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MANOR HOUSE FARM, LITTLE CARLTON.
A SUMMARY REPORT UPON
ARCHAEOLOGICAL EVALUATIONS

1992

Trent & Peak
Archaeological
Trust

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ARCHAEOLOGICAL EVALUATION AT MANOR HOUSE FARM, LITTLE CARLTON,
NOTTINGHAMSHIRE - A SUMMARY REPORT

SUMMARY

At Manor House farm evaluations in response to a research design proposed by Oxford Archaeological Associates have identified archaeological features of the Roman to Post-Medieval periods, including some Anglo-Saxon remains. A number of features seen as cropmarks have been shown to be almost certainly geological in origin. The main conclusions to be drawn from the evaluation are as follows:

- 1 In fields 2, 6 and 8 a pattern of linear and curvilinear features of geological origin has been identified.
- 2 No palaeo-environmental deposits exist within the channel in field 4.
- 3 Features in fields 1 and 4 override earlier palaeochannels.
- 4 No colluvial deposits were identified during evaluation.
- 5 An undated ring-ditch exists in field 8.
- 6 A pair of, probably Romano-British, enclosures exist in fields 1 and 6, while a further enclosure exists in field 3. Further features, probably part of a Romano-British field-system, have been identified fields 2 and 4.
- 7 An isolated feature of Anglo-Saxon date was identified in field 6.
- 8 Rectilinear pits in field 6 have been shown to be post-medieval animal burials. Some post-medieval activity has been identified on the eastern edge of field 4.

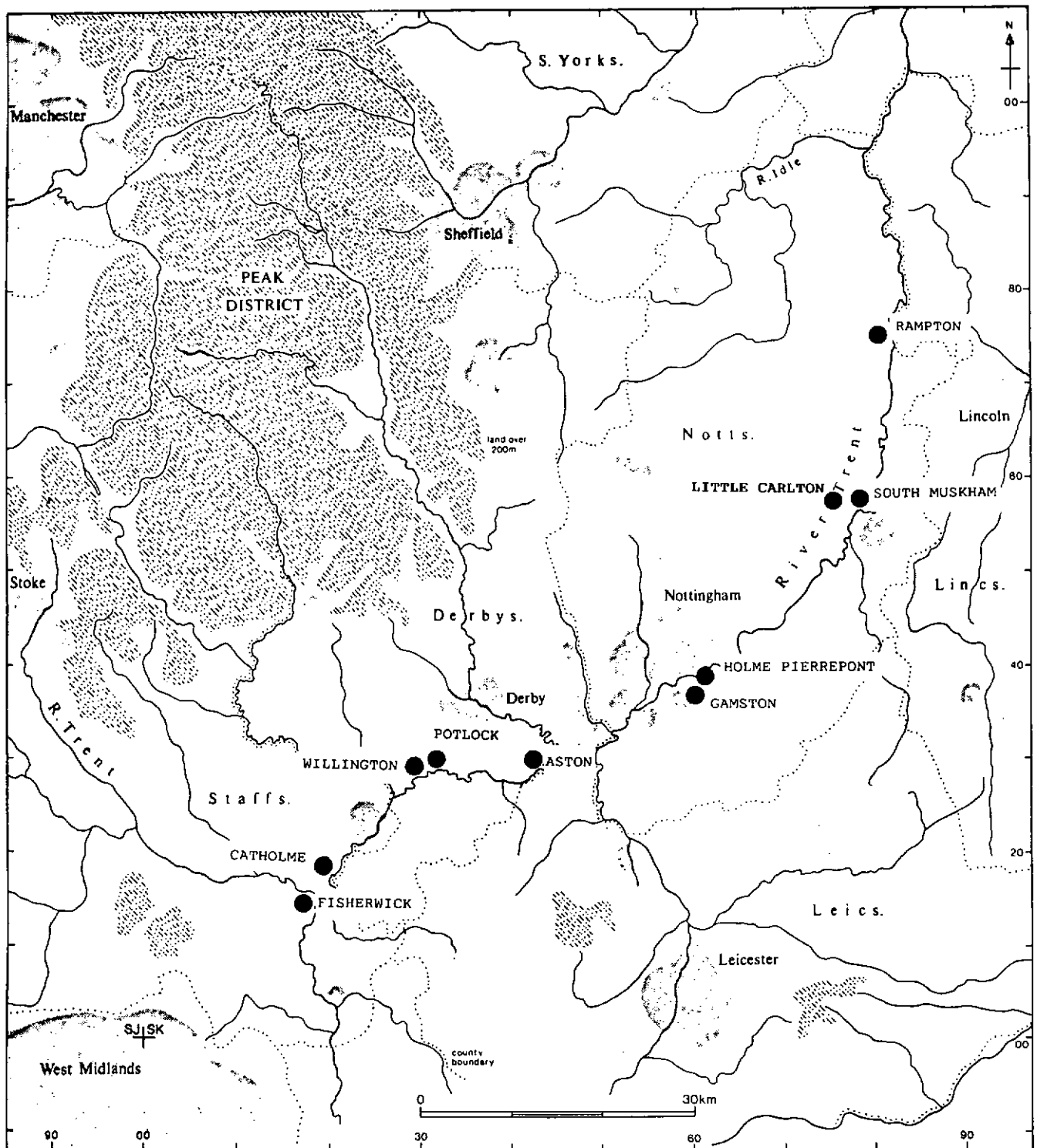


Figure 1. The Trent Valley Showing the Location of Little Carlton and Other Sites Discussed in the Report

SYNOPSIS OF THE EXCAVATION RESULTS

- Field 1** Three ditches similar in size to those at Gamston were excavated and represent at least two phases of activity, probably occupation. They overlay a channel-like geological deposit.
- Field 2** Dog-legged shallow feature of unusual form and indeterminate function. Other features in this trench could not be confirmed as archaeological.
- Field 3a** Two ditches overlain at a higher level by a single deposit. Possible enclosure.
- 3b** Three ditches of at least 2 phases otherwise as 3a.
- Field 4a.1** Large circular post-medieval feature obscuring in part two Roman ditches of field-boundary type. All overlain by recent deposits.
- 4a.2** Roman ditch.
- 4a.3** Complex of parallel Roman multi-phases ditches. The hollow created filled with silt in the Roman period.
- 4b** Only one of the ditches shown by aerial photography was positively identified. To the east, and cut by this, lay a heavy silt/clay deposit (see also Grattan in appendix 1, 8.8 of OAA report and geology section). It is presumed that the enclosure abuts the field system suggested in trench 4a. The ankle-breaker form of the ditch is suggestive of military activity but this is not confirmed by any other findings.
- This field has been subject to earth moving in the recent past.
- Field 6a** A number of features including post-holes, linear ditches and a sub-rectangular ditch, produced fills similar to the features in 6b but no finds. It should be noted, however, that Roman material occurred in the topsoil.
- The ovoid feature had fills similar to those of the geological features in 6c (below).
- Field 6b** A complex trench containing, to the north, a single ditch. South of this lay what appeared to

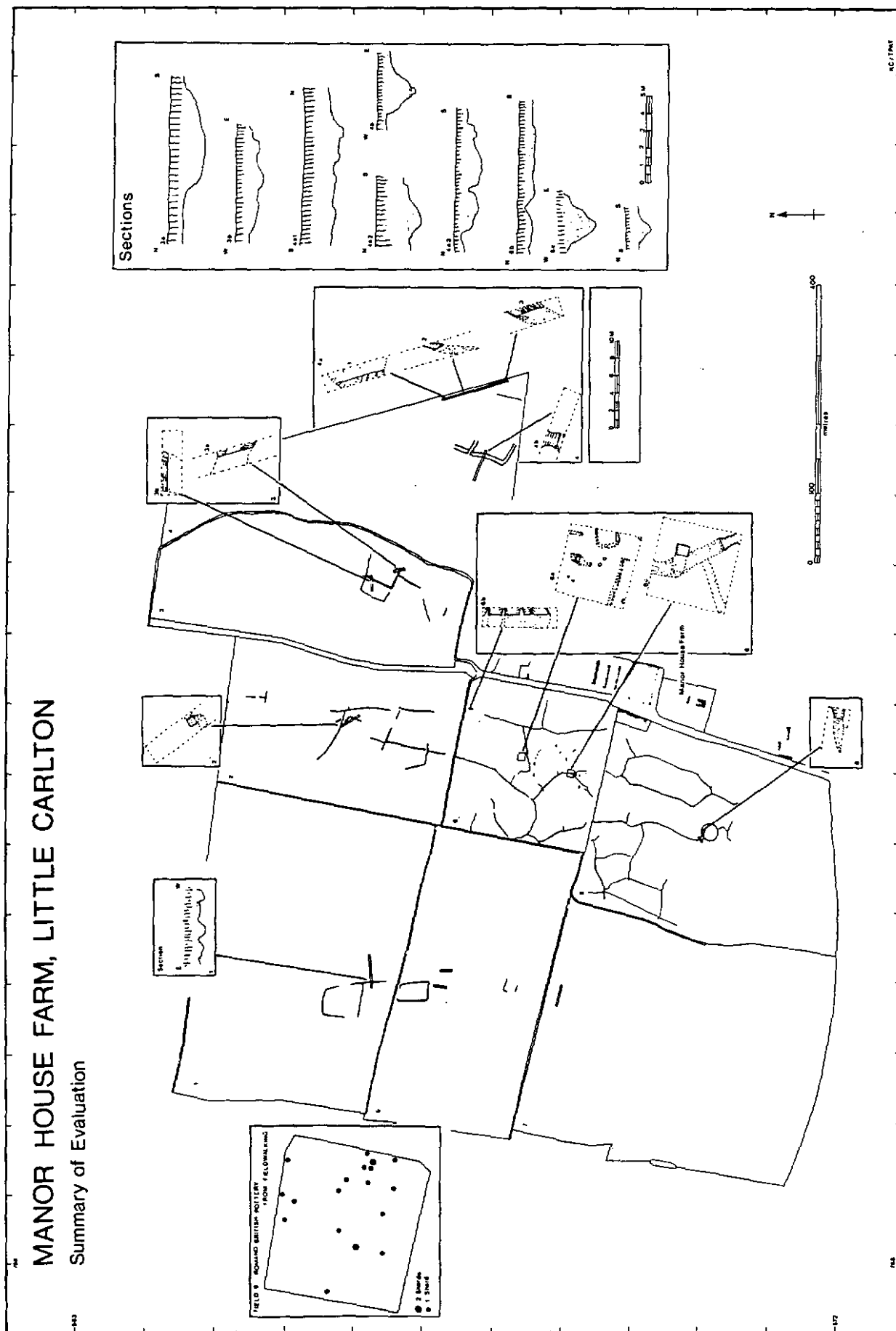


Figure 2. Manor House Farm, Showing Cropmarks, the Locations of Evaluation Trenches and Fieldwalking Finds

be a series of ditches, however, the section suggests a more complex picture.

6c The excavated pit contained redeposited material in unweathered condition plus the articulated remains of an animal carcass. Further pits of this type were observed at the southern edge of the trench. The excavated pit cut a ditch-like feature which contained small particle fills. The features had poorly marked edges and contained no finds. Overall the form of these "ditches" suggest that they, like the ovoid feature in 6a, are geological.

Field 8 A further geological feature was observed. A curvilinear ditch, which contained no finds, is part of the ring ditch seen as a cropmark.

RESULTS

DETAILED DESCRIPTION OF THE EXCAVATED FEATURES

Field 1

- 1a A machine-excavated trench across the southern linear extension of a cropmark enclosure seen in air-photographs revealed a series of three ditches (243, 244 and 245) visible in both the north and south-facing sections .

Ditch 244 (fill 241/232) produced 4 sherds of Romano-British pottery.

Field 2

- 2a A machine-excavated trench examined a linear cropmark feature seen in air-photographs. A dog-leg linear feature (149) was visible at the base of the excavated trench. Its gravel fill (148) produced no finds. Both the form and fill of 149 suggest that it is of geological origin.

Field 3

- 3a A machine-excavated trench examined a north-west - south-east linear cropmark feature forming part of an enclosure. Excavation revealed a 3m wide ditch (023) approximately 1.2m deep. The ditch produced 1 sherd of Romano-British pottery from its (?top) fill. A possible recut to 023, (020) was recorded on its north side. 020 produced 2 sherds of Romano-British pottery, and was itself cut by a pit-like feature (029) which was not fully excavated.
- 3b A second machine-excavated trench examined the north-east to south-west arm of the cropmark enclosure seen in 3a. Here, excavation showed a series of three parallel ditches (045, 046 and 047), forming a feature 3.5m wide and 0.6m deep. The three ditches shared a similar fill (049), which produced no artefactual material. The eastern-most ditch (047) cut a small circular feature (041), possibly a post-hole, while a series of three small post-hole like features (042, 043 and 044) extended in a line to east from 047.

Results from 3a and 3b show the features visible as cropmarks in field 3 to be of Romano-British origin, with at least three phases of activity indicated. It seems likely that the ditches form part of an enclosure, with the adjacent post-holes possibly indicating associated structures.

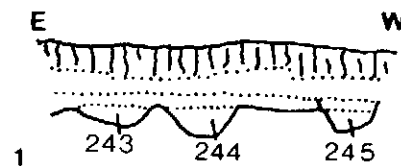
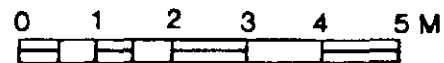
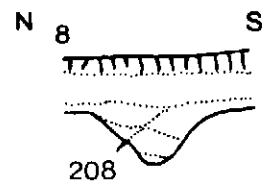
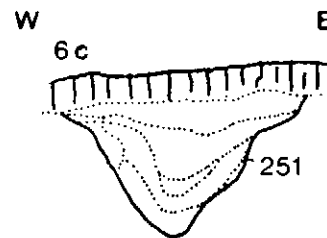
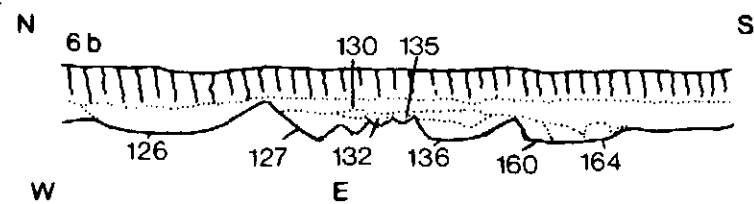
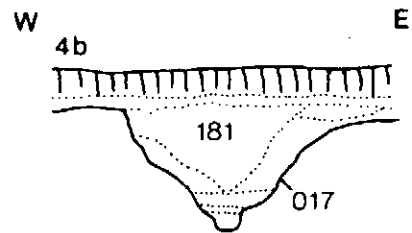
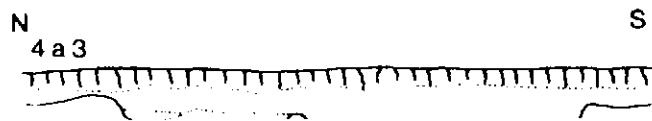
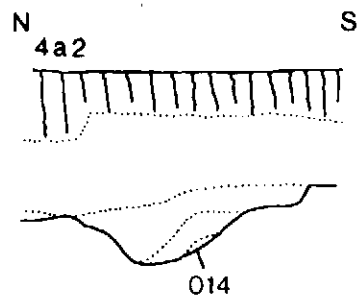
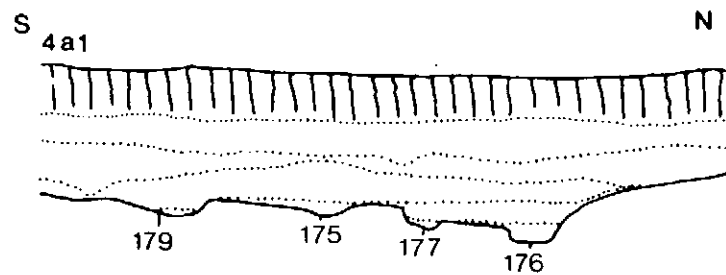
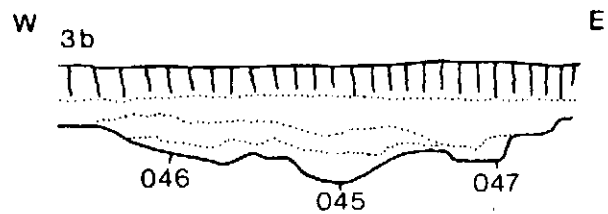
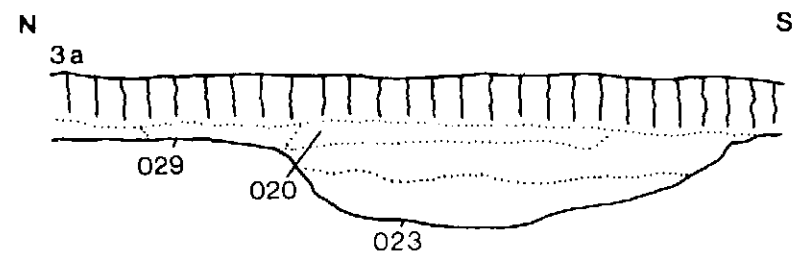


Figure 4. Sections Referred to in Text

Field 4

- 4a A long machine-excavated trench was positioned to test for the continuation of cropmark features, seen to the east, into the proposed development area. A number of archaeological features were found.

At the north end of the trench a east - west ditch, (170) 1.5m wide and at least 0.5m deep was excavated. The ditch produced 26 sherds of Romano-British pottery from its fills (174/175), including one almost complete vessel. 170 was recut on its southern side. Immediately north of 170 a large oval pit, (171), containing post-medieval pottery, was partially excavated. Adjacent to this on the north side was a small sub-rectangular post-hole (172), the fill of which produced no finds.

Towards the middle of 4a, approximately 29.0m north of 170, a further north-east to south-west ditch (014) was excavated. The ditch was approximately 0.80m wide and at least 0.35m deep, it produced 2 sherds of Romano-British pottery from its top fill (006).

Towards the southern end of 4a a series of four parallel north-east to south-west gullies (175, 176, 177, 179) were excavated. The gullies shared similar fills, which produced no artefactual remains, and may represent repeated recuts of the same linear feature.

- 4b A second machine-excavated trench was opened in field 4, to examine a rectangular double-ditched enclosure, seen as a cropmark in air-photographs.

One of the double-ditches was located within the excavated area. This north-east to south-west ditch (017) was 1.40m wide and 1.30m deep. It had a steeply sloping 'V'-profile, and a post-hole, or possible cleaning-slot, was located at the bottom of the excavated section. The ditch showed signs of a recut, the fill of which (181), contained four sherds of Romano-British pottery. The posthole/slot at the bottom contained some partially decayed organic material, including leaves, within its fill.

Field 5

- 5a/b Two machine-excavated trenches were opened within field 5, with the intention of examining a rectangular enclosure seen as a cropmark on air-photographs. The trenches were incorrectly positioned and so failed to locate the cropmark enclosure. The similarity of this enclosure to that in field 1, where excavation has shown

it to be of Romano-British date, suggests that even though the evaluation failed to examine the enclosure, it may be assigned a Romano-British date.

Field 6

Three trenches were excavated within this field with the intention of examining rectangular cropmark features which it was thought may be Anglo-Saxon sunken-featured buildings, other linear cropmark features, and an anomaly detected by the OAA geophysical survey.

6a A 10m square machine-excavated trench was opened towards the centre of field 6. A variety of features were visible in the base of the trench including a number of post-hole like features (099, 100, 101, 102), several irregular pit-like hollows (109, 111), and a small curvilinear feature (112) approximately 1.90m in diameter. None of these features produced finds, and though they are in general form reminiscent of archaeological features, their considerable depth below ground level would seem to suggest that they are all of natural origin.

6b A 7 x 2m hand-excavated trench was positioned to examine an anomaly detected by the OAA geophysical survey. The trench revealed a complex sequence of east-west linear features (126, 127, 130, 132, 135, 136, 160, 164) cut into subsoil and natural sand and gravel.

Earliest within this sequence were a series of narrow linear gullies (130, 132, 135). These were superceded by three larger linear ditches (127, 136 and 160). A complete Anglo-Saxon pottery vessel came from quite high within the fill of 127. A final phase of activity is represented by an apparent ditch terminal (126) which produced a single sherd of Romano-British pottery from its fill.

Clearly the evidence points to a long sequence of activity, the majority of which is undated, but which includes Anglo-Saxon material in the penultimate phase.

6c A 10m square machine-excavated trench was positioned towards the south side of field 6 to examine one of the rectangular cropmark features, a linear cropmark feature and the relationship between the two.

Linear features from north-west to south-east (251) and south-west to north-east (unnumbered) intersected within the trench, the relationship between the two was unclear. A section across 251 was excavated and showed it to be of quite steep-sided 'V'-profile, approximately 1.75m wide and 0.80m deep. No finds came from its sandy fills, and the feature is probably of geological origin.

Two of the rectangular cropmark features, both c. 3.0 x 1.5m in size (259 and 261), were identified within the excavation. 261 was excavated and a partially articulated animal carcass found within its fill. It seems probable that these pits are modern animal burials.

Field 7

- 7a A single machine-excavated trench was positioned to examine the relationship between colluvium and sand and gravel.

Field 8

- 8a A single machine-excavated trench was positioned to examine a cropmark ring-ditch seen in air-photographs. The ring-ditch (208) was identified towards the eastern end of the trench and a section excavated across it. It proved to be 1.4m wide and at least 0.70m deep, with a flared profile indicative of gradual filling by natural weathering. No finds came from its fills.

A further, irregular, curving, feature (050) was identified towards the western end of the trench and partially excavated. Its fill produced no finds and it is probably of geological origin.

INTERPRETATION and DISCUSSION

GEOLOGICAL FEATURES

A number of linear and gently curvilinear features seen as cropmarks within fields 2, 6 and 8 are probably of geological origin (those shown on Fig.4). In area 2a, field 2 a dog-leg linear gulley was excavated but produced no finds. Its ~~form~~ ^{from} may be typical of naturally formed features of periglacial origin. In area 6c, field 6 the relationship between a post-medieval animal burial and a linear feature was examined. The linear feature produced no finds, and again is probably of periglacial origin. A similar feature was also examined in area 8a, field 8, again producing no finds. Such features are common on the Trent Valley gravels and form a background 'clutter' from which it is often difficult to disentangle true archaeological features without excavation.

Cropmark evidence, plotted in Fig.2 reflects areas where topsoil cover is thinnest and the gravel near the surface. To the west of the site keuper marl deposits fail to show cropmark evidence of occupation (though this does not necessarily mean it is absent). In the areas between the cropmark clusters deeper topsoil, or the accumulation of colluvial material has failed to reveal cropmark features (though again this does not imply their absence).

The OAA survey revealed peat beneath a clay deposit within field 4. This clay was identified in area 4b in field 4, where it was cut by a ditch which contained Romano-British pottery in its fill. John Grattan (see Appendix 1) is of the opinion that this clay is of non-fluvial origin, and fills a shallow abandoned braided channel. In area 4a in field 4 Roman ditches were cut by post-medieval features, and these in turn were partially sealed by recent dumped deposits.

This would seem to indicate that at some time prior to the Roman period a shallow river channel existed running across the area of field 4. This channel, when abandoned, was filled by colluviation and the colluvial fill subsequently cut by the Roman enclosure ditches. Recent dumping has attempted to remove remaining surface irregularities associated with the relict channel.

MANOR HOUSE FARM

GEOLOGICAL FEATURES

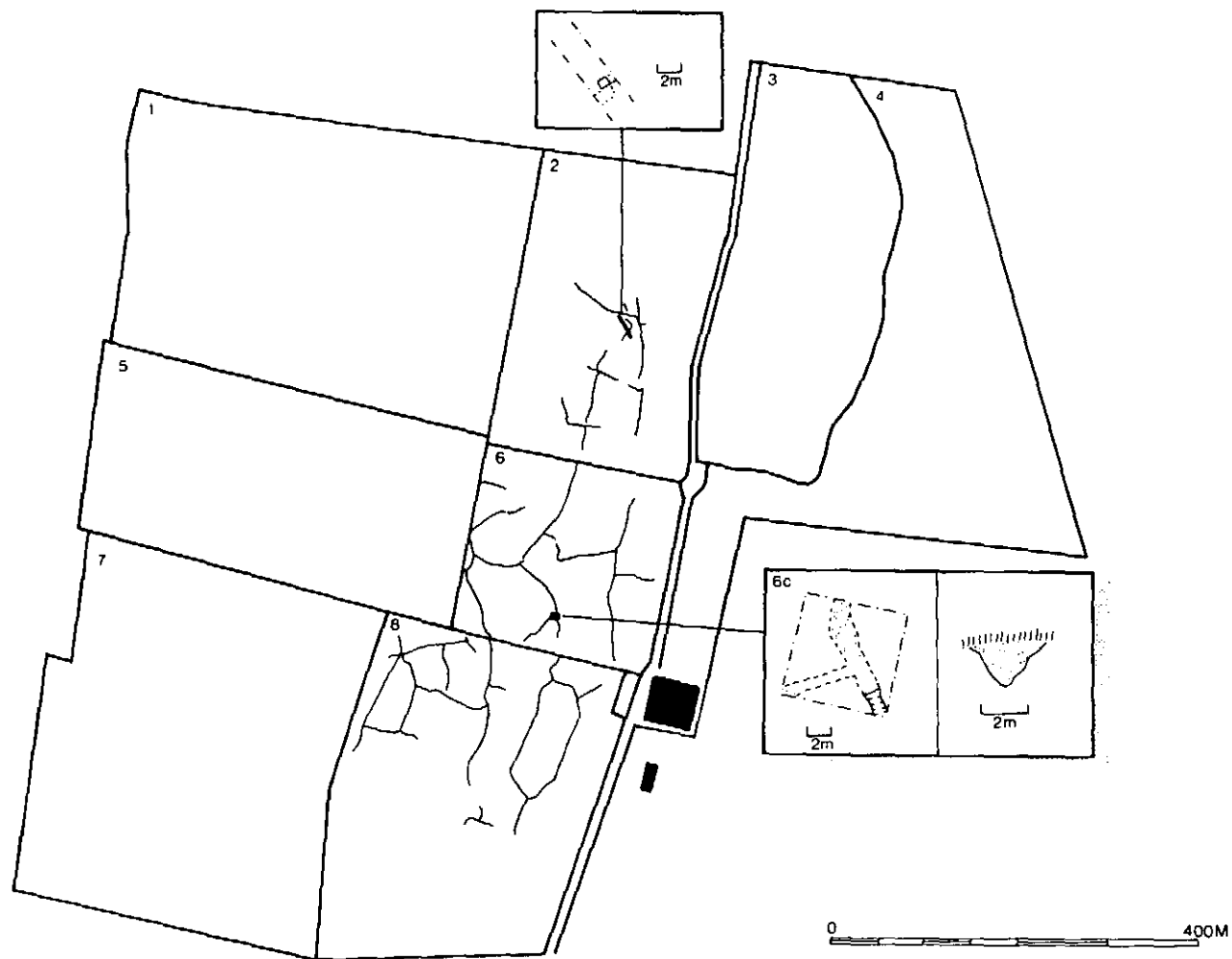


Figure 4. Manor House Farm, Geological Features Identified by the Evaluation

ROMANO-BRITISH FEATURES

Twelve contexts from trenches 1a, 3a, 4a, 4b, 6a and 6b produced a small quantity of Romano-British pottery (Fig.5 and pottery report by R. Leary, below).

Field 1

Pottery from area 1a indicated that the linear feature to the south of the large sub-rectangular enclosure, and hence probably the enclosure also, are of Romano-British date.

Field 3

Pottery from area 3a indicates that the enclosure which this trench investigated is of Romano-British date.

Field 4

Pottery from a number of features within area 4a indicates the south-westwards continuation of linear cropmark features, of Romano-British date, which form the well documented Muskhams group of cropmarks to the north-west (Whimster 1990, fig.62). The Romano-British pottery from the features excavated in area 4b show the enclosure there investigated to be of Romano-British date also.

Field 6

Area 6a produced several sherds of unstratified Romano-British pottery together with a number of undated features indicative of occupation. Area 6b produced Romano-British pottery from one of the linear features not visible as a cropmark, which is adjacent to that producing the early Anglo-Saxon pottery vessel. In addition to that from excavated features field-walking across field six produced a scatter of Romano-British pottery, with no distinct clusters, from across most of the field surface.

MANOR HOUSE FARM

ROMANO-BRITISH REMAINS

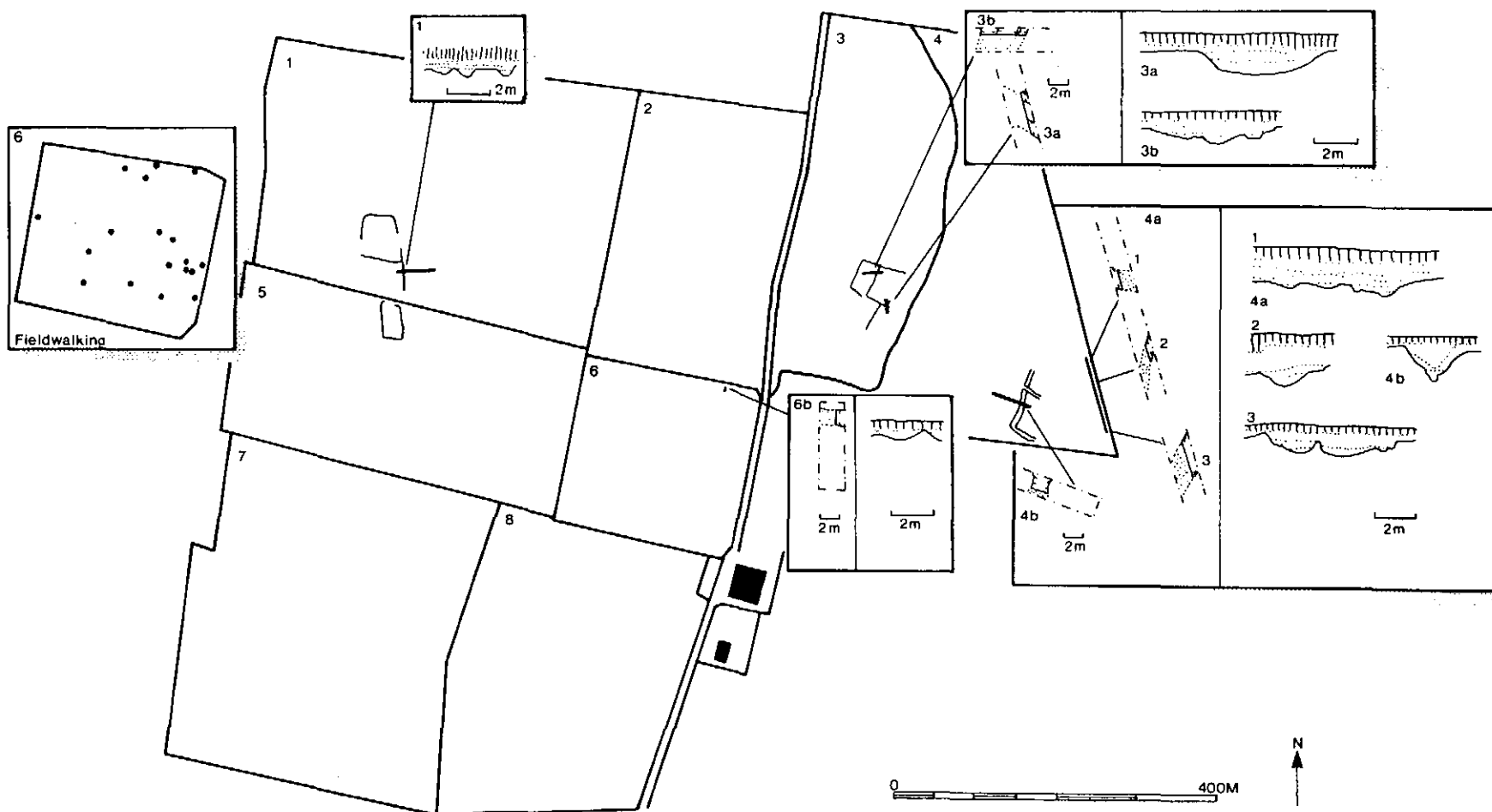


Figure 5. Manor House Farm, Romano-British Remains from the Evaluation

ROMANO-BRITISH POTTERY REPORT

49 sherds of Romano-British pottery were identified, three sherds of tile, one post-Roman sherd (6A 4) and four sherds, probably of prehistoric date (6A 4). The Romano-British pottery can be divided into two chronological groups: 1st-century forms and forms broadly dating to the late 2nd to 4th-century.

Four sherds of vesicular ware, originally shell gritted, were identified. Two were coarse and probably from jars of the type common on 1st-century sites. Two were finer, from 1st-century cordoned cups (Hawkes and Hull 1947, nos.216-217), and in fair, unabraded condition suggesting they were not merely residual.

43 grey ware sherds and two sherds of late 2nd-century samian were identified. Six grey ware vessel forms were present: two flat-rimmed dishes, one everted-rim, wide-mouthed jar, an undercut bead-rim, a small bead-rim jar and a bodysherd from an ovoid jar with burnished wavy line and grooved decoration. The dating of these forms individually is problematic as all of them can be found in the local kilns dating from the mid-late 2nd to 4th-century. However, the absence of flanged bowls, despite the presence of two flat-rim bowls (cf. Blaxton kiln, S. Yorkshire, dated AD 160-250, Buckland and Dolby 1980,34), the samian and the fine, medium-sized, wide-mouthed jar which compared best with the earlier local kiln products (at Knaith, Lincs. late 2nd to 3rd-century, Whitwell forthcoming; Blaxton, S. Yorks., Buckland and Dolby 1980, fig.6 nos.155-8; Branton, S. Yorks., Buckland 1976, fig.5 nos.67-74 type Hb) suggest a date range in the later second to third century. However, the conservative nature of the local potters (Buckland and Magilton 1986, 111) demands caution, particularly with such a small group.

(Pottery Report by R. Leary)

Romano-British Pottery Tabulated by Area/Context

AREA	CONTEXT	WEIGHT (g)	SHERDS
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1a

0232	19	3
0241	22	1

3a

0020	23	2
0023	50	1

4a

0001	80	4
0006	42	2
0009	54	1
0019	130	3
0174	460	25
0175	33	1

4b

0181	32	4
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6a

+	9	2
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6b

0118	10	1
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DISCUSSION

The distribution of Romano-British pottery within linear features and enclosure ditches suggests the presence of a system of rectilinear land division of probable early Romano-British origins across the site. Such systems of land division are well documented, from air photographic evidence, in the Trent Valley (Whimster op. cit.), yet relatively little investigated by excavation (see summary below). In general the pair of enclosures with ditches linking them, identified in fields 1 and 5, are reminiscent of Gamston, where occupation occurred outside of and between the enclosures. The ditch system in field 3 may be part of another large enclosure, though this is not proven. The features excavated in area 4b, field 4, are best interpreted as a pair of enclosures abutted on their eastern side by an extensive field system.

COMPARABLE EXCAVATED SITES IN THE TRENT VALLEY

A number of sites producing enclosures and systems of late Iron Age and Roman-British land division similar to those identified at Little Carlton have been excavated in the Trent Valley (Fig.1) and are reviewed below.

Excavations at Aston-Upon-Trent south-east of Derby (May 1970) examined a ditched enclosure, initially identified as a cropmark on an air photo, within an extensive area of multi-period cropmark features. The enclosure was thought to be an Iron Age square barrow. The small scale of the excavation was unable to relate it to the surrounding archaeological landscape, or demonstrate its date and function.

At South Muskham, north of Newark, (Wheeler 1968), salvage excavation revealed a series of ditches and pits of late Iron Age to Romano-British date, which may have formed part of a field system. However, the limited nature of the excavation prevented greater understanding of the remains.

At Rampton trial excavation (Challis 1990) demonstrated the presence of a large site of late Iron Age and Romano-British date. A number of sub-rectangular enclosures of likely Romano-British or earlier date were identified, and excavation demonstrated the presence of occupation outside of the enclosures, suggesting that the site may have been intensely used over a considerable period of time. Features producing Romano-British pottery and glass, and a possible ploughsoil of Romano-British date were found sealed by post-Roman alluvium.

At Potlock in Derbyshire air-photographs taken since the late 1950s have recorded a complex of crop-marks, including a cursus, ring-ditches, enclosures and field-boundaries, some part of which is protected as a Scheduled Ancient Monument. Within one of the ditched enclosures, a series of circular features seen on the air-photographs can probably be

interpreted as the drainage-gullies or wall-slots of circular timber buildings, probably of the Iron Age.

A number of larger scale excavations have to some extent been able to place individual sites within the context of a developing landscape.

At Fisherwick in north Staffordshire (Smith 1979) a number of cropmark ditched enclosures and trackways of the mid to late Iron Age were excavated. These showed several phases of development, from an unenclosed settlement to one contained by a series of ditched enclosures of various function.

At Willington, on the flood plain terrace of the Trent south-west of Derby, parts of an extensive cropmark site were excavated in advance of quarrying (Wheeler 1979). Occupation throughout the Iron Age focused on a long-lived ditch system which appeared to be part of a stable pattern of land division around which settlement developed. Two separate Romano-British farmsteads were also partially excavated. Aspects of the developing landscape were revealed, although it was not possible to fully understand the the relationship of the widely separated excavated areas to each other, or to the unexcavated cropmarks.

At Holme Pierrepont, immediately to the south of Nottingham, further extensive excavation of another cropmark site on the flood plain terrace of the Trent revealed settlement of the later Iron Age and Romano-British periods (Losco-Bradley and O'Brien, Manuscript). Four separate sites were selectively excavated within the area of the cropmarks. A pattern of ditched enclosures and field systems, with their origin in the Late Iron Age, were continually enlarged and altered until eventual abandonment in the late 4th century AD.

Most recently excavations carried out by Trent & Peak Archaeological Trust at Gamston (Knight 1990) c. 1km from Holme Pierrepont, revealed a series of enclosed and unenclosed phases of settlement and a rectilinear field system, reminiscent of the Brickwork Plan Field-Systems of North Nottinghamshire (Riley 1980). The remains ranged in date from the late Iron Age to the early Roman period.

ANGLO-SAXON FEATURES

An early Anglo-saxon pot was recovered from the fill of a linear feature in area 6b, Field 6 (Fig.6). The pot, a small cup, is 60mm high, with a diameter of 57mm at the rim and 31mm at the base. There are four applied, pierced lugs, in opposed pairs, rising from just below the base to some 10mm below the rim. The fabric is black with common small grit inclusions. Some recent damage to the rim was evident at the time of examination, and the vessel still held the greyish-brown sandy loam fill which it contained when excavated. The vessel falls within Myres' category of plain domestic wares, group III: cook-pots with lugs (Myres 1969, 170 and fig.12). Vessels of this type come from both a settlement and burial context of the 5th to 6th century AD.

It is at present impossible to judge whether this pot is from a cemetery of settlement context. The feature producing the pot is stratigraphically late within a long sequence of intercutting linear gullies. Such a context may tend to suggest that it is associated with settlement. However, the available crop-mark air-photographs show no trace of early Saxon sunken-featured buildings, indicative of a settlement site, which might be expected to show if present. Yet, neither did they reveal the ditch within which the vessel was found (the feature containing the pot was located by OAA magnetic survey). Clearly at Manor House Farm, air-photographic evidence is not a completely reliable indicator of all the archaeological features present.

No other excavated features have produced Anglo-Saxon remains, neither were any Saxon sherds identified during field-walking within field 6. It is most unlikely that this complete early Saxon vessel could be an isolated find and hence an early Anglo-Saxon site, of as yet indeterminate size and nature, must be located within the proposed development area. Such a site is of especial significance, as few early Anglo-Saxon sites have yet been excavated in Nottinghamshire. Its proximity to Romano-British settlement focii, and hence the possibility of investigating the relationship between Roman and Saxon activity, make it doubly interesting.

MANOR HOUSE FARM

ANGLO-SAXON REMAINS

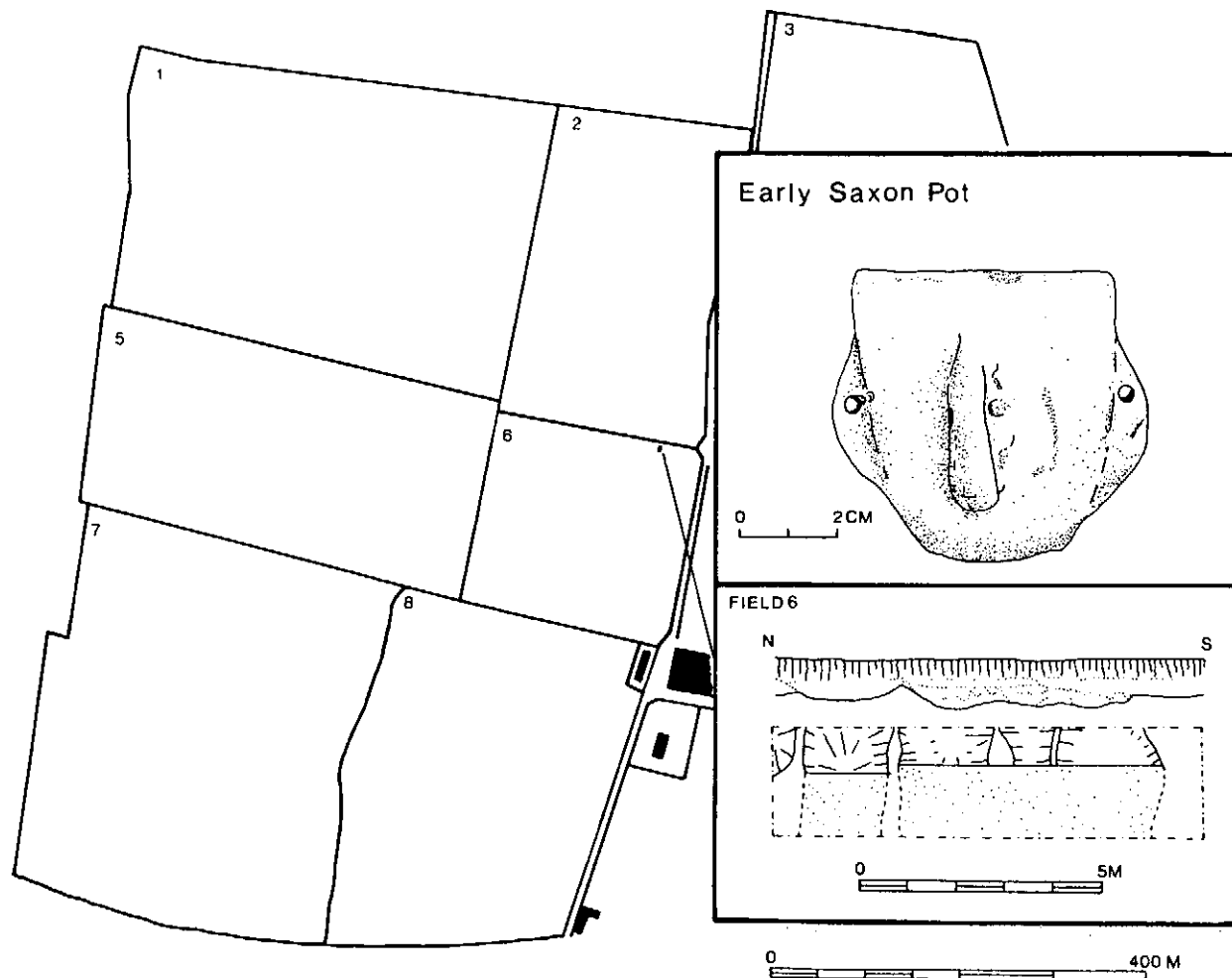


Figure 6. Manor House Farm, Anglo-Saxon Remains
from the Evaluation

MEDIEVAL AND POST-MEDIEVAL FEATURES

A number of sherds of medieval pottery were recovered during field-walking in field 6, but none came from excavated features. Excavation in both field 6 and field 4 produced features containing post-medieval pottery (Fig.7).

Field 4

A large pit at the north end of area 4a contained sherds of post-medieval pottery.

Field 6

A number of small rectangular features within field six, visible on cropmark air-photographs, were though possibly to be indicative of sunken-feature-buildings of Anglo-Saxon date. Excavation of one of these in area 6c showed it to be a post-medieval animal burial, the articulated remains of a carcass partially exposed at the base. In view of the fact that these features form neat alignments it seems likely that all are of similar, post-medieval, origins.

Large amounts of post-medieval and early modern pottery came from field-walking in field 6, these probably indicate the manuring of the field with night-soil in the 18th and 19th century, a common local practise.

MANOR HOUSE FARM

POST-MEDIEVAL REMAINS

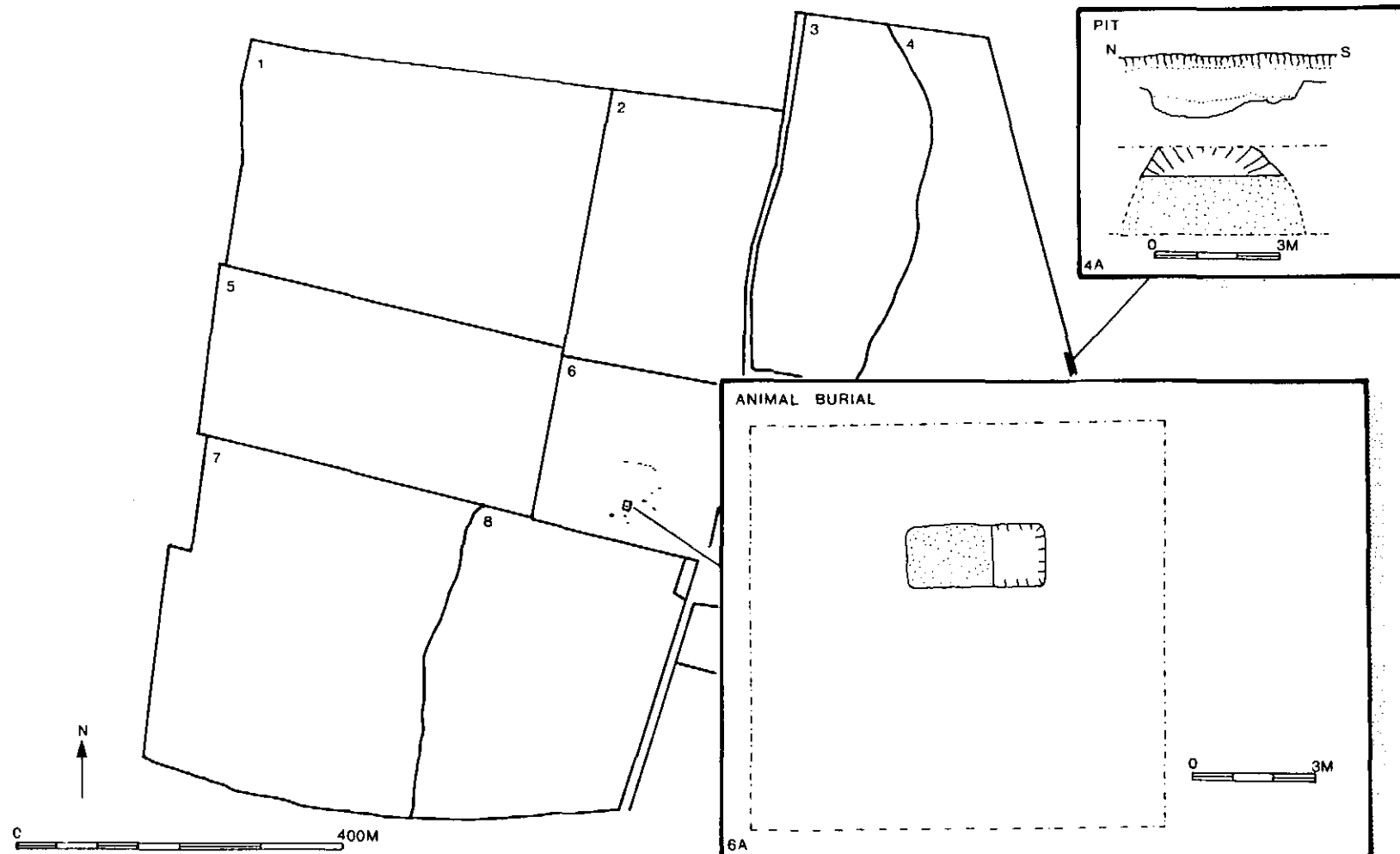


Figure 7. Manor House Farm, Post-Medieval Remains from the Evaluations

RECOMMENDATIONS

The extent and form of the majority of the observed remains is sufficiently clear to allow first stage estimates of excavation costs to be generated if required.

The nature and extent of the unforeseen Anglo-Saxon remains within field 6 remains uncertain, though those features thought to be Anglo-Saxon at the outset have been shown to be post-medieval. To produce estimates for costing final excavation further evaluation would be required. This should comprise:

- 1 Charting the extent of the Anglo-Saxon remains.
- 2 Clearly dating these remains.

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Appendix 1

**An Investigation of a Palaeochannel
Feature on the Floodplain of the Trent,
at Little Carlton**

J.P. Grattan and S. Butler

Archaeological investigations and aerial photography have suggested that the floodplain of the River Trent contains important palaeo-environmental evidence in the form of abandoned infilled meander channels. The present investigation has aimed to assess the potential scientific value of the site of Little Carlton [Figure 1], where the presence of a palaeochannel is indicated by aerial photography and excavation.

Little Carlton

Site description

A shallow linear depression has been identified by the excavator, adjacent to a ditched enclosure which is currently under excavation. Old editions of Ordnance Survey maps, show a stream flowing along the line of this depression. The possibility that this was an infilled meander channel was investigated.

Coring results

An auger transect was cut across the channel in a line extended from the archaeological investigation. The cross sectional profile of the channel was outlined by this method.

The depression was approximately forty metres in width, and can not have been a major river channel. Its linearity was apparent only as far as the northern edge of the field, where an old hedge line has been removed. North of this point there is a terrace along the western limit of the field, but no obvious east bank.

Stratigraphy

The bed of the channel was reached at depths of between 60 - 130 cm from the field surface. Below this level undisturbed fluvio-glacial sediments were found. There is a conformable contact between the depression infill and the fluvio glacial sands and gravels, suggesting that the formation of the channel and its infilling were widely separated in time.

The infill materials exhibit no observable sorting or stratification and are unlikely to have been laid down by fluvial mechanisms. Sedimentological analyses, eg., particle size analysis and particle shape, are unlikely to be able to confirm this, owing to the ultimate fluvial or fluvio-glacial origins of the material available within the floodplain of the R.Trent. (See discussion below).

The infill mechanisms appear to be non-fluvial, such as in situ soil development, colluviation, soil movement induced by ploughing and recent attempts to level the depression. As a result the channel does not contain a well stratified sequence of Flandrian deposits. This reduces its value as a source of palaeo-environmental information. In particular any pollen recovered is unlikely to have been laid down in a conformable sequence, and as with the sediments themselves the exact origin of the pollen would be very uncertain. It is therefore unlikely that pollen or coleopteran analyses of this material will be worthwhile, and therefore we do not recommend any further analysis of this material.

Despite the uncertainty over the origin of the fill material, the cutting of the channel itself represents a phase in the development of the R.Trent and its floodplain, and as such is worth further discussion.

Interpretation

There is no evidence to suggest that the linear feature is a palaeochannel of the River Trent. Both the scale of the feature and the absence of any organic deposits, when compared to the obvious palaeochannel at Girton [Grattan 1990], suggest that it was created by a much smaller stream.

To explain this features at a Little Carlton it is necessary to understand the formation of the floodplain during the Devensian and in the immediate post glacial period.

In the immediate post glacial period the River Trent did not flow in one channel, rather it was braided across the entire floodplain. Discharge within the braided channels would have been across a wide range, from major torrents to minor trickles. The differing levels of flow, reflect different energy levels and these differing energy levels are reflected in the size of the relict Palaeochannels. Major channels are responsible for the major gravel islands rising above the floodplain which have attracted such settlements

as Girton, Collingham and Besthorpe. Smaller gravel ridges, deposited by lesser flows have attracted the settlements indicated by aerial photography. Flow within these channels would have been subject to rapid change as each braid captured or was captured by others.

The channels left by these processes between the gravel bars and ridges have been progressively infilled through the Flandrian (Holocene) with finer materials, and exploited by seasonal stream flow across the flood plain. This process is ongoing today, and accounts for the burial of archaeological features which encroach on these depressions. Since the gravel bars were laid down by fluvial processes and the channels between infilled with finer material an aerial overview suggests that these features are fluvial and concurrent with archaeological structures, when in fact this is not the case.

Channel Development

The channel type described above needs to be seen in the context of the development of the River Trent and its floodplain.

Fluctuating base levels

The Trent valley was free of ice throughout the Devensian. Ice to the west of the pennines pushed into the upper Severn valley [Clayton, 1979, pp 216-221], but on the east of the Pennines ice advance appears to have ceased along the line of Thorne – Wroot – north of Gainsborough [Gaunt 1976]. Meltwater discharge was complicated by the presence of sea ice off the North Sea coast, which blocked drainage through the mouth of the Humber and led to the formation of a large pro-glacial lake, Lake Humber. This lake became the effective base level for all rivers discharging into the region, nearly a third of all drainage for England. The raising of base level led to accretion, rather than erosion of the floodplain. The outline of lake Humber is indicated on the geological map by a clay deposit described as the "25 foot drift"; work for Trent and Peak Archaeological Trust, [Grattan 1990, A] has identified deposits of this material far further south than was previously expected, at Lound.

The drainage of Lake Humber *ca* 15000 B.P. [Straw, 1979, pp122] resulted in rapid incision of rivers as they adjusted to a new, lower, sea level, which at its lowest may have been as much as -18m O.D., *ca* 8500 B.P. (Gaunt *et al.*, 1974). The Humber was reclaimed by the sea from 8000 B.P. onwards, rising sea levels saw alluviation replace incision as the rivers adjusted to higher sea levels.

Channel formation

With the end of the Late Devensian Late Glacial and the thawing of the tundra, large volumes of water and sediment were released. Water draining into the Trent basin, and flowing within its predominantly sandy floodplain, was not constrained within existing channels, and braiding occurred. As a result the floodplain of The Trent at this time contained a myriad of channels on a variety of scales. Flow would commonly have been shallow in the absence of permanent channels, but the volume of discharge would have been high, characterised by frequent and high floods [French 1976]. It is this phase of development which created the gravel islands and ridges, which are described above.

Channel development occurred as downcutting, in response to falling base levels, took place. The channels established developed and grew, capturing minor channels in the process and increasing the volume of flow. The widespread absence of clay deposits on the floodplain at this time resulted in an unstable channel pattern, with channel abandonment likely to be rapid, rather than as a result of meander cut off caused by clay deposition. The discharge thresholds necessary to cause major channel change are likely to have been low in an unconsolidated landscape, containing immature soils and with an early faunal development.

With the maturation of soils and vegetation, culminating in a stable landscape the river Trent and its floodplain was largely "locked down". Mature vegetation and the development of soils raised the thresholds at which work was done in the environment. This resulted in a largely stable river which had little ability to change its channel suddenly. The channel formation of this river is on a much greater scale than that seen at Little Carlton, and would typically exhibit the features illustrated in Figure 2, and at Girton.

River Thresholds

Given a maximum rate of discharge the ability of a river or other natural force to modify the environment is limited by the ability of the ecosystem to resist. The level beyond which change occurs is termed a "Threshold" [Brunsden and Thornes 1979; Schumm 1979]. A small river flowing in an unconsolidated environment has the potential to do a great deal of work, the thresholds here are low. A large river flowing in a stable environment with mature soils and vegetation has little potential to do work, the thresholds here are high. It is the raising and lowering of these thresholds by the action of man which explains the behaviour of the river Trent in the historical period.

Clearance of forest cover increases the rate and force with which rainfall impacts upon the topsoil. This results in two major developments: the rate at which the soil reaches field capacity and overland flow begins is increased; soils developed to cope with low impact precipitation are exposed to high impact and erode. A river channel evolves in response to extreme levels of discharge. Disturbance of the landscape resulting in an increased run off and a steeper storm hydrograph will result in a level of discharge beyond the capacity of the existing channel, [Thornes 1983]. The ease with which a river may erode its bank also depends on the stability and density of vegetation, the removal of tree or scrub growth will lower the threshold at which the river may erode its banks; and may drastically change the relationship between the river and its floodplain without any increase in discharge [Burkham 1972].

Man and channel change

The activity of man in the landscape may have the effect of lowering the thresholds which constrain the river in its bed. Little such disturbance of the landscape is apparent until the Roman period. Of the later prehistoric peoples there is currently little trace, artifact distribution on maps for the region are surprisingly sparse, [May, 1976].

Whilst evidence was found along the Avon for considerable soil erosion triggered in the Bronze age, [Shotton, 1978] and even earlier in the south of England, [Bell, 1981, 1982, 1983]. It may be that the landscape of the lower Trent was not seriously disturbed until the advent of the Roman period and the improved techniques and equipment, which became available then.

Along the Trent we may look for two indicators of such disturbance, channel abandonment and sediment deposition. Sediment deposited by floodwater on the floodplain of the Trent is known as "warp". When warp is improved by drainage and by the planting of root crops the soil formed is light and friable but in the absence of improvement it forms a thick impermeable clay. In this state warp is difficult to plough and drain. Roman sites on the floodplain at Rampton are buried by 1.5 metres of a coarse clay warp.

On the balance of all the evidence, both environmental and archaeological it would appear that the development of agriculture in the roman interlude disrupted the environmental balance of the Trent valley. Clearance which may have been initiated in the pre-Roman period was accelerated, removing the forest and exposing the soils; increasing the speed of run off and the volume of sediment eroded into the rivers. We therefore have both a lowered threshold and an increase in runoff into the channel, ideal conditions for channel change.

The Trent in the Post Roman Period

In the post-Roman period the landscape continued to develop. Carlton, Besthorpe and Girton are names with an Anglo Saxon origin. Girton, is Anglo Saxon for "Settlement On The Gravel", and such names indicate another phase of landscape exploitation.

Channel change has continued to be a feature of the floodplain of the Trent. The O.S. maps for the region show many, clearly defined, old channels. Aerial photography continues to provide evidence of change. In addition to these we can trace marshy ribbons outlining the course of older palaeochannels, which have not left an obvious levee. Further change is illustrated by the location of parish boundaries. These are found along the course of abandoned meanders.

Summary

River channel development is affected by changing sea levels, by run off levels and by landscape maturity.

There have been three base levels for drainage of the Trent basin since the Late glacial period; each of which had an effect on floodplain formation:

- A. Pro glacial Lake Humber which saw deposition and aggradation of the floodplain, in particular of the 25ft drift.
- B. Glacio-eustatic sea level fluctuation 15000-8000 B.P. which saw the fall of sea levels to as much as -18m O.D., circa 8500 B.P. This resulted in active down cutting and incision of the river channels.
- C. Current sea level. The raising of base levels to current sea level has seen aggradation replace incision.

Run off and landscape maturity are interlocked factors. In the immature landscape which characterizes the Late Devensian and early Holocene, run off was rapid and the dominant channel form was of fast flowing interlocked braids. These were rapidly formed and abandoned and are typical of the channel described at Little Carlton.

Developing vegetation and falling sea levels in the early Holocene, encouraged incision and channel stability. Within the floodplain deposits there may be channel infills below current base levels, dating from the period when sea level was -18 metres. Theoretically these will contain environmental evidence from the period before 8000 B.P.

Post 8000 B.P. rising sea levels caused aggradation of the floodplain to occur, and rather than deep incised rivers, drainage will be within broad relatively shallow channels. Once current sea levels are reached the Trent is tidal as far south as Girton. The floodplain is predominantly sandy and channel change at peak discharge can be rapid. Major channels will develop classic forms [Figure 2] In the absence of any management, flow could be within several channels rather than a single one.

Anthropogenic landscape disturbance, in the late Roman period and since, has lowered the thresholds at which the river may erode its banks, flood or change its channel. In response to such landscape disturbance we should expect to find evidence for any or all of these. It is likely that much of the early roman and pre historic landscape of the Trent is buried beneath late and post Roman alluvium and this should be borne in mind when assessing potential sites within the floodplain.

Agricultural improvement has changed the nature of the floodplain, both by the deliberate deposition of warp to improve fertility, and by the cutting of ditches to facilitate drainage. Improvement came late to the floodplain of the Trent [Lyth 1988] and prior to the Nineteenth century there would have been many small rivers within the floodplain, such as those described at Little Carlton [Figure 1]. These improvements have had an effect on the local economy, fishing was a major part of the rural economy into this century.

Channel abandonment is likely to have been rapid in this environment providing an ideal trap for sediment, pollen, plant macro fossils, coleoptera and other diagnostic insects. Such Palaeochannels represent the major remaining unexploited source of environmental evidence remaining in lowland Britain. Their location and subsequent analysis should be considered of vital importance in the assessment of gravel extraction applications. Such assessment will develop and deepen our understanding of the evolution of our landscape and of man's role in this process.

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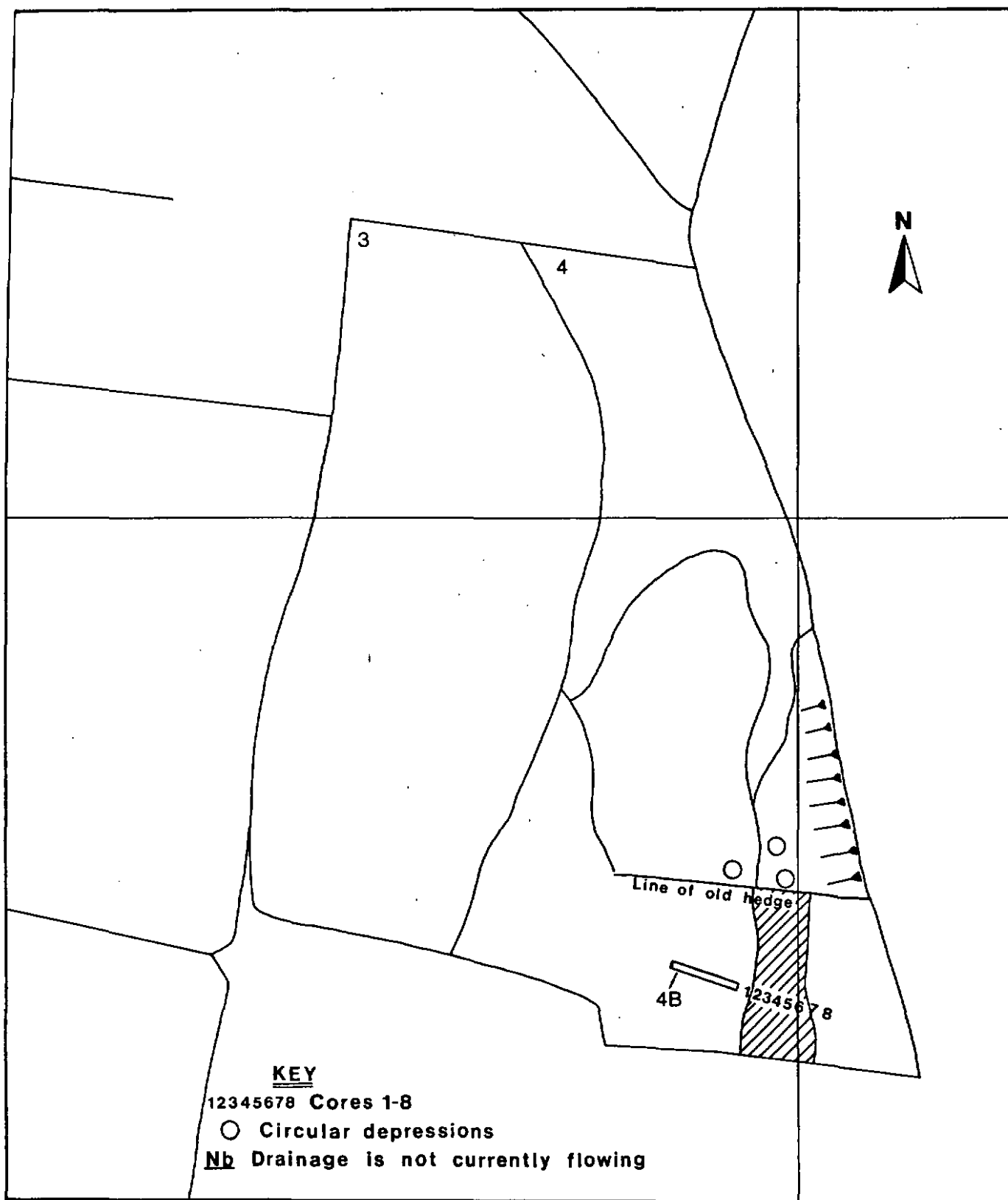


Fig. 1 Palaeochannel investigation at Little Carlton

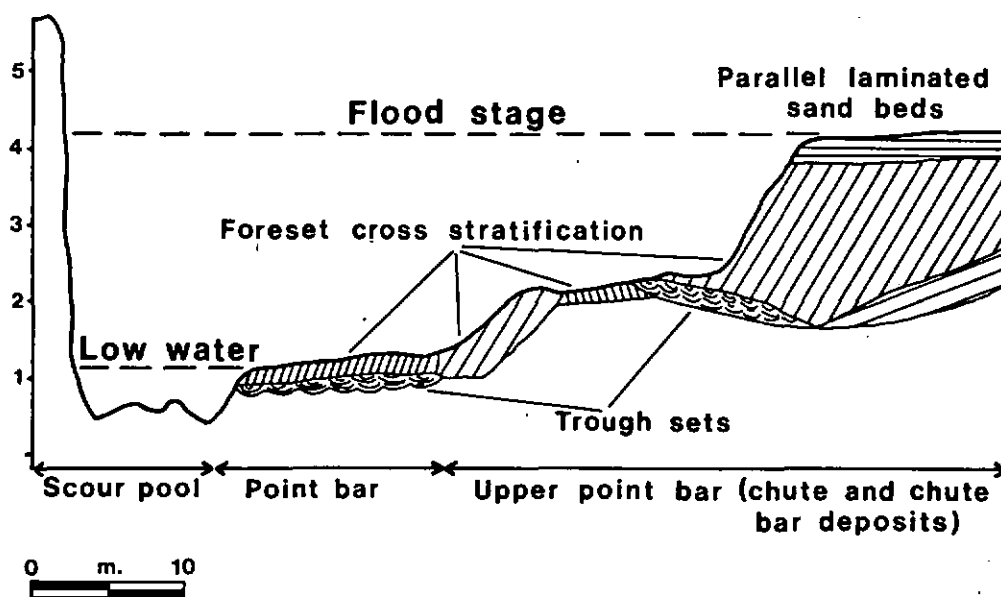


Fig. 2 Cross-section of Coarse grained point bar
(after McGowan and Garner, 1970)