REPORT ON GEOPHYSICAL SURVEY

Site : Wiston, Dyfed

Report : 91 / 05

January 1991

Client : Dyfed Archaeological Trust

GEOPHYSICAL SURVEYS

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Survey Number: 91/05

Site: Wiston, Nr Haverfordwest, Dyfed

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Location, and topography.
The site is situated to the south of Wiston Castle, on a lawned area adjacent to the church.

Archaeology
The archaeology of this site is not known although there are some earthworks. A geophysical survey was undertaken to the west of this site, and encouraging results were obtained.

Aim of Survey
To establish the significance of the earthworks on the site.

Instrumentation

Magnetometer : Geoscan FM36 with ST1 automatic trigger

Resistance Meter : Geoscan RM4 with DL10 datalogger

Survey Method

Magnetic readings are logged at 0.5m intervals along one axis (in 1.0m traverses, 800 readings per 20m x 20m grid) over the survey area. Resistance readings are logged at 1.0m intervals (400 per grid). The data are then transferred to a Compaq SLT/286 and stored on 3.5" floppy discs. Field plots are produced on a portable Hewlett Packard Thinkjet. Further processing is carried out back at base on a Mission 386 linked to appropriate printers.

The location of the survey area is shown in Figure 1.

TECHNICAL AND DISPLAY INFORMATION

The following is a description of the equipment and display formats used in **GEOPHYSICAL SURVEYS'** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GEOPHYSICAL SURVEYS.**

(1) Instrumentation

(a) Fluxgate Gradiometer

This instrument comprises two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor some 100-300mm from the ground surface. At each survey point, the difference in magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT) or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. If multiple readings are logged, then unless specified elsewhere in the report, it may be assumed that they are taken in the direction of grid north.

(b) Resistance meter

This measures the electrical resistance of the earth, using a system of four electrodes (two current, two potential). Depending on the arrangement of these electrodes, an exact measurement of a similar volume of earth may be acquired. In such a case the amount measured may be used to calculate the earth resistivity. Using a 'Twin-Probe' arrangement the terms 'resistance' and 'resistivity' may be interchanged. This arrangement involves the pairing of electrodes (one current and one potential), with one pair remaining in a fixed position whilst the other measures the resistivity variation across a fixed grid. Resistance is measured in ohms, whilst resistivity is measured in ohm-meters.

(c) Magnetic susceptibility

The instrument employed for measuring this culturally enhanced phenomenon is a laboratory based susceptibility bridge. Standard 50g soil samples are collected in the field.

(2) Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report only one type of display mode may be used, although where necessary a number of the options may be presented.

(a) X-Y Plot

This involves a line representation of the data. Each succesive row of data is equally incremented in the Y axis, to produce a 'stacked' profile effect. This display may incorporate a 'hidden-line removal' algorithm, which blocks out lines behind the major peaks and can aid interpretation.

(b) Dot-Density

In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum cut- off value will appear 'white', whilst any value above the maximum cut - off value will appear 'black'. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). When the contrast is equal to 1, then the scale between the two cut-off levels is linear. A C.F.>1 helps to enhance the higher readings. To assess lower than normal readings involves the use of an inverse plot. This plot simply reverses the minimum and maximum values, resulting in the lower values represented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which the numbers of the dots is randomly placed.

(c) Contour

This display joins data points of an equal value by a contour line. Displays are either generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer. The former will generate either colour or black and white copies depending on the printer used.

(d) 3-D Mesh

This display joins the data values in both the X and Y axis. The display may be changed by altering the horizontal viewing angle and the angle above the plane. Again, the output may be either colour or black and white. A hidden line option is occasionally used (see (a) above).

(e) Grey-Scale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots, the intensity increasing with value. This gives an appearance of a toned or grey scale.

(3) Interpretation

This is the most important part of the report and is based on a consideration of not only the display plots , but also a study of the raw data. It should be emphasised that the final interpretation is not based only on the diagrams reproduced in this report.

In some instances geological and pedological anomalies may arise which are impossible to distinguish from those normally associated with archaeological features - in all cases of doubt trial excavation work is recommended to ascertain the nature of the observed anomalies.

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

Report on the Geophysical Survey at Wiston, Dyfed.

Introduction

The geophysical survey in this report was commissioned by the Dyfed Archaeological Trust. An area of approximately 60m by 20m was surveyed by both the resistance and the magnetic method.

The geophysical fieldwork was carried out by two operators during the course of one day on site. This included the time taken to lay out the survey grid. The location of the survey grid is shown in Figure 1. The results are displayed as X-Y traces, dot-density plots and grey-scale images.

Results

Magnetic Data

The presence of cables and support poles has caused magnetic disturbances across the site. The close proximity of a stone wall to the south also affected the magnetic response, as can be seen in Figure 2. Given these problems, and the small area under survey, it is difficult to pin-point any features of archaeological significance. A few anomalies, however, have been highlighted. These may relate to lengths of ditch and pits/metal working areas/possibly hearths. This interpretation is somewhat speculative - modern ferrous debris is a more likely cause, but several of the anomalies may benefit from further archaeological investigation

Resistance Data

A high resistance anomaly, corresponding to the earthworks was detected, as shown in Figure 3. It would seem most likely that, if archaeological, these relate to old house platforms.

Conclusions

The magnetic survey was slightly disappointing due to the high levels of magnetic noise, although one or two anomalies of potential archaeological interest have been highlighted.. The resistance survey may have produced positive results which relate to house platforms. Interpretation of the geophysical data is difficult because of the small survey area.

Fieldwork: S Ovenden and D Shiel

Geophysical Surveys of Bradford
January 1991

WISTON

Grid Location Diagram

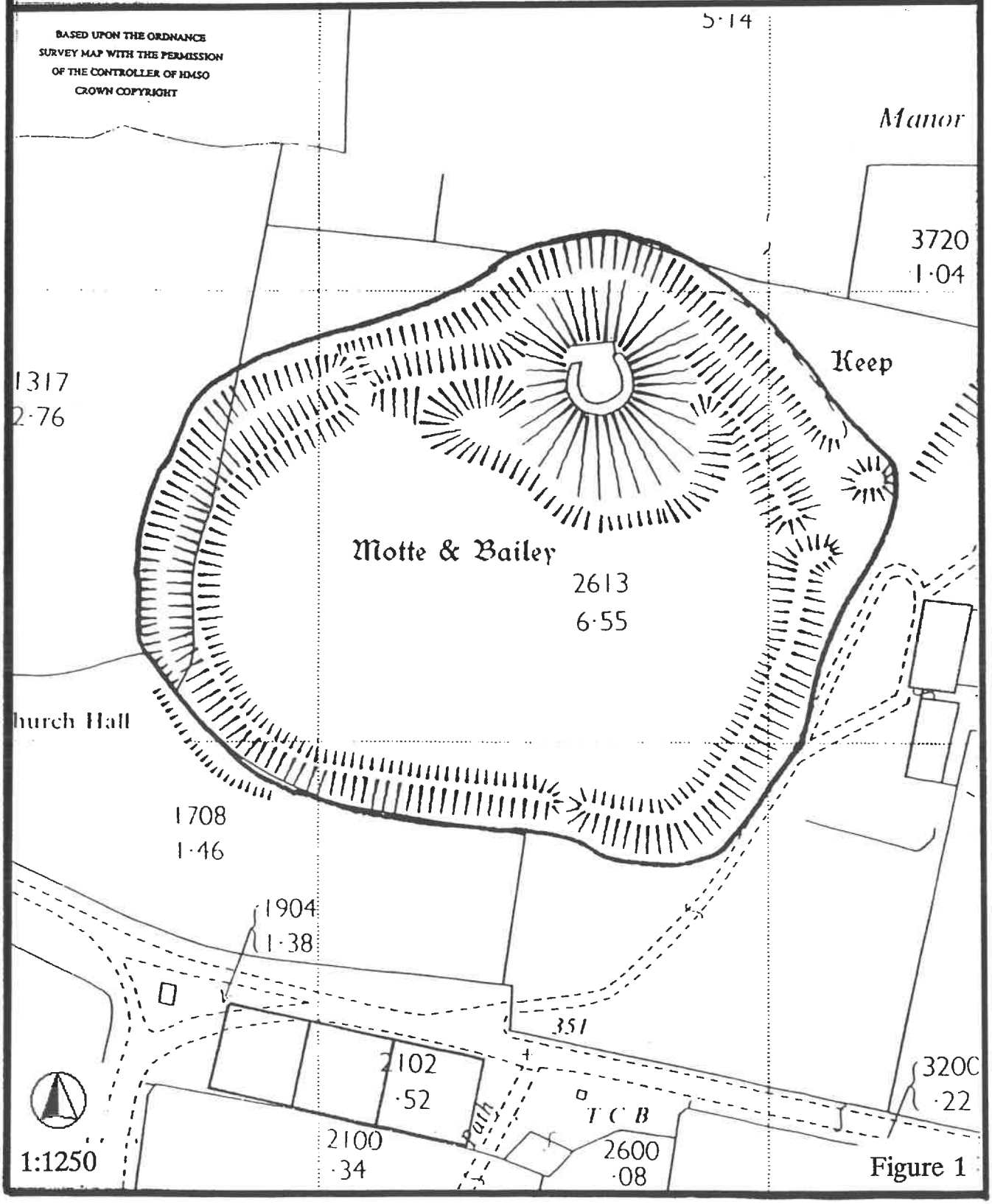
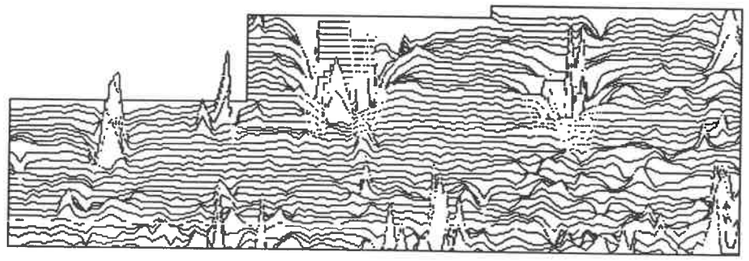


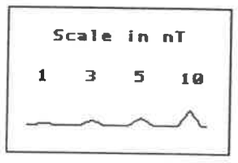
Figure 1

WISTON

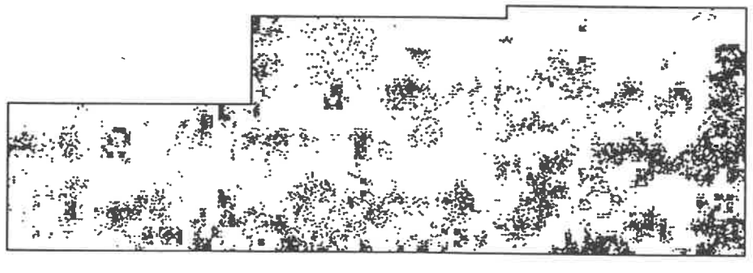
Magnetic Data

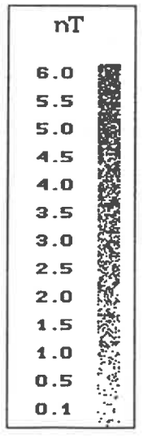


Range: -4 to 8 nT



1:500





Magnetic Disturbance

Magnetic Anomalies: ? Archaeological

? Pits/Metal Working/Hearths
? Ferrous Debris

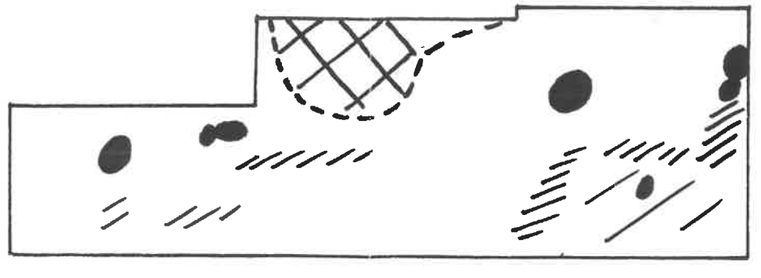
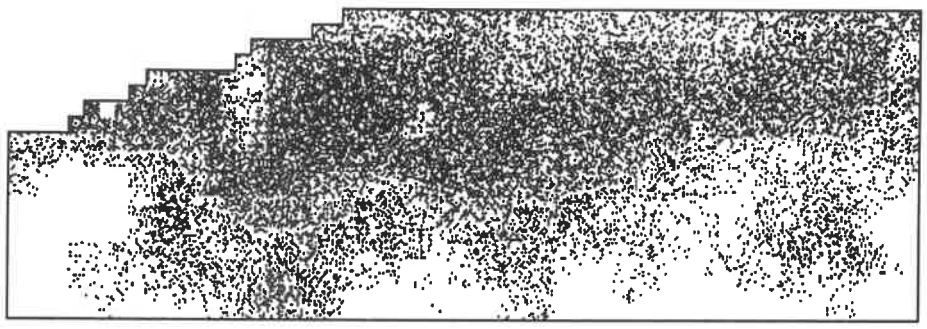
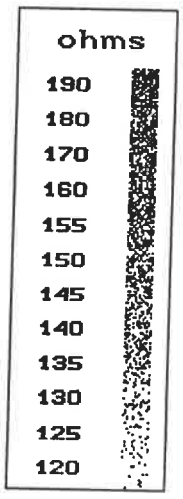


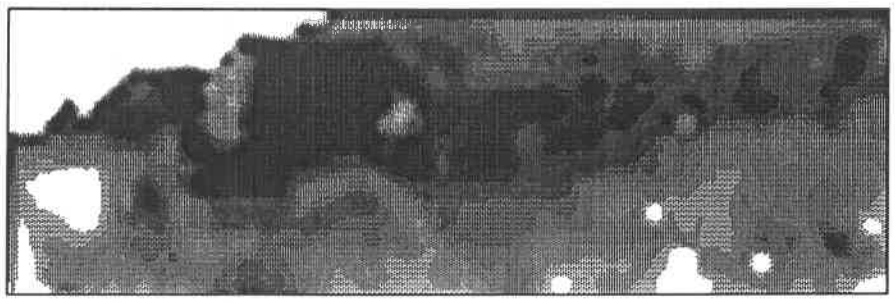
Figure 2

WISTON

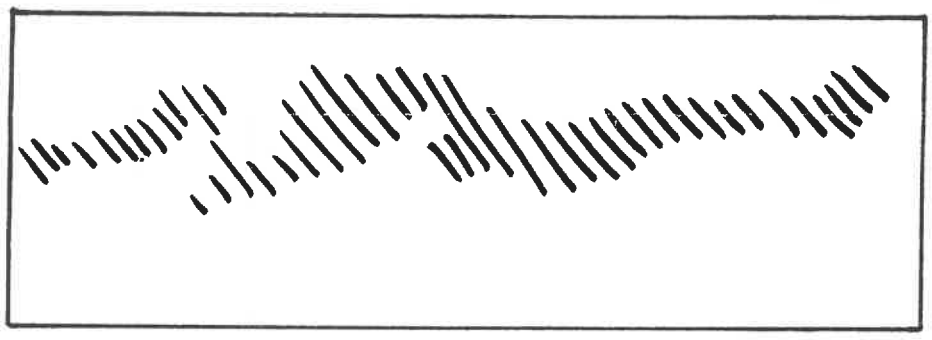
Resistance Data







Range: 95 to 200 ohms



High Resistance

1:500

Figure 3