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Ancient Monuments Laboratory
Report 47/95

HOLLY HOUSE FARM, SCAFTWORTH, NOTTS.
REPORT ON GEOPHYSICAL SURVEY, OCTOBER 1995

M Cole

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Summary

Geophysical survey was undertaken over a square triple-ditched enclosure (Scheduled Ancient Monument Nottinghamshire 56) at Holly House Farm, Scaftworth, near Bawtry, Notts, in response to a request from the Humber Wetlands Project. Resistivity and magnetometry surveys were carried out in an attempt to map accurately the locations of the enclosed ditches (evident as cropmarks on APs), locate any entrances and identify any internal features. The site conditions were particularly well suited to resistivity survey which clearly detected the main ditches and provided some evidence of internal structures. Additionally, the magnetometer survey detected some signs of activity within the enclosure as well as mapping a possible annex to the south. Unfortunately, no firm conclusions can be drawn on the basis of either survey as to the function of the enclosure.

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HOLLY HOUSE FARM, SCAFTWORTH, NOTTINGHAMSHIRE.

Report on Geophysical Survey, October 1995.

INTRODUCTION

Geophysical survey was undertaken over a square triple-ditched enclosure (Scheduled Ancient Monument Nottinghamshire 56) at Holly House Farm, Scaftworth, near Bawtry, Notts in response to a request from the Humber Wetlands Project. The site has long been considered to be a Roman fortlet (Bartlett & Riley 1958) and in fact lies adjacent to the former Roman road joining Lincoln and Doncaster. The main aims of the survey were to map accurately the locations of the enclosure ditches (evident as cropmarks on APs, see for example Bartlett & Riley 1958) and identify any internal features.

The site, situated at the confluence of the rivers Idle and Ryton (centred on SK 659 928), is located on a deposit of river-borne sand overlying river terrace gravels and surrounded by superficial deposits of alluvium (Robert van de Noort *pers comm*). This area of sand can also be seen on the APs referred to above.

METHOD

In an attempt to maximise the information recovered from the site both magnetometer and resistance surveys were carried out.

A grid of 30m squares was established over the site on a roughly north-south alignment (see Fig 1). Each of these squares was then surveyed using Geoscan FM36 fluxgate gradiometers. Measurements were recorded at 0.25m intervals along north-south traverses 1.0m apart and the data was periodically down-loaded to a microcomputer in the field. The resultant data appears in this report in the form of greytone and graphical trace plots (see Fig 2). Presentation of the greyscale plot has been enhanced by the application of a local median filter to reduce the intense response to ferrous material (Scollar et al 1990).

A number of these squares were subsequently resurveyed with a Geoscan RM15 resistivity meter using the Twin Electrode configuration. Measurements were taken at 1.0m intervals along traverses 1.0m apart. This data is also presented in the form of greyscale and graphical trace plots (see Figs 3 & 4). To compensate for the broad changes in background resistance encountered across the site the data has been statistically treated using both a high-pass gaussian filter and an edge detection filter (see Fig 3 plots B & C; Scollar et al 1990).

Additionally, a magnetic susceptibility (MS) survey was carried out using a Bartington MS2 meter and MS2D field coil. Readings were collected at 10m intervals within the survey grid and the data is presented in figure 5. This data has been smoothed using a median filter to reduce the distracting effect of random measurement noise in the data.

RESULTS

Magnetometer Survey (Figures 2 & 6)

It is immediately apparent from the plots that the magnetic response from the site is very quiet. Indeed, analysis of the frequency distribution of the data (see histogram on Fig 2) shows that the majority of the readings lie well within ± 1 nanotesla (nT) which is close to the maximum sensitivity of the instrument. Nevertheless, some significant magnetic variation is evident in the data.

The magnetometer has partially mapped the courses of the innermost and outermost ditches of the enclosure as extremely weak positive magnetic anomalies (~1nT) which are most apparent in grid square 15. The north-eastern corner of the outermost ditch is also just discernable in grid square 11. Significantly, a possible continuation of the innermost ditch[1] to the south can just be made out (see Fig 6) which may well connect with the broad ditch-type anomaly (approximately 5m in width), running at right angles, detected in the south-western corner of the survey area. The latter shares the same NW-SE alignment as the enclosure and together these anomalies suggest that an additional area may have been enclosed. No further evidence of the exact shape or size of the enclosure has been revealed by the magnetometer nor is any internal structure suggested. However, a small number of discrete positive anomalies within the interior (see Fig 6 A) may represent pits.

Also evident in the plots is an arrangement of very subtle linear ditch-type anomalies running along the south-eastern side of the survey area (see Fig 6). However, these are not aligned with the ditches of the enclosure and may well represent an unrelated field or drainage system.

A further linear anomaly can be seen running intermittently on a roughly north-south alignment through the centre of the survey. This feature, also detected by the resistance survey (see Figs 3, 4 & 6) and visible in APs, shares an alignment with part of the modern field boundary (see Fig 1) and presumably represents the remains of a former continuation of the latter.

The magnetometer survey has detected magnetic disturbance, due to the presence of modern ferrous fencing (along the edges grid squares 4 & 5), and miscellaneous buried ferrous material throughout the survey area. The effect of the latter is clearly visible as sharp vertical deflections in the traceplot of the data.

Resistivity Survey (Figures 3, 4 & 6)

The conditions at Holly House Farm at the time of the survey (Oct 95) proved well suited to resistivity survey and the three ditches of the enclosure have been mapped as distinct low resistance anomalies.

From the plots of the data it is clear that the inner and outermost ditches of the enclosure are wider than the intermediate one. Some variation in their construction is also evident with the corners of the outer two ditches being much more rounded than those of the inner. The latter (measuring approximately 60m NE-SW and 65m NW-SE) has been mapped almost in its

[1]Bartlett and Riley (1958) also report a continuation of the "defences" at the southern corner.

entirety although the response is not as clear to the south and east. The majority of the intermediate ditch has also been mapped, although to the east the background resistance is so low (presumably due to the proximity of "Mother" drain) that the response to the ditch is all but obscured. The true extent of the outer ditch is much less clear. To the east it has presumably been destroyed, at least in part, by the construction of Mother drain and to the south and north the circuit of the ditch is incomplete. This may be due to a poor response from the ditch or it may be that the ditch circuit is indeed incomplete. There does not appear to be an obvious entrance to the site, although there is an apparent gap in the two outer ditches on its northern side. It is possible, of course, that the inner enclosure was accessed by means of a bridge.

Inside the enclosure, a pattern of linear low resistance anomalies has been detected which may represent the remains of a former structure, although they are not aligned with the ditches of the enclosure and are not rectilinear in form as might be expected of a Roman structure. Beyond these, little else of obvious archaeological significance has been detected within the interior. The broad zones of high and low resistance evident within the inner enclosure (see Fig 6) are likely to be a natural background effect.

To the east of the enclosure the survey has detected a linear ditch visible in the magnetometer data (see above) as a distinct low resistance anomaly. The ?former field boundary has similarly been detected, as a subtle low resistance anomaly.

<u>Magnetic Susceptibility and Augering</u> (Figure 5 & Table 1)

The MS measurements were carried out in the hope of identifying areas of enhanced topsoil MS associated with former human activity (eg burning). The field coil survey displays moderate values of volume specific MS varying between a low of 15 to a maximum of 46 SI $x10^{-5}$. The highest values (white on the plot) are generally to be found towards the southern and eastern edges of the survey area. The edge of this area of high MS appears to coincide with the change in the soil type within the field from the very sandy soil in its middle to the surrounding clay-rich alluvial soil (this change is visible both on the ground and in APs). The variation in MS may, therefore, have more to do with this change in soil type (and thereby a change in the mineral make-up of that soil) than with any previous human activity. There is, however, a discrete zone of higher MS at the centre of the survey, within the area of sandy topsoil, which coincides with the central enclosure and which may therefore be related to contemporary activities at the site.

The innermost ditch of the enclosure (as located by the resistivity survey) was augered (SCAFT A ; Fig 1 & Table 1) and soil samples retrieved for MS measurement in an attempt to explain the lack of magnetometer response of this sizeable feature. A second, nearby location was also augered (SCAFT B; Fig 1 & Table 1) to allow a direct comparison to be made. The samples retrieved from SCAFT A, whilst confirming that the ditch is indeed substantial and approximately 1.1m deep, demonstrate that the majority of the ditch-fill does not exhibit values of MS greater than that of the surrounding gravelly subsoil. Indeed, even the uppermost fills show values of MS of the same magnitude as the surrounding topsoil. Considering this lack of magnetic contrast it is, therefore, not surprising that the magnetometer failed to completely define the course of the enclosure ditches. The lack of enhancement may well be associated with the waterlogging suggested by the presence of peat in the ditch-fills reported by Bartlett and Riley (1958).

CONCLUSIONS

The geophysical survey has succeeded in accurately mapping the locations of the ditches visible as cropmarks and has produced some evidence of internal structures and of a possible extension of the enclosure to the south. The survey has failed to locate an obvious entrance to the site although there appear to be gaps in the two outer ditches along its northern side.

The resistivity survey was particularly successful, clearly showing that the enclosure is roughly square in form with both the inner and outermost ditches being equally more substantial than the intermediate one. Some evidence of internal structures was detected in the form of a sub-rectangular arrangement of probable ditches, although these are not aligned with those of the enclosure.

The conditions at the site did not prove well suited to magnetometry, however, with this survey only detecting partially detecting the two larger ditches. Despite the subdued response, evidence that a significantly larger area may have been enclosed to the south was detected. Some limited evidence of internal pit-like features was also found. The weakness of the magnetic signature at the site may well be due to the effects of continued flooding (bands of peat were found in ditches during the Bartlett & Riley excavations of 1958). The waterlogged nature of the ditches, in turn, offers an explanation for the excellent response to resistivity.

The size and layout of the site show striking similarities with the triple ditched enclosure surveyed by the Ancient Monuments Laboratory at Lees Rest, Oxon (Payne 1993). The most notable difference between the two sites is the lack of an obvious entrance into the internal enclosure at Scaftworth.

Surveyed by: A Payne
M Cole

Dates: 2-4 October 1995

Reported by: M Cole

17 October 1995

Archaeometry Branch
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References

Bartlett, J E & Riley, D N 1958 The Roman Fort at Scaftworth near Bawtry, *Transactions of the Thoroton Society of Nottinghamshire*, 62.

Payne, A W 1993 Lees Rest Enclosure, near Charlbury, Oxfordshire. Report on geophysical survey, November 1992, *Ancient Monuments Laboratory Report Series* No. 89/93.

Scollar, I et al 1990 *Topics in Remote Sensing 2: Archaeological Prospecting and Remote Sensing*, Cambridge.

List of Figures

Table 1.

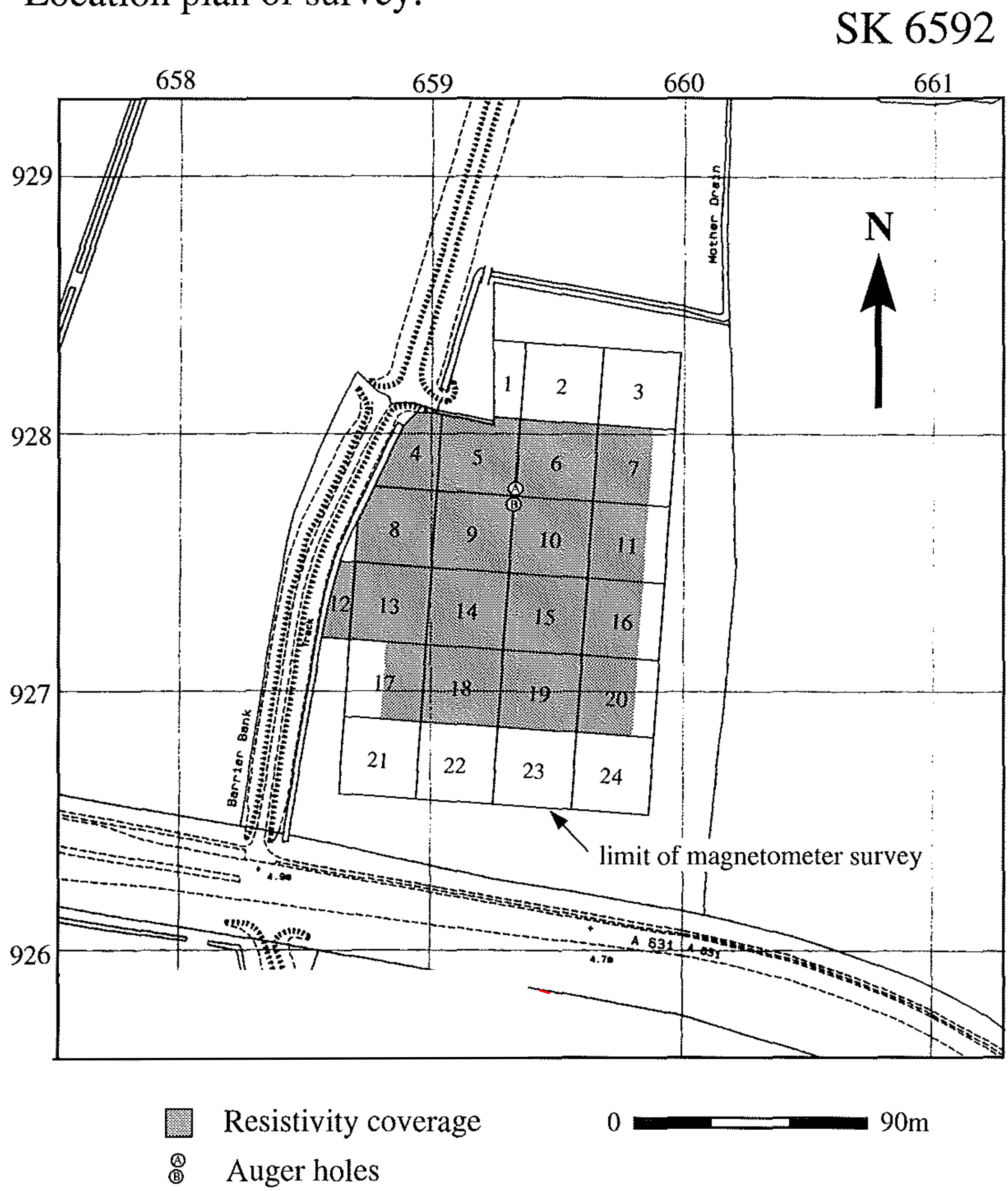
Magnetic susceptibility results on samples from two auger holes.

Sample	Depth (m)	Description	χ (x$10^{-8}m^3Kg^{-1}$)
SCAFT A (Profile through the innermost ditch of the enclosure as located by the resistivity survey.)	0.0 - 0.2	dark brown sandy soil	20
	0.2 - 0.3	"	21
	0.3 - 0.4	"	29
	0.4 - 0.5	"	19
	0.5 - 0.6	lighter brown sandy soil	4
	0.6 - 0.7	"	3
	0.7 - 0.8	"	3
	0.8 - 0.9	"	3
	0.9 - 1.0	"	2
	1.0 - 1.1	reddish/brown sandy soil	1
	1.1 - 1.2	"	2
	1.2 - 1.3	light sandy gravel	3
SCAFT B (Profile through topsoil and natural subsoil.)	0.0 - 0.2	dark brown sandy soil	23
	0.2 - 0.3	"	16
	0.3 - 0.4	"	3
	0.4 - 0.5	reddish sand	1
	0.5 - 0.6	"	1
	0.6 - 0.7	"	2
	0.7 - 0.8	reddish sand with some gravel	2
100 gram mass specific measurements using Bartington Instruments MS1 magnetic susceptibility meter and MS2B bench sensor.			

FIGURE 1.

Holly House Farm, Scaftworth, Notts.
Geophysical Survey, October 1995.

Location plan of survey.



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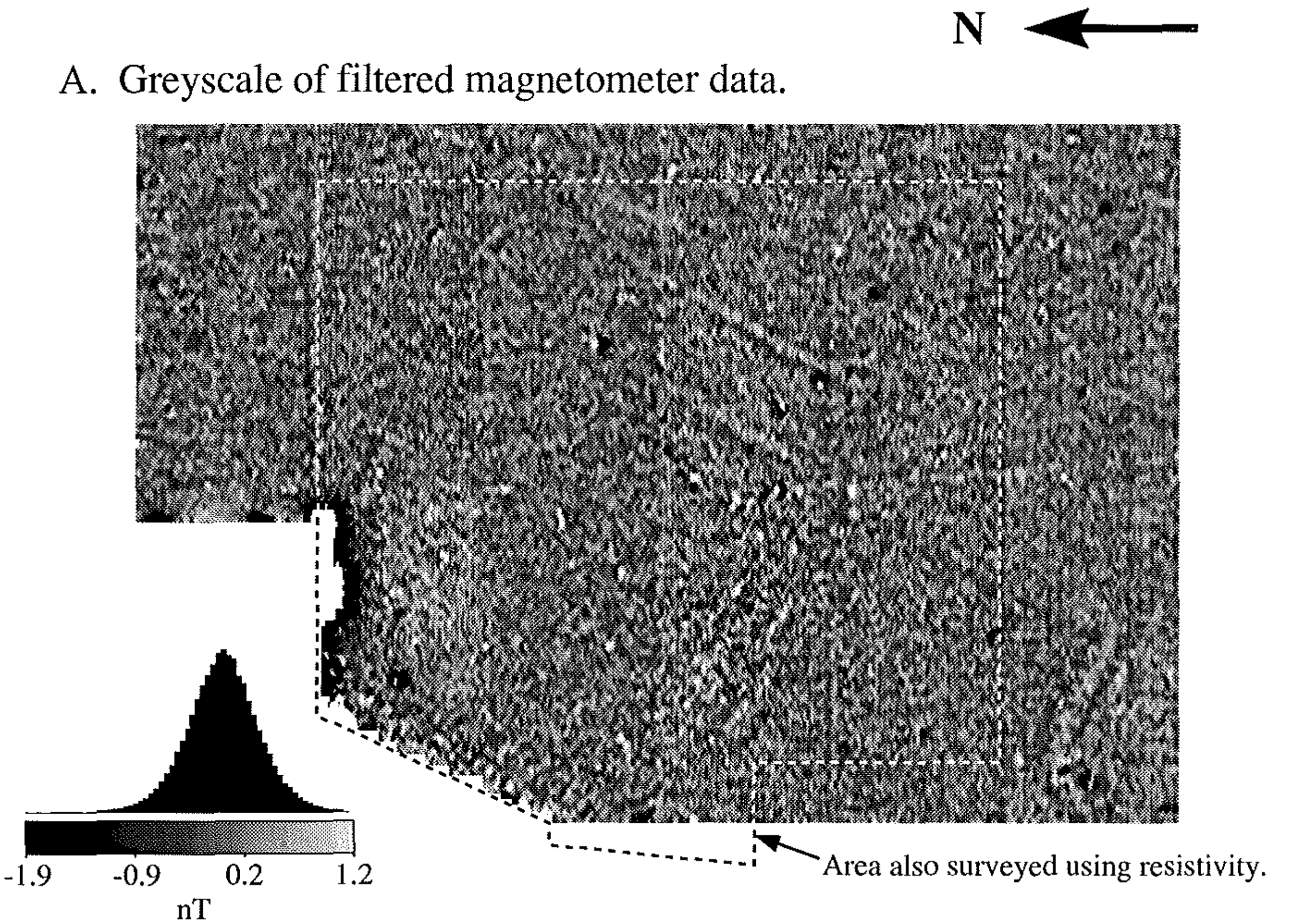
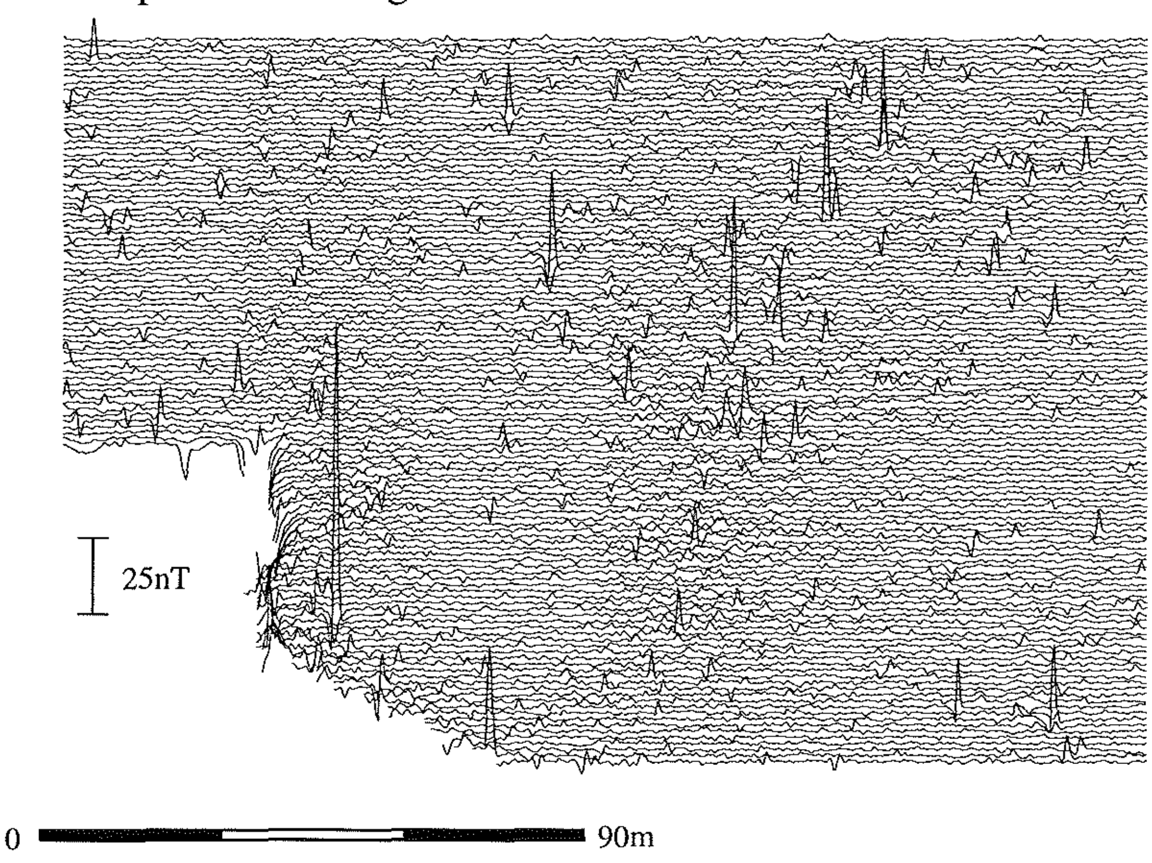
Holly House Farm, Scaftworth, Notts.
Magnetometer Survey, October 1995.

FIGURE 2.

A. Greyscale of filtered magnetometer data.



B. Traceplot of raw magnetometer data.



Ancient Monuments Laboratory 1995.

FIGURE 3.

Holly House Farm, Scaftworth, Notts.
Resistivity Survey, October 1995.

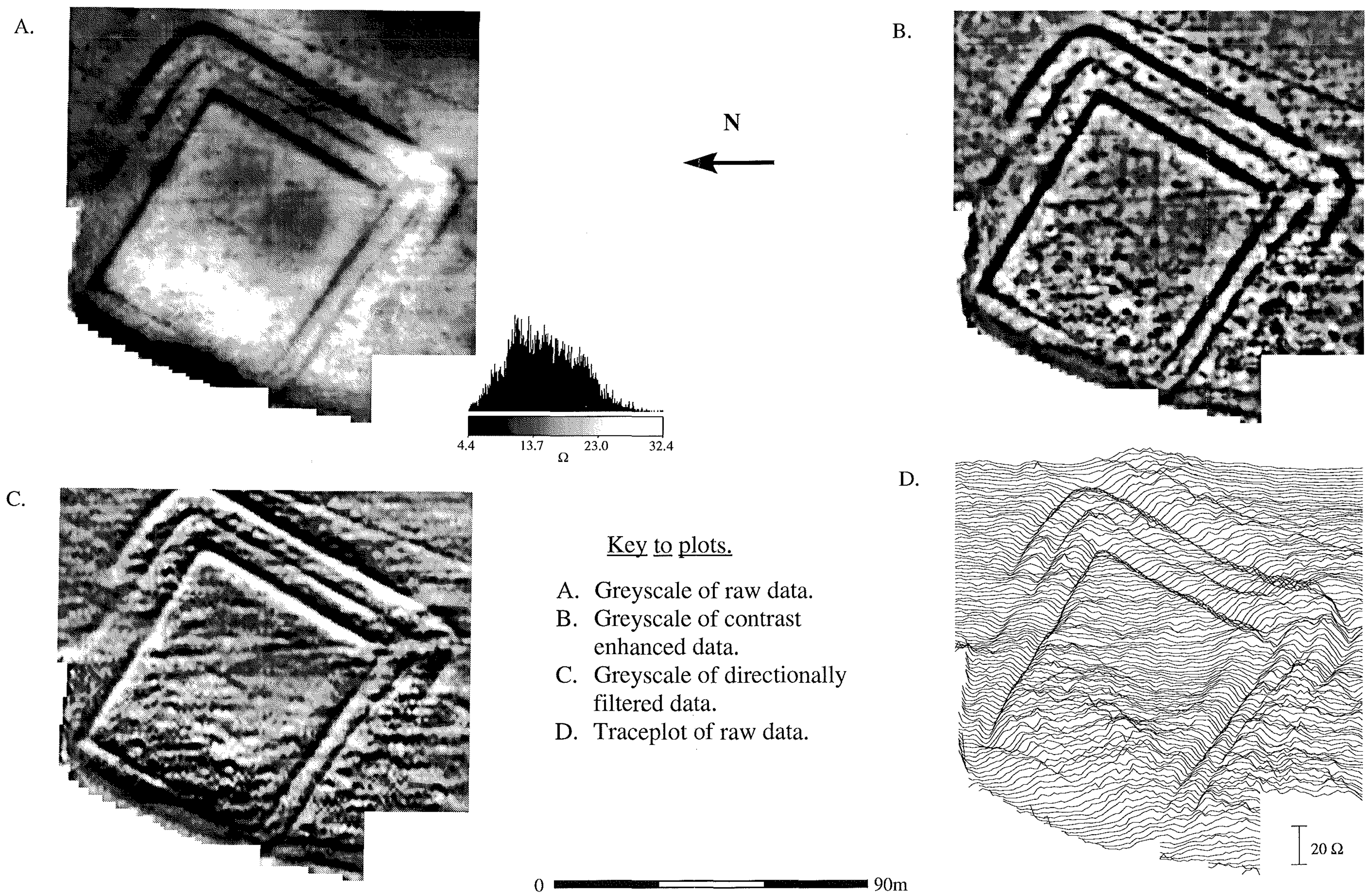


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FIGURE 4.

Holly House Farm, Scaftworth, Notts.
Resistivity Survey, October 1995.

Location of resistivity survey.

SK 6592

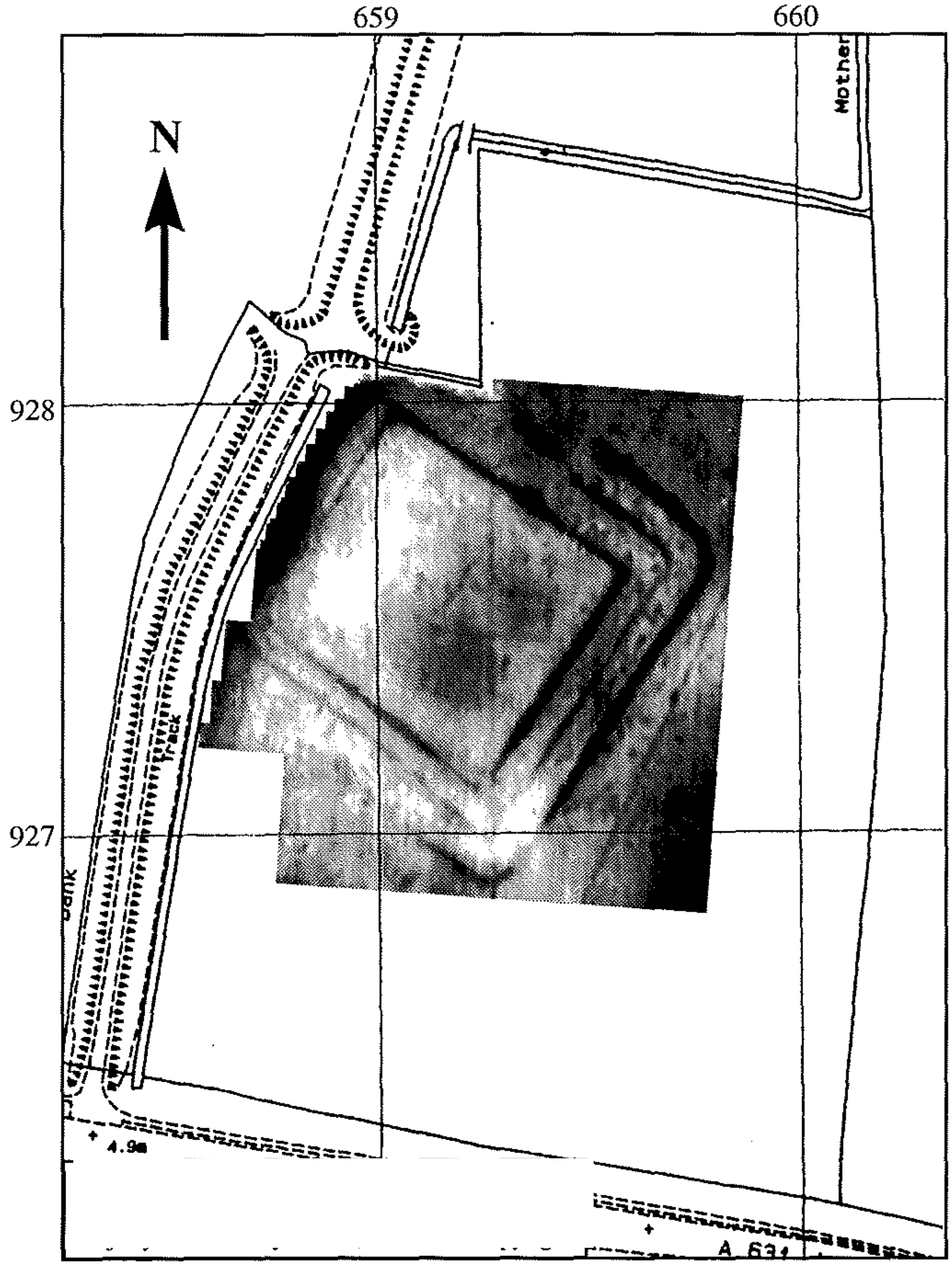

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FIGURE 5.

Holly House Farm, Scaftworth, Notts.
Magnetic Susceptibility Survey, October 1995.

Greyscale of filtered magnetic susceptibility data.

SK 6592

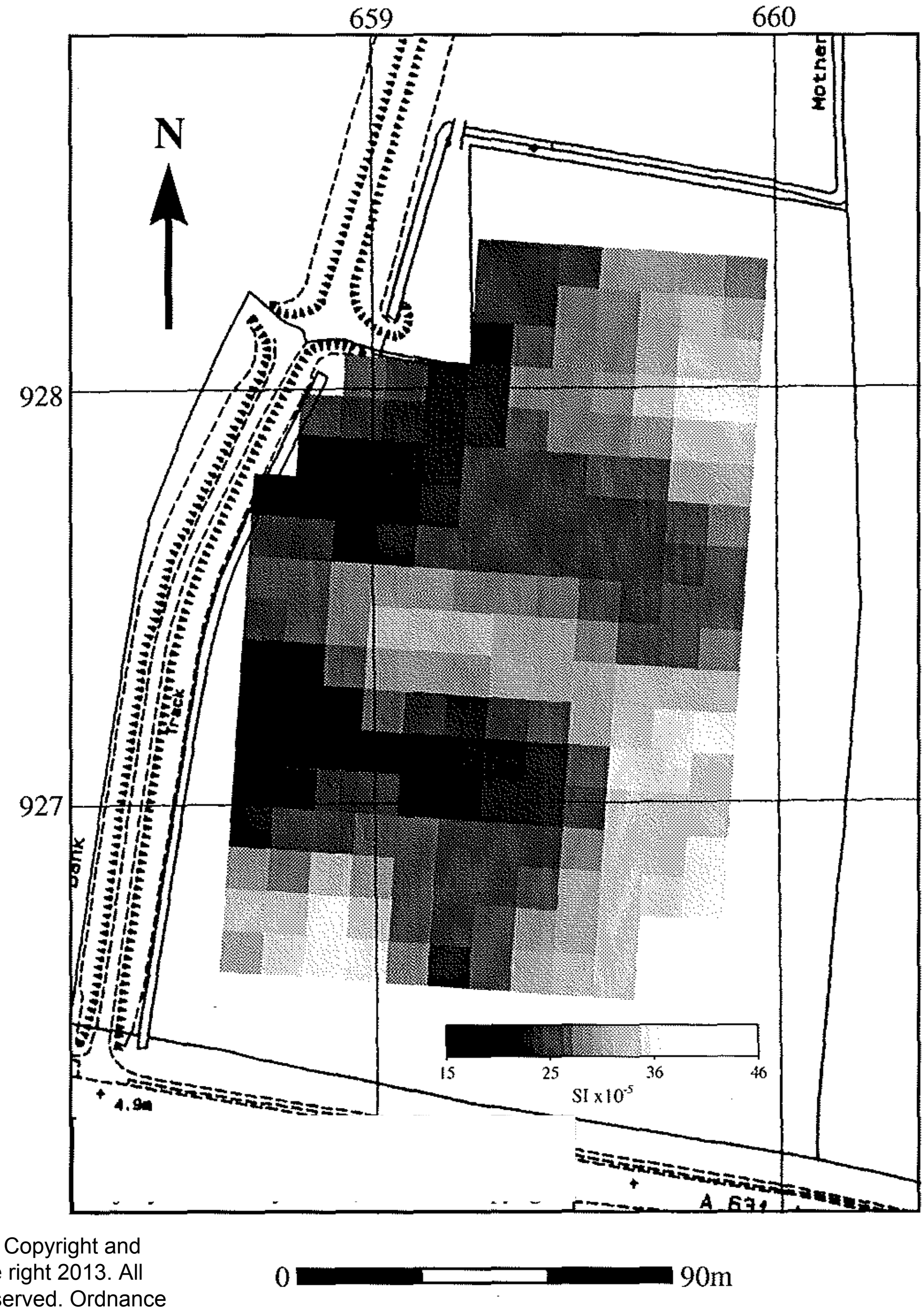

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FIGURE 6.

Holly House Farm, Scaftworth, Notts.
Geophysical Survey, October 1995.

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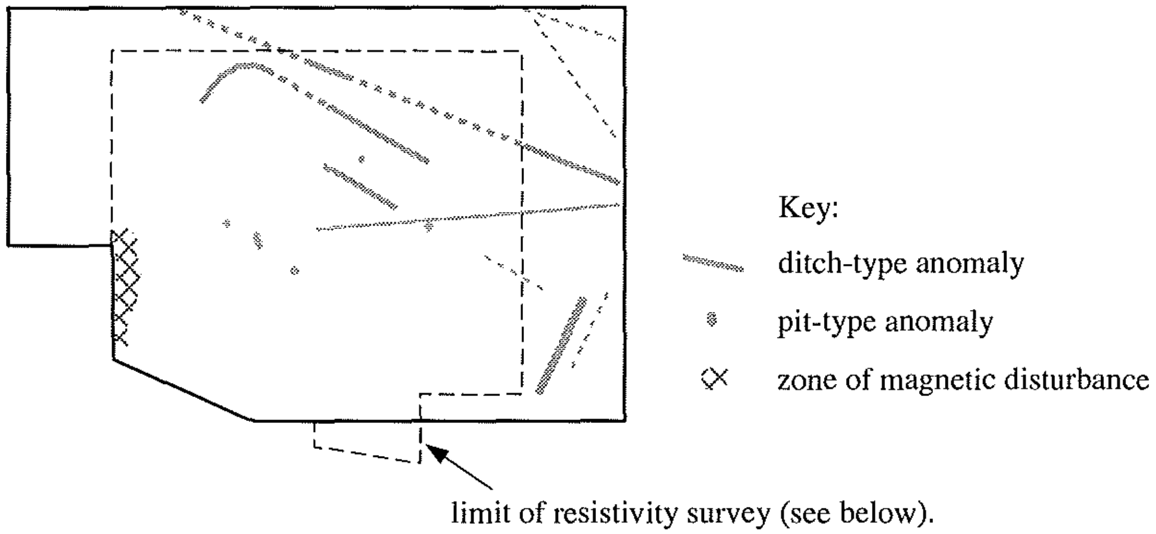
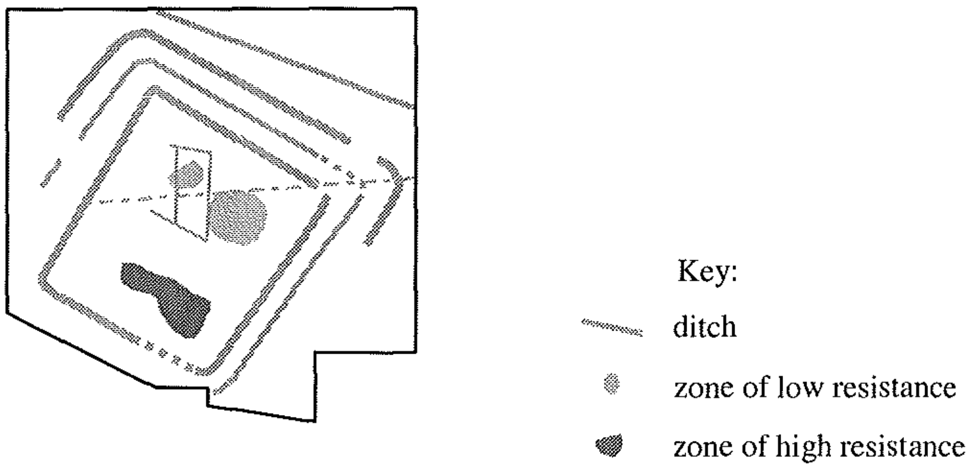
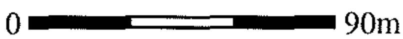
A. Interpretation of magnetometer survey.



B. Interpretation of resistivity survey.





Ancient Monuments Laboratory 1995.