PN 1089

An Archaeological Watching Brief at Shardlow Quarry, Shardlow, Derbyshire Interim Report 2003-2004

Haul Road and Phases 1A and 1B of gravel extraction

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An Archaeological Watching Brief at Shardlow Quarry, Shardlow, Derbyshire
Interim Report 2003-2004

Haul Road and Phases 1A and 1B of gravel extraction

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1.0 Summary

A watching brief was carried out by Birmingham Archaeology during 2003 and 2004 at Shardlow Quarry, in the parish of Weston-upon-Trent, Derbyshire (NGR SK423286). The work was commissioned by Phoenix Consulting Ltd on behalf of Hanson Aggregates. The intermittent watching brief was carried out during the construction of a haul road and the first phase of overburden removal prior to gravel extraction.

Stripping for a section of the haul road involved the removal of alluvial deposits from part of the course of a palaeo-channel which follows the line of the current Aston Brook. A logboat, dated by radiocarbon to the Middle Bronze Age, was found bedded into the silt at the bottom of the channel. Two Middle Bronze Age palstaves, together with a Late Bronze Age axehead and sword were also recovered from an area of extraction to the east of the logboat. Removal of alluvial deposits in this extraction area revealed a system of smaller palaeo-channels and oxbow lakes which were probably part of a larger network of rivers and streams located to the north of the extraction area. The Bronze Age finds contribute to a significant body of Bronze Age metalwork and a further logboat, recorded during previous watching brief work in this area, undertaken by Trent and Peak Archaeological Unit.

A timber platform, or fishweir/kidweir, consisting of a framework of upright and horizontal timbers filled with brushwood bundles, was excavated in proximity to the larger palaeochannel and logboat. However, a radiocarbon date from the structure suggests it was in use in the Late Iron Age or Romano-British period. Evidence of Romano-British activity in the form of inter-cutting linear ditches was also recorded to the north-west of the palaeochannels during stripping for the first phase of the haul road.

The logboat recorded during this watching brief will be the subject of a separate report (Martin forthcoming), and the recorded archaeology from Shardlow quarry will be placed into a broader context within a further volume.

2.0 Introduction

This is an interim report detailing the results of a watching brief carried out at Shardlow Quarry, Weston-upon-Trent, Derbyshire (NGR SK423286, Fig. 1). Birmingham Archaeology was commissioned to carry out the work by Phoenix Consulting Ltd on behalf of Hanson Aggregates. Monitoring took place during the construction of a haul road and during the stripping of overburden for Phases 1A and 1B of gravel extraction (Fig. 2).

The application area is considered archaeologically sensitive and is located near to a concentration of prehistoric monuments including the Aston cursus and a number of ring ditches and barrows. To the northeast of the current area of extraction, previous phases of quarrying removed the fill of a system of oxbow lakes and palaeo-channels which probably dominated the prehistoric landscape (C. Salisbury, pers. comm.). Finds recovered included a Bronze Age logboat (the first logboat to be found at Shardlow) and

fragments of a pile and brushwood causeway on a stone foundation. A number of bronzes, including axe heads, palstaves, spearheads and rapiers were also recovered from the infilled channels. Prior to the commencement of the first phase of the watching brief open area excavation in the western half of the application area uncovered Roman settlement (Martin 2004) of 2nd century AD date.

The watching brief (Phases 1A and 1B), which is the subject of this report, resulted in the discovery of a second Bronze Age log boat (not excavated but preserved *in-situ,* Martin *forthcoming*) lying in the bottom of a large palaeo-channel which follows the course of the present day Aston Brook. The existence of a network of channels was also revealed during Phases 1A and 1B of overburden strip prior to gravel extraction. The presence of a number of squared blocks of sandstone along the edge of a large channel in the northeastern part of the extraction area, might suggest that these former stream channels were being used to transport stone, via the River Trent. Artefacts recovered during this phase of extraction included two Late Bronze Age socketed axe heads, a Middle Bronze Age palstave and a Late Bronze Age sword.

An *in-situ* timber structure (Structure 1), consisting of a framework of vertical and horizontal timbers packed with brushwood, was excavated approximately 10m to the southwest of the log boat. The structure was probably a platform or fishweir/kidweir. A large rectangular wooden block was also recovered from the vicinity of the logboat.

The potential of the alluvial fills of the palaeo-channels for environmental evidence was also recognized and a section across the large palaeo-channel was comprehensively sampled (Martin *forthcoming*). Monitoring of gravel extraction for palaeolithic remains has thus far failed to produce evidence of activity during this period.

3.0 Site Location and Description

The site comprises c. 65 hectares of land immediately southwest of the present Shardlow Quarry, in the parish of Weston-upon-Trent, Derbyshire (Fig. 1). Topographically, it comprises two blocks of land: an area of low-lying permanent pasture to the south of the railway line and bordering the River Trent, which covers c.25 hectares; and an area of predominately arable fields on slightly higher ground, to the north of the railway line covering c. 40 hectares (Fig. 2). The pasture meadows to the south of the railway are susceptible to complete inundation from the river during periods of severe flooding. The geology consists of alluvium and river gravels overlying Mercia Mudstone.

4.0 Archaeological Background

A full description of the archaeological background and of the earlier evaluative surveys undertaken of the site can be found in the Written Scheme of Investigation produced by Phoenix Consulting (Richmond 2003) and will not be repeated here.

5.0 Aims

The aim of the watching brief was to accurately record archaeological features observed in the surface of the exposed gravel, or other horizons, following topsoil and subsoil stripping. The objective is to contribute to an enhanced understanding of the development of the prehistoric and Roman landscape in this region. A further aim is also to clarify the complex history of the site's various palaeo-channels and to identify

prehistoric activity which may exist along the banks of the major channels within the site (Richmond 2003).

6.0 Method

The watching brief involved intermittent monitoring (2 days per week) during the removal of alluvial deposits along the course of the haul road and in the extraction area. Isolated archaeological features were hand excavated and recorded immediately upon their exposure and plotted using GPS. If archaeological remains that constituted a 'site' were revealed during the course of the watching brief, an on-site meeting was held with the developer, their archaeological advisers and the archaeological contractor to determine the best method of dealing with the discovery. Should significant remains be exposed that could not be dealt with under a watching brief remit, a revised scheme was devised, in consultation with the curatorial authority. The alluvial deposits of palaeo-channels were sampled where appropriate in order to enhance the palaeo-environmental picture of the area during the prehistoric period and form part of a separate report (Martin, *forthcoming*). Preserved tree trunks retrieved from the infill of the palaeo-channels were sampled by a dendro-chronologist in order to enhance the master curve for this part of England (Richmond 2003). With regard to evidence of palaeolithic activity, periodic observation of the gravel workings was carried out, in addition to monitoring of the site's 'waster pile' (see Appendix 1)

7.0 Results

Haul Road *Phase A*

Three features were identified along the route of Phase A of the haul road. These comprised three inter-cutting linear ditches (F301, F303 and F304, Fig. 2) cut into the natural subsoil. The earliest of the ditches (F303) was aligned roughly northwest to southeast and was approximately 0.4m in depth. Ditch F303 began to widen out towards its southeastern end into a characteristically terminal shape. However, the ditch was only partially exposed in plan and its full shape and dimensions could not be ascertained. It contained light brown sandy silt with gravel (3003) which produced no dating evidence. Ditch F303 was cut by a northeast to southwest aligned ditch and terminal (F304) which measured approximately 0.9m in width by 0.2m in depth. Ditch F304 contained compact light brown sandy silt (3004) but again produced no dating material. The latest of the features (F301), which cut ditch F304, was a northeast to southwest aligned ditch. It measured 0.9m in width by 0.4m in depth and contained a fill (3001) which was very similar to that of F304. In this case, however, ditch F301 produced a substantial amount of Roman pottery of 2nd century AD date, thus providing a *terminus ante quem* for ditches F304 and F303. Ditch F301 was sealed by a layer of orange/brown clayey silt which was overlain by topsoil.

Interpretation

The ditches were the only features observed along this section of the haul road. The location of these ditches at least 100m away from the easternmost extent of the Roman enclosure located to the west (Martin 2004), would indicate that the area to the east was one of relatively low-level activity, perhaps representing associated field systems. Similarly, the excavation of an area lying to the west of the Roman settlement also suggested low-level activity (*ibid*.).

The ditches located on the haul road may also represent a more complex system of enclosure covering areas further to the north, or south, of the line of the road. A preliminary identification of the pottery recovered from ditch F301 indicates a date contemporary with the Roman activity excavated to the west. The orange/brown clayey silt which sealed the ditches was very similar to the alluvial layer observed in Areas A and B of the excavation (*ibid.), a layer which is present across much of the area*.

Phase B (Fig. 2*)*
The north to south aligned section of Phase B of the haul road followed part of the course of a large palaeo-channel (Fig. 2, Plate 1). This, therefore, involved the removal of very deep deposits of alluvial material, which reached depths of up to 4m. The stratigraphy of the palaeo-channel was composed of sand and silt (2005) at the bottom of the channel, overlain by black gravel with rootlets (2004). A highly organic peaty layer (2003) sealed the black gravel and this in turn was sealed by a layer of grey/black organic silty clay (2002) up to 3m in depth. Orange/brown alluvial material (2001) overlay the latter (Fig.3).

A logboat , which had been sealed by the alluvial deposits, was uncovered in the base of the palaeo-channel (Plate 2).[*] A radiocarbon date obtained from the timber of the boat produced a date in the Bronze Age between 1530 and 1400 BC at 91.8% probability (SUERC-4064). A large bog oak was also found next to the logboat and, in addition, a rectangular wooden block (approximately 0.5m in diameter) made of oak came from nearby (Fig. 2, Plate 3). Dendrochronological dates for these two timbers were around 2500BC (R.Howard pers.comm.). A radiocarbon sample taken from wood at the base of the palaeo-channel (SUERC-4833) calibrates within a range of dates between 3520 and 3100 BC at 95.4% probability. A radiocarbon sample taken from the top of the palaeo-channel calibrates to between 420 and 600 AD (SUERC-4834) at 95.4% probability.

Interpretation
The vestigial remains of the palaeo-channel are today formed by the Aston Brook. Plotting of the edges of the palaeo-channel using GPS suggests that the original channel was very wide and probably constituted a major river during the prehistoric period. The fact that the logboat was bedded into and partially covered by the sand and silt at the bottom of the channel would indicate that the boat was in use when the channel was a free-flowing river. The silting up of the channel probably began when the meander of the river was cut off and then formed a stagnant loop or oxbow lake (C. Salisbury pers. comm.). The radiocarbon dates suggest that this channel began to silt up from c.3500 BC, and that this process continued into the first half of the first millennium AD. The intervening period of some 4000 years witnessed the use of the location for the intentional deposition of metalwork in the Bronze Age and the sinking of a logboat.

Despite the presence of a number of Bronze Age artefacts in the palaeo-channel, settlement along the banks of the channel was not detected. However, settlement may have been unlikely in an area which was probably marshy and prone to flooding.

[*] The logboat and a detailed description of the overlying alluvial deposits, including environmental analysis, can be found in a separate report. The boat was left *in-situ* and was not excavated.

Earlier activity may be represented by the rectangular wooden block, which may have been used as a chopping block. If this is an intentionally worked piece, dated by dendrochronology to c.2500BC (R.Howard pers. comm.), it suggests activity in the area in the Late Neolithic/Early Bronze Age.

Excavation of Timber Structure 1

A timber structure (Structure 1) was excavated approximately 10m to the west of the log boat. The structure was visible protruding through the alluvium (Fig.4, Plate 4) and excavation revealed that it penetrated a series of deposits which filled the palaeo-channel.

The earliest deposit observed was a layer of dark grey silty sand and gravel (1000, Fig. 5). Sealing layer 1000 was a deposit, approximately 0.4m thick, of grey/ black silty clay (1001) which contained densely matted reeds, twigs and branches. Overlying the reed layer was a thin deposit of dark organic material (1002) which contained a very high percentage of degraded wood. This had been overlain by a thick layer of brown/grey organic silty clay (1003). The points of the upright stakes penetrated the earliest layer of grey silty clay (1000).

The upright timbers, which were sharpened into stakes up to 1.9m in length, were made of oak. One timber has provided a radiocarbon date calibrating to between 110BC and 140 AD at 95.4% probability (GU-12348). Traces of horizontal timbers were observed running between the upright stakes. The horizontal posts appeared to have been placed at the bottom of the stakes and half way up their length. (Fig.5). The vertical and horizontal posts thus formed a sort of framework. A detailed analysis of the timbers can be found in Appendix 3.

In plan the structure defined a roughly ovoid area (Fig 4). The northern half of the area contained a series of uprights, which protruded through the alluvium. Pieces of worked timber, which were lying horizontally in the upper horizon of the alluvium, were also visible in plan in the northern half of the area (Fig.4). The southern half of the area contained a number of scattered sandstone blocks, one of which was large and squared (approximately 0.4m x 0.5m).

Interpretation

The stratigraphic sequence of the palaeochannel suggests that the wooden structure is later than the logboat. The upright stakes of the structure did not penetrate the sand and silt forming the base of the Aston Brook channel (as with the logboat) but instead were driven into a deposit of alluvial build which lay at least 1m above the level of the boat. As the logboat appeared to pre-date all alluviation this suggests that it cannot be contemporary with the timber structure. This stratigraphic interpretation has been confirmed by the radiocarbon date. This demonstrates that the structure was built in the Late Iron Age / early Romano-British period and is not associated with the Bronze Age logboat.

In terms of function the structure may be interpreted in a number of ways. The presence of a layer with a high density of twigs or branches may suggest that bundles of brushwood were an integral part of the structure, deliberately laid within the framework of vertical and horizontal posts. A similar structure (although in this case laid on a stone

foundation) was uncovered during gravel extraction in the area of the first Shardlow log boat (C. Salisbury pers. comm.) and was interpreted as part of a causeway. It is not unlikely, that in an area which was marshy and prone to flooding, raised track-ways would have been fairly common. The structure might also have been a platform from which fishing was carried out or have been part of a fishweir. Another possibility is that the structure was a kidweir. These weirs were made of vertical and horizontal stakes and layers of branches and were intended as a revetment to help the flow of a river by stabilising the bank (Lord 1997). Structure 1 is located c. 10m from the bank of the palaeo-channel which would be the case if it were a kidweir. The layer which contained the twigs and branches (1001) also contained densely matted reed. It is possible that reeds were used to fill the spaces between the branches and twigs in order to make the whole structure more solid. Excavation revealed that this reed layer was limited in extent and had an edge which stretched roughly north to south (Fig. 4) across the centre of the structure, perhaps suggesting that it was deliberately laid as part of the construction of the kidweir. Alternative interpretations of the structure, however, are possible if the layer of branches and reeds was the result of natural deposition. This would mean that the timber structure was made only of vertical and horizontal posts and, therefore, was more likely to have been a raised platform or fishweir.

Whatever the function of the structure, however, stratigraphically it seems to predate deposit 1003, which represented the latest phase of alluviation. This is suggested by the fact that horizontal timbers had been placed at the base of the structure which could only have been done when the channel contained free-flowing water. This may have been at a time when the earlier infilled channel, which contained the log boat, had undergone a period of rejuvenation due to flooding. This would have meant that some of the alluvial deposits in the original channel were scoured out resulting in the re-cutting of the channel. The structure was most likely to have been constructed after this, but when the channel became cut off again alluvial material gathered around the structure and sealed it.

The sandstone blocks found with the uprights may have been part of the original structure. In previous discoveries of fishweirs, stones appear to have been used to buttress the bottom of the timber props which reinforced the wattle fences of the weir (Salisbury 1978). However, in the case of Structure 1 the stones were found bedded into the upper horizon of the latest deposit of alluvial build up (1003). It is possible that this was because the stone blocks were in fact unconnected with the structure, having been washed in from elsewhere during flooding. However, given the fairly substantial size of some of the stone blocks it is more likely that they belonged to the original structure, perhaps as part of an upper level. It should be borne in mind that the structure might only have been partial when excavated and that other elements of its construction, in particular a superstructure, which could have thrown light on its appearance and function, may have decayed or been washed away.

Phase 1A/1B Extraction

No archaeological features or deposits representing settlement structures or associated material were observed in the extraction area. The presence of Bronze Age metalwork does, however, attest to at least intermittent episodes of activity here.

The area was characterised by geomorphology which comprised a system of narrow palaeo-channels, up to 2m deep, cutting the southern half of the area in a generally north to south alignment (Fig. 2). In the northeastern part of the extraction area the gravel was found at depths of up to 4.5m and was sealed by very deep alluvial deposits which were stratrigraphically similar in composition to those found in the large palaeo-channel mentioned above (Fig. 3). The gravel rose towards the south, and formed a plateau which stretched down towards the River Trent (Fig. 2). This was sealed by shallower deposits of alluvial material, of up to 1.2m in depth. No archaeological deposits were detected along the banks of the channels or on the gravel plateau across the southern half of the extraction area.

A number of substantial sandstone blocks, which appeared to have been roughly worked, were found scattered along the western edge of a palaeochannel (Fig. 2, Plate 5) in the northeastern part of the extraction area. They had been sealed by the alluvial material filling the channel. A Bronze Age socketed axe head, two palstaves* (Plate 7) and a Late Bronze Age sword (Plate 8*)* were also found in this area during the watching brief. A number of bog oaks were retrieved from the alluvial fills of this area all of which were sampled and dendro-dated to c. 2500BC (R. Howard pers.comm.).

Interpretation

The very deep deposits of alluvial material in the northeastern part of the extraction area probably formed the infill of oxbow lakes and wide palaeo-channels, which stretched northwards to join a larger system of channels once covering the area between the River Trent and the Aston Brook (C. Salisbury pers. comm.). The plateau across the southern half of the extraction area was cut by a number of smaller, meandering palaeo-channels. These formed a network of braided channels which probably drained the land during times of flood (Fig. 2). No archaeological features or deposits were detected along the edges of the palaeo-channels, or on the gravel plateau of the floodplain. Nevertheless, the presence of Bronze Age metalwork attests to at least the coalescence of groups at this location in the Bronze Age and the intentional deposition (e.g. Bradley 1998) of such objects.

The large blocks of sandstone which were found along the edge of the palaeochannel (Plate 6) in the northeastern part of the extraction area, may attest to quarrying activity and transportation of stone by water in the prehistoric period. Similar blocks of sandstone were found in association with the first Shardlow logboat which was uncovered in the gravel pit to the north of the current area. In that case, the conclusion was that the boat was being used to transport the stone. However, the fact that the stratigraphic relationship between the sandstone blocks and the Bronze Age metalwork in the extraction area is not secure, leaves their association ambiguous. The fact that the blocks were recorded on the edge of the channel may not mean that they pre-date all phases of alluviation. The association of sandstone blocks with the Late Iron Age/ Romano-British wooden structure to the west may suggest that this material, in a similar location at the edge of a palaeochannel, is related to later activity associated with fish weirs or such like in the area. Nevertheless, it remains possible that stone was being transported in logboats, but without a direct and unambiguous stratigraphic association

* The axe heads were found by the machine drivers and their exact location is, therefore, uncertain.

between such stone blocks and a logboat or Bronze Age artefact, this cannot be demonstrated with certainty.

8.0 Discussion

The first phase of the watching brief at Shardlow Quarry has served to demonstrate something of the geomorphological development of this part of the Trent valley. The discovery of a system of ox-bow lakes and palaeo-channels, in particular the very large channel now marked by the course of the Aston Brook, has enhanced our understanding of the landscape of the area during the prehistoric period and may allow a clearer interpretation of the complex history of alluviation in the valley. Moreover, the palaeo-environmental evidence, in addition to the Carbon14 dates, retrieved from the alluvial fills of the channels will help to build a picture of the surrounding environment and land use during this period.

The absence of any evidence of permanent settlement in the prehistoric period may be due to the unsuitability of this riverine environment. The area would have been marshy and prone to flooding and any settlement would have been restricted to areas of higher gravel away from the floodplain of the river Trent. However, something of the interaction between prehistoric people and the surrounding environment has been gleaned from the artefactual evidence yielded by the watching brief. The Bronze Age logboat uncovered in the Aston Brook palaeo-channel, attests to the exploitation of the rivers and lakes of the area for transportation, fishing and fowling, during this period. The metalwork has added to a growing corpus of such artefactual evidence from Shardlow. The intentional deposition of these objects in an irretrievable context suggests that this location was a focal point for the ritual deposition of metalwork (e.g. Bradley 1998) from the Middle Bronze Age. It is possible that this activity represents a shift away from the emphasis on burial monuments such as the ring ditches and barrows recorded in the vicinity.

The evidence recorded in the watching brief has provided an important insight into the interaction between Bronze Age communities and a riverine environment. The presence of a second logboat from this location underlines the importance of this environment in the Bronze Age for activities such as fishing and fowling, communication and trade in a period and region for which the evidence for domestic activities is rare. The presence of axe heads may reflect utilitarian activities in the broader landscape, whilst the Late Bronze Age sword reflects a society in which conflict may have been prevalent. Together with the environmental record collected from the palaeochannels, the finds recorded during this watching brief demonstrate the potential importance of Shardlow for understanding prehistoric activities in this region.

The presence of Romano-British features 100m to the east of the Area A excavation (Martin 2004) suggests that Romano-British activity may be detected during future phases of extraction at Shardlow Quarry, but this is likely to be when quarrying involves the gravel terrace running along the northern edge of the quarry. Similarly, this may also be an area where further Bronze Age features in terms of land division, settlement or funerary monuments could be detected. An examination of this area could place the log boat and metalwork into a wider context (such as that demonstrated at Flag Fen, Pryor 1992).

The absence of evidence of Romano-British activity, in particular of settlement evidence, during Phases1A and 1B of extraction is probably due to the same environmental factors which precluded settlement in this area during the prehistoric period. Phase 2 extraction is also located on the floodplain of the River Trent and it seems unlikely that significant evidence of Roman activity will be uncovered here. However, the presence of a Late Iron Age/ early Roman timber structure in alluvial deposits in the area of the Phase B Haul road allows for the possibility of further such structures surviving in the Phase 2 extraction area.

9.0 Recommendations for further post excavation work.

1) Further post excavation analysis is necessary to complete the work carried out in this watching brief. A full analysis of the environmental deposits from the Aston Brook palaeochannel is currently underway according to a remit agreed with the curatorial authority and client. These deposits can provide a valuable record of environmental change in the locality spanning a period of up to 4,000 years.

2) A petrological summary is necessary in order to source the sandstone on the site and therefore place the use of this material into a wider context.

3) Dating of context 1001 is necessary in order to establish whether this deposit is contemporary with the wooden structure. This will provide an insight into the function of the structure.

The results of this analysis will be presented together with a full discussion of the archaeology in a Shardlow volume.

10.0 Phase 2 Extraction

The watching brief to be carried out during Phase 2 of gravel extraction (Fig. 2) is likely to result in a similar set of findings to those of Phase 1A/1B. The area is located on the gravel plataeu noted in the southern part of the extraction area of Phase 1a/1b and is, therefore, of potential archaeological interest. The continuations of the smaller palaeo-channels, exposed during Phases 1A/1B are also likely to be uncovered, as is the continuation of the massive channel which follows the course of the current Aston Brook. The Aston Brook flows across the western end of Phase 2 extraction in a northeasterly direction and it may be possible to expose a more complete profile of the channel than was possible in the first phase of the watching brief. It is also possible that Phase 2 of the watching brief will produce evidence of activities associated with riverine environments. If the logboat attests to exploitation of the Aston Brook palaeo-channel for water transport or for fishing and fowling, then it is possible that other boats, or structures like causeways or raised platforms, may be present along the course of the channel. Phase 2 of extraction will also allow a systematic programme of sampling (see Appendix 2) for the purpose of dating the palaeo-channels and oxbows of the area.

11.0 Acknowledgements

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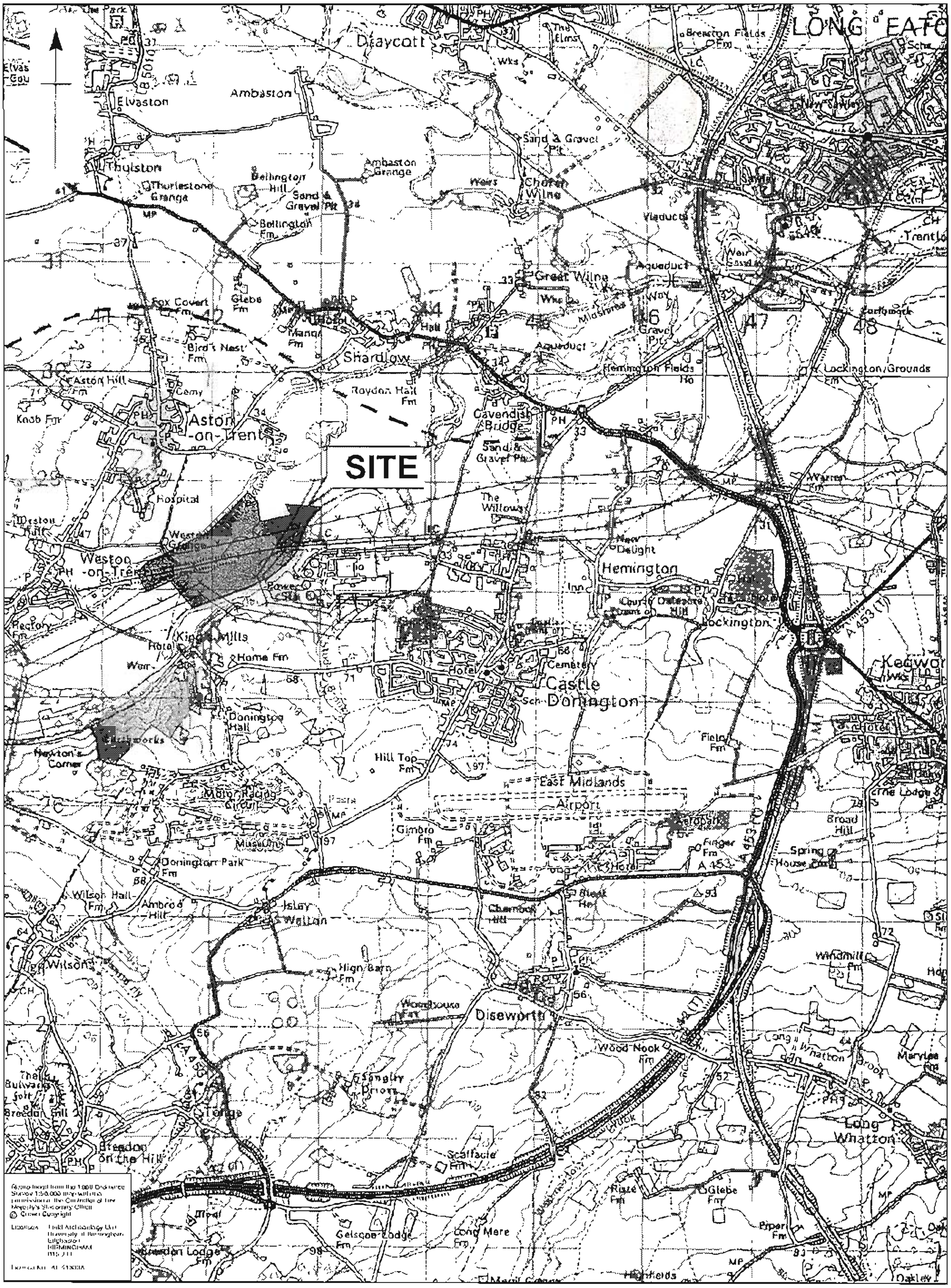
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Elvaston
Thulston
Ambaston Grange
Sand & Gravel Pit
Church Wilne
Great Wilne
Shardlow
Aston-on-Trent
Cavendish Bridge
Roydon Hall Fm
Hospital
Weston-on-Trent
Weston Grange
Hemington
Lockington
Kings Mills
Home Fm
Castle Donington
Donington Hall
Hill Top Fm
East Midlands Airport
Motor Racing Circuit
Museum
Donington Park Fm
Isley Walton
High Barn Fm
Diseworth
Woodhouse Fm
Wood Nook Fm
Long Whatton
Breedon on the Hill
Tonge
Scotfaccie Fm
Gelscoe Lodge Fm
Long Mere Fm
Piper Fm
Oakley
Fig.1

Fig.1

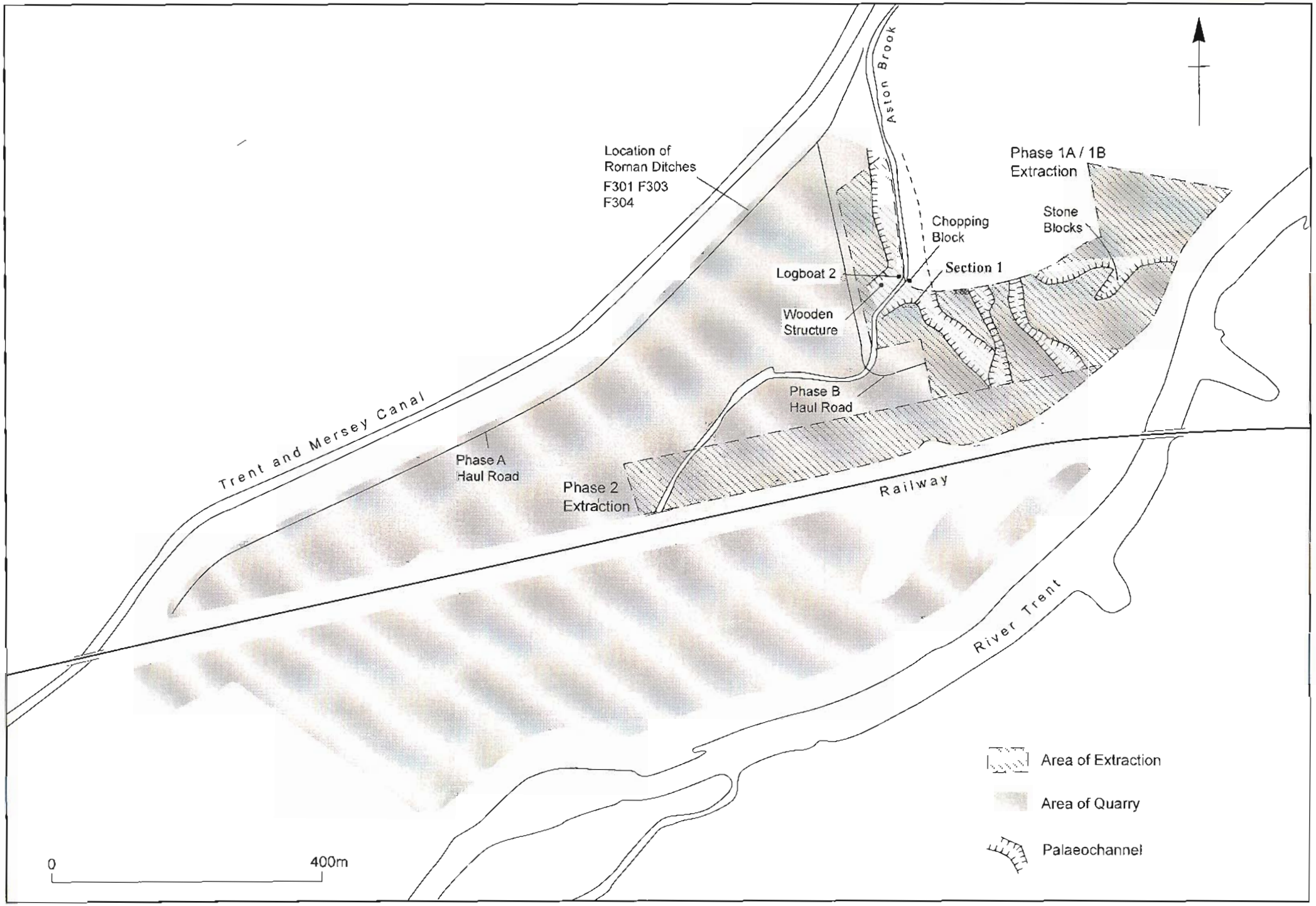

Location of
Roman Ditches
F301 F303
F304
Aston Brook
Phase 1A / 1B
Extraction
Stone
Blocks
Chopping
Block
Section 1
Logboat 2
Wooden
Structure
Phase B
Haul Road
Trent and Mersey Canal
Phase A
Haul Road
Phase 2
Extraction
Railway
River Trent
Area of Extraction
Area of Quarry
Palaeochannel
0
400m

Fig.2

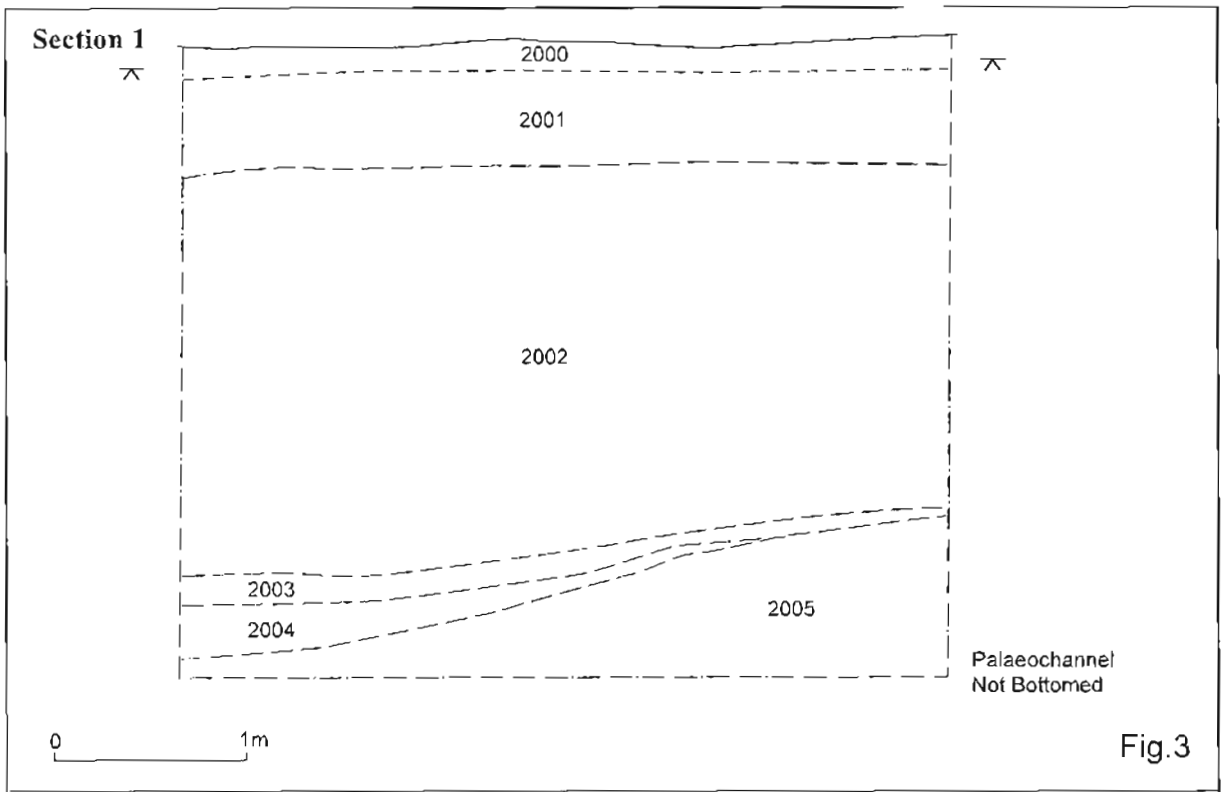


Fig.3

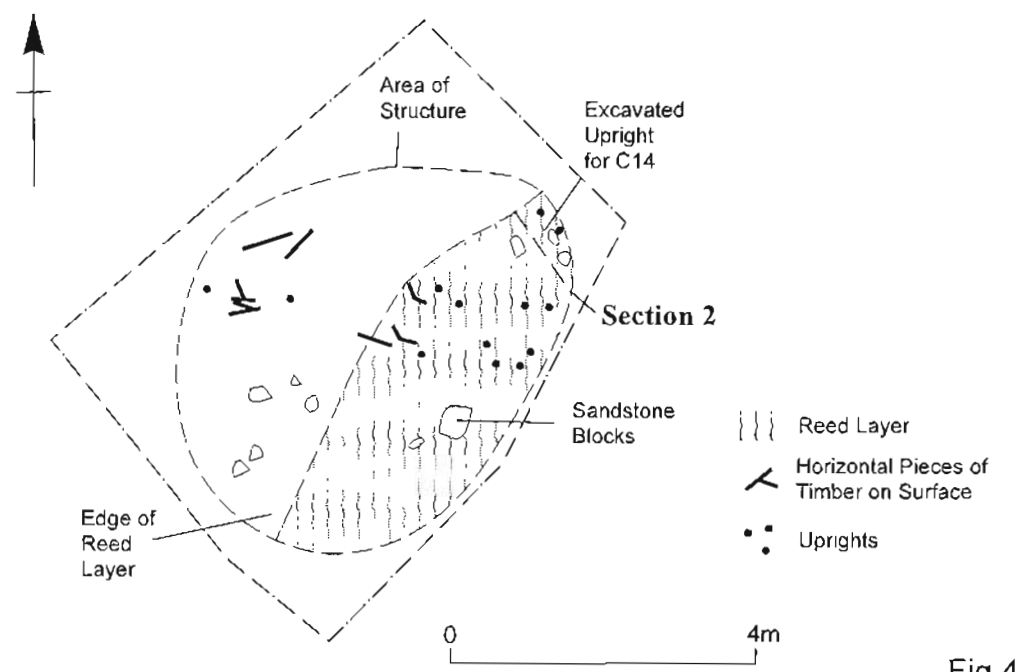


Fig.4

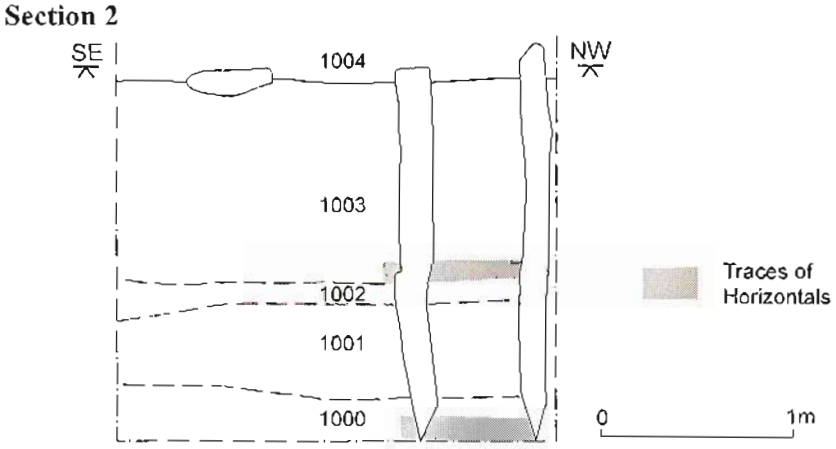


Fig.5

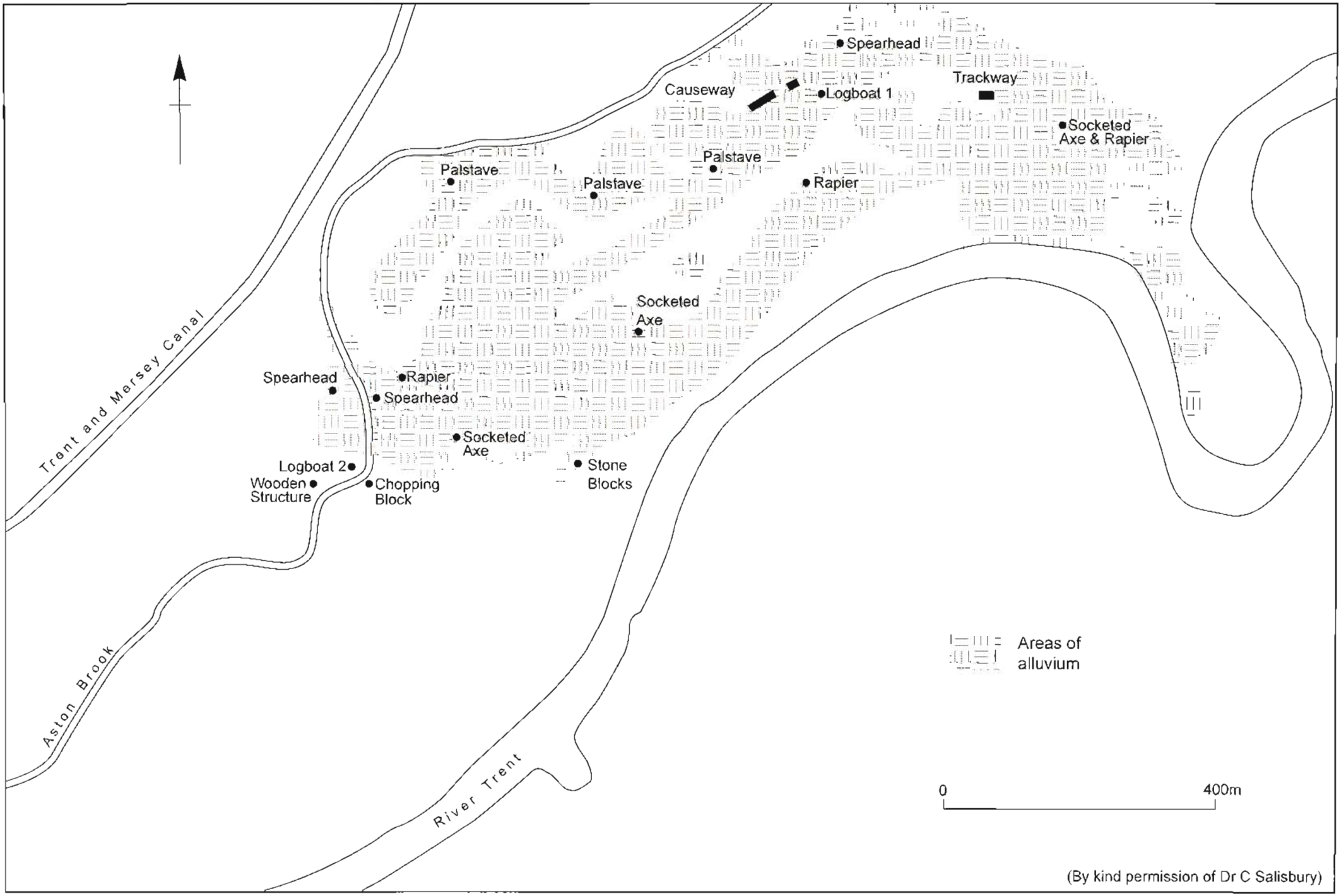

Spearhead
Causeway
Logboat 1
Trackway
Socketed Axe & Rapier
Palstave
Palstave
Palstave
Rapier
Socketed Axe
Spearhead
Rapier
Spearhead
Socketed Axe
Logboat 2
Wooden Structure
Chopping Block
Stone Blocks
Trent and Mersey Canal
Aston Brook
River Trent
Areas of alluvium
0
400m
(By kind permission of Dr C Salisbury)

Fig.6

Plate 1

Plate 2

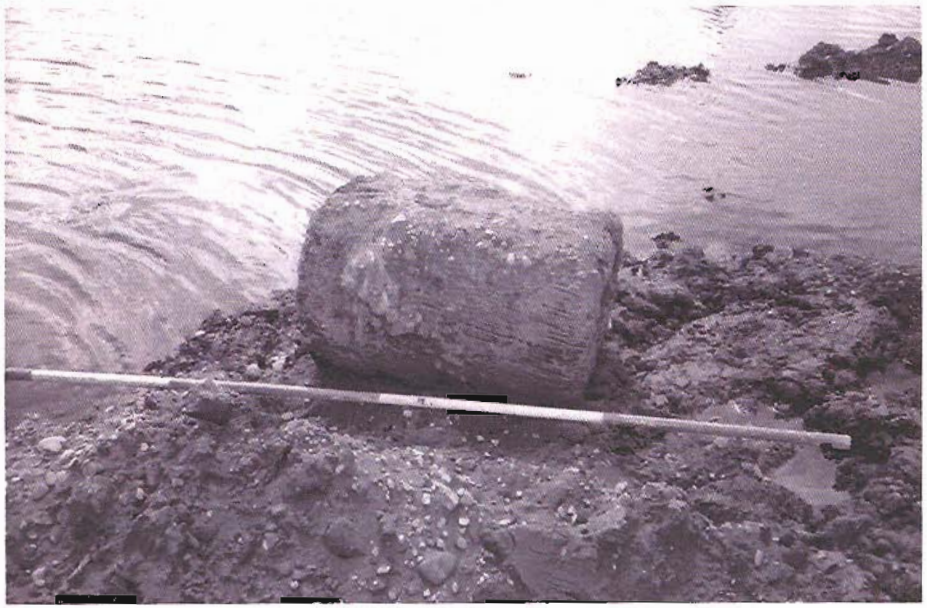


Plate 3

Plate 4

Plate 5

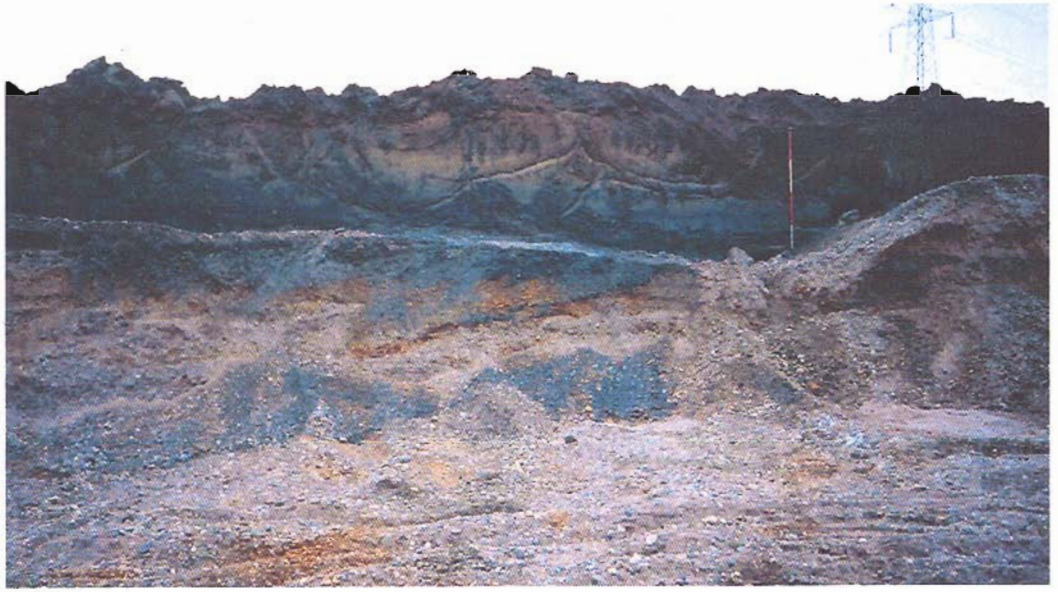


Plate 6

Plate 7

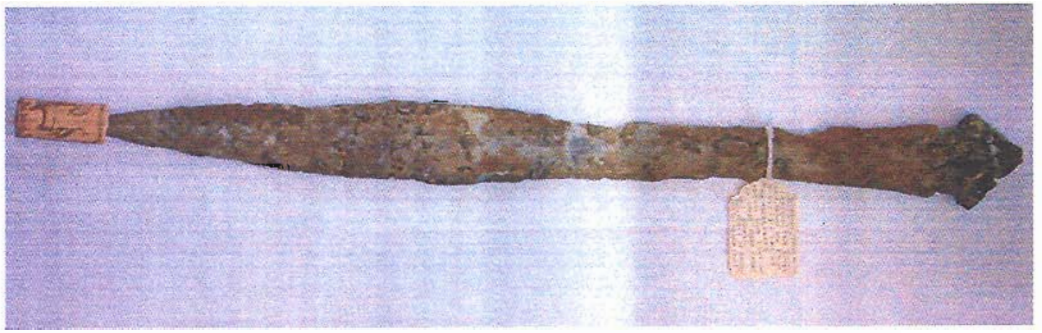


Plate 8

Appendix 1

The Palaeolithic by Alex Lang

Shardlow quarry currently extracts aggregate from the Hemington member of the Trent Valley Formation (Maddy *et al*. 1999). This is a low terrace, c. 1m above the floodplain, above which lies the alluvium of the Holocene (identified as the Trent member, *ibid.*). The gravel is thought to date to c. 11 Ka, and is therefore associated with the late glacial period in Britain, a time of reoccupation by Humans in Britain after the major cold stage of the LGM (late Glacial Maximum) c. 24 – 18 Ka.

Large amounts of Lower and Middle Palaeolithic artefacts are recorded from the Trent Valley, most notably by Posnansky (1963) from two major quarries of the River, Hilton and Willington. There is therefore every possibility that these artefacts have been reworked through various natural processes into the later terraces of the Trent. This is a common occurrence throughout the Midlands and perhaps the most important example is from the Carrant Brook in South Worcestershire (Whitehead 1988). Informal watching briefs held over two decades recovered a vast array of artefacts relating to the Lower, Middle and early Upper Palaeolithic periods in Britain. The majority of these artefacts related to much earlier deposits but were reworked by natural processes into the later gravel.

Methodology

There is every likelihood that this is the case at Shardlow. Monthly watching briefs must be continued, including observing the extraction area, walking across the pit floor and observing rejects from the waster pile. Artefacts are likely to range across all Palaeolithic periods, including the late Upper Palaeolithic, when Humans were beginning to reoccupy Britain.

If any artefacts are found it is important to observe where the current extraction areas lie, as Palaeolithic artefacts are often found in 'clusters' (e.g. Hardaker 2001). Observations for bones should also be tied into the archaeological watching brief as Palaeolithic sites are as much about the environment as they about the archaeology itself. Once the extraction area is moved away from the River and overlying alluvium, observations should be increased to fortnightly. The potential for discovering Palaeolithic artefacts (especially Lower and Middle Palaeolithic) are more likely to be derived within higher terrace features.

The use of EDMs and GPS equipment are useful for recording sections and any *in situ* material found. However, the majority of Palaeolithic artefacts that may be found at Shardlow are likely to be in secondary contexts and very detailed recording on this level will not help to understand the derived nature of the artefacts.

References:

Hardaker, T. (2001) New Lower Palaeolithic Finds from the Upper Thames. In S. Milliken & J. Cook (eds.), 180-98. *A very Remote period indeed; Papers on the Palaeolithic presented to Derek Roe*. Oxford, Oxbow

Maddy, D., A. Brandon, G. R. Coope, T. D. Douglas, C. P. Green, C. Gao, A. J. Howard, D. H. Keen, A. Richards, J. M. Sinclair, K. A. Smith, M. G. Sumbler & P. Worsley (1999) The English Midlands. In Bowen, D.Q. (ed.), 28-44 *A Revised Correlation of the Quaternary Deposits in the British Isles*. Bath, Geological Society Special Report 23.

Posnansky, M. (1963) The Lower and Middle Palaeolithic Industries of the English East Midlands, *Proc. Prehist. Soc.* **29**, 357-394.

Whitehead, P. F. (1988) Lower Palaeolithic Artefacts from the Lower Valley of the Warwickshire Avon. In MacRae, R. J. & N. Moloney (eds.), 103-21. *Non-Flint Stone Tools and the Palaeolithic Occupation of Britain*. Oxford, British Archaeological Reports, British Series 189.

Appendix 2

The Palaeoenvironment by David Keen

This large quarry works the sands and gravels of the Hemington Member of the Trent Valley Formation of the Late Pleistocene. The sequence has a base on Chalky/Jurassic Till which may date to the Middle Pleistocene Anglian glaciation, although ages in a younger ice advance cannot be ruled out. Overlying the till is a coarse gravel up to cobble size laid in plane beds. This gravel probably dates to the Last Glacial Maximum around 20 ka, although an age in the Lateglacial (*circa* 11 ka) is possible. The upper unit is a fine-grained gravel and sand, separated from the lower gravel by a contact along which mud-balls of organic silt, some with wood fragments, are prominent. The upper gravel is cut by sand and organic-mud filled channels dating to the Late Holocene.

Methodology

The sequence in the quarry is complicated both in vertical and lateral planes. To obtain a clear idea of the genesis of gravel bodies and channel systems the pit should be visited at no longer intervals than monthly and sections recorded as the faces are cut back. It is vital that sections and channels are accurately recorded on plans of the site either by conventional survey using an EDM, or by means of GPS technology. The three dimensional geometry of the channels and sediment bodies can only be determined if such accurate survey is coupled to section recording. It would be necessary for the sections to be recorded by someone with familiarity with the deposits of large-scale fluvial systems.

The Shardlow deposits have the potential to provide a long environmental record from Middle Holocene times onwards using palaeobotany (pollen and plant macro-fossils), insects (Coleoptera, Trichoptera), Mollusca and Ostracoda. Because of the extensive spread of deposits and numerous channels the temptation would be to sample every channel. This would be the wrong option, because processing the large amount of sediment collected would be very difficult and the pollen, insect and snail counting would consume large amounts of resources. Scientifically this would not be justified as many of the channels seem to be of similar age and would produce a similar environmental story. As the sections by the boat seem to be in the axis of a channel and thus contain the thickest sediment, I suggest that a “master section” be identified which is sampled bottom to top using monolith tins (or serial samples of 10cm vertical extent) which can then be analysed for all environmental proxies from the same section ensuring direct comparability of evidence. Subsidiary samples from the smaller channels could then be taken to add detail to the environmental account. It would also be useful to sample conspicuous pockets of shell, insect or seed-rich sediment as single bulk samples up to 10 kg in weight, as these often produce large numbers of shells or insects and raise the diversity of the fauna being examined. Spoil heaps around the faces should be routinely examined for bones. On most of my visits to the site bones have been found.

Although palaeobotany or animal fossils may give some idea of the age of a deposit none of the possible proxies can give the detailed chronology possible with radiocarbon. However, radiocarbon dating fluvial sequences are not without their problems as plant debris is typically re-worked by floods and large errors of dating can result. It is not

adequate in the sort of sequences as those at Shardlow to obtain a single date from a section. At minimum dates should be done from the base, middle and top of channel fills as this allows the identification of errors (the oldest date should be at the base, the youngest at the top; inversions are clearly wrong). Dating of seeds by ^{14}C AMS would allow samples for dating to be taken from a monolith "master" section so giving a close age framework for the environmental data. Lesser channels could then be correlated to the master section by palaeontology and dated by selected radiocarbon assay of particular horizons in the channels.

Appendix 3

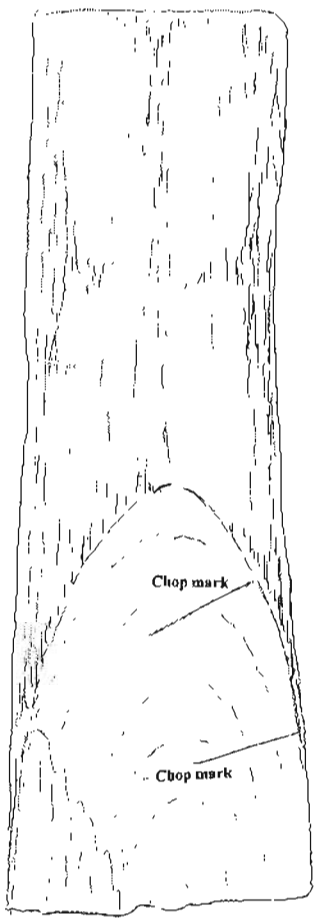
Examination of a Tree Ring Sample from Structure 1 by R. E. Howard

The sample was a section of timber some 0.27m long by 0.07m diameter taken from one of the upright stakes forming Structure 1. The timber appears to represent part of a whole small timber or tree (traces of bark, and particularly the sub-bark cambial coating being present), rather than a section of timber such as a half or quarter tree, or a boxed-heart section. Although there was no post-excavation decay or degradation, the timber being waterlogged, the timber was first frozen to consolidate and stabilise the wood. Once frozen a complete cross-sectional slice , 0.02m, thick, was cut from the widest end of the timber. This slice was then prepared using a Stanley knife blade and scalpel to show the annual growth rings present and help with the identification of the wood type. At this point it was seen that the sample, which was identified as oak, had only thirteen annual growth rings, far below the statistically reliable minimum of 54 rings required for reliable cross-matching and dating. It was thus not possible to attempt any dendrochronological analysis. A few brief observations of the timber may, however, be made.

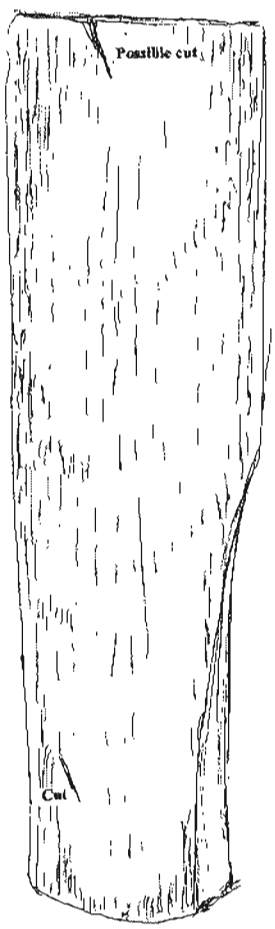
Given that the timber represents a whole section, and that it has thirteen annual growth rings, it is clear that the timber had been growing for thirteen years when it was cut. The growth of the timber is eccentric however, with the centre of the tree being nearer to one side than other. At the widest point of growth the average annual ring width is 3.07m, being approximately 1.77m at the narrowest point. Along these growth radii there is little variation in growth-ring width year on year. This regular regime with little annual variation is more indicative of growth in open, rather than closed conditions, suggesting that there was relatively little competition from other trees. Given too that the timber has an eccentric centre, it is more likely that it grew as a small side branch on a tree, with one side, the widest section of growth, being the underside and acting as a buttress. Were the timber grown as a sapling pole under managed coppice conditions there would be less eccentricity (though still possibly some), and the earliest growth-rings would be nearer the centre of the timber.

The piece of timber is part of a stake, stave, or pole. One end of the timber is slightly smaller and it appears to have been chopped or cut back. There is evidence of working with a blade to the cut surface and under a microscope clear indication of two cut marks made by a fine bladed implement can be seen. This chopping probably represents the felling or cutting of the wood, this being done with perhaps no more than three blows from a machete type implement, the pole then being twisted slightly to snap it off (there is a small patch of rough surface area possibly caused by such breaking action). Such a method of cutting gives the timber a slightly more pointed end and makes it easier to stick into the ground. There is no sign of any other working to the surface of the timber, and it does not appear to have been trimmed or shaped in any way. It was probably used with the bark left on. There is, however, what appears to be a small cut, about 1cm long by about 2mm wide, in the surface of the timber. Given that this cut is at a slight angle, i.e. it is not in line with the grain of the wood which, when waterlogged, often splits naturally when drying, this suggests that it might have been made by sticking a knife into the wood. There is another possible small cut on roughly the same face, at the other end of the piece of wood, but there is less certainty that it has not been caused later. These

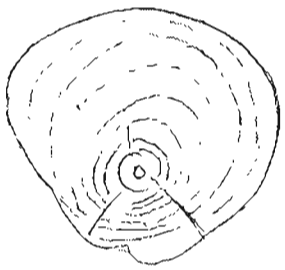
points are indicated in the illustration overleaf. Some other very small marks on the surface of the wood may have been caused during of after excavation.



Face view of timber to show worked end and position of chop marks



Side view of timber to show chopped end and position of possible cuts



End view of timber to eccentricity of growth.

All radii contain 13 annual growth rings, but on one side (top) each ring is much wider than on the opposite side (bottom). Such growth is more indicative of a branch than of a coppice pole where the growth round all sides might be more even.