 1092 dominate the site.¹ The builders appear to have re-used the Roman defensive ditch system to its northern and eastern sides. The castle was rebuilt between 1361 and 1371 by John de Strivelyn, one of Edward III's nobles, using stone from the fort. It was finally abandoned around 1640 and largely demolished and has since become a source of cut stone. The remaining fabric was consolidated by English Heritage in 2003-4.

Continuity of occupation in the environs of the fort is exemplified by evidence of prehistoric activity nearby. This includes a stone hut circle and round cairn, sited 800m east of Woodhead together with another stone hut circle close by. Hennel Clough bowl barrow is sited 785m south west of High Grains Farm. The significant Anglo-Saxon cross, which appears to be in its original position in the churchyard within the fort, suggests an important centre either royal, religious or both.² A Saxon clay loom weight was also found during the excavation of the bath-house by Gillam *et al.*³

There are several medieval sites in the proximity of the fort. The Hall Hills medieval dispersed settlement is situated close to the site 370m west-north-west of St. Cuthbert's Church. The site overlooking the confluence of Hall Sike and Kirk Beck includes a partly mutilated platform upon which lie the remains of a stone built house, an enclosure and a small building platform. Further away a dispersed medieval settlement is situated 250m to the north of Bush Farm and a medieval pele tower and

three shielings are located 200m to the west of High Grains Farm. Braes Pele medieval tower and shielings is sited 350m east of Borderrigg and there is a further medieval dispersed settlement on Mount Hulie. All these latter four sites are to the east or north east of Bewcastle. Interestingly, there is a record of a hospital at Bewcastle in 1294, referred to as 'Hospitale de Lennh.'⁴ There is no record of its founder or patron or why it was sited there.

Previous research

The early antiquarian history of the fort is summarised by Birley.⁵ An excavation directed by Sir Ian Richmond identified the east facing *principia*, the *praetorium*, a possible barrack block and the south-west defences including the *porta decumana*.⁶ A bath-house was excavated in the *praetentura* between 1949 and 1954,⁷ although part of the structure is conjectural. This site, in the south-east corner of the fort, revealed a building of the same type to that seen at Netherby, Chesters and Carrawburgh and was almost an exact replica of the bath-house at Benwell.⁸ (See Figure 1)

Austen carried out an excavation in the north-west corner of the fort in 1977-8, examining a section of the defences and some internal buildings.⁹ A fundamental part of this report was to revise Richmond's dating of the phasing. It appears evident that the fort was hexagonal from its establishment in the Hadrianic period, with a turf and

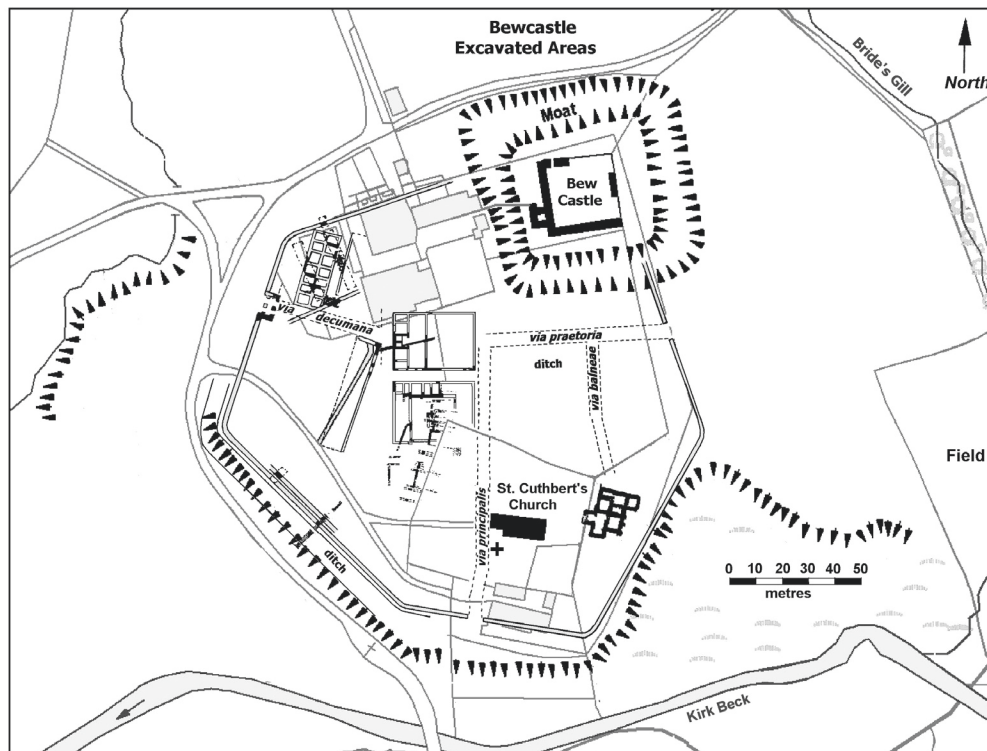


FIG. 1. Plan of fort showing location of excavated areas.

timber rampart and timber internal buildings, although it is probable that the *principia* was built in stone at this time. There is no evidence of an earlier fort in the traditional rectangular form.

Austen attributes the stone fort wall and stone buildings to the period when the Roman army returned to Hadrian's Wall in c.AD 163. The fort was then altered extensively in the late second to early third century to accommodate a larger garrison. It is likely that a *cohors milliaria equitata* was garrisoned there at the same time as similar garrisons at the other outpost forts of Risingham, High Rochester and Netherby. Richmond found that the rampart had been removed on the south-west side of the fort to provide additional internal space resulting in a higher density of buildings. This phase lasted for most of the third century with changes being made to the *principia*, bath-house and defences. But then the area of the fort was reduced and a fort wall constructed on a new line. The evidence suggests that after this phase the fort was then neglected or abandoned. The date of the abandonment of the fort, derived from coin evidence, is much earlier than Richmond's proposed date of 367. The latest coin from any of the outpost forts is c.309 and it has been convincingly argued that the outpost forts were given up under Constantine c.312-14.¹⁰ The evidence from Bewcastle appears to support these findings. Little evidence of any post-Roman occupation was found by Austen but he did note some evidence of flimsy foundations, probably medieval, seen where c.300mm of top soil covered the Roman deposits.¹¹

The fort was built to house a milliary cohort with cohort I *Dacorum Milliaria Peditata* being garrisoned there under Hadrian,¹² with a further unnamed *cohors milliaria* being recorded in the third century. Two dedication slabs, following building work, were set up by the Second Legion Augusta including one jointly with the Twentieth Legion Valeria Victrix.¹³ Several dedications have been recorded to the deity Cocidius who had a shrine close to the fort.¹⁴

As the fort was not in visual contact with the Wall it was necessary that signal stations be used to maintain contact. A Roman signal station is known to have been sited on Gillalees Beacon, a flat-topped hill between Bewcastle and Birdoswald. Although it was possible to see the Wall fort of Birdoswald from this position, it was not possible to see the fort of Bewcastle; nor was it possible to see both forts from anywhere on the hillside. A further signal station, however, has been located at Barron's Pike, 1 3/4 miles to the east of Bewcastle. This links the fort to the Gillalees station with the additional advantage that the fort of Carvoran can be seen from Barron's Pike.¹⁵

Methodology

An analytical earthwork survey of the fort and its surroundings has been undertaken by Sainsbury and Welfare.¹⁶ This was used as a template to locate and confirm the identity of some of the anomalies detected. A number of substantial extant earthworks were located during this survey, many of which were probably Roman in origin.

The magnetometry survey was conducted using a Fluxgate Gradiometer (Geoscan Research) with 1m parallel traverses and 0.25m sample intervals, within 30 metre

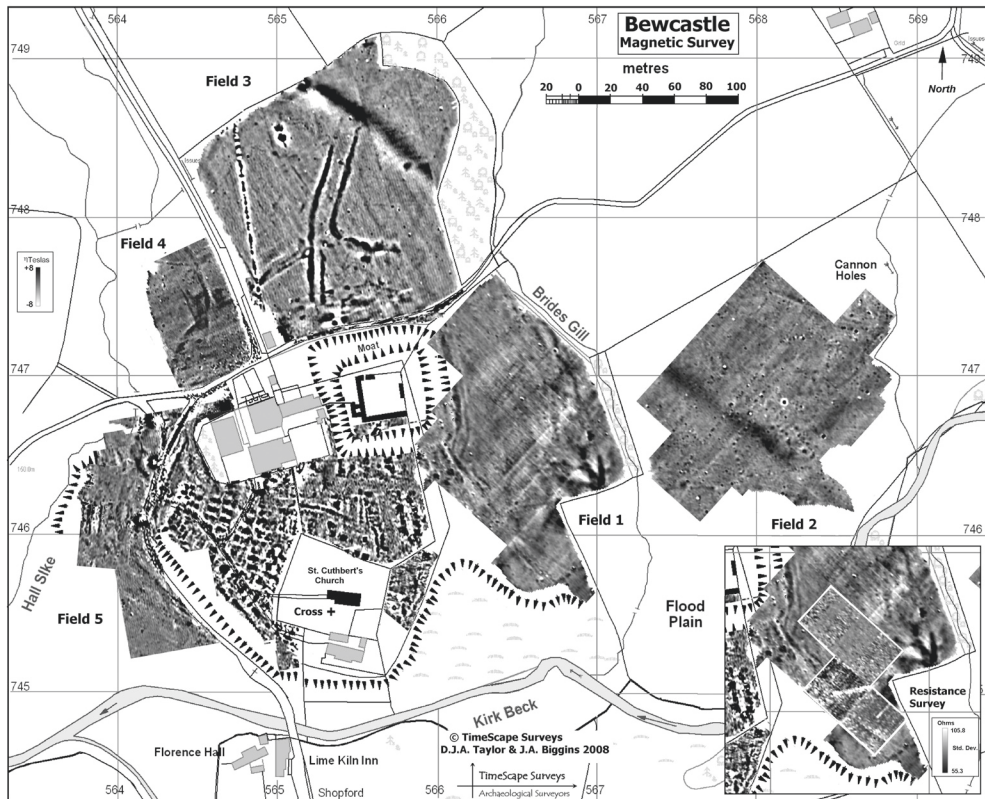


FIG. 2. Magnetic survey of the fort and surrounding areas.

grids. An automatic trigger was employed and zero drift was recorded at the end of each grid, when the instrument was recalibrated. The direction of survey was approximately south west to north east. From this data a grey scale magnetic plot was produced (Fig. 2).

The grids were set out at an angle of approximately 25-45° in relation to known archaeology (i.e. the fort) using a Leica TC403L EDM, and the grids and other relevant mapping features recorded. This survey strategy eliminates some spurious effects of data processing, effectively enhancing the resolution of some features. The total area surveyed using magnetometry was 9.25 hectares. The setting-out and mapping data collected was used to produce a topographical map, which superimposed upon an Ordnance Survey base map, was used to identify the precise location of the suspected agger leading east from the fort. The geophysical survey data was computed and analysed using Geoplot 3 data processing software (Geoscan Research). Terramodel and Terravista mapping and digital terrain software (Spectra Precision Software) was used to process the topographical data.

The Bewcastle Heritage Society carried out a resistivity survey of part of field 1. It was the intention to involve local archaeologists in the project from the outset and without their efforts this aspect of the survey would not have taken place. The survey employed a

Geoscan RM 15 resistivity meter, using 0.5m sample intervals and 1.0m traverses. The total area surveyed by this method was 0.4 hectares and was emplaced to determine the response from the road located east of the fort. It should be noted that geophysical survey cannot generally determine the phases of the archaeological deposits and some late medieval and post medieval deposits may overlie the Roman features. It is therefore difficult to determine the relative period or phase of many of these anomalies.

The fort

Richmond's excavation found that the *principia* had been severely robbed out and was seen to measure *c.* 72ft (21.9m) north to south by 100ft (30.5m) east to west. The extant *praetorium* was located across a street to the south and found to measure at least 88 ft (26.8m) north to south by 78ft (23.8m) east to west. The east elevations of the two adjoining buildings faced the *via principalis* with their rear elevations lining up with the *via quintana* as shown in the report. This would imply that the front of the *praetorium* was set back some 22ft (6.7m) from that of the *principia*. This, however, does not agree with the plan produced by Richmond and the evidence of the survey which suggests both buildings had a similar frontage to the *via principalis* although the road does appear to kink at that point.¹⁷ To the west of the two buildings excavated by Richmond, a possible stable or barracks were detected in the *retentura* behind the *principia* and *praetentura*. This was set at an angle of approximately 20° to the line of the rear wall of these latter buildings. It is generally found that buildings, which have been excavated, do not show up clearly in geophysical survey due to ground disturbance and backfilling. However, from the survey, the position of the *principia* can be identified (1) together with evidence of the *praetorium* (2). (See Fig. 3.) The line of the *via praetoria* can be established (3) centred on the *principia* with the *via principalis* running at right angles approximately north-south (4). The latter road appears to be cut by a strong linear feature crossing east-west just south of the *via praetoria* (5). This feature is indicated as a pronounced earthwork, initially running east-west and then heading directly south. This may be a channel or aqueduct which leads directly towards the bath-house, at this stage running parallel to the *via praetoria*. It is not possible to establish the form of the *laterna praetorii* due to the constraints of the survey and there is no firm evidence of any granaries.

The buildings in the *praetentura* are set out parallel to the east fort wall. There is no evidence of the *porta praetoria* however. There are between four and five rows of the linear cellular buildings between the *principia* and *praetentura* in the east fort wall with a road running between the blocks to the south of the *via praetoria* (6). The character of the buildings differs somewhat to those in the *retentura* in that the buildings do not seem to be as tightly packed together and are more diverse in plan form. Richmond cut a further trench, which was placed parallel with the west wall of the churchyard. This narrow trench revealed the remnants of a channelled hypocaust.

The bath-house is unusually sited within the fort walls in the *praetentura* (7a). At the outpost forts of Risingham and High Rochester the bath-house was similarly sited within the fort walls. The high positive magnetic anomalies reflect the position of the furnaces and hot rooms. The location of the bath-house as shown by Austen¹⁸ differs

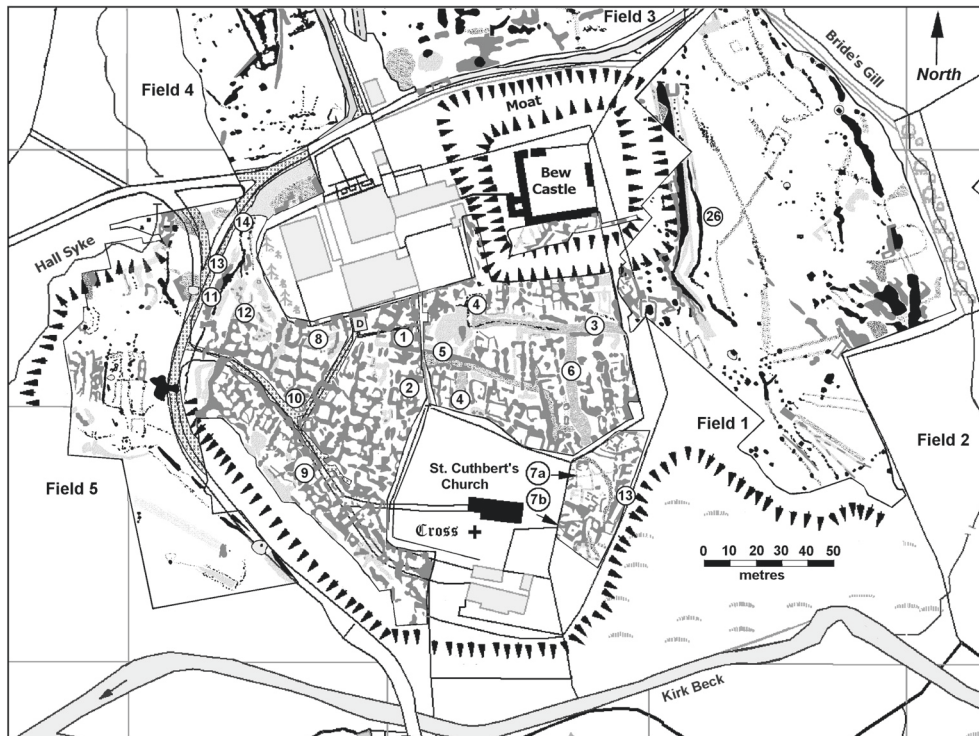


FIG. 3. Anomaly plan of the fort.

from that indicated by Sainsbury and Welfare¹⁹ and the evidence of the survey.²⁰ Located just south, and possibly contiguous with the position of the bath-house is a very strong bipolar response, probably a hypocaust or furnace (7b). The strength of the response (-35 to +120nTeslas) may indicate the location of bricks or tiles.

The ranges of buildings in the *retentura* are set out parallel to the north-west fort wall (8). However, a band of buildings set out parallel to the south-west wall abuts these (9). It is likely that a lane runs between the groups of buildings set out on a different orientation (10), probably running parallel with the track leading to the churchyard entrance.

The *porta decumana* was excavated by Richmond in 1937. He found a double-portal gateway, with no guard chambers, built contemporarily with the fort wall. A lime kiln was found abutting the fort wall adjacent to the gate passage wall where the rampart-backing had been removed. The strongly bipolar anomaly on the edge of the line of the north-west wall marks the assumed position of these features (11). There is no evidence of the *via decumana*.

A large building is sited inside the fort close to the *porta decumana* (12). The building, which measures c.15m by 10m, has six internal spaces and is represented by strongly responsive magnetic anomalies. The central north-western chamber in particular

exhibits very high magnetic values, perhaps indicating ceramic or burnt material. This could indicate the location of another bath-house.

The only part of the survey where the fort wall can be identified is to the west of Demesne Farm adjacent to the *porta decumana* and possibly to the south east (13). Excavation of the south-west defences by Richmond revealed the bottom of a single external ditch. The single fort ditch can be seen to the north west of the fort (14).

There is no evidence of any medieval or later structure within the area of the fort. It is probable that the bailey to the castle extended over the area occupied by the farm buildings and adjacent yards. The survey indicated that some masonry features, probably pre-medieval, are still present to the south of the Bew Castle berm.

Fields 1 and 2 to the east

The Maiden Way running from Birdoswald to Bewcastle has been described by Collingwood²¹ and Margary.²² Collingwood found that the road ran more or less in a straight line for most of its length, varying no more than two hundred yards at any one time. He established that the road crossed Kirk Beck some 50 yards (46m) to the east of Byer Cottage. The same route was accepted by Richmond, who shows the line of the road crossing the beck and climbing up the hillside towards the east gate.²³

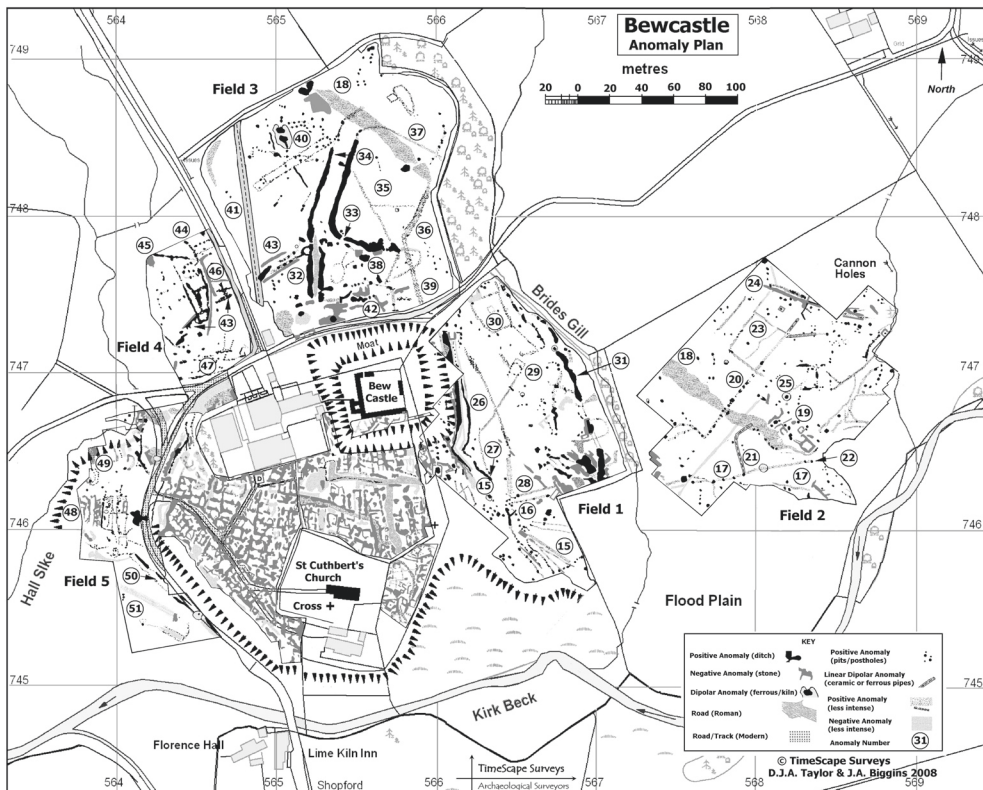


FIG. 4. Anomaly plan of the fort and surrounding areas.

Collingwood discounts any suggestion that the road proceeded further north into Scotland and no convincing evidence has been proposed.²⁴ The line that Richmond took to be the road can be seen visually in field 1 as a linear agger, some 200mm in height and 3-4m wide. This feature is registered by both the magnetometry survey and particularly by the resistivity survey as a strong high resistance feature (15, See Fig. 4). A further similar strong feature runs east-west to join this (16) and can be seen visually to be a bank on the line of a stone field boundary wall. However, this linear feature is some 3-4m in width and does, perhaps notably, lead towards a small stream where a number of anomalies of undetermined significance are present.

The magnetic survey established the line of a road (17) in field 2 leading west from a point on the north-west bank of Kirk Beck *c.*285m from the east gate. The feature was seen as a pronounced *agger* close to the beck and runs close to the edge of the river terrace for most of its length in the field. The edge of the terrace could reflect an earlier course of the beck. There is some evidence of the road in the western side of field 1, and if its line is extrapolated it would extend to a point close to the north side of the east gate. From there it could climb an incline up to the fort. Richmond shows the postulated line of the road south of Kirk Beck diverted from a straight line in field no. 496.²⁵ If the road had continued in a straight line it would have reached a point on Kirk Beck close to the projected line of the road on the far bank. This submission has yet to be established by further survey. Therefore, in view of the evidence of the present survey, some doubt must be cast on the line of the road from its point south of Kirk Beck to the fort, as put forward by Richmond.

The large dark linear positive feature in fields 2 and 3 is a geological anomaly (18). It is probable that it is a tertiary volcanic dyke forming an extension to Foster's Hill dyke on the River Irthing.

A small linear group of stone buildings is sited some 30m north of the road (19). Several lines of postholes can be seen in the field (20), one of which is sub-circular in form (21) abutting a linear feature, probably a trackway (22). This trackway joins the line of the probable Roman road close to the western edge of field 2. The whole or part outlines of three rectangular enclosures are also evident (23). A further linear feature of unknown origin extends north west to south east at the north east edge of the survey (24). An intense bipolar anomaly in the centre of field 2 could represent a lime kiln (25).

In field 1 a ditch to the east of the upcast mound to the castle moat formed part of the defences (26). A ditch running south east from this feature is modern (27) and was cut in recent times to drain standing water.²⁶ The field immediately below the fort to the east is largely devoid of any evidence of buildings reflecting either Roman or medieval occupation. The lack of Roman evidence could be due to several centuries of continuous medieval agricultural activity. However, there is some possible evidence of a stone building in the angle of linear features (15) and (16). This can be seen as a rectangular structure on the resistivity survey (28).

Possible traces of rectangular timber buildings can be seen close to the centre of the field (29) adjacent to some rectangular enclosures (30). The irregular linear positive

features running parallel to Brides Gill could indicate earlier riverine channels of this watercourse (31). Many postholes are situated randomly and in line throughout the field indicative of possible earlier field boundaries.

Fields 3 and 4

Field 3 to the north of the fort has a gradual, even slope running down to the fort. Directly opposite the north gate and on line with the *via principalis* a well defined road some 2.5m wide with a ditch to each side runs away from the fort in a direction slightly east of north (32, See Fig. 4). At a distance of some 65m from the fort the road is joined on the east by a much less well-defined road, the evidence for which is lost as it runs towards the south east (33). This feature is bounded by a ditch to each side, that to the south being only suggestive. The road now running north east (34) is some 10m wide with a well-defined ditch to each side. After a distance of some 80m the inner ditch starts to curve to the south east whilst the outer ditch curves to the north east; at this point the features lose definition.

It would seem that the latter two roads (33 and 34) formed the southern and western boundaries of a rectangular enclosure approximately 50m by 75m (35). The south-eastern boundary ditch can be seen as a faint shadow and has either been truncated by later agricultural activity or never fully excavated (36). The north-eastern boundary is defined by a weak linear feature (37). It could be significant that the ditch to the south abutting the eastern road (33) is very irregular in form and could suggest a series of interlocking pits or an unevenly dug ditch.

A possible interpretation is that the wider road (34) might be a drove road connecting with the area in front of the fort (38). The faint outline of a possible ditch can be seen to the east enclosing the space on that side (39). It is suggested that whilst the fort was in occupation that these two enclosures might have been used for the picketing of horses. Interpretation of the evidence from Ribchester indicates that horses were picketed in *extra mural* enclosures close to the fort where they could be guarded by men positioned in towers within the fort.²⁷

Two conjoined intense bipolar magnetic anomalies can be seen to the top of field 3 (40). It is possible that these are substantial lime kilns, many of which are recorded in the area where limestone is abundant, although the dating is uncertain. The linear bipolar anomaly running north-south to the west of the image is a water pipe (41), supplying Demesne Farm. This water supply arises from a natural spring some 600m north of the farm.

To the north of the fort, extending for a distance of 30-40m either side of the east gate, is some evidence of stone and timber buildings (42). A large negative anomaly just outside the north gate represents a building or group of buildings c.20m by 15m. It must be questionable as to whether some or any of these buildings are of Roman origin. Interestingly, several building stones, probably of Roman origin, can be seen adjacent to the western field boundary in field 3.

A linear feature runs west from the road leading north from the fort in field 3 (43). This feature cuts the ditch to the west of the road and can be seen to be on the same line as a similar adjacent feature in field 4 (43). It can therefore be assumed that they are part of the same feature and probably represent a ditch, which can be seen to run to the south west. A further ditch runs north from this ditch in field 4 (44) with a branch running north west close to the top of the image (45). The mass of positive features (46) adjacent to the junction of ditches (43) and (44) in the field cannot be explained. Substantial earthworks are visible on the ground, but not as complex as seen with the geophysical data. Close to the bottom of the image and the unclassified road, several small stone buildings can be identified (47).

Field 5

The area of land immediately to the south of the west gate forms a natural platform above Hall Sike, which then falls away to the south. Evidence of building activity is present and this is best seen in the presence of a block of dressed stone set into the side of an unused silage pit, approximately 1m deep. This masonry block, measuring 800mm by 600mm by 350mm was reputedly used as a cheese press but is almost certainly Roman in origin (48). Some evidence of possible stone/timber buildings can be seen as disturbed anomalies on the platform adjacent to this feature. Evidence of a corn-drying kiln described by Bruce²⁸ and Whellan²⁹ is present to the north of the platform on the crest of the steep slope above Hall Sike (49).

A ditch runs from the platform alongside the unclassified road (50). There is also a linear surface feature (51) which runs at an angle alongside it. This linear feature, which can be determined as a ramp on the ground, may indicate a former road or track, which may have followed a lesser gradient than the modern road, possibly leading to the site of the present bridge or a fording point nearby. This would suggest that it would have been used for wheeled traffic. There are possibly a number of timber buildings located between this feature and the road.

Conclusion

It is apparent that the siting of the fort at Bewcastle on a knoll in the valley of Kirk Beck was not chosen for its defensive attributes. It is also clear, based on the present level of research, that the fort was situated at the end of the Maiden Way; being in practical terms at the end of a cul-de-sac. Significantly in the second and third centuries minimal evidence attributes a milliary cohort with the fort. Other outpost forts at Netherby, Risingham and High Rochester could have had similar garrisons during the third century.³⁰ This implies that the fort at Bewcastle was sited in a known area of unrest from which a large, highly mobile military force could be sent out to quell any possible aggression. It was evidently not a fort built with any pretension for a defensive role. In the case of Bewcastle the security of the garrison was more exposed than at the other outpost forts in that it was effectively situated at the end of a military road whilst the others were on major military main supply routes. This would have made the fort particularly vulnerable if the signal station maintaining contact with the Wall was ever destroyed.

It is pertinent to compare the siting of the fort of Bewcastle with that of High Rochester, the only other outpost fort where significant areas of geophysical survey has been carried out.³¹ In contrast to the former's non-defensive position High Rochester is situated alongside Dere Street overlooking a major river crossing in a well-defended location.

Although the survey encompassed large areas around the fort there was little evidence of any enclosed fields suggesting arable or pastoral activity. Field boundaries defined by a ditch and usually a bank have been seen adjacent to the fort and *vicus* at all the Wall forts surveyed by the authors.³² At the fort of Castlesteads the field boundaries extended over the length of the survey of 750m. The evidence at Bewcastle suggests that little or no agricultural activity took place around the fort. The only exception may be elements of enclosure within field 2, but the origin is probably medieval, rather than Roman. At High Rochester evidence of access tracks and the remains of small fields were evident to the north west of the annexe; these were thought to possibly represent Romano-British field systems.³³

The substantial enclosing earthwork to the north of the fort has not been seen elsewhere during any survey carried out by the authors at a Roman fort. It is undoubtedly Roman and would have had a military purpose, and could possibly have served as an annexe. Its proximity to the fort could suggest the corralling of animals, possibly horses and other military equipment. Significantly a series of annexes have been built at High Rochester including a sub-annexe to accommodate a bath-house

The evidence for any *vicus* is minimal and it is not possible to confirm that the buildings seen outside the fort are of Roman origin. Some buildings to the east of the fort, in particular close to the river crossing, are likely to be of Roman origin; in addition the extant stone block to the west of the fort suggests a Roman building or feature of some pretention outside the fort. In contrast the evidence from High Rochester suggests that a significant number of buildings were constructed outside the fort particularly alongside Dere Street. The lack of any meaningful evidence for a *vicus* reinforces the military role of the fort and suggests that it formed an unstable environment unsuited to the typical *vicani*.

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Notes and references

- ¹ M. Jackson, *Bew Castle, A Brief History and Description* (Carlisle, no date)
- ² E. Birley, *Research on Hadrian's Wall* (Kendal, 1961), 231-3

3. I. A. Richmond, K. S. Hodgson, and K. St. Joseph, 'The Roman fort at Bewcastle', *CW2*, xxxviii, 195-237
4. J. P. Gillam, I. M. Jobey and D. A. Welsby, *The Roman Bath-House at Bewcastle, Cumbria*, CWAAS, Research Series No. 7 (Kendal, 1993)
5. J. Brand, *The History and Antiquities of the Town and County of the Town of Newcastle upon Tyne* (London, 1789), 607
6. P. S. Austen, *Bewcastle and Old Penrith*, CWAAS, Research Series No. 6 (Kendal, 1991)
7. *ibid*, 40
8. pers. comm. P. S. Austen
9. RIB 991
10. RIB 995, 996
11. RIB 985, 986, 987, 988, 989, 993
12. G. D. B. Jones and D. J. Wooliscroft, *Hadrian's Wall from the Air* (Stroud, 2001), 141
13. I. Sainsbury and H. Welfare, 'The Roman Fort at Bewcastle: an Analytical Field Survey', *CW3*, 39-146
14. P. S. Austen, *Bewcastle and Old Penrith*, CWAAS, Research Series No. 6 (Kendal, 1991), 5, Fig. 2
15. Sainsbury and Welfare, 'The Roman Fort at Bewcastle', 140, Fig. 1
16. The geophysical survey and the plan of the analytical survey by Sainsbury and Welfare place the bath-house almost parallel with the wall to the church yard and at an angle to the castle facing approximately NNE. Austen does not show the bath-house and its relation to the churchyard but places it at an angle to the castle facing approximately just west of north.
17. W. G. Collingwood, 'The Roman Fort at Bewcastle', *CW2*, xxii, 169-182. W. G. Collingwood, 'The End of the Maiden Way', *CW2*, xxiv, 110-116
18. Ivan D. Margary, *Roman Roads in Britain* (London, 1967), 450-1
19. Richmond, Hodgson and St. Joseph, 'The Roman fort at Bewcastle', 196, Fig.1
20. W. G. Collingwood, 'The Roman Fort at Bewcastle', *CW2*, xxii, 181
21. Richmond, Hodgson and St. Joseph, 'The Roman fort at Bewcastle', 199, Fig.3
22. Pers. comm. G. Noble resident farmer
23. K. Buxton and C. Howard-Davis, *Bremetenacum Excavations at Roman Ribchester 1980, 1989-1990* (Lancaster, 2000), 404
24. J. C. Bruce, *The Roman Wall* (2nd ed., London, 1853), 322
25. W. Whellan, *The History and Topography of the counties of Cumberland and Westmorland* (Pontefract, 1860), 630
26. David J. Breeze and Brian Dobson, *Hadrian's Wall* (Harmondsworth, 2000), 263-4
27. 31. J. Crow, 'Survey and Excavation at High Rochester 1992', *Universities of Durham and Newcastle upon Tyne Archaeological Reports* 1992, 16 (1993), 30-4; J. Crow, J. 'High Rochester, Survey and Excavation 1993', *Universities of Durham and Newcastle upon Tyne Archaeological Reports* 1993, 17 (1994), 29-37; J. Crow, 'High Rochester 1994', *Archaeology in Northumberland 1994-1995*, (1995), 34-5; J. Crow, 'High Rochester 1996', *Archaeology in Northumberland 1996-1997*, (1997), 29; J. Crow, 'High Rochester – Bremenium', in P. Bidwell, (ed), *Hadrian's Wall 1989-1999* (Newcastle upon Tyne, 1999), 188-95; J. Crow, 'High Rochester – life beyond the wall', *Current Archaeology*, No. 164, (London, 1999), 290-4; D. N. Hale and M. J. Noel, *Geophysical Surveys of Bremenium, Northumberland 1995*, (Unpublished report for Northumberland National Park, 1995); Tania Hancke, Beryl Charlton, and J. Alan Biggins, 'A Geophysical Survey at High Rochester Roman Fort', *Archaeologia Aeliana*, ser. 5, 33 (2004), 35-50; M. J. Noel, *Geophysical Surveys of Bremenium, Northumberland 1994*, (Unpublished report for Northumberland National Park, 1994); M. J. Noel and J. W. Wright, *Geophysical and Topographical Surveys of Bremenium, Northumberland* (Unpublished report for Northumberland National Park. 1992); M. J. Noel and J. W. Wright, *Geophysical and Topographical Surveys of Bremenium, Northumberland 1993* (Unpublished report for Northumberland National Park 1993). Although the fort is attributed to a Flavian foundation it is thought to have been occupied during most of the second century and after a period of abandonment reoccupied during the late second or early third centuries.
28. J. A. Biggins and D. J. A. Taylor, 'Geophysical Survey of the vicus at Birdoswald Roman fort, Cumbria', *Britannia*, 35 (2004), 159-178; J. A. Biggins and D. J. A. Taylor, 'The Roman fort and vicus at Maryport: geophysical survey, 2000-2004', in R. J. A. Wilson and I. Caruana, (eds), *Romans on the Solway*, CWAAS Extra Series 31, (Kendal, 2004), 102-133; J. A. Biggins and D. J. A. Taylor, 'A geophysical survey of Housesteads Roman fort', *Archaeologia Aeliana*, ser.5, 23 (2004), 51-59; J. A. Biggins and D. J. A. Taylor, 'The Roman Fort of Castlesteads, Cumbria: a Geophysical Survey of the Vicus', *CW3*, 7, 15-30; Barry C. Burnham, 'Roman Britain in 2000. Carvoran', *Britannia*, 32 (2001), 330-332; D. J. A. Taylor, J. Robinson and J. A. Biggins, 'A Report on a Geophysical Survey of the Fort and Vicus at Halton Chesters', *Archaeologia Aeliana*, ser. 5, 28 (2000), 35-46
29. Hancke, Charlton and Biggins, 'A Geophysical Survey at High Rochester Roman Fort', 35-50