A483 IMPROVEMENT AT LLANFAIR-AR-Y-BRYN LLANDOVERY (G1884)

GEOPHYSICAL SURVEY

G1884

Report number : 606

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

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Prepared

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for

Carmarthenshire County Council

Ymddiriedolaeth Archaeolegol Gwynedd
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ARCHAEOLOGICAL MITIGATION: GEOPHYSICAL SURVEY

1. SUMMARY

A programme of geophysical survey was carried out as part of mitigatory measures in advance of road improvements at Llanfair-ar-y-bryn near Llandovery. The survey detected a range of features associated with the nearby Llandovery Roman auxiliary fort. An enclosure with an array of three defensive ditches may indicate the presence of larger earlier fort beneath the currently visible earthworks. The ditches were subsequently reused as the defences for an annexe to the auxiliary fort. The annexe contains evidence for several phases of dense occupation and may contain industrial remains. A major Roman road, the Via Julia Montana runs along the south-eastern side of the survey area and bypasses the fort. A road branches off this and runs into the north-eastern side of the annexe. Roman activity alongside the roads also seems likely. The features detected in the survey form part of a buried Roman Landscape of national importance.

2. INTRODUCTION

The Gwynedd Archaeological Trust was contracted to carry out a programme of geophysical survey at Llanfair-ar-y-bryn near Llandovery Roman fort by Carmarthenshire County Council. This forms part of the archaeological assessment of the area in advance of road improvements. An initial assessment report was produced in 2004 by Clwyd-Powys Archaeological Trust (Silvester 2004) recommending geophysical survey as one of the initial mitigatory measures.

3. ARCHAEOLOGICAL BACKGROUND

The development area lies just to the north-east of Llandovery Roman Fort (PRN 4072). The visible earthworks (see Fig. 2) suggest that the fort is a conventional playing-card shape covering an area of around 2.4 ha. Excavations in 1961 and 1962 revealed four phases of construction indicating occupation from pre-Flavian times through to the mid 2nd century AD (Jarrett 1969). A major Roman Road known as the Via Julia Montana (PRN 3419) runs north-eastwards from the fort. The line shown on modern Ordnance Survey maps, probably derived from cropmark evidence (Silvester 2004), appears to bypass the fort. A ploughed down terrace is visible on or close to the published line of the road in the southernmost fields of the survey area. Cropmarks and stray finds also suggest Roman activity between the fort and Llanfair farm.

A substantial area of geophysical survey was carried out on the north-west side of the A483 in 2004 by Gwynedd Archaeological Trust for Cambria Archaeology (Hopewell 2004) as part of the Cadw funded Roman Fort Environs project. This confirms that Roman occupation extends to the north-east of the fort. The results have a bearing on the interpretation of the current survey and are reproduced in the present report.

4. METHODOLOGY

Two survey methods were specified in the project design. The entire 6 hectare study area was to be surveyed using a fluxgate gradiometer along with selected areas using resistivity.

4.1 Fluxgate Gradiometer

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 2005) 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* (civilian settlements

outside the main defences) in the form of ribbon development along at least one of the roads leading from the fort.

4.1.1 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 thermoremnant 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 Mumetal 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.

4.1.2 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.

4.1.3 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.

4.1.4 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.

4.2 Resistivity

Resistivity surveys measure the ability of soils to conduct an electrical current which is passed through them. Resistance is largely linked to moisture content, water-retaining substances such as ditch fills will have a low resistance whereas dense substances such as stone will have a high resistance.

A Geoscan RM 15 resistivity meter was used for the survey. This utilises two pairs of electrodes. One pair is placed in a fixed position while the other pair, fixed to a frame at a spacing of 0.5m, is moved over the site acting as detector probes. Readings were taken at intervals of 1m using the same grid layout as the gradiometer survey. The data is collected in onboard data logger and downloaded into a computer for processing in Geoplot. The results are presented as a grey-scale plot and an interpretation diagram.

4.3 Grid locations

The survey grids laid out manually using 50m tapes and a theodolite. They were located by measuring to fixed points shown on the current Ordnance Survey map on each side of the survey area.

5. THE GEOPHYSICAL SURVEY RESULTS

5.1 Introduction

The survey was carried out over two weeks commencing on the 30th August 2005. The Gradiometer survey was carried out by the author and Macsen Flook and the resistivity survey by John Burman. The survey was conducted in a single gridded area across four fields and an orchard. The fields were in the most part fairly level and separated by hedges. The land drops away steeply to the flood plain of the river to the south-east. The steeply sloping areas were not in general surveyed for several reasons. Survey in these areas is somewhat hazardous, particularly in wet weather and is also inaccurate due to surveying on a 45 degree slope in what is essentially a two dimensional survey. The steep slope was the edge of the area eroded away by the river, magnetic scanning showed the floodplain to be very magnetically quiet and it seems likely that any archaeology would be confined to the area above the slope. The survey therefore was extended to a little over the break of slope but not down the slope on to the flood plain. This resulted in the surveyed area being slightly narrower than that specified in the project design at the north-east of the study area and a little wider in the central part. Survey conditions were generally good. The fields were all under pasture with short grass and few obstructions apart from the hedges and some thick patches of nettles at the south. The orchard was not ideal for survey. This had been recently cut but still contained trees, bushes, cold-frames and two box hedges. These obstructions resulted in several unsurveyed areas and added considerable directional handling error to parts of the gradiometer survey. The weather was mostly hot and dry with occasional rain. Soil conditions were good for resistivity survey. The soil was somewhat dry at the end of the summer thus providing a good contrast between water retaining features and the surrounding soil.

The gradiometer data is presented as a trace plot (Figs 1), a grey-scale plot (Fig. 2) and an interpretation diagram (Fig. 3). The grey scale plot was smoothed in order to reduce pixellation by interpolation in the Y-axis. The resistivity data is presented as a grey-scale plot (Fig. 4) and an interpretation diagram (Fig. 5).

5.2 Results

5.2.1 Gradiometer Survey

The 2004 survey

The results from the 2004 survey carried out by Gwynedd Archaeological Trust for Cambria Archaeology (Hopewell 2004) are reproduced with minor revisions in this section of the report and on Figs 2 and 3. The 2004 survey is the area to the north-west of the A483 and the side road to Llanfair church.

The outline of the north-eastern part of the fort is defined by a 10 to 15m wide, magnetically quiet band containing the defensive ditches. The line of the ditches is not altogether clear but two (1 and 2) can be seen on the northern corner and a possible third (3) delineates the outside of the defences. There may also be the remains of an earlier rampart visible amongst the ditches on the north-west side. The interior of the fort contains a mass of overlapping anomalies almost certainly indicating several phases of occupation. The gradiometer cannot differentiate between the different phases and the greyscale plot therefore shows all detectable phases superimposed on each other making interpretation difficult. The rampart is probably indicated by a band of fairly random responses (4) with a break indicating the *porta principalis sinistra* (5) and a wider band of responses indicating a possible re alignment of the defences (6). The *via principalis* (7) is well defined with an internal drain running along its south-west and possibly its north-east side. The outline and some internal details of a building with dimensions of 15m x 25m (8) in the *Latera praetorii* can be seen. This produced high magnetic responses (see trace plot Fig. 1) suggesting destruction by fire. The interior of the building is not particularly clear but there are suggestions of multiple, closely spaced, transverse features possibly indicating the floor supports of a double granary. The north-western end of this range is fairly well defined. The area to the south-east is less clear and appears to consist of several phases of activity. The *praetentura* appears to contain barracks arranged *per strigas*. The suggested outline of two buildings (9 & 10) are shown on Fig. 4 but cross walls in between the buildings and other anomalous wall lines indicate that more than one phase of buildings is present.

The *retentura* is crossed by a modern iron water pipe (11). There are clearly several phases of buildings in this range. The outline of a long building arranged *per strigas* (12) could indicate more barracks but a larger rectangular building seems to overlie this (13) and other anomalous walls suggest further phases of building.

A line of noise (14) running down the slope from the *porta principalis sinistra* could indicate the line of a road, possibly turning to the north-east on the level ground at the bottom of the slope. Several other linear anomalies are visible in area A. Feature 15 is a relict field boundary shown on the 1840 tithe map. Anomalies 16 & 17 are probably ditches or drains but could be assigned to almost any period. The double linear anomaly 18 crossing the fort ramparts could be the result of drains but could be interpreted as part of an enclosure or large building. The high responses along the edge of the field (19) are modern concrete structures and piles of rubble.

Much of area B is dominated by a mass of overlapping anomalies many of which show signs of significant thermoremnant magnetism. Detailed interpretation is not possible in this area and Fig 4 only aims to illustrate certain features of the results. The main area of activity lies immediately to the north-east of the fort defences (1 & 2) and appears to be surrounded by a series of ditches. An array of three possible ditches (20) can be seen on the north-east side although they can only be traced for about 30m with any certainty. These could be the ditches of a much larger earlier fort now largely masked by later activity. Anomaly 31 appears to be a continuation of one of these ditches.

The northern limit of much of the activity seems to be defined by the rounded corner of a rampart or ditch (21) perhaps indicating that this area was, for some of its history, enclosed within an annexe of the fort. A further ditch (22) to the north-west of this appears to be one side of an enclosure truncated (or magnetically masked) by the annexe. The activity within the annexe is characterised by large numbers of overlapping features on different alignments and this clearly represents several phases of occupation. There appear to be two major areas of strong magnetic enhancement consistent with heavy burning.

Area 23 appears to consist of a mass of burnt buildings one of which (24) has dimensions of 25m x 15m. These are fairly well defined at the west where two or three rectangular structures are visible. Elsewhere the anomalies are fairly random indicating a mass of burnt rubble.

Two or perhaps three lines of strong anomalies (25) cut by what is probably a post-Roman field boundary (26) were detected immediately to the north-east of the fort. These are best interpreted as a series of kilns or ovens. A further series of similar anomalies (27) appear to be enclosed within a building or enclosure. Several other strong anomalies detected elsewhere in area B (28, 29, and 30) could be interpreted as either being either the result of industrial activity or burnt buildings. A well-defined anomaly with dimensions of 7m x 4m (32) appears to be a rectangular building standing within a rectangular enclosure.

The area (33) beside the modern road, in contrast to the rest of the annexe, exhibits little evidence for heavy burning but contains a series of overlapping linear anomalies some of which can be resolved into buildings (e.g. 34). This could be the part of strip development alongside either a road from the fort, which could have run close to the line of the present road, or a Roman road recorded about 70m to the south east (PRN 3419). This fairly low level of activity seems to extend alongside the modern road to the north-east end of the survey area. There is a lot of modern noise alongside the road making it difficult to see any detail and only a single rectangular structure (35) with dimensions of 18m x 15m can be resolved with any certainty. Several other linear features can be seen in this area although most seem to fade away as they approach a magnetically very quiet area (43) that occurs across most of the field to the west of Llanfair Farm. Feature 36 may be part of a field boundary shown on the tithe map of 1840. Feature 37 is presumably a ditch. This runs parallel to the triple ditch array and could be contemporary. Anomaly 38 is presumably another ditch or drain but could be of any period. A series of three narrow negative anomalies (39) are probably modern water pipes leading to a manhole in the field (44). The status of the magnetically quiet area 43 is unclear. It is currently quite wet and could have been very marshy before the railway was built, thus limiting activity. A double linear anomaly (40) is visible as a well-defined bank in the field. This is not shown on the tithe map suggesting that it is early. Several other linear features including boundary 36 seem to fade as they run into the area and it is possible that this area was landscaped or infilled when the railway was built. If this is the case, bank 40 would be a modern feature.

Two other linear anomalies can be seen in area B. Feature 41 is very narrow and is probably a modern drain or pipe. Feature 42 could be part of he annexe defences or possibly a continuation of bank 40.

The 2005 survey

The present survey comprises the area to the south east of the A483.

A good range of anomalies were detected across the whole survey area and background noise was fairly low. Responses appearing to derive from geology or glacial drift can be seen along the edge of the slope down to the flood plain and are most noticeable where the slope has been cut back or eroded at the north-eastern end of the survey (45). The orchard area produced noisy results, mainly as a result of contamination by modern ferrous material.

The survey supports the OS line of the Roman road. A linear anomaly (46), about 7m wide, defined by ditches on either side falls exactly on the projected line. This cannot be traced with certainty to the south-west although ditches 47 and 48 could mark its line. Its line may however be indicated by a clear delineation between the more magnetically active areas (49 and 50) adjacent to the fort and annexe and the magnetically quiet area (51) to the south-east above the flood plain of the river. The road to the north-east of 46 appears to have been eroded away by the Afon Bran at an unknown time in the past because otherwise it would fall steeply about 2 metres down the slope to the flood plain. The speed of

change of the river channel is demonstrated by the change in its line between that shown on the 1980s edition of the OS map and its present day course (see Fig. 3). There is a noticeable change in the line of the slope at the eastern end of the survey and a corresponding geophysical anomaly indicates the line of a side road (52) and a junction with the Via Julia Montana. The side road runs in a north-westerly direction up the slope and turns to the west before presumably turning again to follow the line of the modern A483 through a gate in the annexe. There is a break in the geological noise along the line of the side road as it climbs up the slope perhaps indicating a cutting now filled with magnetically quiet ploughsoil. The road is about 5m wide as it runs across the level ground to the fort and the cutting is about 7m wide.

The continuation of the triple ditched enclosure (20) detected in the 2004 survey is clearly visible and its rounded corner confirms its Roman origins and also allows the opposite corner to be projected with a little more certainty. Faint anomalies 53 and 54 appear to show the line of the ditches as they pass through the orchard. The scale of the triple ditched defences, as noted above, seems to be greater than usually associated with an annexe. The results of the two surveys when viewed together emphasise the impression that the ditches represent the defences of an earlier fort that were subsequently reused as the defences for an annexe. The dimensions of the annexe (measured from the inside of the ditch array) are 122m x 81m (0.99 ha). The extent of the possible earlier fort is less certain but if it included the presently visible auxilliary fort it would be about 263m x 140m (3.68 ha). Details of the interior of the annexe/fort in the present survey are unclear. There is a large area of high magnetic responses (55) within the orchard and adjacent field. This seems to respect the line of the ditches but some of the responses within the orchard are definitely modern (cold frames etc). There are no clearly defined structures visible although some of the stronger anomalies (56) resemble the possible thermoremnant responses 25 and 27 from the 2004 survey. A band of reduced activity (57) hints at the presence of a road.

A further ditch (37) runs roughly parallel to the triple ditch array. They are separated by a largely featureless gap of 32m. The ditch curves around the eastern corner of the fort before either terminating as it reaches the Via Julia Montana or joining up with the roadside ditch. The extent of the ditch is unknown on the northern side of the fort and annexe as it cannot be traced through the magnetically quiet area (43) next to the railway cutting. A smaller ditch (58) runs at right-angles across the four other ditches and terminates at the inner and outer indicating that it likely to be contemporary.

The area between the fort/annexe and the Via Julia Montana exhibits a general increase in noise (areas 49 and 50) along with discrete, stronger, probably thermoremnant anomalies. The thermoremnant anomalies could indicate hearths or industrial activity, but could be more modern bonfires from hedge cuttings etc. Two faint rectangular anomalies (59 and 60) could indicate buildings overlying or immediately to one side of the road and a narrow linear anomaly (60) is best interpreted as a drain, possibly modern. The area between the Via Julia Montana and the drop to the flood plain contains few anomalies, two patches of increased noise (62 and 63) could indicate buried archaeology as could two strong thermoremnant responses (64 and 65).

The area beside the side road to the fort (52) also shows signs of Roman activity. A ditched enclosure (66) respects the road and must therefore be contemporary. It contains a series of faint anomalies (67,68 and 69) which could indicate buildings or other activity. The area to the south of the road as it approaches the outermost ditch (37) is quite noisy (area 70) and contains many small moderately strong anomalies. These could be interpreted as a series of small thermoremnant responses from hearths. This kind of activity is quite common alongside roads leading from Roman forts (e.g. Canovium, Hopewell 2005). In most cases these hearths indicate the presence of *vicus* buildings running at right angles to the road. In this case, however, they seem to be randomly placed and there are no other anomalies demonstrating the presence of buildings. They could therefore be the result of small bonfires or even just an area of more magnetic stones occurring naturally in the subsoil. Elsewhere a single thermoremnant response (71) could represent activity (possibly funerary) alongside the Via Julia Montana.

There are several anomalies that do not fit in with the Roman remains in the area. Strong rectangular anomaly 72 appears to be the remains of a modern shed, the ground here shows signs of relatively recent disturbance. Linear feature 73 crosses the Roman road and is probably a former field boundary. Faint parallel anomalies (74 and 75) running down-slope are best interpreted as field drains. Similar anomalies (76 and 77) running across the slope are probably the result of ridge and furrow or later

ploughing. The origin of a faint linear anomaly (78) running across much of the survey area is unclear. It could be an early road but could equally be a more recent agricultural feature. Other linear anomalies 79, 80 and 81 cannot be assigned to any particular period but do not appear to relate to any of the Roman activity identified in the survey.

5.2.2 The resistivity survey

A roughly rectangular area was surveyed with maximum dimensions of 173m x 75m. This included the area around the Llanfair building cropmark (PRN 14324), as specified in the project design along with the orchard. The orchard was surveyed because the gradiometer data was adversely affected by modern ferrous contamination and obstacles such as hedges and trees. There is clearly complex archaeology in this area and it was hoped that the RM15 being unaffected by ferrous anomalies would operate more effectively here.

A range of anomalies were detected across the survey area many of which were not detected by the gradiometer. The triple ditched enclosure (1) is only visible at the north-western side of the survey area. Elsewhere in this field the most obvious anomalies are a series of parallel linear features best interpreted as ridge and furrow. The probable modern shed or building (15) is again visible. The rest of the anomalies in this field are the result of variations in the surface moisture content, 7, 12 and 6 are dry areas beneath trees and 12 and 13 are very humic areas where cattle feeders had been standing.

There are further dry patches in the orchard (8, 9, 10 and 11). A series of linear anomalies 3, 4 and five superficially appear to be grid mismatches in the data but are in fact overgrown gravel paths running on the same alignment as the grid. A further linear anomaly (16) is not aligned with the modern or Roman features and may be a drain.

6. CONCLUSIONS AND SUMMARY

The 2005 survey revealed activity throughout much of the survey area. The gradiometer survey was particularly informative and revealed a wide range of archaeological features interpreted as dating from the Roman period up to modern times. The resistivity survey detected several features most of which were close to the surface but failed to add any new information about the more deeply buried Roman archaeology.

The Via Julia Montana appears to run along the line shown by the Ordnance Survey. A road branches off and runs up-slope, probably through a cutting, and then turns to run through a gate in the annexe (now beneath the modern road). The triple ditched defences of the annexe to the fort are clearly visible, as is a further, probably contemporary, defensive ditch. The triple ditches may well have originated as part of an earlier larger fort. Recent work elsewhere in Wales has uncovered other evidence for larger triple ditched forts preceding Flavian Auxiliary forts. Llandeilo (Hughes 2003) and Pennal (Hopewell 2005) appear to follow broadly similar patterns. Llanfor (ibid.) although on a different site to the nearby auxiliary fort of Caer Gai may also be seen as a parallel. The interior of the annexe seems to be densely packed with several phases of buildings although few details are visible in the current survey due to the masking effects of more recent features. An enclosure on the north of the side road to the fort incorporates the roadside ditch and is therefore probably contemporary although its function is unclear. Further Roman activity may be present alongside the two roads, particularly where the side road approaches the annexe. Evidence for this is, however, inconclusive and would have to be tested by excavation.

It should be noted that the geophysical survey has detected a series of anomalies that have been interpreted solely by their two-dimensional appearance and the strength of their magnetic response. They must therefore be seen as a series of hypotheses to be tested by excavation. In some cases the anomalies can be assignment to a particular period with a high degree of certainty. The triple-ditched playing-card-shaped enclosure is very typically Roman and the associated ditch and roads can be interpreted by association. There is however no particular reason to assume that all of the buildings within the annexe area are Roman. It is possible that some of the phases are medieval, associated with the early ecclesiastical site at Llanfair. It should be recognised that there is little in the annexe that can be recognised as being typically Roman by shape alone and any interpretation as such, in advance of excavation, must therefore be considered to be provisional. It should also be noted that it cannot be assumed that geophysical survey will detect all buried archaeology.

The results can be interpreted with enough certainty to recognise that there is extensive Roman and possibly post-Roman archaeology of national importance within the surveyed area.

7. REFERENCES

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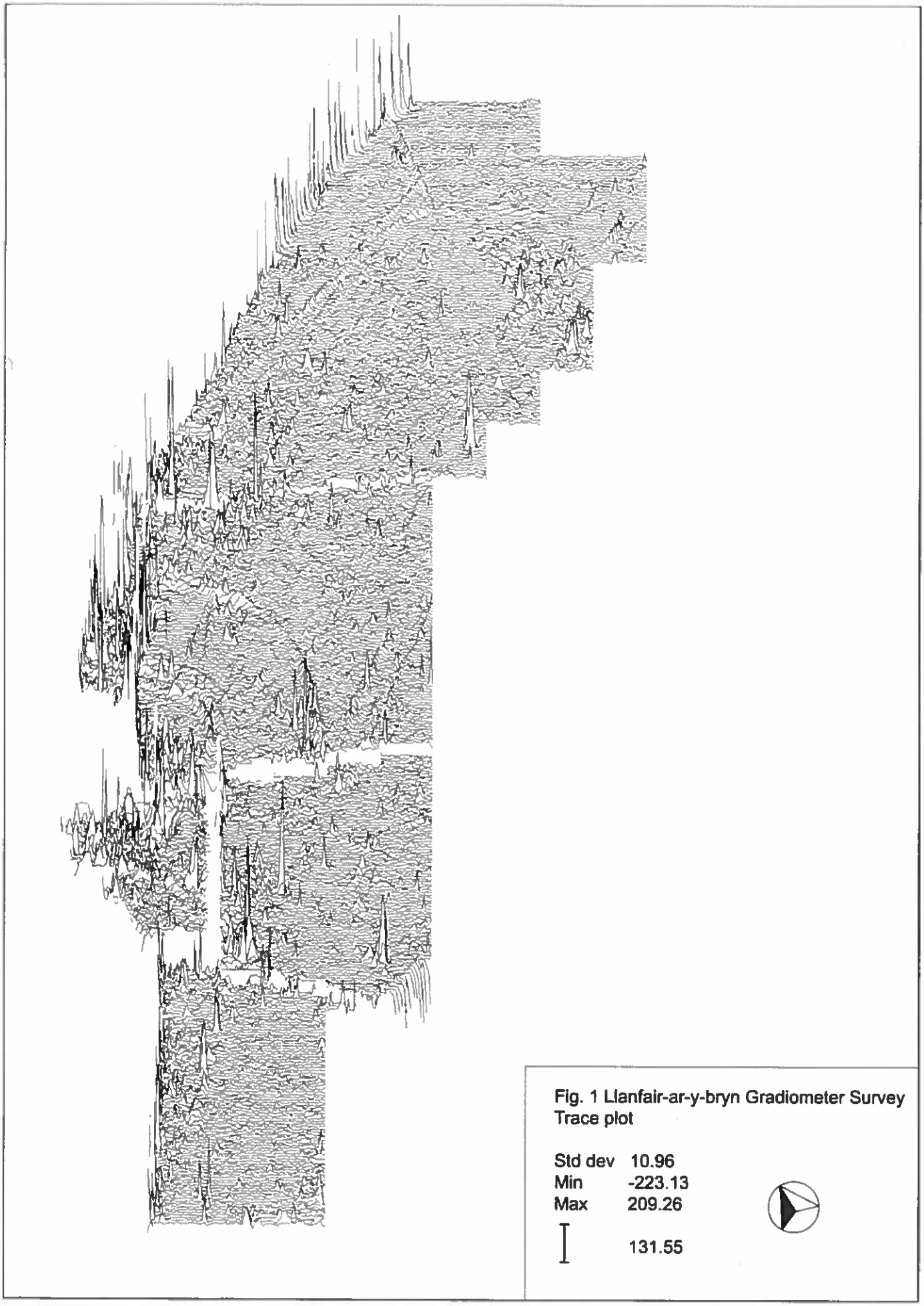

Fig. 1 Llanfair-ar-y-bryn Gradiometer Survey
Trace plot

Std dev	10.96
Min	-223.13
Max	209.26
	131.55

Fig. 2 Llanfair-ar-y-bryn Gradiometer Surveys: Grey-scale plan

14 nT

0.00

-14 nT

2004 Survey by D Hopewell and P Crane.
2005 Survey by D Hopewell and M Flook

railway cutting

N

Area B

Llanfair farm

A483

2004 survey

2005 survey

Line of Roman road
(Ordnance Survey "course of")

Area A

Llandovery Roman Fort

Llanfair Church

Approximate line of fort ramparts

A483

Afon Bran (1980s)

Afon Bran

0

100 m

Fig. 3 Llanfair-ar-y-bryn Gradiometer Surveys: Interpretation plan
2004 Survey by D Hopewell and P Crane.
2005 Survey by D Hopewell and M Flook

railway cutting

N

Area B

2004 survey

Area A

Llandovery Roman Fort

Llanfair Church

Approximate line of fort ramparts

A483

Llanfair farm

Line of Roman road (Ordnance Survey "course of")

Slope down to flood plain

2005 survey

Afon Bran (1980s)

Afon Bran

0

100 m


Fig. 4 Llanfair-ar-y-bryn Resistivity Survey: Grey-scale plan
Survey by J Burman
Llanfair farm
A483
0
50 m
Afon Bran


Fig. 5 Llanfair-ar-y-bryn Resistivity Survey: Interpretation plan
N
Llanfair farm
A483
Afon Bran
0
50 m
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16