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SNY	11604
ENY	3886
CNY	
Parish	8045
Rec'd	?1989

ON

# Kirk Smeaton Magnetometer Survey

E of  
Windhill  
Plantation

ABRAMSON, P. (1989)  
(WYAS RA 23)



West Yorkshire  
Archaeology Service



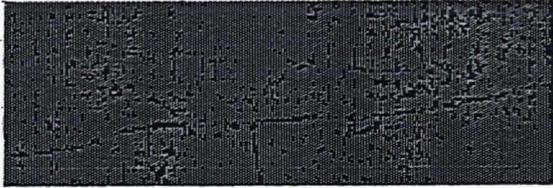


Fig. 2a. A dot density print-out of the data.

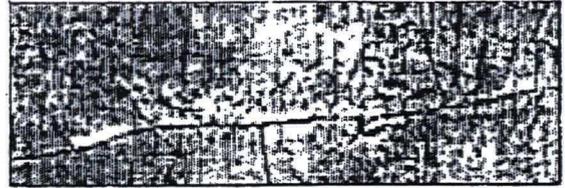


Fig. 2b A grey scale print-out of the data

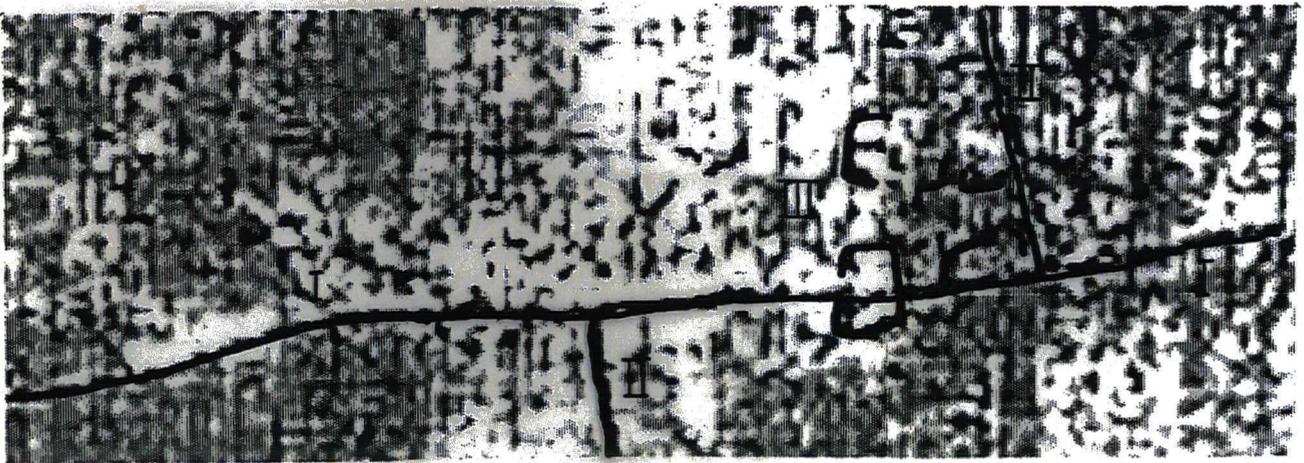


Fig . 2c. An enlarged grey scale print-out of the data shown in Fig.2b. The interpretation of the data is given in the results section.

lightly tilled in a north-south direction and a thin grass crop covered the field. Due to recent rain, the soil was moist.

## **Instrumentation**

The survey instrumentation incorporated a fluxgate gradiometer with an inbuilt data-logging facility. The data was 'dumped' on to an Epson HX20 field computer and later transferred to a more powerful micro-computer. The data was processed using both a dot density (Fig. 2a) and a grey scales format (Fig. 2b). The grey scales software was recently developed at the University of Bradford, and provides an image similar to a blurred photograph.

The gradiometer detects the small magnetic anomalies created by the organically-richer infilling of ditches, slots and gullies which cut into the bedrock. Over the years these features will have become backfilled and indistinguishable from the surrounding field contours. On the print-out the darker areas reflect higher magnetic readings than the surrounding low readings which constitute the background measurements.

## **Method**

The survey area was approximately 30% of the proposed quarry extension and was gridded into 20 by 20m squares which formed a transect across the field. A total area of 10,800 sq metres (1.8 ha) was surveyed with readings taken at 1m intervals in a west-east direction.

## **Results**

The print-out on Figure 2c provides clear evidence for a sinuous ditch (I), stretching across the centre of the survey area.

Associated with this ditch are at least two other ditches (II) which connect to it from the north and the south.

Also visible, although with less clarity, are a series of small (c.10m diameter), enclosures (III), grouped at the north-east area of the survey.

## **Discussion**

All of the above-mentioned features have produced relatively weak readings of between 2 to 5 nT against a background average of -1nT. Smaller features therefore, which perhaps do not cut deeply into the bedrock, will not be easy to distinguish and could be incorporated into the background readings.

The archaeological status of the features cannot be determined by remote-sensing techniques, but a documentary research may reveal that the anomalies tie in with a boundary line which has subsequently been removed.

An examination of the first edition Ordnance Survey map (Fig. 3), shows the presence of two field boundaries running across the survey area

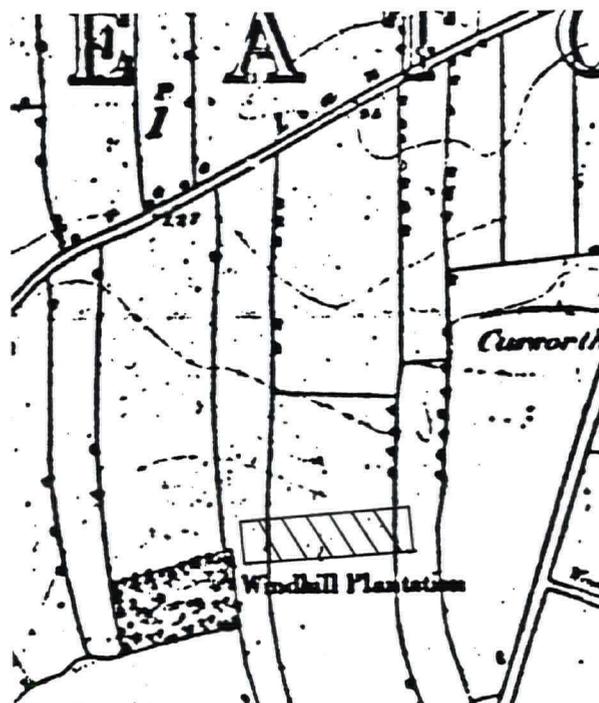


Fig. 3. First Edition Ordnance Survey map showing the survey area and the position of two north-south field boundaries

in a north-south direction. Both of these boundaries have been removed but neither shows on the survey, suggesting that they were hedges and did not cut into the bedrock.

## **Conclusion**

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It is likely that the major features detected by the gradiometer represent ditches cut into the bedrock which form part of a field system complex.

It is also possible that small enclosures exist, but it is not possible to say if these are associated with the field system or belong to a different period.

There is a suggestion of the presence of less coherent features but due to the weakness of the readings these cannot be extracted with confidence from the data.

Magnetometry is a remote-sensing technique and the limits of detection are subject to a number of variables, including the depth of overburden, the depth of the features and the magnetic susceptibility of the bedrock and fill of the features. These factors must be taken into account and it is possible that features exist which have not been detected by the survey instrumentation.