THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

Roman Fort Environs in Powys I

The Geophysics

CPAT Report No 702

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By BOB SILVESTER, DAVID HOPEWELL and IAN GRANT

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Report for Cadw: Welsh Historic Monuments

The Clwyd-Powys Archaeological Trust
7a Church Street, Welshpool, Powys, SY21 7DL
Tel: 01938 553670; Fax: 01938 552179

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ROMAN FORT ENVIRONS IN POWYS I

Introduction

This report is the fourth from the Clywd-Powys Archaeological Trust (CPAT) in a series dealing broadly with various aspects of the Roman military machine and its legacy in mid and north-east Wales. It follows two earlier reports on the Roman roads of the region as a whole (Silvester and Owen 2003, Silvester 2004a) and a further report which provided a scoping study of known and suspected Roman military sites across the same area which provided a prelude to the present assessment (Silvester 2004b).

This report, then, covers work that expands the programme, taking it into new fields, both literally and metaphorically. While CPAT was conducting its Roman road study in 2002-4, two of the other Welsh Trusts – Gwynedd Archaeological Trust and Glamorgan-Gwent Archaeological Trust – were beginning to assess by geophysical prospecting the level of survival of the *vici* (or civilian settlements) that adjoined some of the longer established forts in their regions (Hopewell 2003; Pearson 2004). The results in Gwynedd and to a lesser extent in the Glamorgan region were startling. In the former, well-known sites such as Caerhun (Canovium), Caer Gai and Pen Llystyn all yielded much new information while the largely unexplored fort at Cefn Caer, Pennal, just over the Dyfi from Powys, know displays a much fuller and largely unanticipated picture, both internally and outside the defences. Independently in 2003, a survey of Dinefwr Park near Llandeilo in Carmarthenshire for Cambria Archaeology on behalf of the National Trust produced remarkable evidence of the previously suspected but unproven Roman fort with its associated *vicus* (Hughes 2003, 113).

All these works demonstrated that not only were the potential results likely to be illuminating, but also that this particular avenue of research was highly topical and fitted well within a work programme that already had a significant pan-Wales dimension.

The Background

Within the modern county of Powys (formerly Montgomeryshire, Radnorshire and Breconshire) and the old county of Clywd (now Denbighshire, Flintshire, Wrexham County Borough and the eastrn part of Conwy County Borough), thirteen Roman forts have been confirmed including the two forts at Caersws and the putative fort at St Asaph which is generally agreed to have existed although no substantive traces of it have ever come to light. And in addition there are a further fifteen 'sites' where the evidence is inconclusive or, arguably, fictitious.

It was suggested, perhaps rather optimistically, in the scoping report (Silvester 2004b, 3), that all but the shortest-lived forts would have witnessed the development of *vici* around them. In some cases those *vici* might have survived as functioning entities only as long as the fort itself was occupied, but elsewhere it was posited that a well-established *vicus* might have developed a life of its own, independent of the fort and lasting beyond the removal of the military to other areas.

For three forts, there is already cumulative archaeological evidence of their *vici.* Caersws (Montgomeryshire) has perhaps the most extensive evidence, built up over many years because of the developments in and around the modern village. Limited work by Wheeler at Brecon Gaer (Breconshire) in the 1920s, relatively recent metal-detecting and some geophysics at

Castell Collen (Radnorshire) and the varied evidence of limited excavation, aerial photography and geophysics at Forden Gaer (Montgomeryshire) has demonstrated the presence of civilians settlement, even though its extent and often its date range remain uncertain. The potential for geophysical survey of *vici* in the region has also been flagged up by a single specific episode of work in the late 1990s on the fort and its immediate environs at Hindwell (Radnorshire). Rarely, however, do surface traces of a *vicus* remain. The exception in the region seems to be Caerau near Beulah in south-west Powys where a road leading out of the north-west gate of the fort does appear to have shallow earthworks running off it. Some *vici* or at least portions of them, are regularly under plough, but as yet fieldwalking does not seem to have been employed as a mechanism for identifying the locations of external settlements, even though its potential merits at places like Caersws and Forden might be envisaged.

On the basis of the extant results from Gwynedd and elsewhere, coupled with the Trust's sponsored work at Castell Collen in 1997 and at Hindwell, it seems clear that geophysics is at present the most potentially significant mechanism for enhancing our understanding of *vici*, both where such civilian settlements have already been identified, and perhaps too where at present they are only suspected.

With this in mind a programme of geophysics was proposed to Cadw at the beginning of 2004 for the financial year to follow. Clearly for meaningful results, it would not be possible to examine more than two or three potential *vici* with the resources that were likely to be available, so for the initial season of geophysics, three sites were selected which it was hoped would meet different criteria and where varying levels of information already existed. Brecon Gaer was known to have an extra-mural settlement from Wheeler's work, but his excavations had been pinpointed at specific locations so that the overall image of the *vicus* was little more than a series of spots on a map showing the land around the fort. If the ground around the Gaer was susceptible to geophysics techniques, it was thought that a programme of work might provide a better context for Wheeler's discoveries as well as demonstrating the lay out of the *vicus*. Caerau at Beulah as noted above is the only *vicus* with above-ground traces, so this was selected in the anticipation that geophysics might amplify the existing record and allow an interesting correlation of different techniques. The third site, Colwyn Castle (Radnorshire) has always been an enigma. Its Roman significance escaped attention until the 1970s – it does not feature for instance in Michael Jarrett's 1969 revision of *The Roman Frontier in Wales* – when Jack Spurgeon of the Welsh Royal Commission realised that the large bailey in which the medieval ringwork sat was probably of Roman origin. This seemed to be confirmed by a trial excavation in 1975, and Colwyn came back to notice with the recent discovery and identification in 2003 of pre-Flavian pottery in the spoil of a badger sett, the significance of the discovery being enthusiastically espoused by Professor Sheppard Frere (2004).

All three sites were subjected to varying levels of geophysics during the summer of 2004, courtesy of their respective owners, and additional work was done at Brecon Gaer as a result of a timely grant from the Brecon Beacons National Park. As will be seen below the results were rather different.

The report below is jointly authored. RJS oversaw the project, has written the introduction, the background to each survey and the conclusions, DH was responsible for the actual geophysics work on-site and the descriptive and analytical texts, and IG together with Richard Hankinson assisted DH with the surveys and has contributed comments on the selection of areas, and also the Appendix.

The Geophysical Surveys

Introduction

The Gwynedd Archaeological Trust was contracted in 2004 to carry out fluxgate gradiometer surveys at three Roman fort sites by Clwyd Powys Archaeological Trust. The survey formed part of a Cadw-funded pan-Wales study examining aspects of Roman fort environs and Roman roads. Surveys had previously been carried out at several Roman military sites within Gwynedd and had produced good results. In consequence, there was no logical reason to modify the approach adopted in Gwynedd and the methodology developed in these earlier surveys was retained in the present project.

Methodology

Fluxgate gradiometer survey provides a relatively swift and completely non-invasive method of surveying large areas. Roman military sites are well suited to this technique as significant magnetic enhancement of the soil is an inevitable result of the day to day activities in a Roman fort. Recent surveys carried out in and around Roman forts in Gwynedd and Cumbria (Hopewell 2003 and Burnham Keppie and Fitzpatrick 2001) have demonstrated the suitability of this approach. A wide range of features was detected both within and outside the forts. Most of the sites produced evidence for the presence of *vici* in the form of ribbon development along at least one of the roads leading from the fort.

Instrumentation

All geophysical work was carried out using a Geoscan FM36 Fluxgate Gradiometer. This instrument detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides which tend to be concentrated in the topsoil. Features cut into the subsoil and backfilled or silted with topsoil therefore contain greater amounts of iron and can therefore be detected with the gradiometer. This is a simplified description as there are other processes and materials which can produce detectable anomalies. The most obvious is the presence of pieces of iron in the soil or immediate environs which usually produce very high readings and can mask the relatively weak readings produced by variations in the soil. Strong readings are also produced by archaeological features such as hearths or kilns, because fired clay acquires a permanent thermo-remnant magnetic field upon cooling. Not all surveys can produce good results as anomalies can be masked by large magnetic variations in the bedrock or soil or high levels of background "noise" (interference consisting of random signals produced by material within the soil). In some cases, there may be little variation between the topsoil and subsoil resulting in undetectable features. It must therefore be stressed that a lack of detectable anomalies cannot be taken to mean that that there is no extant archaeology.

The Geoscan FM36 is a hand held instrument and readings can be taken automatically as the operator walks at a constant speed along a series of fixed length traverses. The sensor consists of two vertically aligned fluxgates set 500mm apart. Their metal cores are driven in and out of magnetic saturation by a 1,000Hz alternating current passing through two opposing driver coils. As the cores come out of saturation, the external magnetic field can enter them producing an electrical pulse proportional to the field strength in a sensor coil. The high frequency of the detection cycle produces what is in effect a continuous output (Clark 1990).

The gradiometer can detect anomalies down to a depth of approximately one metre. The magnetic variations are measured in nanoTeslas (nT). The earth's magnetic field strength is about 48,000 nT, typical archaeological features produce readings of below 15nT although burnt features and iron objects can result in changes of several hundred nT. The machine is capable of detecting changes as low as 0.1nT.

Data Collection

The gradiometer includes an on-board data-logger. Readings in the Roman fort environs surveys were taken along parallel traverses of one axis of a 20m x 20m grid. The traverse interval was one metre. Readings were logged at intervals of 0.5m along each traverse giving 800 readings per grid.

Data Presentation

The data is transferred from the data-logger to a computer where it is compiled and processed using Geoplot 3.0 software. The following two display options are used in this report along with an interpretation drawing.

a) X-Y plot
Each traverse is shown by a line trace. These are presented side by side allowing the full range of data and the shape of any anomalies to be seen.

b) Grey-Scale
Data values are represented by modulation of the intensity of a grey scale within a rectangular area corresponding to the data collection point within the grid. This produces a plan view of the survey and allows subtle changes in the data to be displayed.

Data Processing

The data is presented with a minimum of processing although corrections are made to compensate for instrument drift and other data collection inconsistencies. High readings caused by stray pieces of iron, fences, etc are usually modified on the grey scale plot as they have a tendency to compress the rest of the data. The data is however carefully examined before this procedure is carried out as kilns and other burnt features can produce similar readings. The data on some noisy or very complex sites can benefit from 'smoothing'. Grey-scale plots are always somewhat pixellated due to the resolution of the survey. This at times makes it difficult to see less obvious anomalies. The readings in the plots can therefore be interpolated thus producing more but smaller pixels and a small amount of low pass filtering can be applied. This reduces the perceived effects of background noise thus making anomalies easier to see. The trace plots show raw data and can thus be used to assess the magnitude of anomalies modified for grey-scale plots. Any further processing is noted in relation to the individual plot.

Grid Locations

The survey grids were located by triangulation from several points usually defined by field boundaries and buildings. It should be noted that there were slight discrepancies between the OS data and the actual field boundaries in the following areas and the location of the survey areas may be slightly inaccurate: Brecon Gaer Area A, Brecon Gaer Area B (largely resolved by the use of aerial photographs) and Colwyn Castle Area D.

Caerau, Beulah

Background

The Roman fort known as Caerau occupies the tip of a spur overlooking the small river known as Afon Cammach, about 1km to the south-east of the small village of Beulah and a little less than 6km to the north east of Llanwrtyd Wells. To the south-east the Cammarch feeds into the Afon Irfon and beyond its plain rise the bulwarks of Mynydd Epynt. Westwards are the southern reaches of the Cambrian Mountains. But the geographical location of Caerau is perhaps important because further to the south-west the watershed between the Irfon and Tywi valleys offers one of the easiest access lines into south-west Wales, squeezed between the heights of Epynt and the Black Mountain on the one hand and the southern tail of the Cambrian Mountains on the other. It cannot be claimed that Caerau controls this route but it certainly overlooks it, and perhaps explains why the fort lies on the west rather the east side of the Cammarch.

The position is a naturally prominent one, and the farm which now sites within the south-western half of the interior of the fort is visible from all directions, giving some indication of the potential visibility and aspect enjoyed by the fort's defenders when it was in use (see RCAHMW 1986, fig 155 for an indication of the local topographical setting of the fort). The significance of the position is reinforced by the presence of a small motte which appears to straddle the inner rampart on the south-west side of the fort, even though of course the presence of existing earthworks may have proved an attraction to the local lord, perhaps a millennium or so later. From the low eminence at the end of the spur which is straddled by the farm, the ground drops away in all directions. While three sides of the fort itself are largely on the crest, the fourth side to the north-east drops away towards the river.

The fort itself has, overall, been fully described by the Royal Commission and there is no need to repeat their description here (RCAHMW 1986, 130). In its essentials its traditional playing-card shape is slightly distorted to a trapezoidal form (See Plan A). A single bank, now largely showing as a scarp can be detected for most of the perimeter. At the south corner, however, there is a second, counterscarp bank, with traces of an intervening ditch, but nothing similar has been identified elsewhere, except for very faint remains of an outer bank on the north-west side. Nevertheless, excavations in 1965 revealed greater complexity with a rampart and three ditches attributable to two phases, the Flavian and the early 2nd century AD. The outermost ditch was used at both times but the innermost, Flavian, ditch was superseded by the middle ditch.

A further scarp bank across the width of the fort and just to the north-east of the farm buildings has been interpreted as a subsequent reduction in the size of the fort from around 1.77ha to 1.32 ha (*ibid*, 130).

Beyond the north-eastern end of the fort is a further earthwork. The Royal Commission saw this as an L-shaped feature defining an extra 'platform' but they were uncertain as to whether it had a natural origin, although in view of the amount of building debris around the hedge line that crossed it they argued that it might have supported the bath-house. In fact there can be little doubt that the earthwork is artificial, in as much as its form may be the result of cutting back the natural slope, the resultant spoil being dumped inside to level out the platform. It is also more extensive than shown on the plan (*ibid*, fig 156), for the scarp can be traced further to the north-west as an earthwork that adopts a less regular line and gradually diminishes; this portion could perhaps be natural.

Of the roads serving the fort not much can satisfactorily be said. The Royal Commission (*ibid* fig 156) proposed a road coming out of the north-east gateway, but there is no visible evidence to confirm this assumption. No road to the north-west was adduced, yet its low earthwork is apparent on the ground and also on the superb Cambridge University aerial photograph (*ibid*, fig 157), and it comes as no surprise that this was being wholly confirmed by the geophysical survey (see below). Additionally there is a further linear earthwork running on a south-west to north-east alignment, emerging from beneath the hedge boundary that adopts a line parallel to and outside the fort's north-west defences, and continuing on a straight course down the slope to the Cammarch. The Royal Commission judged this to be 5.5m wide and 0.2m high, but we assess it at 7-8m wide and perhaps 0.4m high above the broad, shallow hollow that accompanies it on its north side. The presence of this gully could conceivably indicate that this bank is no more than relict field boundary, but perhaps we should not rule out the possibility that this is the main north-east road which past the fort rather than through it. Certainly at the time of the current on-site work the field was under a root crop which demonstrated that there was a significant stone component to the bank.

Finally, earlier work argued for the presence of a vicus on the gently sloping ground to the north-west of the fort. The Royal Commission's plan (*ibid* fig 1555, based on earlier 1958 work) depicts the "marks of [four} supposed buildings" and several shelves or terraces which were considerable to be building ledges. But as the Royal Commission put it in 1986 (*ibid,* p.130): "in its present-day appearance the sloping surface exhibits several vague undulations, depressions and small terraces which form no distinguishable plan". Notwithstanding this accurate yet somewhat dismissive statement, this field was statutorily designated as a scheduled ancient monument as part of Br 148.

The Areas Examined

Before the geophysical survey began various factors were taken into account to determine which areas of Caerau should be covered by the survey. Optimising the efficient use of the limited resources available, meant prioritising those areas that were considered to offer a higher return in new information about the site, specifically aiming to locate and identify possible road networks and the existence of a *vicusi* outside the fort. Initially four areas encompassing the entire perimeter of the fort were designated for survey. Two of the areas, beyond the north-west and north-east perimeters of the fort, fell within the already scheduled area of Caerau, and general scheduled monument consent was received from Cadw for work in those parts of the site that were statutorily designated. Previous fieldwork, referred to above, had already identified the strong possibility of archaeological remains within these areas.

The next procedure involved a single day's field examination of the site in order to gauge the topography of Caerau. This proved to be an invaluable exercise as it became increasingly obvious that the steep nature of the hillslopes to the south-east, south and south-west of the farm would potentially discount those areas from the investigation, previous positive geophysics results from other Roman fort sites having favoured the natural plateaux surrounding the forts. A rapid sketch survey was made of all the potential archaeological features, either visible as upstanding earthworks or groups of obvious undulations in the topography of the landscape.

Additional information was also gathered on any limits of access to the designated areas, owing to the agricultural use of the farmland: a measured survey can be quite a destructive process as a result of intensive walking through either a pasture field awaiting a silage cut or a recently seeded field. Other constraints such as the presence of livestock, previously unrecorded farm

out-buildings, stock piles of farming equipment, fence lines, telegraph poles and associated cable stanchions all had to be taken into consideration.

The initial aim of the programme did not include any survey of the interior of the fort. However, by coincidence, Mr R Thomas, the landowner, had made preliminary representations to Cadw about the erection of a new barn within the scheduled interior of the fort. The regional inspector of Cadw, Dr S Rees, in consultation with her colleague Dr M Yates, requested that the area of the proposed construction be included in the geophysics survey as a matter of priority. The results, which are detailed below, proved to be extremely positive and we assume that they will be useful in determining any scheduled monument consent application.

Adjustments to the projected survey coverage were made as the work progressed. For continuity and general good working practice, it is considered advisable to link together as far as this is feasible the separate surveys across a site into one concise grid. At Caerau this required further limited survey work in the interior of the fort in order to tie in the results with the outlying survey of the *vicus* and road network. The rapid production of grey-scale survey maps in the field allowed the monitoring of the results, and minor changes were made to the programme as originally planned in order to recover further information, both within and outside the fort.

The Geophysics

An irregular area of approximately 4.5ha was surveyed encompassing part of the fort and possible annexe along with most of the more level ground around the earthwork. The survey was carried out in four separate areas that were divided by roads and field boundaries although it should be noted that Area 1 extends into three fields.

The data is presented as four separate trace plots showing the data with only minimal processing to remove the affects of instrument drift (Figs 1 to 4). The grey-scale plots were combined (Fig. 5) because many archaeological features were found to extend over several areas.

All four areas produced a similar range of results with relatively low levels of background noise. Ditches and roads produced weak and in some cases barely discernible anomalies. Buildings and occupation sites were visible as collections of strong anomalies many with readings of +-20 to 30nT. Most archaeological anomalies produce readings of +- 15nT. The higher readings suggest significant magnetic enhancement, probably as a result of burning. Hearths have been shown to produce characteristic anomalies usually consisting of a patch of high positive readings surrounded by a slightly offset negative 'halo' representing a thermo-remnant dipole.

The very high readings around the edges of the survey areas were the result of fences and gates. Area 3 is crossed by an iron pipe which produced an alternating positive and negative anomaly.

All significant anomalies are indicated on an interpretation plan (Fig 6). In some cases it was felt that the grey-scale plot revealed the maximum amount of information and that any attempt to show all of the finer detail would tend to over-complicate the plan and obscure the weaker anomalies. In these cases the extent but not the finer detail of the anomalies is indicated on the plan.

Results

The edge of the fort earthwork corresponds to a somewhat irregular anomaly (1) indicating the remains of the rampart. Two stronger anomalies (2) could tentatively be interpreted as ovens at the rear of the rampart. The defensive ditches (3 and 4) are barely visible but the spacing of the visible lengths suggest that there are at least two and that the defences extend to about 22m from the rampart. Jones (1969) identified two ditches with a 12.8m killing zone between them in a section across the defences (visible as feature 5). The extent of the defences is probably indicated by the magnetically quiet area extending around the north-west and north-east of the fort. This could presumably not continue around the south-eastern side of the fort as the ground level drops away steeply close to the ramparts. A similar arrangement can be seen at Cefn Caer in Pennal (Hopewell 2003 and forthcoming) where the fort is set slightly off centre within earlier ditches but with the area around the original defences being kept clear of subsequent development.

A high level of activity was detected within the fort, with very strong magnetic enhancement probably indicating burning. This could be a result of destruction by fire or could indicate *in situ* thermal enhancement possibly indicating a bathhouse or industrial activity. Two roads (6 and 7) are clearly visible. The anomalies produced by the buildings are rather amorphous and the following interpretations are therefore somewhat speculative.

Anomaly 8 appears to be a long building (52 x 7m) with cross walls although a kink in the north-east wall could indicate that it is a product of two phases.

Anomaly 9 appears to be a rectangular building with dimensions of 25 x 20m with several internal divisions.

Anomaly 10 could be a poorly defined small rectangular structure or possibly a part of 9

A line of anomalies, possibly post holes, set at a slight angle to the rest of the buildings may be part of another rectangular building (11) belonging to a different phase.

A negative anomaly (12), another possible rectangular building, clearly belongs to a different phase to buildings 8 and 9.

The corners of other buildings (13 and 14) can be seen on the edge of the survey.

The function of the buildings in this area of the fort are debatable, they do not appear to be structures typically found within a fort, suggesting that this area was reused as an annexe. The high levels of thermo-remnant magnetism could indicate the presence of a bathhouse.

Jones suggested that the bathhouse was located on a shelf to the north-east of the fort. A rectangular building (15) with dimensions of about 40m x 17m is visible here but the lack of thermo-remnant anomalies suggests that it is not a bathhouse. Earthworks in the field to the north of the fort (16) produced only vague anomalies and do not support Barri Jones' suggestion of a ploughed out rampart enclosing an annexe.

A 5m to 6m wide road (17) with ditches (18 and 19) visible on either side can be seen to run to the north-west of the fort. A *vicus* in the form of ribbon development extends to a distance of at least 150m from the fort gate. The *vicus* is defined by a line of hearths visible as strong thermo-remnant anomalies separated by linear divisions. There are clearly several phases of overlapping activity. This makes detailed interpretation difficult but this pattern of development

has been identified in several *vici* in Wales and elsewhere (Hopewell 2003 and forthcoming) and has been shown by excavation to indicate rectangular buildings, usually of wood, set end on to the road. Each usually contains a substantial hearth. Further anomalies can be seen to the rear of the buildings possibly indicating light industrial activity. Elsewhere in this field two parallel linear anomalies (21) could tentatively be interpreted as ditches beside a road leading to the north of the fort. A faint linear anomaly (22) is possibly a ditch running along the rear of the *vicus*.

No activity was detected in a small survey area to the south-west of the fort.

Other work

Sited to the north-north-east of the fort is a large field that encompasses the outer limits of the plateau before it gently slopes down to the A483. This area is currently outside the scheduled zone and, although it was not feasible to carry out geophysics here as the field was under a root crop at the time, a rapid fieldwalking exercise produced a significant quantity of 1st and 2nd-century AD Roman pottery, glass and two beads. All of the find spots were recorded with the aid of a GPS handset and the collection currently resides with the Clwyd-Powys Archaeological Trust. Their discovery may well indicate some form of settlement or other activity in a part of the environs around Caerau fort which have not yet been assessed.

Colwyn Castle

Background

Colwyn Castle lies on the western slopes of the valley of the Edw, a tributary of the Wye, a short distance from the hamlet of Hundred House and a little more than 6km to the north-east of Builth Wells.

Like Caerau it is set at end-of-spur location where the ground rises gently to a low eminence before falling away into the river valley. Minor streams run in valleys to the north-west and south-east, offering all round aspects, though not a particularly strong natural location. Established within the earthworks is Fforest Farm.

Colwyn Castle is a relatively recent edition to the corpus of Roman military sites in Wales. It did not feature in Michael Jarrett's revision of *The Roman Frontier in Wales* and has not been subject to a detailed analysis by the Royal Commission, at least not in published form. Its recognition in 1974 was, however, due to Jack Spurgeon of the Welsh Royal Commission (RCAHMW). The only convincing plan that is available appears to be that prepared by the Ordnance Survey in the previous year, which given the complexity of the site is regrettable, though because of the presence of the medieval ringwork there are earlier sketch plans such as that prepared by the Royal Commission for their Radnorshire Inventory in 1913. More recently, other specialists have taken an interest in Colwyn Castle. Professor Shepherd Frere and Dr Jeff Davies have examined it and pottery recovered from a badger sett in the north-western rampart would appear to indicate pre-Flavian occupation (Frere 2004). Mr Hugh Toller has also made observations, particularly in relation to the roads relating to the fort (H Toller: unpublished typescript).

The Roman element as shown appears to consist of a trapezoidal enclosure which internally is around 160m north-west to south-east (See PLan B). Its other axis is more difficult to determine. The northern corner seems plain, the earthwork n the form of a substantial scarp bank turning through a right angle before disappearing under the medieval earthworks. There is also an apparent corner on the east beside the access lane leading to the farm with other earthworks that at first sight appear to extend its line. However, the two corners are completely out of alignment, the other earthworks are more likely to be a part of the medieval stronghold, and it seems likely that almost all of the north-eastern side together with the eastern corner have been levelled. This being the case the north-east to south-west internal axis is likely to have been in the region of 160m also, the whole being pretty well square with an internal area of around 2.56 hectares.

Straddling the north-eastern defences is the massive ringwork which gives its name to the site (and within which Fforest Farm lies). Its bailey lies to the north and east and on the basis of the accompanying ditch – not something that is a feature of the Roman fort – and the curvilinear line of the bailey earthwork to the north of the ringwork this appears, at first sight, to be a new construction rather than a re-used Roman defence line. We would probably be right to assume that the Roman fort was also used as a subsidiary bailey but this does not really explain why the de Braoses who are credited with the construction of the castle around the beginning of the 13th century (Remfrey 1996, 130) chose to build over the Roman defences rather than incorporating them into their new stronghold. A possible explanation might be that the supposedly medieval bailey is in fact a contemporary Roman outwork or addition to the fort and that the curvilinear section is a response to the local topography and that the Roman ditch was deepened in order to enhance the Roman bank. Had the ringwork then been positioned to respect the north-east return of the inner line of the Roman defences, it would have effectively

cut what became the eastern bailey into two. Only by building the ringwork over the defences was enough space created to produce a viable eastern bailey.

Hugh Toller has noted that about 40m or so outside the south-western defences of the fort there was a low scarp bank (see also the geophysics and D Hopewell's interpretative diagram of the geophysics data). This earthwork can be detected on the ground curving through a right angle outside the west corner and continuing as far as the field boundary which is visible running over the top of it. Its line cannot be determined in the field on the north-west side of the fort, but it reappears further to the north-east, mirroring the curve of the northern corner of the fort defences where these swing in towards Fforest Farm. It is evident from this that there was a second line of defences to the Roman fort, although whether this masks a similarly complex sequence to that at Caerau, will probably only emerge from excavation.

Within the proposed fort on the west there is no visible trace of any earthwork features that could be attributed to Roman activity (and equally there is nothing obviously medieval). On the east in the putative Roman annexe, turned medieval bailey, the ground is more uneven but also rather higher, specifically on the north side of the ringwork, a feature that may be in part due to the natural topography but is also likely to represent some levelling up, perhaps in the medieval period. North-east of the ringwork a linear ridge, at least 7m wide, runs across the eastern bailey in a north-north-easterly direction. Beyond the bailey its course has been identified by Hugh Toller traversing the slope into the valley, and ending in the hedge beside the crossroads. There can be little doubt that this is the Roman road that probably left the north-east gate of the fort. Whether there is any significance in the large worn boulder, at least 1.5m long lying recumbent beside the hedge and adjacent to the road is an open question.

To the south-east of the fort various earthworks have been identified by Hugh Toller in the field below the road. These are a result of a combination of relict field boundaries and tracks, although there is also a curious, short length of embankment running down at right angles to the stream at the bottom of the field.

In conclusion, it is evident from the surface evidence that Colwyn Castle is a complex multi-phase site. Existing plans are inadequate, both for record and for interpretational purposes and it is plain that a more detailed survey than has previously been prepared would add substantively to the understanding of what is potentially a remarkable site.

The Areas Examined

A similar approach was adopted to that at Caerau in choosing which areas around Colwyn Castle should be incorporated into the site survey. From the outset it was not our intention to survey the interior of the fort. However, consistently negative results from the first two outlying areas to be surveyed, A and C, necessitated the compilation of control data from an area where it could reasonably be anticipated that some archaeology would survive. Different soil types, weather conditions and temperature fluctuations may all contribute to poor or indeed negative survey results, and we needed to be certain that the results from Areas A, B and later C were fair representations of the sort of data that might be acquired from the site as a whole.

Both areas A and B, to the south-west and north-west respectively, were under pasture and the plateau that formed the upper parts of both fields presented the opportunity for potentially good results. The sloping pasture fields to the south-east of the fort, designated as Area C, contained a number of relic field boundaries and tracks that had already been identified as earthworks by

Hugh Toller. Here was the opportunity to trace potential road networks, together with elucidating the nature of a few small plateaux areas on the lower slopes of the field.

The Geophysics

Four areas were surveyed at Colwyn Castle (Figs 7 to 12). Three were located outside the expected position of three of the fort gates, along with one within the fort to act as a control. The area outside the north-east gate was not surveyed. Only a small area was available for survey here and much of this was either covered by spoil from the ditch around the motte or was close to the gate and fences. Magnetic scanning was carried out in the available area and it was found to be very quiet it was therefore decided that the small area between the ditch and fence was unsuitable for conventional gradiometer survey.

Results

The three areas outside the fort (A-C) were found to produce very low magnetic responses with readings generally below +-3nt (see trace plots Figs 7 to 10) indicating low levels of magnetic enhancement. Area 4 was slightly more 'noisy' but was still unusually quiet considering that it was located within several phases of defensive enclosure.

Area A
A rectangular area of 60m x 100m was surveyed. A single narrow linear anomaly (1) can be seen at the north of the area. This type of anomaly is typically produced by field drains or non ferrous pipes. However, the landowner, Mr. G. Barstow, was unaware of any drains in this location. A weak anomaly (2) appeared to correspond to the outside of a low bank in the field. It should be noted that this area has been heavily cultivated and has been subsoiled (deep tillage to a depth of over 0.5m), perhaps contributing to the homogenous nature of the results.

Area B
An area of 80m x 40m was surveyed here. This again exhibited very little magnetic variation although there was an area of increased noise (3), consisting mainly of spikes produced by ferrous iron debris, close to the farm building. This area had also been heavily cultivated.

Area C
An irregular area with maximum dimensions of 160m x 80m was surveyed. Several earthworks were visible within the field, most notably a disused road running along the north-west of the field and possible relict field boundaries in the western half of the area. A strong anomaly (4) corresponded to a nettle-covered mound in the field. This was found to be the site of a large bonfire where the land-owner has burnt several trees and lengths of old fencing. The visible earthworks failed to produce any significant anomalies. Most of the old road produced no magnetic response although a corresponding very slight increase in noise (6) is visible at the north of the survey area. A drain running from the farm (5) is also faintly visible. It should be noted that this field had not been very intensively cultivated.

Area D
An area of 60m x 80m was surveyed within the south-western part of the fort. This was carried out in order to act as a comparison with the magnetically quiet areas outside the fort. There would be expected to be a greater level of enhancement within the he Roman and medieval defences.

This area also produced relatively low magnetic responses although in this case some anomalies were visible. Most of the area is crossed by faint parallel anomalies (7) that are almost certainly a result of ploughing. A series of stronger linear anomalies (8) are consistent with responses produced by field drains although the landowner was unaware of any in this orientation. A band of noise (9) corresponds to a raised bank, in the field that can probably be interpreted as an old road.

The survey detected no anomalies corresponding to the Roman or medieval occupation of the site. This appears to be at least partly due to the low magnetic susceptibility of the soil. This is indicated by very low levels of magnetic variation and a general failure of visible earthworks to produce strong anomalies. It should, however, be noted that a recent bonfire produced a significant anomaly, as did ploughing within the earthwork thus demonstrating the potential for the production and detection of archaeological anomalies. It is therefore surprising that no anomalies corresponding to archaeological features were detected, particularly within the fort where magnetic enhancement would be expected. It could be argued that the buildings within the fort were wooden and thus would not have produced significant anomalies, particularly considering the subsequent medieval activity and evidence of ploughing. This is perhaps the most likely scenario but the lack of any detectable geophysical anomalies means that the presence of a Roman fort in this location must still be seen as being unproven.

Brecon Gaer

Background

Brecon Gaer is arguably the best known Roman fort in Powys, partly because of its stone-walled defences and perhaps too because it was partially excavated by Mortimer Wheeler in 1924-5. Its significance is enhanced, as Jarrett pointed out (1969, 48), by its size for it is one of the largest forts in Wales. Jarrett was dismissive of an earlier view that this might be the *Cicutio* of the Ravenna Cosmography, but Rivet and Smith tended to favour it (1979, 307).

It is set on the relatively level top of a spur squeezed between the Usk and its tributary the Yscir. The main river lying to the south has cut a deep valley and there is a strong river terrace on this side, the fort lying a little back from this in order to utilise the flatter ground. Eastwards the spur provides a level approach to the fort for several hundred metres before rising to the forested hill known as Coed Fenni-fach, but to the north the ground rises and the lands beyond are hidden from the fort. On the west there are good views across the river to the little settlement of Aberyscir.

The fort itself is under pasture, but the ancillary buildings of Y Gaer farm overlie the northern defences. The whole of the interior and most of the defences, including the farm buildings, are scheduled, while the excavated gates, on the south and west are in guardianship. The scheduling 'envelope' is pulled tightly around the fort, and the amorphous earthwork banks outside the east side fall outside it, as do virtually all the potential areas of the *vicus*. There were two smaller, detached scheduled areas, one extending across the field where Wheeler identified his building A, between Y Gaer and its farm buildings, and the second to the north-west of the latter where building B had been excavated.

Wheeler's excavations 'revealed traces of a substantial civil settlement on both sides of the road away from the north gate, for a distance of *c.*300m' (Jarrett 1969, 51). Timber buildings were the norm, but a stone workshop, a *mansio* and a bath house were all identified (See Plan C). It is unclear whether Wheeler also sought traces of the vicus outside the other gates, or whether he simply had a good nose for where the civilian settlement was likely to be found. Certainly, a cursory examination of his text (1926, 56ff) suggests that there were no surface indications, although it is also clear that summer parching, particularly in 1925, revealed the road to the north gate of the fort, and that some of the internal details of the fort had also been revealed by similar processes in earlier years.

Therefore, it is probably safe to assume that pasture improvement over the years has removed all traces of any earthworks that might once have signalled the presence of the vicus. Unlike Caerau, for instance, there is nothing now to see, all the fields showing the same smooth surface. The only exception is to the east of the fort where there are one or two faint linear features but these are not likely to have any significance in interpreting the Roman activity, and indeed this has been confirmed by the geophysics (below).

The Areas Examined

It was already clear from Mortimer Wheeler's work in the 1920s that elements of its *vicus* lay to the north of Brecon Gaer. Inevitably, his work provided only a partial picture of the activity on this gently rising ground and it was anticipated that the geophysics if it provided positive results would present a useful context for the discoveries during the earlier excavations.

East of the fort the ground was noticeable level and hypothetically it was considered that this was an ideal location for further extra-mural activity. To the south and west there was less obvious scope for positive results. The ground dropped away to the valleys of the Usk and the Yscir respectively, leaving only small relatively level areas that might have been utilised. However, to demonstrate once and for all whether the Brecon *vicus* was limited to the north side of the fort as Wheeler's work implied, or whether it spread over two or more sides of the fort, some geophysics survey of these sides was required. Unlike the other two forts no work was conducted within the defences.

The Geophysics

Five areas were surveyed in order to assess the level of extramural activity around the fort. It was assumed that this activity would be centred around the fort gates and the survey therefore examined these areas. Previous work by Wheeler (1926) identified a road, and buildings (A to C Fig 18) to the north of the fort. The area to the east is fairly flat and the landowner Mr. E. Jones reported that part of a rotary quern had been ploughed up here. The land to the south and west falls away steeply. The grey-scale plots were all processed by interpolation in the Y axis and the application of a low pass filter to reduce pixellation.

Results

Area A

This area of 120m x 140m was selected in order to investigate the level field to the east of the fort. A possible road had been detected as a parch mark running at a slight angle to the gate. The area was found to be magnetically quiet. The line of the proposed road (1) was defined by a 30m-wide band of slightly increased noise. There was no indication of settlement and the line of the road could not be resolved in any detail. The band of noise could indicate some low-level roadside activity but this could be not be resolved by the gradiometer. A linear anomaly (2) was produced by a deep modern land drain. The slight linear anomalies at the north of the area are probably agricultural in origin.

Area B

An irregular area with maximum dimensions of 180m x 100m was surveyed. The road (3), first recognised by Wheeler, is well defined. The roadside ditches produced clear anomalies and suggest that the road is about 4.5m wide. A wide range of anomalies alongside the road indicate an extensive *vicus*. A series of roadside buildings (4) are defined by a concentration of thermo-remnant anomalies produced by hearths, some divisions running at right angles to the road and a band of increased noise. Two clear rectangular anomalies (5 & 6) with dimensions of 12m x 5m and 5.5m x 3m are set back from the road. They could both be interpreted as buildings but lack the characteristic hearths seen elsewhere in the *vicus*. The smaller anomaly is magnetically strong (+30nT) indicating significant thermo-remnant enhancement; the large area of positive enhancement in the northern anomaly (5) is also significant. These features could be interpreted as having an industrial function perhaps with enhancement produced by metalworking. Other scattered hearths (8) at the rear of the *vicus* buildings probably indicate further industrial activity. The rear of the vicus appears to be delineated by a ditch (7). The corner of Wheelers building B is visible as a negative anomaly (9) on the edge of the field. Further light buildings could be indicated by a series of weak anomalies (10) alongside the field boundary. Further faint linear features (11 to 14) are visible in the western part of the field but these cannot be reliably assigned to any particular phase of activity.

Area C

An irregular area of approximately 100m x 60m was surveyed in the former orchard opposite the present farm house. There was a considerable amount of modern ferrous material present within the survey area (15 and hatched area) including a shed, the remains of an iron fence, a septic tank and a dump of modern demolition material. A substantial building 16 can be seen close to the north of the survey area. The negative anomalies representing the walls suggest that it is stone built (c.f. feature 9, area B). The south-eastern side is partly obscured by modern ferrous noise but the dimensions appear to be about 27.5m x 26.5m with subdivisions in the north-east side and a possible courtyard at the south-west. A linear anomaly (17) that does not seem to cut the building, and could thus be earlier, also runs through this area. It consists of a central anomaly about 1.5m wide with a wider area of disturbance about 6m wide. This could tentatively be interpreted as a continuation of the stone-built drain identified by Wheeler in building C. Several indistinct anomalies were detected in the western part of the survey. Linear anomalies 18 & 19 are probably modern drains. Further activity (19) is largely obscured by modern ferrous contamination but could be associated with Wheelers building B.

Area D

This area of 80m x 40m was surveyed in order to investigate the 40m wide natural shelf in front of the western gate. The area was fairly magnetically noisy suggesting some activity, but no evidence of buildings was detected. Linear anomalies 21 and 22 probably correspond to the fort ditch. Narrow linear anomalies 23 and 25 are difficult to interpret with any certainty although 25 could be a continuation of the drains running from the fort gateway. Linear anomaly 24 corresponds to a modern drain.

Area E

An area of 80m x 60m was surveyed in order to investigate a level shelf, about 80m wide, outside the southern gate. The area was very magnetically quiet suggesting little extramural activity. The fort ditch is visible as a weak linear anomaly (26). The road from the gate 28 can be traced for about 15m and a faint anomaly suggests that it turns to the east although this is not certain. Linear anomaly 27 corresponds to a ploughed out field boundary.

Discussion

The survey confirmed and added to Wheeler's investigation at the north of the fort. There is a *vicus* in the form of ribbon development extending to at least 200m alongside the road from the fort. Anomalies consistent with industrial activity were detected at the rear of the *vicus* buildings. A ditch appears to enclose the majority of the *vicus* and associated industrial activity. A substantial stone-built courtyard building stands about 90m from the fort on the west side of the road. This is presumably a high status building with an official function. Buildings of similar dimensions and design have been detected in geophysical surveys at Caerhun and Cefn Caer, Pennal (Hopewell 2003 and forthcoming). The survey results suggest that extra-mural settlement was mainly confined to the north of the fort. The level field to the east would appear to be a good settlement site but only the faintest suggestion of a road was detected. This field has been extensively drained and it is possible that it was too wet for habitation in the Roman period. The areas outside the western and southern gates consist of natural shelves above steep drops down to the Afon Ysgir. There was little indication of either major roads or extra-mural activity in these areas.

Conclusions

The three geophysics programmes have produced extremely different results, but overall have confirmed that, as a technique, geophysics has much to offer in elucidating the patterns of settlement around Roman forts and that in line with other regions of Wales the results from the Powys are of significant interest, generating pictures which it is difficult to envisage being produced by any other process other than by large-scale and costly excavation.

Of the three sites, Colwyn Castle remains the most enigmatic, and there has been much discussion between the contributors of this report as to whether the apparent absence of activity in any of the four areas that were examined is the result of a genuine dearth of sub-surface archaeological features, unsympathetic soil conditions, the failure of the particular geophysics technique, post-depositional agricultural practices which have had an inimical impact on the archaeological remains, or perhaps a combination of two or more of these. Selective excavation could resolve this issue once and for all, while the re-examination of selected areas through resistivity survey rather than magnetrometry might be illuminating. That there is a Roman fort at Colwyn seems not to be in dispute (see Frere 2004), so the apparent absence of any features within its putative perimeter is strange. It is of course possible that it was occupied for such a short period that the interior was not laid out properly and that occupation was so transient as to leave no discernible traces. On the other hand from a relatively minute area, Roman pottery of early date has been recovered, and it is not just the Roman occupation that is unrepresented for there are no discernible medieval features within what must have been the bailey of the ringwork. At present it seems best to assume that a combination of unresponsive soils and the geophysics technique that was adopted may indicate the problem. Possibly, the way forward is to conduct a fieldwalking programme when any of the fields are next ploughed.

The results from Caerau and Brecon Gaer are more illuminating. At the former it seems evident that there is good survival both within and outside the fort, but that *vicus* activity is confined largely to the north-west quadrant along the road running off in that direction. It is not entirely clear cut, however, for the boundary of the settlement on the north-west has not been established, the modern road currently providing the edge, and there are signs of activity on the north, derived from the collection of Roman material in the plough soil, which suggest that the full picture has yet to be defined. Brecon Gaer is perhaps not unexpectedly beginning to reveal more of it riches. While the areas outside the south and particularly the east gate which were considered to have considerable settlement potential have been demonstrated to be clear of features, another stone building, together with rather more evidence along the road to the north-east, reveals to the north of the fort much was happening and that there are still areas that need to be assessed I order that a realistic picture can be established.

Acknowledgements

Our thanks are due to Mr Thomas at Caerau, Mr Barstow at Colwyn Castle and Mr Jones at Brecon Gaer for their permission to work on their respective farms and for their interest while we were on site; to the Brecon Beacons National Park for their grant to enable additional work to be undertaken at Brecon Gaer; and particularly to Cadw without whose support none of this work would have been possible.

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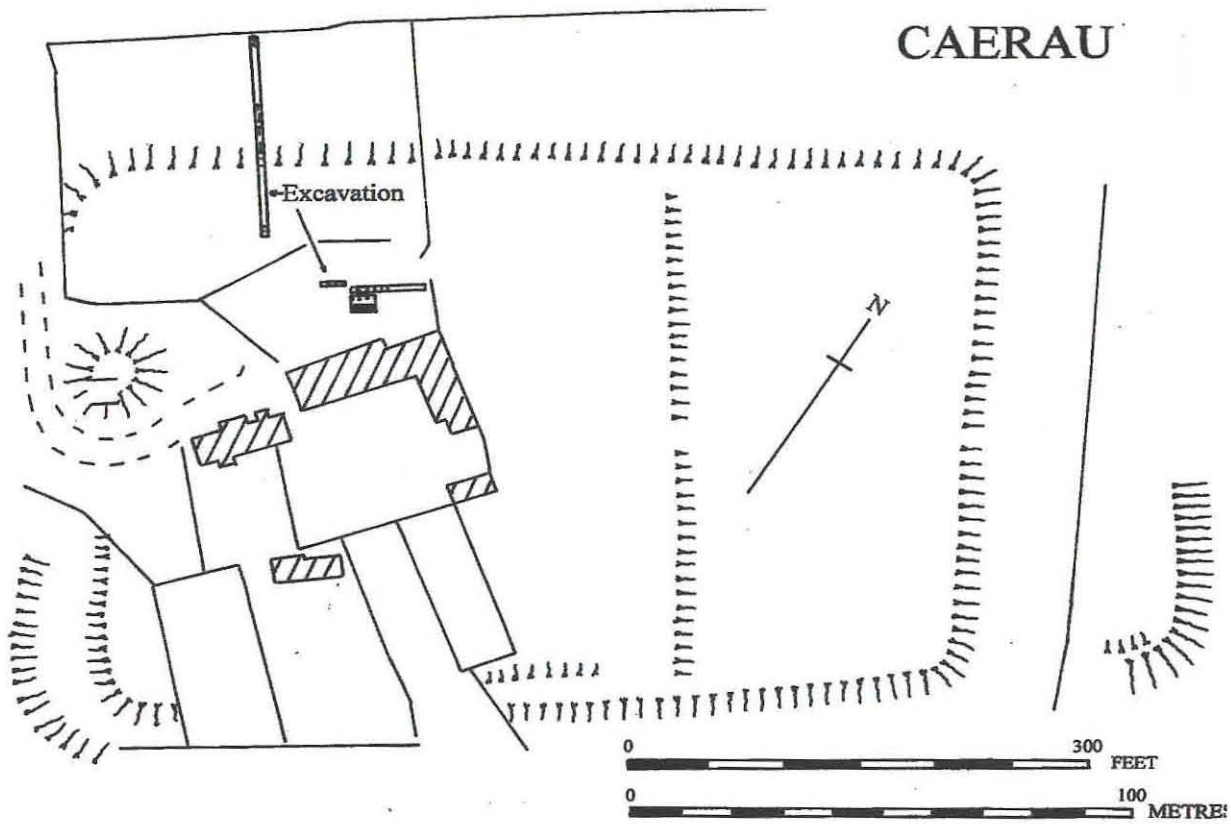
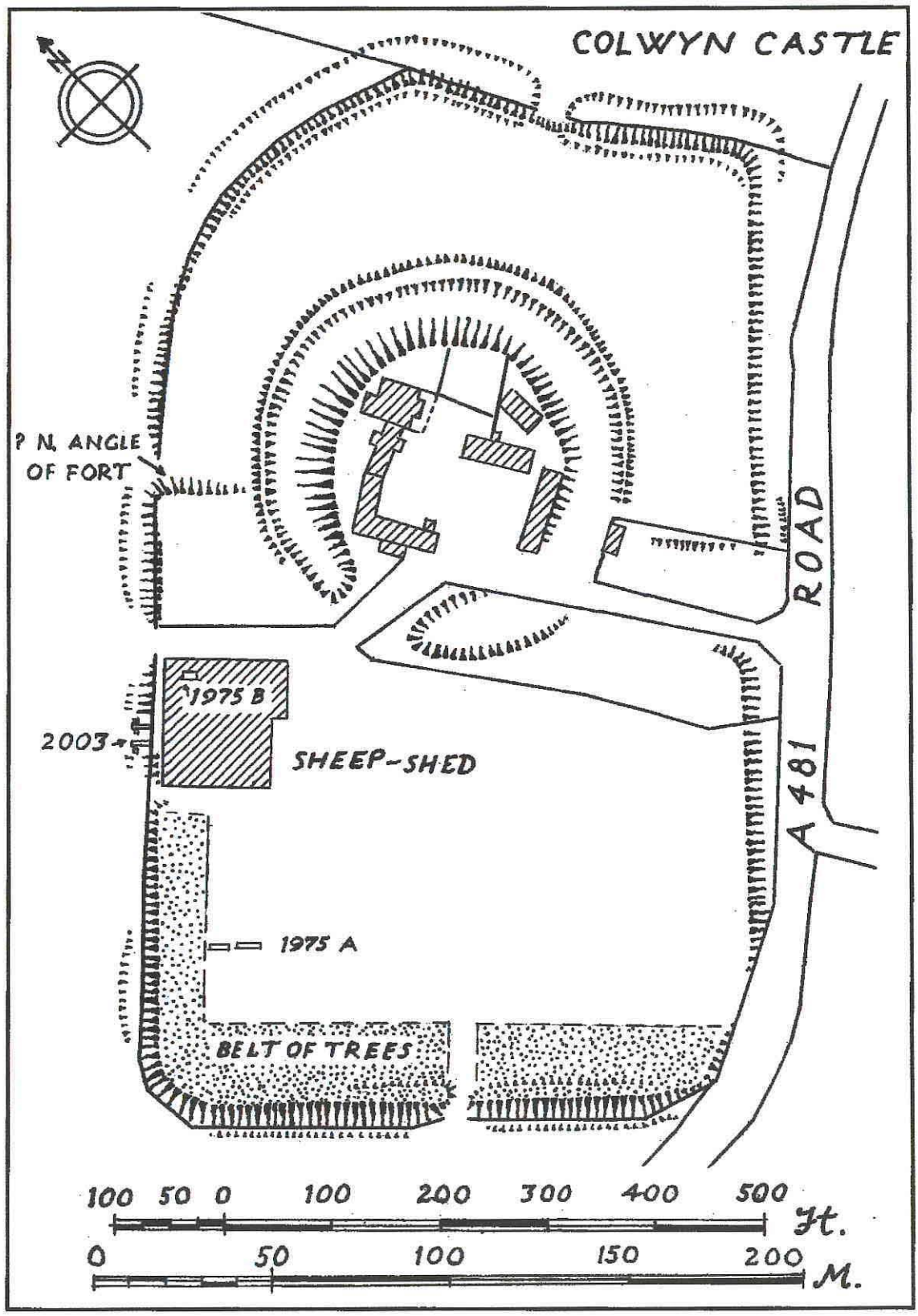


Plan A: Caerau, Beulah (after Webster 1965)



Plan B: Colwyn Castle (after Frere 2004, based on Spurgeon 1974)

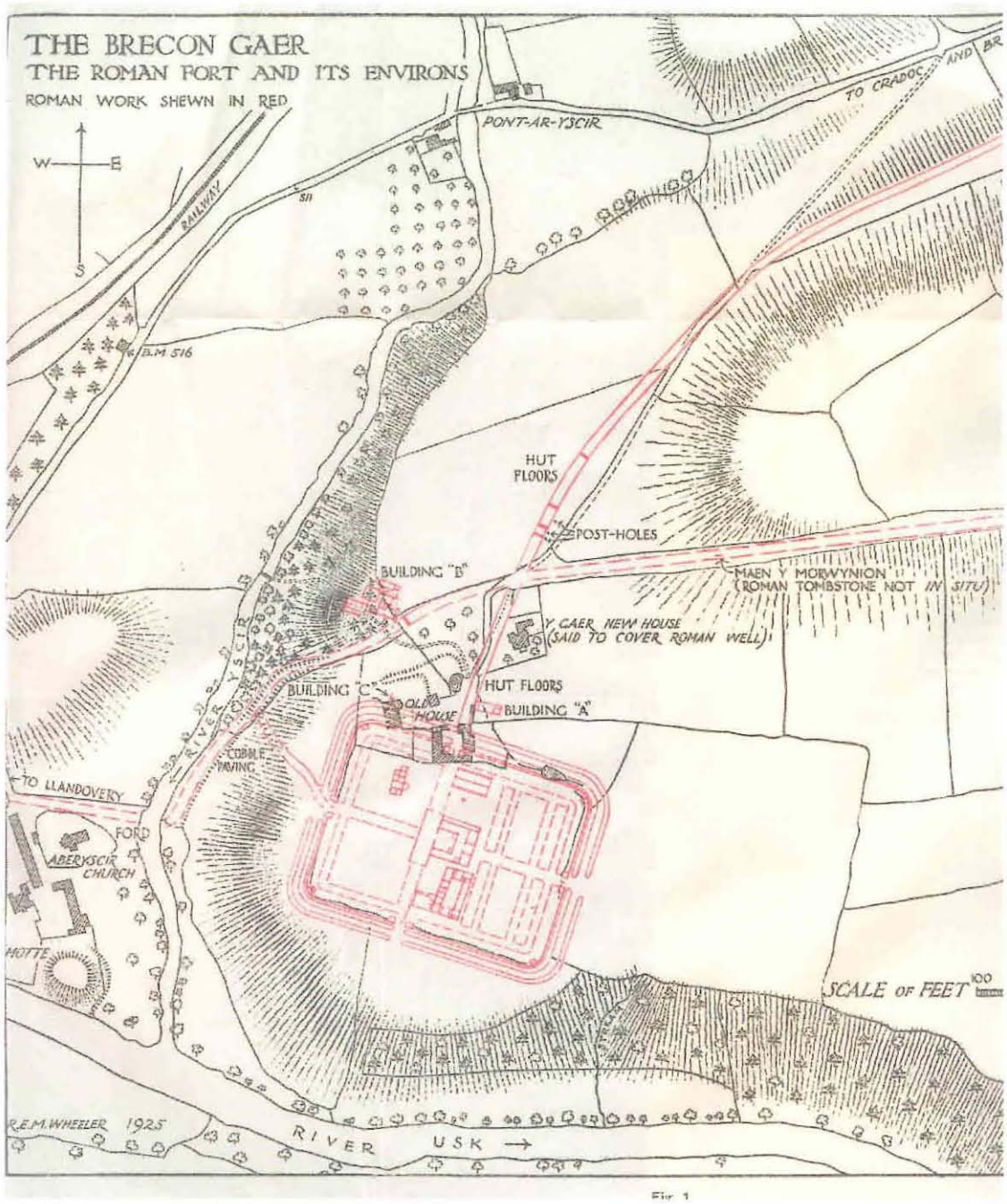


Fig. 1

Plan C: Brecon Gaer (after Wheeler 1926)

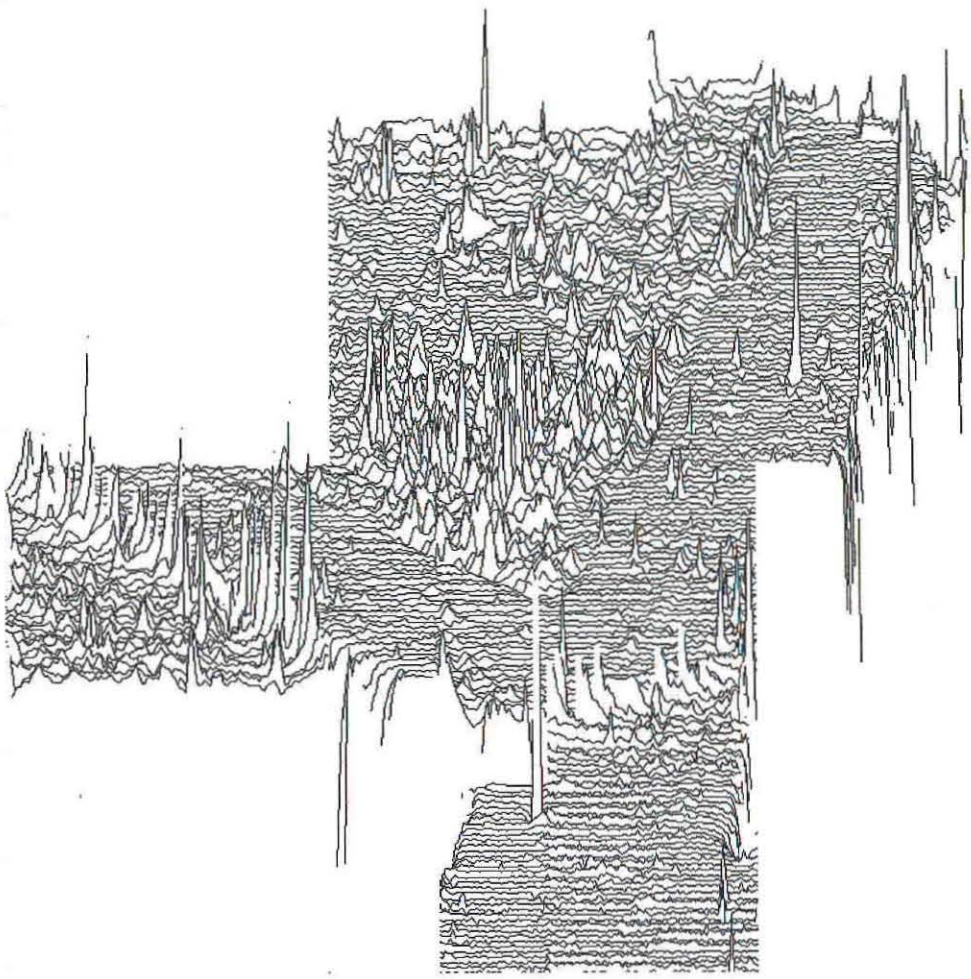


Fig. 1 Caerau gradiometer survey
Area1, trace plot

Std dev 10.35
Min -198.67
Max -197.46

41.41 nT

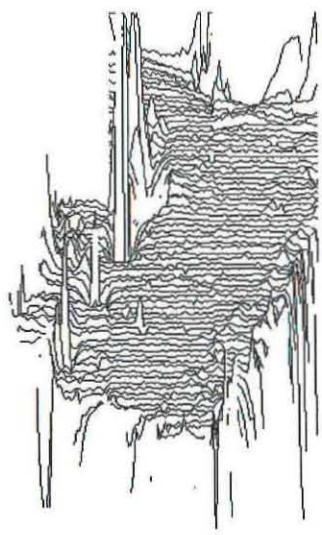


Fig. 2 Caerau gradiometer survey
Area 2, trace plot

Std dev 10.35
Min -198.67
Max -197.46

41.41 nT

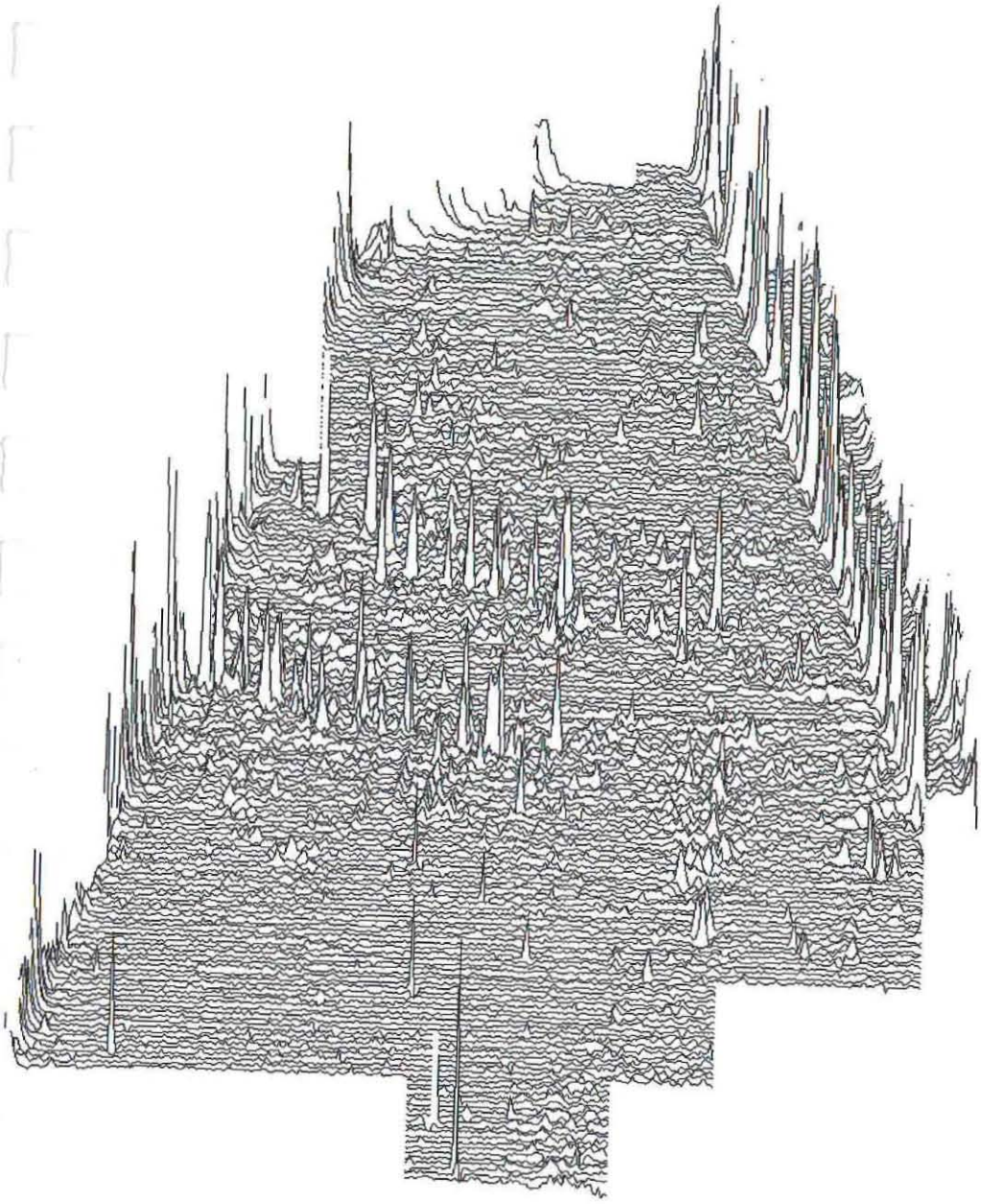


Fig. 3 Caerau gradiometer survey
Area 3, trace plot

Std dev 10.02
Min -189.77
Max -202.67

40.15 nT

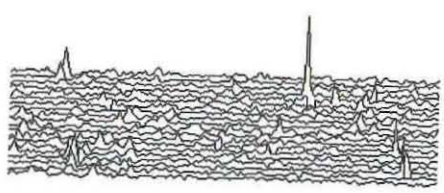


Fig. 4 Caerau gradiometer survey
Area 4, trace plot

Std dev 1.92
Min -42.39
Max -45.02

30.79 nT


Fig. 5 Caerau Gradiometer survey
Grey-scale plan
10 nT
0.00
-10 nT
Survey by D Hopewell and I Grant.
June 2004
METRES
0
100


21
22
16
3
17
20
20
19
18
4
2
12
8
1
9
15
10
7
11
6
5
13
14
Fig. 6 Caerau Gradiometer survey
Interpretation plan
10 nT
0.00
-10 nT
Survey by D Hopewell and I Grant.
June 2004
METRES
0
100

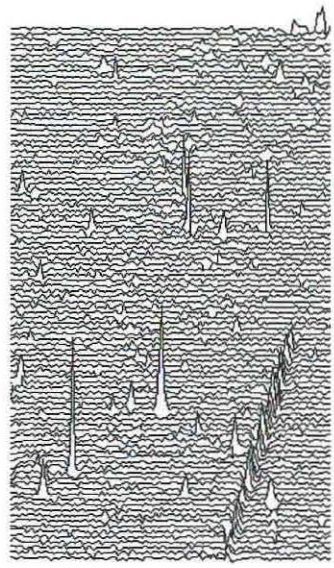


Fig. 7 Colwyn Castle gradiometer survey
Area 1, trace plot

Std dev 1.96
Min -38.31
Max -76.18

31.47 nT

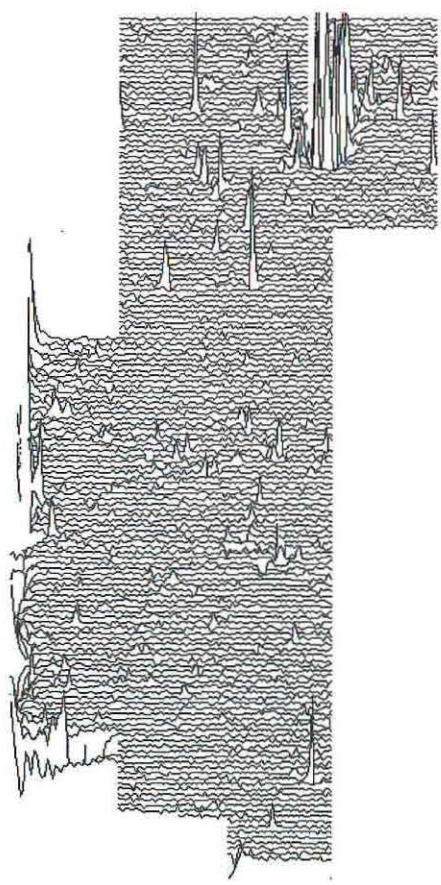


Fig. 8 Colwyn Castle gradiometer survey
Area 2, trace plot

Std dev 7.28
Min -202.89
Max -130.75

29.13 nT

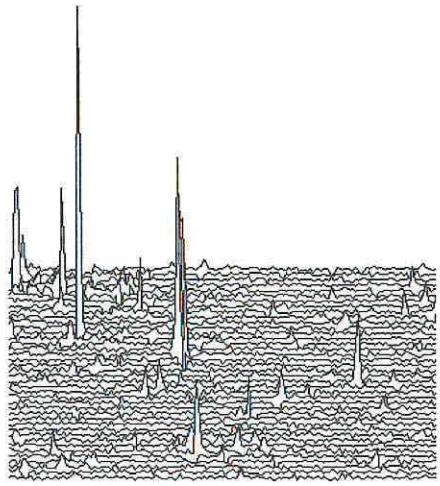


Fig. 9 Colwyn Castle gradiometer survey
Area 3, trace plot

Std dev 5.18
Min -162.37
Max 187.04

31.10 nT

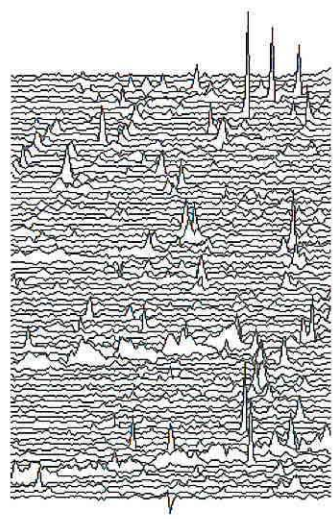


Fig. 10 Colwyn Castle gradiometer survey
Area 4, trace plot

Std dev 3.53
Min -75.58
Max 94.14

49.46 nT

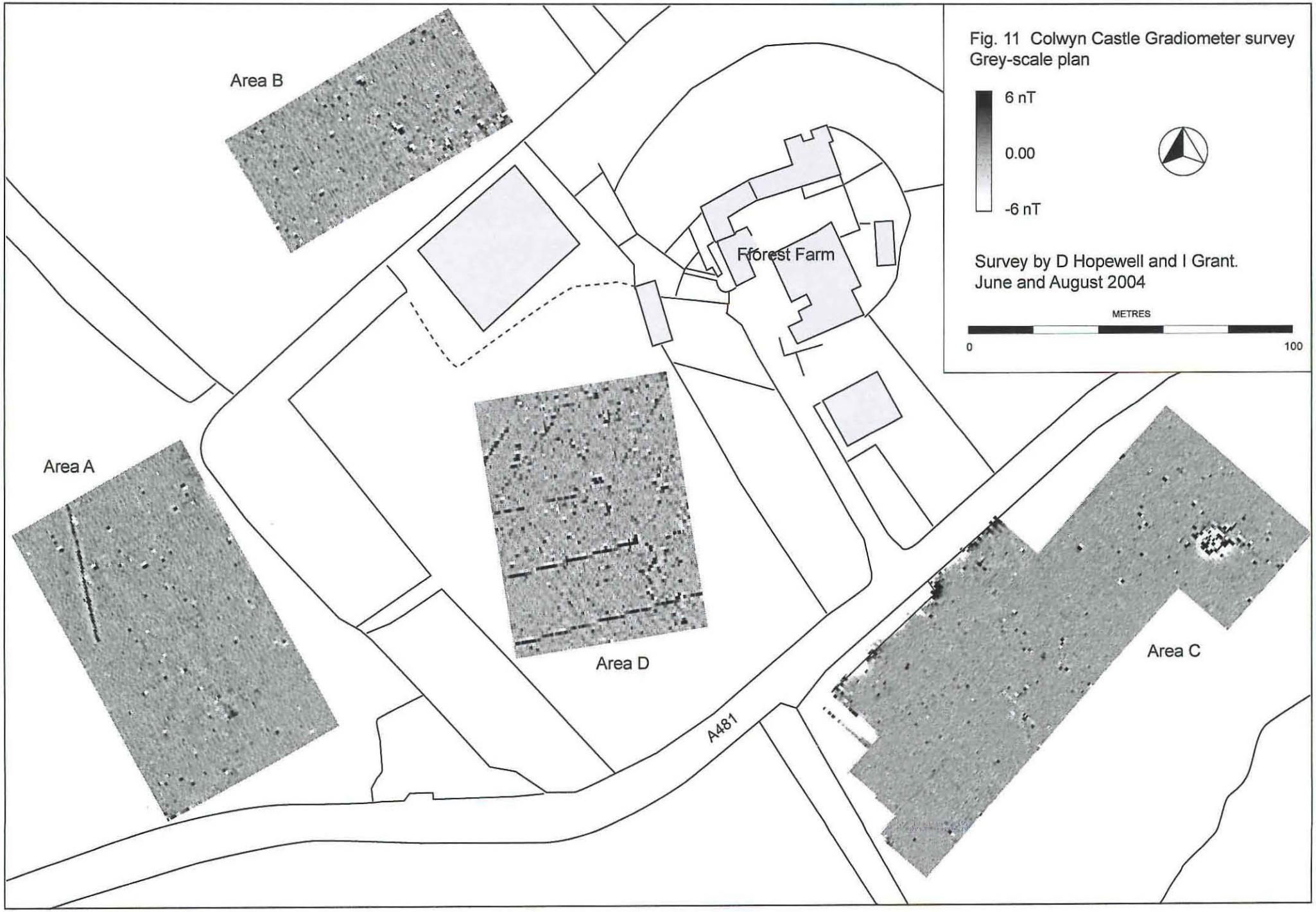


Fig. 11 Colwyn Castle Gradiometer survey
Grey-scale plan


Fig. 12 Colwyn Castle Gradiometer survey
Interpretation plan
6 nT
0.00
-6 nT
Survey by D Hopewell and I Grant.
June and August 2004
METRES
0
100
Area A
Area B
Area C
Area D
Fforest Farm
A481
1
2
3
4
5
6
7
8
9

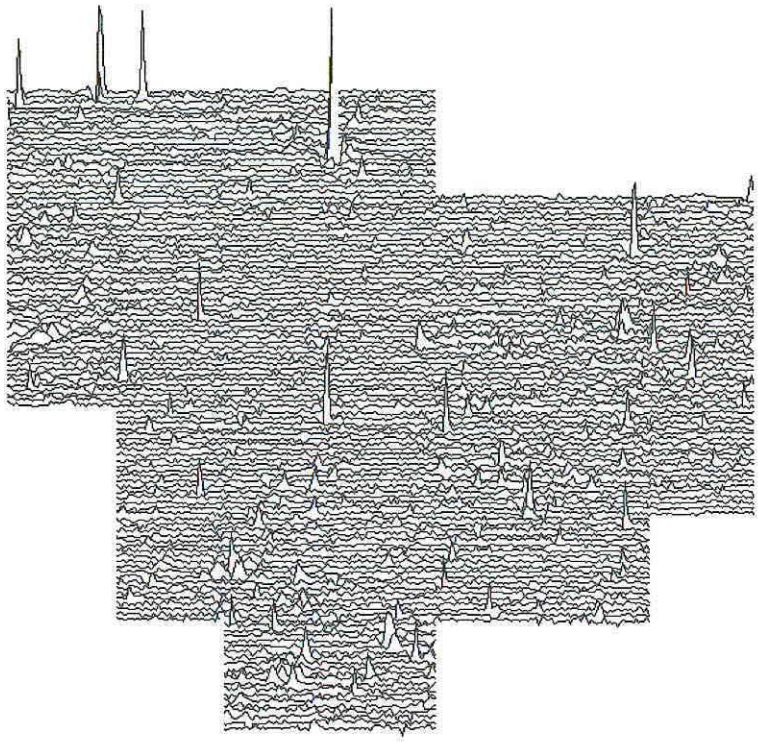


Fig. 13. Brecon Gaer gradiometer survey
Area1, trace plot

Std dev 1.89
Min -72.56
Max -170.54

22.27nT

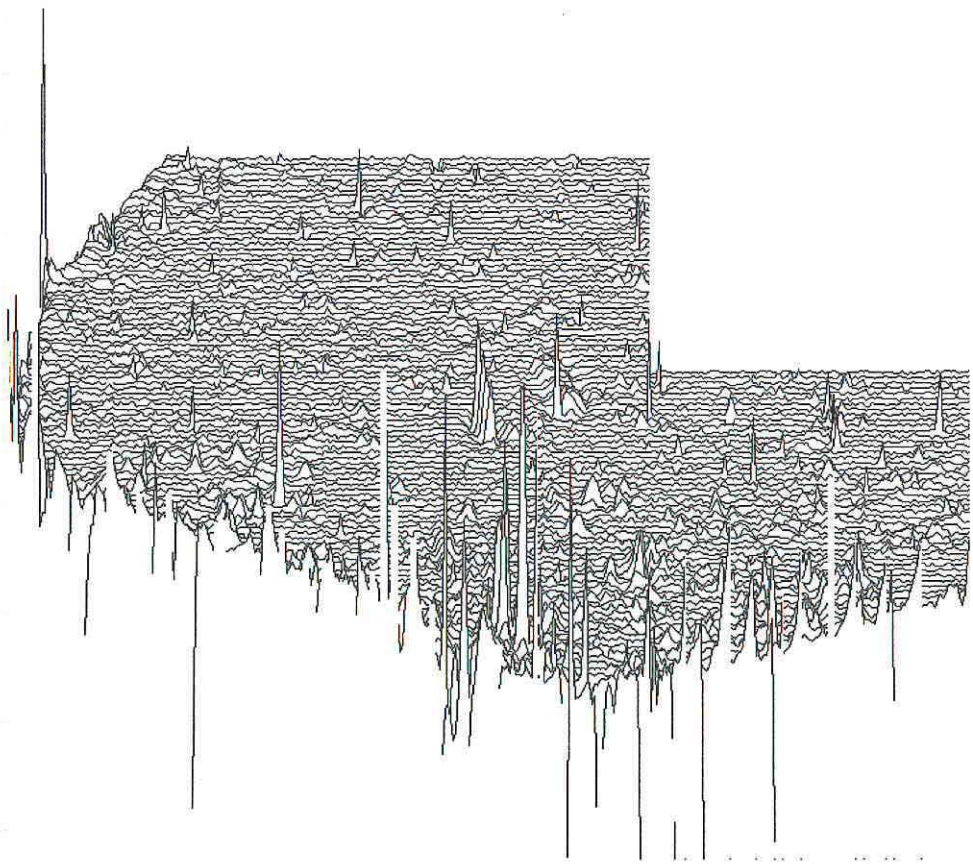


Fig. 14 Brecon Gaer gradiometer survey
Area 2, trace plot

Std dev 8.05
Min -22.33
Max -161.62

32.20nT

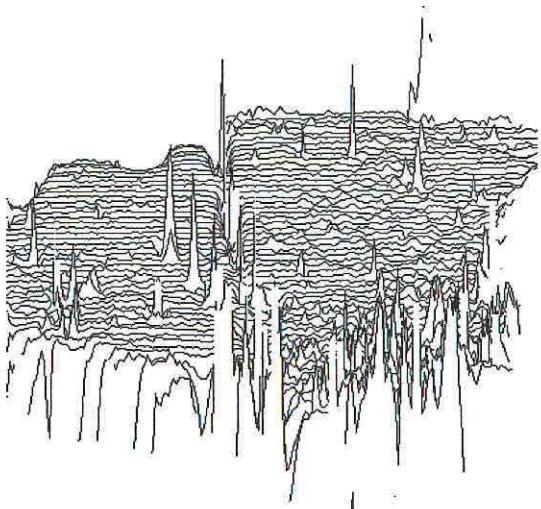


Fig. 15 Brecon Gaer gradiometer survey
Area 3, trace plot

Std dev 24.60
Min -205.69
Max -211.55

100.57 nT

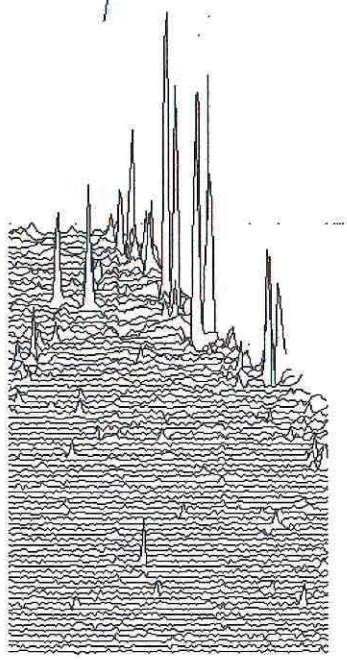


Fig. 16 Brecon Gaer gradiometer survey
Area 4, trace plot

Std dev 9.14
Min -182.09
Max -205.79

36.59 nT

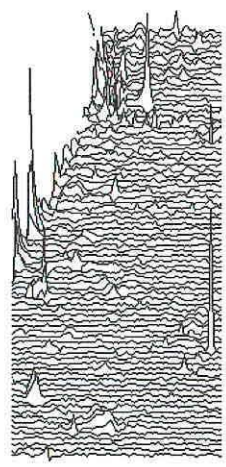


Fig. 17 Brecon Gaer gradiometer survey
Area 5, trace plot

Std dev 9.26
Min -196.56
Max -185.46

55.37 nT

Fig. 18 Brecon Gaer Gradiometer survey
Grey-scale plot

7 nT

0.00

-7 nT

Survey by D Hopewell, R Hankinson
and I Grant. August 2004

METRES

0 100

Area B

Path (

Site of building 'C'

Y Gaer

Line of Roman road

Area C

Site of building 'B'

Site of building 'A'

Area D

Track

Area A

Y Gaer
ROMAN FORT

Area E

Spring

Fig. 19 Brecon Gaer Gradiometer survey
Interpretation plan

7 nT

0.00

- 7 nT

Survey by D Hopewell, R Hankinson
and I Grant. August 2004

METRES

0 100

Area B

Path (L

Site of building 'C'

Y Gaer

line of Roman road

Area C

Site of building 'B'

Site of building 'A'

Track

Area D

Area A

Y Gaer
ROMAN FORT

Area E

Spring