

# Lytes Cary Manor Gradiometer survey May - December 2009

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## 1.0 Introduction

The survey took place in the field Cowleaze, which covers approximately 10ha and is situated to the west of Lytes Cary Manor, near Charlton Mackrell, Somerset. It was carried out on behalf of the Charltons Historical Society, as part of the Lytes Cary Landscape Research Project. The manor is currently owned by the National Trust, and the field to the west of the house was scheduled by English Heritage in 1993 as being the site of the deserted medieval settlement of Tuck's Cary with associated fieldscape. An earthwork survey of the site was carried out in 1978. The purpose of the gradiometer survey was to confirm and add to what is already known about the extent and nature of the site and its relationship with the surrounding landscape. Lytes Cary is situated 5km southeast of Somerton on blue lias and Charmouth mudstone (Fig 1).

The work was carried out by members of the South Somerset Archaeological Research Group.

### 1.1 Equipment

*Fluxgate gradiometer – Bartington Grad 601-2*

The Bartington Grad 601-2 is a dual system gradiometer, a form of magnetometer. It comprises two sensor rods carried on a rigid frame, each sensor including two fluxgates aligned at 90° to each other, one set 1m above the other. It measures variations in the magnetic field between the two fluxgates, recorded in *nanoTesla* (nT) at each sampling point within a grid. The manufacturer claims a depth range of approximately three metres. The instrument is most effective when carried at a consistent height, not exceeding 0.3m above the ground.

Magnetometers are especially effective for discovering thoroughly decayed organic materials, such as those which accumulate in ditches and pits, and matter exposed to intensive firing, including industrial areas, hearths and larger ceramics. All of these are likely to give a positive magnetic response, sometimes with a negative halo, giving a dipolar effect. Non-igneous stone features, such as walls and banks, are usually perceived as negative anomalies against a background enhanced by decayed organics.

*Software – Geoscan Geoplot 3.00v*

Geoplot 3.00v allows the presentation of data in four graphical forms: dot-density, grey scale, pattern and X-Y (or *trace*) plots. The latter are particularly effective when used in conjunction with other graphical modes to emphasise ferrous magnetic anomalies or other distortions which show as accentuated peaks or troughs. The programme supports statistical analysis and filtering of the data.

### 1.2 Field method

The area was divided into 20m squares orientated according to the Ordnance Survey grid (Fig 1). Readings were logged at 0.25m intervals along east to west traverses set 1m apart, in a zig zag pattern

### 1.3 Processing method

Preliminary processing revealed some areas of modern ferrous magnetic features, characterised by sharp dipolar fluctuations ranging from approximately 30nT to over 3000nT. Two processing sequences were carried out to mitigate the impact of modern ironwork.

- 1) Readings exceeding 30nT either side of 0 were replaced by null (dummy) entries.
- 2) Any anomalous isolated readings were similarly replaced.
- 3) Typical regular error due to the zig zag operation of the gradiometer was removed.

- 4) The mean reading for every traverse was reset to 0.
- 5) The asymmetric data collection pattern was mitigated by the positive interpolation of data points along the Y axis using the calculation of  $\sin X/X$ .

## 2.0 The survey area

The grid comprises 252 contiguous whole and partial squares covering the scheduled area and the field to the south (Fig 1). It is bounded by the manor driveway with wire fencing to the north and east, and hedges along the road/lane to the south and west.

Visible ferrous magnetic disturbance was provided by the wire fence and wire cages around trees along the driveway.

### 2.1 Results (Figs 2, 3 & 4)

Results of gradiometry surveys of Deserted Medieval Village sites can be variable, as buildings are most likely have been constructed from materials such as timber and clay and so provide insufficient contrast with the background geology. The presence of earthworks can also mask any underlying archaeological anomalies. Although some of the anomalies are directly related to the visible earthworks, the results do not always reflect what can be seen above ground.

The survey results are dominated by a network of positive and negative linear anomalies, many of which correspond with features recorded in the earthwork survey, and as such are likely to be associated with the deserted medieval settlement and surrounding fieldscape. Whilst some of the negative linear anomalies are dipolar responses associated with the positives, many reflect the presence of anomalies which are negative in their own right.

Although some of the non-linear anomalies could be due to modern ferrous disturbance, it is more likely that they indicate archaeological features reflecting human occupation of the site, such as rubbish pits and hearths containing thermo remanent material or occupation debris indicative of anthropogenic activity. These anomalies generally range between 2 and 7nT, but some have a stronger magnetic signature, occasionally exceeding 20nT, which is within the range for significant thermo remanent features (e.g. hearths, kilns), or ferrous magnetic disturbance. These have been highlighted separately (fig 4) in order to maintain clarity in the overall interpretation graphic (fig 3).

Major dipolar anomaly **A** encloses a tree-planted knoll which literary evidence ("Commonplace Book of Thomas Lyte", 1610) suggests was the site of Tuck's Cary manor house. The shape of the anomaly suggests buried metal fencing, possibly with associated stone walling, as a large amount of broken stone is still visible in the field around this point. Due to the large amount of modern ferrous interference the results for this area of the survey are inconclusive.

Dipolar anomaly **B** is possibly related to quarrying activity to the northwest (see earthwork survey, Fig 5). The Scheduling Assessment suggests the possibility of a large building and yard immediately to the west of this anomaly (Preece, A.E. 1993)

Linear dipolar anomalies **D - G** are due to pipelines.

There is a marked contrast between the scheduled area and the field to the south which is dominated by anomalies consistent with ridge and furrow, suggesting either the settlement did not extend into this area or it has been destroyed by ploughing (see **f**, page 7 below).

#### 2.1 (i) Positive anomalies

**1** Two parallel linears, the northern within a range of 1 to 2nT and the southern 1 to 4.5nT, which is within the lower range for thermo remanence. Within the normal range for ditches.

- 2** Linear anomaly within a range of 1 to 4.5nT. Within the normal range for a ditch and lower range thermo remanence.
- 3** Two parallel, slightly diffuse linears within a range of 1.5 to 4nT. Both within the range for ditches and lower range thermo remanence. The negative anomaly **54** suggests an associated stone fabric. Anomaly corresponds with the location of a bank recorded in the earthwork survey.
- 4** Short linear within a range of 1.5 to 9nT. Within the range for a ditch incorporating thermo remanent residues.
- 5** Two parallel linears with widely divergent magnetic characters. The northerly one within a range of 1.5 to 5nT which is within normal range for a ditch, and the southern within 5 to 16nT suggesting strongly thermo remanent local deposits or ferrous magnetic interference. Possible pipeline associated with ferrous magnetic anomaly **C**.
- 6** Linear anomaly within a range of 2 to 9.5nT. Within normal range for a ditch with thermo remanent deposits.
- 7** Diffuse parallel linears within a range of 1.5 to 9nT. Within normal range for ditches incorporating thermo remanent residues. Corresponds to location of a double ditch or hollow way recorded in the earthwork survey.
- 8** Weak linear anomaly within a range of 1 to 2nT. Within normal range for a ditch or gully. Appears to underlie the ridge and furrow in this area (see **c** below).
- 9** Linear anomaly within a range of 1 to 2.5nT. Within normal range for a ditch.
- 10** Linear within a range of 1.5 to 7nT. Within the range for a ditch incorporating thermo remanent residues.
- 11** L-shaped linear within a range of 2 to 11nT. Within the range for a ditch with strong thermo remanent deposit. Corresponds to location of a ditch in the earthwork survey.
- 12** Linear anomaly within a range of 1 to 2.5nT. Within normal range for a ditch. Along with **15** which runs roughly parallel, this anomaly would appear to enclose a discrete area of narrow ridge and furrow (see **a** below).
- 13** Linear within a range of 1.5 to 3nT. Within normal range for a ditch. Possible association with **12** and **15**.
- 14** L-shaped linear within a range of 0.5 to 1.5nT. Within normal range for a small ditch or gully. Possibly part of a small enclosure but there is a considerable amount of disturbance in this area.
- 15** Weak linear anomaly within a range of 1 to 2nT. Within normal range for a ditch. Possible association with **12** and area of ridge and furrow **a**.
- 16** Diffuse and irregular linear within a range of 1 to 3.5nT. Proximity to negative linear anomaly **58** suggests possible dispersed bank with associated accumulation of organic material. Possibly displaced by later ploughing.
- 17** L-shaped linear within a range of 1.2 to 4nT. Within normal range for a ditch or gully. Possible small enclosure ditch. Alignment suggests a possible association with **19**. Appears to be cut by negative linear **57**.
- 18** Irregular linear anomaly within a range of 1 to 3nT. Within normal range for a ditch, probably associated with negative linear **57**.

**19** Irregular and diffuse anomaly within a range of 1 to 5nT. Within normal range for a ditch or gully with lower level thermo remanent material. Possible alignment with **17**.

**20** Long linear within a range of 1 to 3nT. Within normal range for a ditch. Appears to underlie negative linear **57**.

**21** Linear anomaly within a range of 1 to 5nT. Within normal range for a ditch and lower range thermo remanence. In association with negative linear **59**, corresponds with location of driveway identified in earthwork survey.

**22** L-shaped anomaly within a range of 1 to 3.3nT, stronger to the north. Within normal range for a ditch or gully containing occupational debris probably associated with negative anomaly **64**.

**23** Weak linear anomaly within a range of 0.3 to 0.6nT. Within the range for a small ditch or gully. Anomaly runs parallel to negative linear **61** and corresponds with a ditch on the earthwork survey, part of a group of earthworks which the survey suggests might indicate a farm site.

**24** Long linear within a range of 0.9 to 1.8nT. Within normal range for a ditch. Corresponds with the location of a ditch and bank on the earthwork survey.

**25** Linear anomaly within a range of 1 to 3.5nT. Within normal range for a ditch. Appears to be abutted by negative linears **66** but the results in this area are very disturbed.

**26** Linear anomaly within a range of 3 to 9.5nT. Within normal range for a ditch with strongly thermo remanent deposits.

**27, 28 & 29** Four diffuse parallel linears abutting **68**, within a range of 2 to 9nT. Within normal range for significant cut feature fills or deposits, suggesting intensive occupation activity. Anomalies appear to have an association with negative linear anomalies **71 - 76**. The middle two (**28**) correspond with the location of a broad hollow way or driveway identified in the earthwork survey, and the nearby anomalies collectively suggest the presence of small enclosures or tofts. Adversely affected by ferrous magnetic disturbance from pipeline **D**.

**30** Two contiguous curvilinear anomalies within a range of 1 to 5nT. Within normal range for a small ditch or gully with lower range thermo remanent deposits. Corresponds with location of small enclosure hollow (possibly the site of a building) identified in the earthwork survey. The negative anomaly **69** suggests an associated stone fabric.

**31 & 32** Linears generally within a range of 1.3 to 2.5nT, although the northern rises to 5nT in places. Within normal range for ditches. Alignment suggests they are part of the same anomaly. Corresponds with the location of a ditch on the earthwork survey.

**NB:** The following anomalies **33 – 42** together with negative anomalies **90 – 97** form part of a "ladder" of small square or rectangular fields identified in the earthwork survey.

**33** Linear anomaly within a range of 2 to 6nT. Within normal range for a ditch with thermo remanent deposits.

**34** Two parallel linear anomalies generally within a range of 0.5 to 1.5nT but rising to 5nT in places. Within normal range for ditches incorporating thermo remanent deposits. Appears to represent double ditch trackway, partially identified in the earthwork survey. Alignment suggests an association with negative linear **68** and associated anomalies.

**35** Linear abutting **34** within a range of 1 to 4.5nT. Within normal range for a ditch and lower range thermo remanence.

- 36** Linear anomaly within a range of 0.7 to 2.3nT. Within the normal range for a ditch. Appears to underlie negative linear **90**.
- 37** Linear with a return to the west. Generally within a range of 1 to 4nT, but weaker where it turns to the south, reaching only 1.5nT. Within normal range for a ditch or gully. Possible small enclosure.
- 38** Short linear within a range of 1 to 5nT. Within normal range for a ditch incorporating thermo remanent material. Alignment suggests continuation to the east (see **39** below). Corresponds with feature on earthwork survey.
- 39** Linear within a range of 1 to 1.5nT. Within normal range for a ditch. Possible continuation of **38**. Corresponds with ditch on earthwork survey.
- 40** Irregular linear within a range of 1 to 3nT. Within normal range for a ditch or deposits of organic material associated with negative linear **95** which corresponds with location of a bank in the earthwork survey. Irregular shape suggests possible disturbance by subsequent ploughing – see **d** below.
- 41** Irregular linear within a range of 1.5 to 5nT but peaking to 10.5nT towards the north. Within normal range for a ditch with strongly thermo remanent local deposit, probable association with negative linear **97**.
- 42** Short linear running alongside the southern end of negative linear **92**. Within a range of 2 to 6nT. Within normal range for a small ditch or gully incorporating thermo remanent residues.
- 43** Intermittent parallel linears, generally within a range of 1 to 2nT, but rising as high as 12.5nT to the southwest of ferrous magnetic anomaly **A**. Within normal range for a ditch with significant thermo remanent deposits. Corresponds with the location of hollow way identified in the earthwork survey.
- NB:** The following anomalies **44 - 47** together with negative anomaly **87** appear to form part of a “ladder” of enclosures or small fields on the same alignment as **33 – 42**.
- 44** Linear anomaly within a range of 1 to 6nT, the northern part of which corresponds with hollow way in earthwork survey. Within normal range for a ditch incorporating thermo remanent material.
- 45** Two parallel linears with widely divergent magnetic characters. The north within a range of 2 to 5nT and the south 2 to 13nT, suggesting significant thermo remanent deposits. Northern anomaly corresponds with ditch on earthwork survey.
- 46** Linear anomaly within a range of 0.5 to 4nT. Within normal range for a ditch and lower range thermo remanence.
- 47** Three short parallel linears, the northern and middle anomalies within a range of 0.5 to 1.5nT, but the southern reaching up to 7nT indicating higher range thermo remanence.
- 48** Weak linear within a range of 0.3 to 1nT. Within normal range for a ditch or gully.
- 49** Curvilinear anomaly within a range of 2 to 8.5nT. Within normal range for a ditch incorporating thermo remanent material. Appears to intersect with negative linear **84**.
- 50** Weak irregular linear within a range of 1 to 1.3nT. Within normal range for a small ditch or gully.
- 51** Linear anomaly generally within a range of 1.5 to 3nT but rising to 17nT to the west - likely to be due to ferrous magnetic disturbance but is within the range for thermo remanence.

**52** Three contiguous linears generally within a range of 1.5 to 4nT, but the southern rising to 8nT. Within normal range for ditches with thermo remanent deposits to the south. Possibly part of a small enclosure.

**53** Weak diffuse linear within a range of 0.3 to 0.6nT. Within the range for organic deposits but more likely to be geological.

**NB: a – f** Weak parallel linears generally within a range of 0.5 to 1nT. Within normal range for ridge and furrow:

**a** Appears to be enclosed by linears **12**, **15** and **57**. Narrower and of different alignment than other identified areas of ridge and furrow.

**b** Widely spaced and irregular but of same general alignment as anomalies associated with Deserted Medieval Settlement earthworks. Possibly overlying **16** and **58**.

**c** Enclosed by/likely to be contemporary with linears **7**, **57** and **68**. Represented in earthwork survey as identifiable ridge and furrow.

**d** Of same general alignment as Deserted Medieval Settlement but the irregularity of linear **40** suggests it may have been displaced by ploughing from a later settlement phase. The phasing for this area is ambiguous as the ridge and furrow is masked by the magnetically stronger linears associated with the DMV site.

**e** Respects the alignment of anomalies associated with Deserted Medieval Settlement earthworks.

**f** To the south of the scheduled area the survey results reveal an extensive area of ridge and furrow. Areas **b** and **d** above suggest that anomalies associated with the Deserted Medieval site survive subsequent ploughing. There is very little other evidence for activity in area **f** apart from possibly towards the far South (see **52**), and it seems likely that the hollow way (**43**) could have defined the edge of the area of settlement.

## **2.1 (ii) Negative anomalies**

**54** Amorphous anomaly within a range of –1 to –2nT. Within normal range for a bank incorporating non-magnetic stone. Association with **3** above. Corresponds with the location of a bank in the earthwork survey.

**NB: 55 – 57** correspond with ditches recorded in the earthwork survey, dividing a block of four rectangular fields.

**55** Linear anomaly within a range of –1 to –3.5nT. Within normal range for a stone wall/bank or stone filled ditch.

**56** Linear within a range of –1 to –3nT. Within normal range for a stone wall/bank or stone filled ditch.

**57** Long linear within a range of –1 to –3.5nT. Within normal range for a stone wall/bank or stone filled ditch.

**58** Diffuse and irregular anomaly within a range of –0.5 to –1.5nT. Within normal range for a bank incorporating non-magnetic stone. Association with **16** above suggests possible dispersed bank.

**59** Linear within a range of –1 to –1.5nT. Within normal range for stone wall/bank or stone filled ditch. Together with positive linear **21**, this corresponds with the location of a driveway identified in

the earthwork survey. Southern end abuts **64** suggesting a possible association.

**60 - 64** Compact group of weak linears generally within a range of  $-0.5$  to  $-1.5\text{nT}$ . Within normal range for stone filled ditches or gullies. Probable association with positive linears **22** and **23**. Corresponds with the location of a group of ditched rectangular platforms identified in the earthwork survey.

**65** Parallel linears within a range of  $-0.5$  to  $-1\text{nT}$ . Within normal range for stone walls/banks or stone filled ditches. Corresponds with parallel bank and ditches in the earthwork survey. Linears merge towards the south into a diffuse anomaly within a range of  $-1$  to  $-1.5\text{nT}$ , suggesting dispersal of material.

**66** Weak parallel linears within a range of  $-0.3$  to  $-0.7\text{nT}$ . Alignment suggests possible association with land drainage system. Possible association with **25** and/or **65**.

**67** Short linear within a range of  $-0.7$  to  $-1.6\text{nT}$ . Within normal range for stone filled ditch or gully.

**68** Long linear running approx east-west across survey area, within a range of  $-1.5$  to  $-3.5\text{nT}$ . Within the range for stone filled ditch. Corresponds with series of contiguous ditches and banks in earthwork survey. Alignment and apparent association with other positive and negative linears, particularly to the south, suggests a trackway associated with deserted medieval village site.

**69** Two irregular anomalies within a range of  $-2$  to  $-8\text{nT}$ . Within the range for non-magnetic stone or rubble. Corresponds with hollow in earthwork survey identified as possible site of a building. Probably associated with **30**.

**70 – 76** Series of linear anomalies of parallel alignment abutting **68**, generally within a range of  $-1.5$  to  $-5\text{nT}$ . Within the range for stone filled ditches or stone walls/banks. Correspond with location of broad hollow way or droveway and other ditches and/or banks recorded in earthwork survey. Appearance suggests possible building enclosures or tofts associated with deserted medieval settlement. Adversely affected by ferrous magnetic disturbance from pipeline **D**.

**77** Linear abutting **68** within a range of  $-1$  to  $-2\text{nT}$ . Within normal range for a stone filled ditch or stone wall or bank. Corresponds with the location of a ditch with associated banks in the earthwork survey.

**78** Linear abutting **77** within a range of  $-0.5$  to  $-1.2\text{nT}$ . Within normal range for a stone filled ditch or wall/bank. Corresponds with location of ditch in earthwork survey which, along with **68**, encloses a small oblong field.

**79 - 82** Weak linears generally within a range of  $-0.5$  to  $-1\text{nT}$ . Within range for stone filled ditches or gullies. Correspond with ditches identified as drainage gullies in earthwork survey.

**83** Slightly diffuse linear within a range of  $-1$  to  $-8\text{nT}$ . Within range for a stone wall/bank. Corresponds with part of a bank identified in the earthwork survey.

**84** Linear abutting **83**. Within a range of  $-1$  to  $-3.5\text{nT}$ . Within normal range for stone wall or stone filled ditch or gully. Anomaly runs slightly to the south of ditch identified in the earthwork survey.

**85 & 86** Weak parallel linears within a range of  $-0.5$  to  $-1\text{nT}$ . Within normal range for stone filled gullies. Possible association with land drainage.

**87** Short linear within a range of  $-1$  to  $-1.2\text{nT}$ . Within normal range for a stone wall/bank or stone filled ditch or gully. Appears to be associated with "ladder" of enclosures or small fields (see **44 – 47** above).



**88** Y-shaped linears within a range of  $-1$  to  $-3nT$ . Within normal range for a stone wall or stone filled ditch or gully. Although the survey results around this area have been adversely affected by modern disturbance, the anomaly appears to correspond with the location of a curving bank/platform in the earthwork survey.

**89** L-shaped linear abutting **34**, within a range of  $-0.5$  to  $-1nT$ . Within normal range for a stone filled ditch or gully. Alignment and proximity to **35** suggests a possible association.

**90 – 97** Group of linears generally within a range of  $-1$  to  $-5nT$ . Within normal range for stone walls/banks or stone filled ditches. Together with **33 – 42** above, they form part of a "ladder" of small square or rectangular fields identified on the earthwork survey.

**98** Amorphous linear generally within a range of  $-1.5$  to  $-9.5nT$  but incorporating areas of modern ferrous interference. Corresponds with disturbed area of ground in the field associated with surface stone and voids.

**v - z** Within a range of  $-0.3$  to  $-0.8nT$ . Within normal range for land drains.

### **3.0 Conclusion**

The degree of confidence in identified anomalies is generally very high. There are demonstrable archaeological features representing at least three phases of activity, the most obvious being those associated with the earthworks of the scheduled Deserted Medieval Settlement. A further activity phase orientated northwest – southeast is suggested by linears **1, 2, 5, 6, 9, 10, 24** and **36**, and a third phase running roughly north-south by **8, 12, 15** and **20**.

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In memory of Duncan Black

(1940 – 2008)