The Excavation of a Roman Road and a Medieval Causeway at Ditchford Pit, Wellingborough, Northamptonshire

by

GRAHAM D. KEEVILL AND ROBERT J. WILLIAMS

SUMMARY

Ditchford Pit, run by ARC Central, lies on the north bank of the river Nene, approximately 3 km east-south-east of Wellingborough. Irchester Roman town lies immediately to the south on the opposite side of the river, and Chester-on-the-Water deserted medieval hamlet lies to the east of the Roman town. An existing earthwork running north–south across the floodplain towards the river was evaluated by the Oxford Archaeological Unit on behalf of ARC Central in 1989. The earthwork was shown to be a metalled road, and part of it was excavated by OAU in 1994. The feature is Romano-British, and is oriented on the east gate of the Roman town. OAU has also been maintaining a watching brief on the extraction programme since 1991, and in August of 1992 part of a previously unsuspected causeway was revealed. Radiocarbon dating has established that this was a medieval structure. The two excavations are described in this report, and the structures are placed in their local and regional contexts.

INTRODUCTION

Ditchford Pit (SP 918673) lies on gravel terrace deposits in the floodplain of the river Nene approximately 3 km east-south-east of Wellingborough town (Figs 1 and 2). The pit area is entirely contained within Wellingborough parish and mainly consists of flat hay meadow at around 42 m above Ordnance Datum (OD). The ground rises sharply to the south across the river to a level of approximately 82 m OD on the main A45 road (RCHME, 1979, 90, and information from modern 1:1250 Ordnance Survey maps). The ground rises rather more gradually to the north and west towards Wellingborough. The Nene flows from west to east through the quarry, turning north towards Ditchford Mill and Bridge (SP 930682). The landscape is otherwise dominated by the mainline railway which crosses the floodplain on an embankment and crosses the river on a viaduct. The railway embankment bisects the quarry, and the operations described in this report occurred both to the north (Roman road) and the south (medieval causeway) of the line (Fig 2). A disused railway branch line to the east is used as a haul road within the quarry (Fig 1).

The middle reaches of the Nene valley are extremely rich in archaeology of all periods (RCHME, 1976 and 1979), and gravel extraction in the area has engendered numerous excavations and watching briefs. In recent years the Raunds Area Project (RAP) has seen a concentrated programme of archaeological fieldwork in the parishes of Raunds, Ringstead and Hargrave, covering approximately 40 km^2 (Dix, 1986–7). The parish of Wellingborough adjoins the west edge of the RAP survey area and has received rather less archaeological attention, although numerous sites are known from aerial photography and fieldwork (RCHME, 1979, 166–70). The most important site in the area, however, is the Roman town of Irchester (SP 917667) on the south side of the river at the north edge of the parish of the same name (RCHME, 1979, 91–6). The town lies at the junction of three Roman roads and occupies the slope from the higher ground to the south towards the river. The earthwork remains of the town defences are impressive, and extra-mural settlements exist to

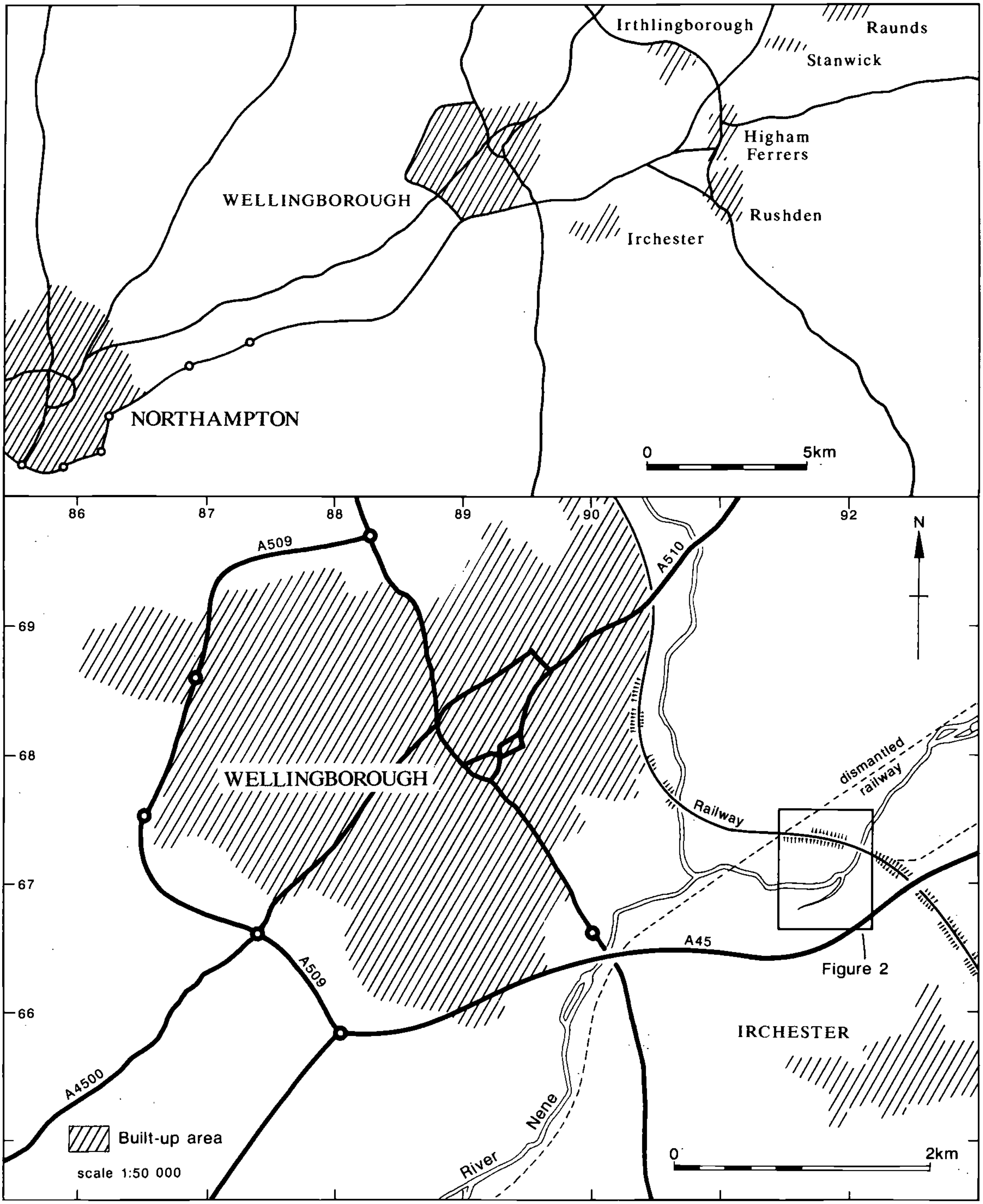

Fig 1 Ditchford Pit, Wellingborough: site location map.

the south, east and west (RCHME, 1979, 95; Dix, 1991). A Roman cemetery was discovered during ironstone quarrying in the Cherry Orchard area during the late 19th and early 20th centuries (RCHME, 1979, 95). Irchester and its environs have been subjected to sporadic programmes of archaeological fieldwork since the late 19th century.

A low linear earthwork (County Sites and Monuments record no 3127) was recognised crossing the floodplain to the north of Irchester in the 1970s (RCHME, 1979, 96). The earthwork ran north-north-west to south-south-east and was aligned on the east gate of the Roman town. It was interpreted as a causeway or road of probable Roman date. Aerial photographs show that the feature intersects with several palaeochannels (Plate 1).

Little is known of the Anglo-Saxon history and archaeology of the immediate vicinity. Two saucer brooches reputed to be from the area (Leeds, 1913, 200; Meaney, 1963, 190) can be discounted, as they derive from the cemetery at Marston St Lawrence in the south-west of the county (Kennett, 1969, 49; RCHME, 1979, 96). Other Saxon finds have been made straddling the parish boundary between Wellingborough and Great Doddington approximately 3 km south-west of the site (RCHME, 1979, 169). The most important medieval site is the deserted hamlet of Chester-on-the-Water immediately to the east of the farm at Chester House (RCHME, 1979, 96).

The gravel quarry at Ditchford takes its name from the mill and bridge which lie 3 km east of the town of Wellingborough. The mill is first mentioned by name in 1235 (Gover *et al*, 1933,

Plate 1 Ditchford Pit, Wellingborough: oblique aerial view looking south-east, clearly showing the causeway overlain by the Wellingborough to Bedford railway line, and Chester House Farm at the top (photograph by courtesy of Northamptonshire Sites and Monument Record, copyright Northamptonshire County Council).

183) and lies on the main channel of the river Nene immediately to the east of Ditchford Bridge. The latter lies at the junction of three medieval townships (Irchester, Irthlingborough and Rushden) and is first documented in 1292 in the *Compotus* Rolls of Peterborough Abbey; the abbey then held the manor of Irthlingborough (McKeague, 1988–9, 179).

ACKNOWLEDGEMENTS

The Roman road project was funded by ARC Central Ltd, while the medieval causeway project was funded by English Heritage. We are very grateful to ARC for all their assistance throughout both projects, and especially to Andy Bate (Area Manager), Ron Binder (Pit Manager) and Malcolm King (Pit Foreman) for their support. Glenn Foard and Sandy Kidd of Northamptonshire Heritage (previously the Curatorial Section of the Northamptonshire Archaeology Unit) deserve special credit for their assistance and encouragement of our efforts, and we are particularly grateful for their help in obtaining funding for the excavation of the medieval causeway from English Heritage. The English Heritage Inspectors for the county, Anthony Fleming and latterly Malcolm Cooper, have been instrumental to the success of the projects, and we are extremely grateful to them. David Neal, Rob Perrin and Vicky Crosby of the Central Archaeology Service kindly provided information on the medieval causeway excavated by English Heritage at Stanwick, Northants.

John Moore, Simon Palmer, Ellen McAdam, Anne Dodd and Dave Jennings provided internal management support throughout the excavation and post-excavation programmes. We thank all the specialists who have contributed to this report, but particularly Dr Mark Robinson who also visited the sites on several occasions; he has been a constant source of help and advice, and the text has benefitted substantially from numerous conversations with him. Finally, full credit is due to the excavation teams of: Steve Lynch, Chris Richardson, Dan Poore, Gabor Thomas and Gwilym Williams (Roman road); and Bob Bailey, Jim Collins, Peter Harris and Gareth Williams (medieval causeway), for their hard work and endurance, often in difficult conditions. Mark Roberts accompanied Dr Mark Robinson on a site visit to the medieval causeway after that excavation had finished, and drew the section which is reproduced here as section 2 on Figure 7. Bob Williams wishes to thank Gordon Heritage for his skilful use of a metal detector. Graham Keevill wishes to thank Miss R. Watson, County Archivist at the Northamptonshire Record Office, for her assistance with NRO Map 605, reproduced here as Plate 6.

ARCHAEOLOGY AT DITCHFORD PIT

Modern quarrying, the construction of railways and road widening have all taken their toll on the archaeology of the Wellingborough/Irchester area. Indeed the eastern half of Ditchford Pit had already been quarried before the programme of archaeological works described here began. ARC Central applied to Northamptonshire County Council for planning permission to extend the pit in 1989. The council decided that the existing causeway should be evaluated in advance of determining the application, and ARC Central commissioned OAU to undertake this work in July 1989.

The evaluation took place in August 1989. The visible earthwork was surveyed, and six trial trenches were excavated along its course (Fig 2). Trenches 1–3 investigated the northern end of the structure, which was the subject of the 1994 excavation. Trench 1 revealed the full width of the agger and its side ditches, although poor ground conditions made detailed recording very difficult. Trenches 2 and 3 were thought to have revealed a shallow palaeochannel at the southern end of the causeway, apparently confirming the aerial photographic evidence; the excavation of this area, however, did not locate a palaeochannel here. Trenches 4–6, sited 300 m further south, examined the relationship between the structure and a number of palaeochannels. Trench 6 revealed a sequence of metalled road surfaces between flanking ditches 12 m apart overlying the palaeochannel fills containing waterlogged deposits. None of the trenches produced any positive dating evidence.

ARC Central were granted planning permission for the pit extension, but there were a number of archaeological conditions. The first of these was

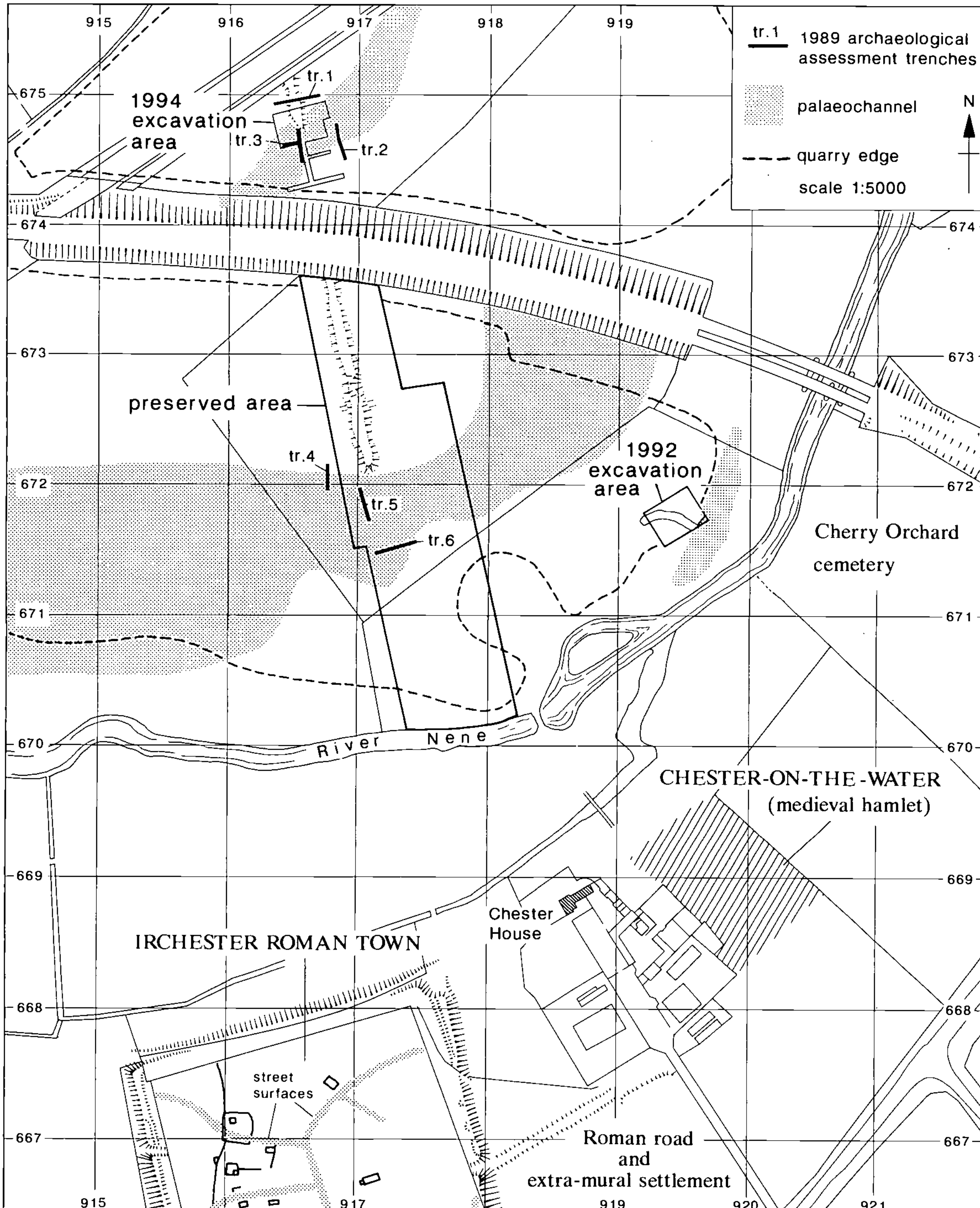

Fig 2 Ditchford Pit, Wellingborough: location plan showing the Roman road and medieval causeway in relation to the Roman town of Irchester and the medieval hamlet of Chester-on-the-Water.

that an area to either side of the earthwork between the mainline railway and the river Nene should be taken out of the extraction plan and therefore preserved in situ (Fig 2). A watching brief was then to be kept on the remaining area, with the principal aim of recording any palaeochannels which were exposed and obtaining palaeoenvironmental samples from the channel fills. Finally the earthwork was to be excavated in the small area between the mainline railway and the disused branch line to the north before extraction took place there.

Extraction and the concomitant watching brief commenced in October 1991, and OAU personnel made regular visits to the site from then onwards. The visits were arranged with Ron Binder, ARC's pit manager, to coincide as far as possible with initial stripping of overburden in regular stages. The previously unknown medieval causeway was discovered during this process; the circumstances are fully described below. The watching brief was still ongoing at the time of writing (December 1995) and was expected to continue for a considerable time. The area designated for full excavation was scheduled for extraction during 1994. ARC Central and OAU therefore arranged for the excavation to take place during June–July 1994. Again the circumstances are described more fully below.

On-site recording for the watching brief and for both excavations followed the single context recording system used by the Oxford Archaeological Unit (Wilkinson, 1992). A tripartite numbering system was used for the linear features flanking the Roman earthwork during the 1994 excavation: a primary number (ditch) was assigned to each ditch at a 'group' level, and a second context (cut) was used for each excavated segment; fill numbers were assigned by segment/cut. The site code WHDC was used during the ARC-funded watching brief and 1994 excavation, with suffixes to identify the year in which work was carried out (i.e. WHDC 92, WHDC 94). The site code WHDNC was used for the English Heritage-funded 1992 excavations so that the projects could be kept separate for administrative purposes.

The original site records, finds and archival information for the watching brief and excavations will be deposited in an approved store in Northamptonshire. Unfortunately storage problems within the county mean that the final destination had not been determined when this report was undergoing final editing (December 1995). The sites are recorded on the Northamptonshire Sites and Monuments Record, however, and the ultimate destination of the project archives will be noted in the SMR at the appropriate time. Microfiche copies of the archives will be lodged with the National Monuments Record.

THE ROMAN ROAD EXCAVATION
by Robert J. Williams

with contributions by Leigh Allen, Paul Booth, Philippa Bradley and Dr Mark Robinson.

INTRODUCTION

The short length of earthwork in the small area between the railway and the disused branch line to the north was excavated by OAU between 27 June and 22 July 1994 under the direction of Robert J. Williams. The four principal objectives of the excavation (defined in Foard, 1990) were:

i. To date the construction and use of the causeway and to investigate its stratigraphic relationship to the alluvium.
ii. To determine the nature of construction of the causeway and its flanking ditches and ascertain any structural sequences within it by means of representative cross and long sections.
iii. To examine the relationship of the causeway to the projected palaeochannel and to determine the detail of construction at the crossing.
iv. To explain why the causeway appears to be discontinuous.

An area of *c*. 42 m × 28 m was stripped with a 10 tonne 360° excavator using a 1.5 m-wide toothless bucket (Fig 3). The excavation area was centred on the southern end of the visible earthwork and extended over the projected position of the palaeochannel recorded in the 1989 evaluation trenches. A 34 m-long and 3 m-wide trench (Fig 3: Trench A) was excavated southwards along the centre line of the causeway.

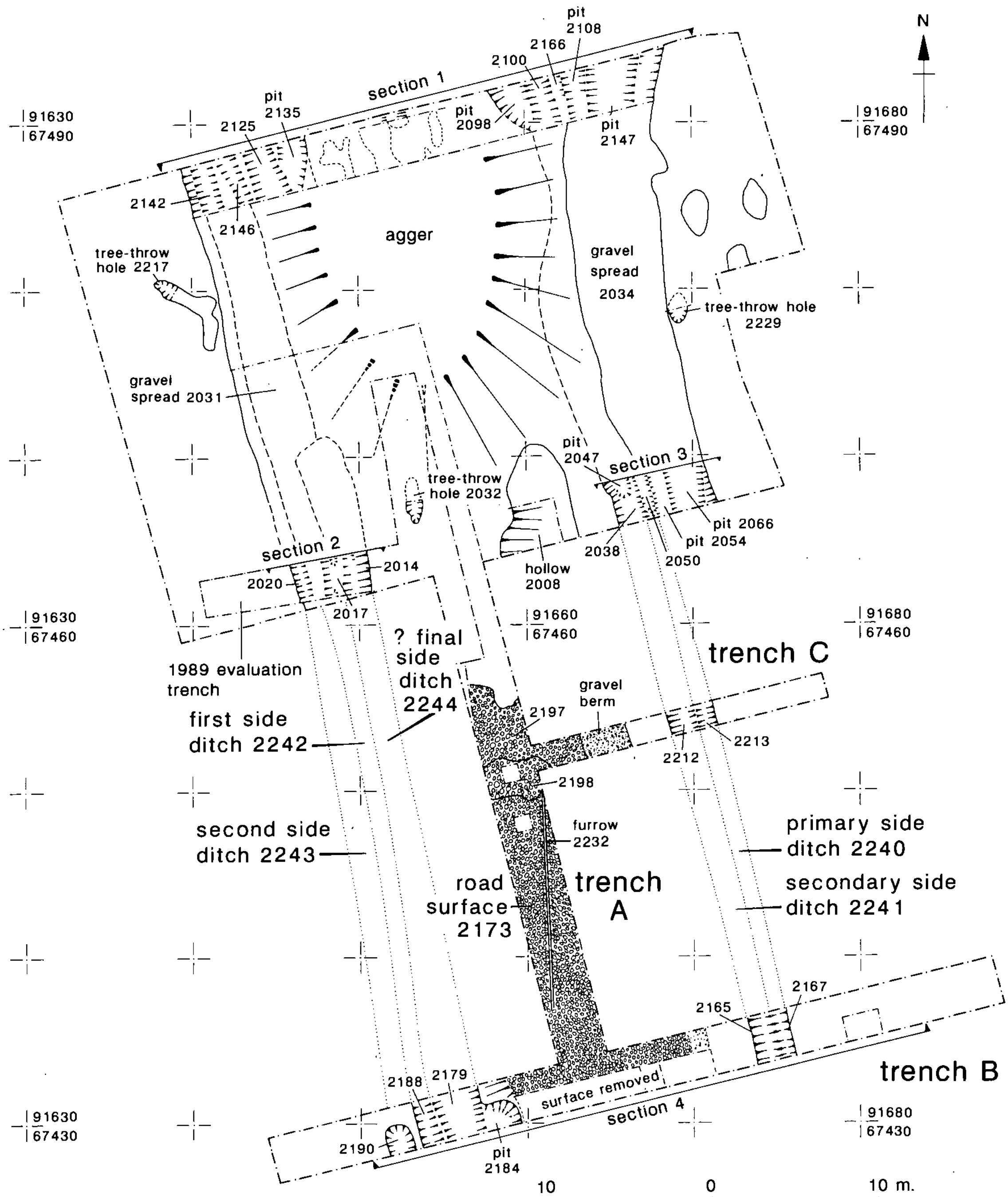

Fig 3 Ditchford Pit, Wellingborough: site plan of the Roman road showing all features and excavated areas.

A 50 m-long and 3 m-wide trench (Fig 3: Trench B) was excavated at right-angles to the southern end of Trench A, revealing the full width of the road and its side ditches. A narrower, 18 m long, trench (C) was also excavated in an easterly direction to establish the line of the eastern side ditch, and to determine whether any of the flanking quarry ditches extended south beyond the surviving part of the agger.

A metal detector search was made of the entire stripped area including the metalled road surface. This resulted in the discovery of most of the metalwork finds described below. Environmental support was provided by Dr Mark Robinson, many of whose comments are included in the report. On his advice it was decided to take a single sample from the partially waterlogged base of the west side ditch (ditch 2244, cut 2179, layer 2178). The results of the analysis for plant and invertebrate remains appears below.

DESCRIPTION

NATURAL FEATURES

A late Devensian clayey soil (layers 2153 and 2154) to the east of the road was particularly visible in Trench B (Fig 5: Section 4). The late Devensian soil had been sealed by a layer of brown sandy loam (2152), thought to have resulted from Roman ploughing, which had in turn been sealed beneath alluvium (see below). Numerous amorphous tree-throw holes filled by a dark grey clayey loam were visible on the gravel surface. Three examples were partially excavated (Fig. 3: 2032, 2217 and 2229), but the others have not been shown on Figure 3 for reasons of clarity. One (2229) had been partially cut away by the digging of the outermost eastern side ditch, and contained evidence of burning; this is typical of Neolithic and Bronze Age woodland clearance activity. A number of the tree-throw holes had been sealed by the soil forming the agger and others were noted beneath the metalled road surface to the south. The fills of the tree-throw holes and the late Devensian soil were indistinguishable in the south-east corner of the site where this soil was thickest. Numerous tree-throw holes, some very large and deep, were also noted in the upper gravel during the watching brief of the soil stripping operation in the gravel pit to the east of the road. Although these features are not uncommon they are particularly prevalent in the Nene Valley (Dr Mark Robinson, pers. comm.).

THE AGGER AND GRAVEL ROAD SURFACE

The agger was visible as an earthwork for a maximum of 44 m on the field surface between the disused railway and the Wellingborough to Bedford railway. The earthwork was between 11 m and 14 m wide. The north end had been disturbed by the disused railway and no evidence for its continuation is visible to the north of the haul road. The excavation area included an 18 m-long stretch of the agger earthwork (Fig 3). The agger was more pronounced once the alluvial overburden had been removed. The earthwork was now up to 22 m long, 17 m wide and 0.6 m high at its centre (measured above the surrounding stripped gravel surface), with a gently cambered cross-section (Plate 2). A 3 m-wide section (Fig 5: Section 1) was excavated both by hand and machine at the north end of the excavated area. The south-west end was excavated as a 'quadrant' (Fig 3) producing a longitudinal section of the agger where it sloped down to the gravel surface.

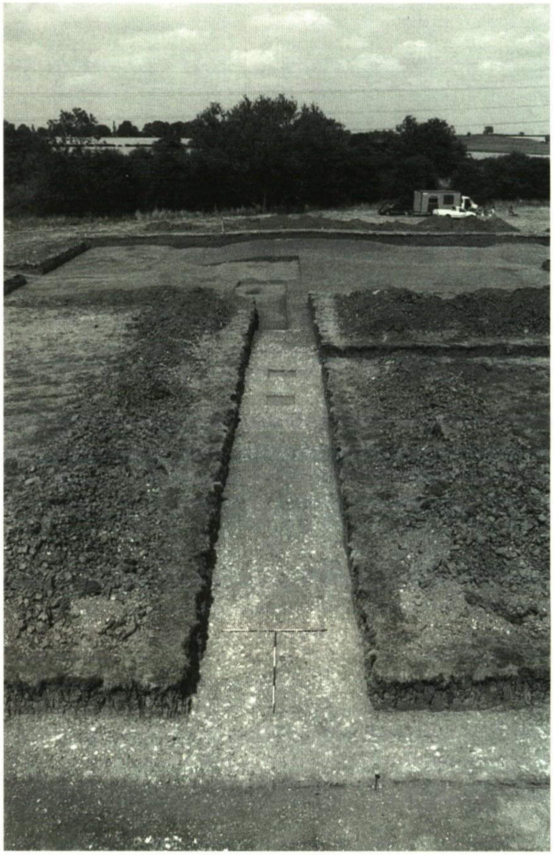

Plate 2 Ditchford Pit, Wellingborough: view of the Roman road excavation looking north with the metalled surface in the foreground (OAU).

The agger consisted of brown loam up to 0.45 m thick (Fig 5: Section 1, layer 2136), with no trace of a turf line beneath the gravel road surface. The small amount of gravel within layer 2136 indicates that it was a plough soil rather than a truncated meadow soil. It was impossible to distinguish any

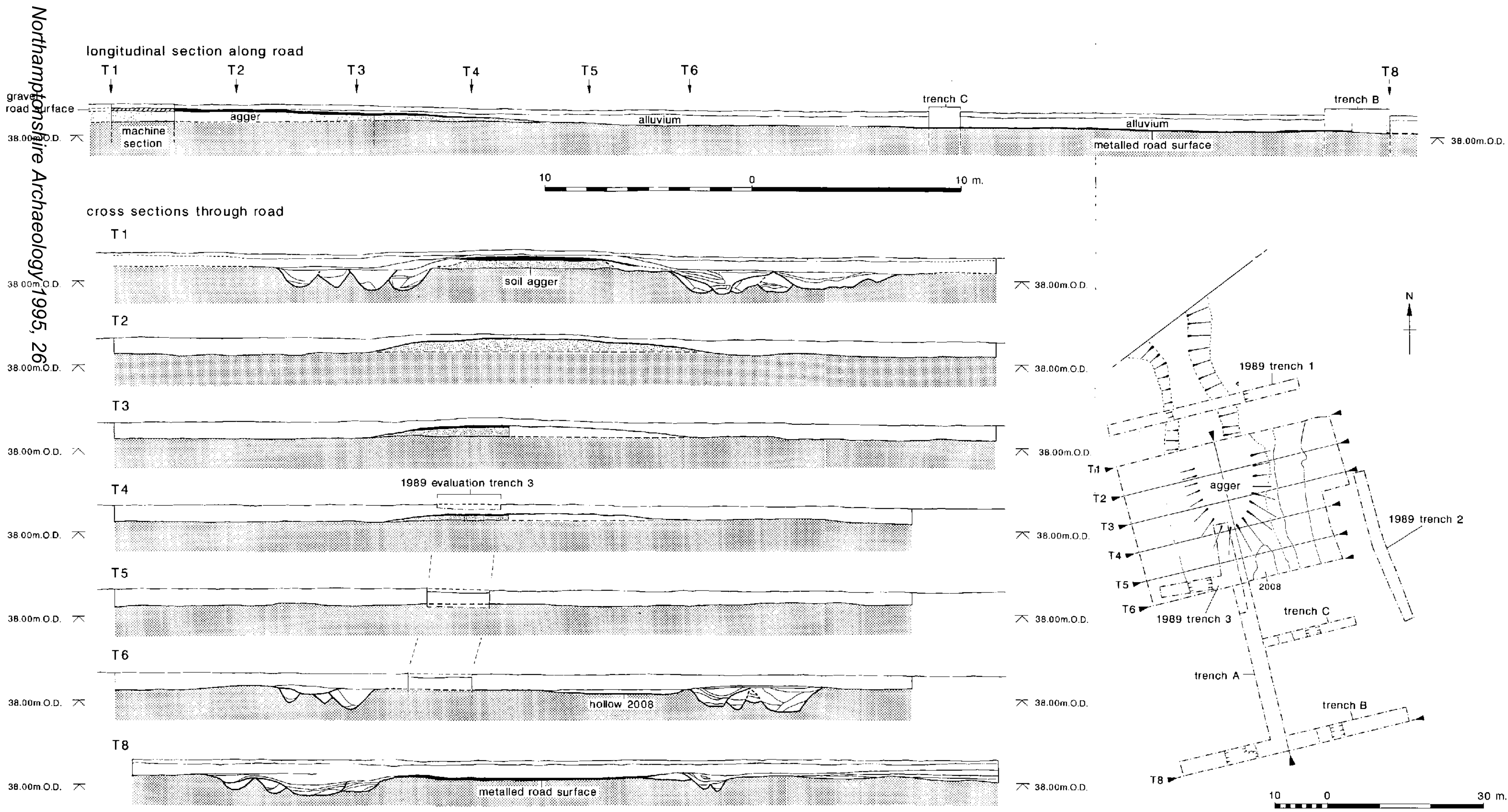

Fig. 4 Ditchford Pit, Wellingborough: schematic longitudinal and cross sections of the excavated part of the Roman Road.

Fig. 5 Ditchford Pit, Wellingborough: the Roman road, sections 1–4.

change throughout its thickness, although it is probable that it was composed of a combination of both the original ploughsoil and soil from excavation of the quarry pits to either side. It is also possible that the topsoil removed along the line of the metalled road to the south (see below) was also used in the construction of the agger.

The soil agger had been covered with a layer of gravel metalling (Fig 4: Section 1, layer 2122) surviving to no more than 0.15 m thick. This surface would originally have been substantially thicker but it had suffered from later plough damage and more general erosion. This observation is supported by both the size of the quarry ditches to either side and the volume of gravel (Fig 5: Section 1, layers 2109 and 2120) which had been redeposited in the silted up tertiary layers of the side ditches.

The edges of the agger had also suffered significant disturbance particularly to the east side where a berm, almost 3 m wide, existed between the edge of the road and the ditch. This berm may have been part of the original road construction but had suffered from very late Roman or later Saxon/early medieval ploughing once the side ditch had been totally silted.

The south end of the agger sloped gently down from a maximum height of 0.25 m above the general ground level until it petered out *c*. 15 m north of where the limestone metalled road surface commenced (Fig 3: layer 2197). The gravel metalling became a very thin layer, but it did extend over the entire length of the buried soil agger (see the longitudinal section, Fig 4). This suggests that the gentle incline along its length was intentional rather than a result of subsequent activities or more general erosion.

THE METALLED ROAD SURFACE

The road on top of the agger had been composed entirely of gravel quarried from the side pits. It continued southwards after a gap of 15 m as a consolidated and well-preserved metalled stone surface (Plate 3). Most of the road consisted of an homogenous layer (Fig 3: layer 2173), never more than 0.1 m thick, of small rounded limestone and ironstone nodules 50 to 100 mm across with occasional larger river pebbles in a coarse gravel matrix. The road was *c*. 10.5 m wide where its full width was exposed in Trench B, and its surface was slightly concave in cross-section (Fig 5: Section 4).

A 3 m to 4 m-wide berm was noted between the eastern edge of the road and the east side ditch (2241, cut 2165). The berm had been surfaced with a shallow spread of gravel with no larger stone metalling, partially overlying a truncated but *in situ* soil (Fig 5: Section 4, layer 2164). This was not found under the metalling, suggesting that the contemporary topsoil had been removed by the Roman road builders before the metalling was laid on the exposed gravel surface. This created a slight hollow way. The metalled surface was slightly narrower in Trench C, which only exposed the east side of the road, and the gravelled berm was also well-preserved there. The berm may have been affected by later plough encroachment, as suggested above, but it is probable that it

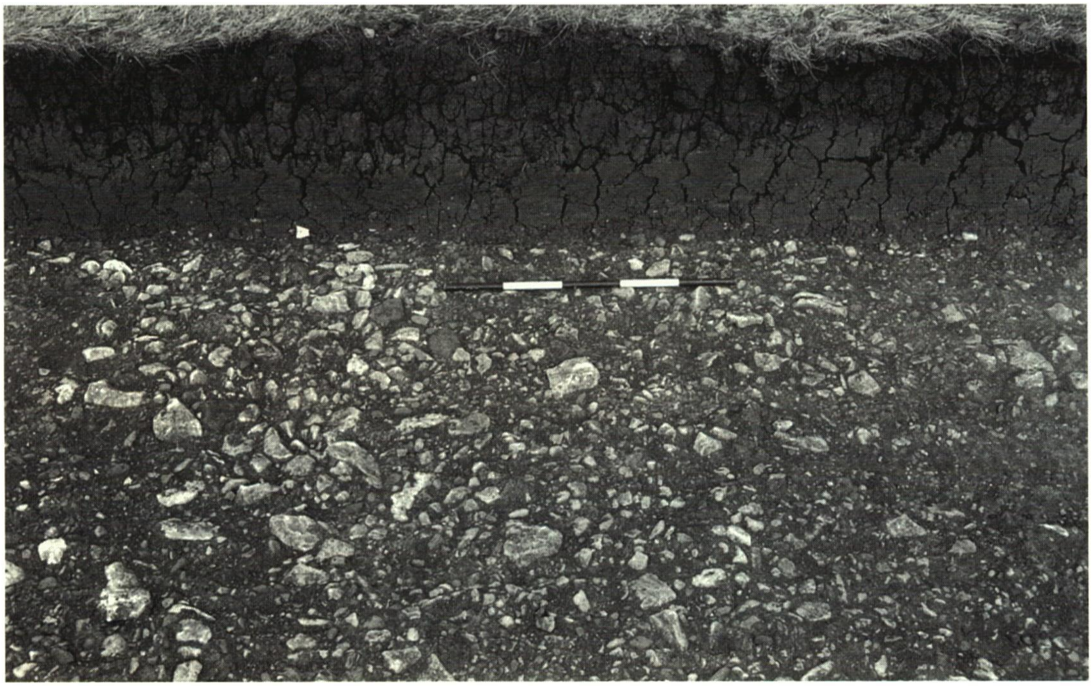

Plate 3 Ditchford Pit, Wellingborough: the Roman road – detail of the metalled surface (OAU).

was part of the original road construction. It has been suggested that pedestrians were very occasionally allowed a metalled side walk on Roman roads (Johnston, 1979, 76), perhaps accounting for the location of the main carriageway off-centre between the side ditches here (Fig 3).

The surface character of the metalled road was slightly different towards its north end, with the inclusion of a greater percentage of more angular fragments of limestone, some of which had been set on edge (Fig 3: layer 2197). A 2.5 m-wide spread of more level limestone slabs (2198) lay immediately to the south of this. It was not possible to determine whether these surface differences had resulted from later patching or were original constituents of the road make-up. A 1 m-square sample of the flat limestone slabs was removed and these were found to lie directly on the natural gravel. It may also be significant that most of the metal artefacts found within the road make-up derived from this area, perhaps indicating that the road metalling at the north end originated as building rubble transported to the site from elsewhere.

Apart from the minor variations in its composition the surface of the road was relatively even falling only 100 mm along its 25 m length (Fig 4). No obvious cart ruts were visible, but a shallow, 13 m-long and 0.13 m-wide 'furrow' (Fig 3: 2232) filled with a brown sandy loam was visible in the road surface between Trenches B and C. It was not parallel with the road and is unlikely to have been of Roman date, although it contained an iron goad (Object 8).

It was evident from several sections dug through the road that the metalled surface lay directly on the natural gravel (Fig 5: Section 4). No earlier features were found beneath the road surface apart from a number of tree-throw pits described above, which contained fragments of limestone and ironstone in their upper fills. It was impossible to determine whether this had been deliberate consolidation of soft spots by the road builders, or whether the weight of traffic had caused subsidence of the metalling into softer hollows.

The metalled road surface had been sealed beneath the alluvium with no visible intervening deposit. The limestone of the road surface was very leached, however, probably as a result of decaying organic material in the overlying alluvial sediment which remained heavily gleyed. The absence of any soil accumulation between the road and the alluvium indicates that the road had remained clear of debris until alluviation commenced, probably in the late twelfth century (Dr Mark Robinson, pers. comm.). The corollary must be that the road either remained in use after the Roman period, preventing the build up of a soil, or that the onset of alluviation commenced earlier than has generally been considered.

THE QUARRY PITS

The 3 m-wide section (Fig 5: Section 1) across the north end of the agger revealed a complex sequence of ditches and pits on either side of the road. Some of the cuts (including 2125, 2142 and 2146 to the west and 2100 and 2166 to the east) were the side drainage ditches (described below), but these had been dug through the partially infilled remains of somewhat amorphous quarry pits.

Pit 2135 immediately to the west of the agger was *c.* 1 m deep (below the gravel surface) and at least 2 m wide, but it was only visible in the south-facing section. An almost identical pit (2098) on the east side had also been cut away by a side ditch (2241, cut 2100); it was of similar dimensions to 2135 and similarly was only visible in the south facing section. A flat-bottomed cut (2108) may have been another early quarry pit. Its west side had been cut away by the primary side ditch (2240, cut 2166), and its east side by a later quarry pit (2147). This quarry, which was at least 4 m wide but only 0.7 m deep, was visible in both the north and south-facing sections.

Sections were also excavated towards the southern end and on either side of the agger on the projected line of the side ditches. There was no evidence for any quarry pits on the west side (Fig 5: Section 2). The sequence shows a similar pattern on the east side (Fig 5: Section 3) to that described above. The most westerly pit (2047) was only visible in the south-facing section. Feature 2054 appears to have been an earlier pit cut away by a much larger flat-bottomed quarry (2066).

The quarry pits (2047, 2098 and 2135) closest to the road were clearly discrete pits of rounded form, but the similarity of cuts 2054 with 2108 and 2066 with 2147 indicates that they may have been continuous along the east side of the agger. They did not extend as far as Trench C, however, and must have terminated a short distance beyond the south end of the agger.

All of the quarry pits contained very mixed fills of loamy deposits with pockets of sandy gravel, suggesting that they had been backfilled by hand rather than having been infilled through natural processes. It has previously been noted that quarry pits were sometimes dug to provide materials for Roman road construction, although the excavation of broad 'scoop' ditches along one or both sides of the road was more typical (Johnston, 1979, 76; Margary, 1973, 19). It is difficult to determine how much gravel was obtained from the pits as opposed to the side ditches at Ditchford, because it was not possible to reveal any length of the pits in plan.

The excavated evidence suggests that most of the gravel for the agger was dug from the east side of the road. None of the quarry pits/ditches extended for any distance beyond the south end of the agger, since there was no need for additional material apart from that required for the road surface itself. The limited quantity of gravel for this could have derived from the excavation of the drainage ditches to either side and any surplus from the construction of the agger.

It was noticeable that the quarry pits and ditches had only removed the coarse upper gravel above the much looser good quality sands and gravels. This coarse material, which is frequently used nowadays to construct temporary haul roads, contained sufficient clay within its matrix to bind the aggregate together when compacted. The looser material below would have been too friable to have formed the top of the agger and the road surface without the addition of other material to bind it together.

If the side ditches (described below) were also contemporary with the construction and early use of the road the quarry pits/ditches must have been landscaped to create smooth-sided cuts. The very mixed nature of the fills and their contorted layering supports this hypothesis. The outer broad and shallow quarry on the east side of the road appears to be relatively late in the sequence of cuts, although at no point was it possible to establish its relationship accurately with either the primary (2240) or secondary (2241) continuous drainage ditches. It is possible that this feature was dug sometime after the road was built to provide material for patching or resurfacing, but no independent dating evidence was found to support this assertion.

There was no need for quarries where the road continued to the south as a hollow way. However, on the west side of the road in Trench B (Fig 5: Section 4), a shallow pit or ditch terminal (2184) cut by Ditch 2244 (Cut 2179) may be the northern end of another sequence of quarries for the continuation of the agger beneath the existing railway line (Fig 2).

THE SIDE DITCHES

A sequence of drainage ditches existed to either side of both the gravel-surfaced agger and the metalled road surface. These had been cut through the filled-in remains of the quarries, and so they were not primarily intended to provide road material. Their principal roles were threefold: to ensure the road was well drained, to remove any surface water and to demarcate the 'road zone'.

Two phases of ditching were evident in all four excavated sections on the east side of the road (Fig 3). The primary ditch (2240) was on the outer line and the subsequent ditch (2241) had in each instance cut away the inner (west) edge of the silted up primary ditch. At no point did the entire profile of the primary ditch survive, although it would originally have been V-shaped. It was up to 2.5 m wide and 1 m deep at the north end, reducing to perhaps no more than 1 m wide and 0.7 m deep at the south end. The later ditch, which was of similar shape and depth, was wider towards its top having been dug through earlier softer ditch or quarry pit fills. Surprisingly, the bases of both phases of ditch slope towards the north although the ground surface falls slightly from north to south towards the river.

The surviving part of the primary ditch contained a characteristic series of primary, secondary, and tertiary silts deposited over a period of time and derived from the erosion of the sides and surrounding area. The fill of the later ditch was entirely different, however, comprising a very sandy soil; this contained pockets of almost pure sand which had been sorted by water flowing along it course. Dr Mark Robinson has suggested that the ditch fill had derived from the inwash of the Roman sandy loam ploughsoil which overlay the later prehistoric buried soil. At its north end the top of the ditch had subsequently been sealed beneath a layer of gravel (Fig 5: Section 1, layer 2109) derived from the erosion of the gravel road surface, which may have commenced in the later Roman period and continued until it was sealed by the onset of alluviation.

Three phases of side ditch ran the entire length of the west side of the road and, like those on the east side of the road, they drained northwards. The first ditch (2242) had a V-shaped profile averaging 0.8 m deep and at least 1.5 m wide, although at no point did the entire upper profile survive. It would originally have been set back 4 m to 5 m from the edge of the road, although this berm had been disturbed by a later ditch (2244).

Two subsequent ditches had been dug to either side of the primary ditch. There was no direct stratigraphic relationship between these later ditches, but analogy with the sequence on the east side of the road suggests that the inner ditch (2244) was the last cut; this is supported by the higher clay content of its fill. The outer ditch (2243) was of similar proportions to the primary ditch and contained a similar sequence of layers, mainly composed of dirty gravels and silty loams. Ditch 2244 was larger: it was over 1 m deep and 2.4 m wide with a V-shaped profile at its north end (Fig 5: Section 1, cut 2125), becoming shallower and wider to the south in Trench B (Fig 5: Section 4, cut 2179). The primary silt of this ditch contained poorly-preserved organic remains. Analysis of waterlogged plant and invertebrate remains from fill 2178 of cut 2179 in Trench B indicates that the ditch held stagnant water. They also indicate that the site was relatively well-drained for most of the year, although the land alongside the causeway could have experienced brief episodes of flooding during the Roman period. The lower fills (2012 and 2178) of two sections of ditch 2244 contained pottery of probable later first to second century date. These sherds may have been residual, however, and could be derived from the fill of the earlier ditch which had been disturbed when 2244 was dug.

The side ditches to the east of the road had been rapidly filled, and were probably almost invisible by the end of the Roman period, but those to the west had been subjected to relatively slow sedimentation. The last two ditches (2243 and 2244) in particular had remained as significant hollows into the post-Roman period, with the upper part of their profiles filled with alluvium (Fig 5: Section 4, layer 2168). A brief episode of early medieval ploughing then seems to have occurred on the site, resulting in the incorporation of a layer of gravel (2171) into the alluvium (Dr Mark Robinson, pers. comm.). This attempt to bring the area into cultivation may also have continued to denude the agger, spreading the gravel to either side of the road. The onset of a lengthy period of alluviation halted any further attempts at cultivation and sealed the entire area (apart from very top of the agger) beneath a thick blanket of alluvial sediments.

OTHER FEATURES AND DEPOSITS

Numerous pre-Roman tree-throw holes have been described above. A hollow (2008) at the south-east end of the agger (Fig 3) was the only other feature not directly associated with the road or its side ditches. The hollow appeared as an elongated depression 5 m wide and over 6 m long in the gravel subsoil. It had been filled with a 0.15 m-thick deposit of alluvium, over which lay a thin spread of gravel sealed by the main alluvium. This gravel interface may also have resulted from the brief period of cultivation following initial alluviation but prior to the onset of the prolonged period of alluviation. The origin of the hollow is uncertain, but it must have formed as a depression in the road surface between the end of the agger and the metalled road.

The top of the agger projected above the level of the floodplain, but the surrounding area (including the silted up side ditches) had been sealed beneath a thick deposit of non-calcareous buff-coloured alluvial clay up to 0.5 m thick. Only a shallow 0.2 m-thick topsoil had formed over the alluvium, supporting typical flood meadow vegetation which probably developed under medieval management of the floodplain as seasonal hay meadow (Dr Mark Robinson, pers. comm.). No physical evidence of medieval or later ploughing in the form of ridge and furrow was evident.

The alluvium directly overlay the gravel terrace deposit on the west side of the road, with little evidence of any intervening soil accumulation. A late Devensian clayey soil (layers 2153 and 2154) to the east of the road was particularly visible in Trench B (Fig 5: Section 4). The late Devensian soil had been sealed by a layer of brown sandy loam (2152), thought to have resulted from Roman ploughing, which had in turn been sealed beneath alluvium.

ARTEFACTS

ROMAN POTTERY
by P. Booth

Forty-two sherds (411 g) were recovered from the 1994 excavation. All but one, a small fragment probably of middle Iron Age date, were Roman. Many of the sherds were relatively small and moderately abraded, and so close dating was not possible. None of the sherds has been illustrated. The Roman material appears to cover the period from the second to the fourth centuries.

Ten fabrics were identified. Only summary descriptions are given here and well-known fabrics are identified only by their common names. The fabric numbers are followed by the OAU fabric code used in the original recording of the material.

1 S30, Central Gaulish samian ware. 1 sherd, 3 g.
2 F52, Lower Nene Valley colour-coated ware. 1 sherd, 44 g.
3 O10, fine orange oxidised fabric, possibly from Much Hadham. 1 sherd, 3 g.
4 O20, oxidised (orange-buff) fabric with moderate rounded quartz sand grains. 3 sherds, 4 g.
5 R10, fine reduced fabric, dark grey-black surfaces with brown core, highly micaceous. 14 sherds, 121 g.
6 R20, coarse reduced fabric. Abundant sub-rounded quartz sand grains, micaceous. 3 sherds, 17 g.
7 R30, fairly fine reduced fabric. Abundant fine quartz sand grains, slightly micaceous. 3 sherds, 81 g.
8 C11, ?late Roman shell-tempered ware. 1 sherd, 5 g.
9 C70, soft fabric characterised by voids, perhaps for leached-out shell inclusions. Oxidised or reduced. 14 sherds, 130 g.
10 AZ3, hand-made fabric, black-brown, with moderate small sub-rounded quartz sand grains and occasional elongated voids. Probably middle Iron Age. 1 sherd, 3 g.

Only five vessels were represented by rim sherds. These were undiagnostic jars in Fabrics 7, 8 and 9 (one each), a straight-sided flat flanged bowl in Fabric 7 from the primary silt (2178) of ditch 2244 and a small fragment probably of a Drag. 35 (Fabric 1) samian ware vessel also from a fill (2012) of Ditch 2244. The Fabric 8 jar from plough disturbance (layer 2192) on the west side of the agger is assignable to the later third to fourth centuries if the fabric has been correctly identified (the sherd is small and poorly-preserved). The probable Drag. 35 is second century and the other vessels may also be of this date, but this is not certain. The Nene Valley colour-coated ware sherd, found during the topsoil stripping operation and consequently unstratified, is a pedestal base from a typical late beaker. Other base sherds are not indicative of specific vessel types.

The assemblage is very limited. The pottery derives principally from quite local sources. The reduced coarse wares are consistent with production in the Nene Valley and Fabric 9 is ubiquitous on Northamptonshire sites, particularly in the first and second centuries. This is the best represented and most widely spread fabric in the assemblage (the sherds of Fabric 5 were all fragments of a single vessel in one context). It is possible that the reduced fabrics (5–7) succeeded Fabric 9 as the dominant local coarse ware, but it is more likely that at least some of the sherds in these fabrics were in use contemporaneously with Fabric 9. The ceramic emphasis of the site may therefore be in the second century rather than later; the only two sherds assignable with some confidence to a late Roman date are in Fabrics 2 and 8.

ROMAN COINS
by P. Booth

Six coins were recovered in the 1994 excavations. Most had been in reasonable condition when lost but were poor when recovered; the bronzes in particular were very unstable. The coins are listed in approximate chronological order. Only Coin 2, which was found in the matrix of the metalled road surface, is likely to have been *in situ*. The remainder were contained in material almost certainly derived from the surface of the agger, but which had been redeposited by plough disturbance over the top of the ditches/quarry pits on the east side of the road.

1 **Denarius**. Caracalla.
Obv. ANTONINUS PIUS AUG
Rev. PART MAX PONT TR P IIII
Ref: RIC IV i, Caracalla 54b. Date A.D. 201.
SF10, Layer 2030 – Plough spread from agger.

2 **Barbarous radiate**, *c*. 11 × 12 mm. Originals of obverse and reverse types unidentifiable.
Date *c*. A.D. 260–295.
SF13, layer 2197 – From matrix of road surface 2197.

3 **AE4**. Constans.
Rev. VICTORIAE DD AUG QQNN.
Mint mark: Missing, a leaf is visible in the field. Probably Trier.
Ref: Probably LRBC I 140/140a. Date *c*. A.D. 341–346.
SF2, layer 2085 – Plough spread from agger.

4 **AE4**. ?Emperor.
Rev. GLORIA ROMANORUM, emperor and captive.
Mint mark: Arles.
Ref: Cf LRBC II 487–489. Date *c*. A.D. 364–367.
SF1, layer 2085 – Plough spread from agger.

5 **AE4**. Gratian.
Rev. GLORIA ROMANORUM, emperor and captive.
Mint mark: Lyons. Details not certain.
Ref: Probably as LRBC II 318. Date *c*. A.D. 367–375.
SF4, layer 2109 – Plough spread from agger.

6 **Fragment**, illegible. Probably 4th century.
SF3, layer 2109 – Plough spread from agger.

METALWORK
by L. Allen

The only metal artefacts other than Roman coins recovered during the 1994 excavation were six small amorphous waste fragments of lead and nine ferrous objects, all found during metal detector survey of the stripped surface during and after the completion of the excavation. The six fragments of lead, none of which is larger than 30 mm across and which formed as molten globules, were all found in plough-disturbed material to either side of the agger. This material had almost certainly originated from the metalled road surface. All but one of the lead fragments were concentrated on the west side. The pieces are all similar in appearance, and they may have derived from the same source.

One of the nine iron objects described below is unstratified, and four each are derived from plough-disturbed material to either side of the agger and from the matrix of the metalled road surface. The four objects from the agger may have been casual losses which became incorporated into the road material. The four objects from the metalling, even allowing for the action of earthworms, probably derived from the same source as the limestone used to surface the road.

The iron objects were X-radiographed at the Oxfordshire Museums Service and subsequently superficially cleaned to aid identification. Only two of the artefacts are catalogued, the remainder comprising four nails/possible nails and three unidentifiable objects.

7 **Padlock bolt** from barb-spring padlock, incomplete.
The bolt has two rectangular-sectioned spines with double leaf springs set at right angles to one another. The spines are inserted into a solid circular-sectioned stop ridge. Barb and spring padlocks of this general type are common in both the Roman and medieval periods (Manning, 1989, 95–97; Biddle, 1990, 1012–1014).
Iron, 91 × 27 × 33 mm. SF15, Layer 2109 - Plough spread from agger.

8 **Ox-goad** with coiled socket, tip slightly damaged.
Iron, 32 × 19 × 19 mm. SF17, Layer 2173 - Metalled road surface.

STRUCK FLINT
by P. Bradley

Seven pieces of struck flint were recovered from the soil of the agger (a broken scraper, possibly end and side, from layer 2085; two flakes, a blade or blade-like flake, a keeled core weighing 16 g and an end and side scraper from layer 2193) and from cleaning of the stripped surface (one blade/blade-like flake from context 2000). The flint is mid- to dark-brown in colour with a thin and abraded brown or white cortex. A single piece of orange-brown flint was recovered from layer 2193. The flint would appear to be from a derived source, probably the local river gravels. The flintwork is not particularly diagnostic. The two scrapers are neatly retouched on thin non-cortical blanks and although they are not particularly diagnostic forms, they would not be out of place in a Neolithic or early Bronze Age context. The rest of the assemblage would also seem to be of this date, possible exceptions being the blades/blade-like flakes which may suggest an earlier element to the flintwork. However, this possible earlier element is too small and lacking diagnostic forms to date with any certainty.

ENVIRONMENTAL EVIDENCE

FAUNAL REMAINS

A small amount of animal bone was found in the fills of the side ditches. All the identifiable bones were cow, and these include a radius and ulna from context 2178, a humerus from context 2119 and an astragalus from context 2011. The cow radius and ulna from the waterlogged fill (2178) of ditch 2244 were well-preserved, but the other fragments of bone showed a marked degree of degradation from the slightly acidic ground conditions. It is unlikely, however, that the absence of faunal remains resulted from preservation problems. It is more likely that the small quantity reflects the general paucity of refuse deposited in the ditches and the distance of the road from contemporary occupation sites.

WATERLOGGED PLANT AND INVERTEBRATE REMAINS
by Dr. M. Robinson

The sediments revealed by the excavation were mostly not sufficiently calcareous for the survival of mollusc shells. Most of the ditches on the site probably extended below the pre-modern water table, but the recent lowering of the water table due to gravel extraction has resulted in almost all of the deposits becoming aerobic. However, a poorly-preserved organic layer consisting of a dark grey brown gravelly loam was noted in the bottom of roadside ditch 2244 (cut 2179, fill 2178). A sample of 1 kg was washed over a 0.2 mm mesh to extract organic remains; the heavy residue which remained was sieved on a 0.5 mm mesh to recover mollusc shells.

The flot and residue were sorted and the results have been listed in Tables 1–3, which give the minimum number of individuals represented by the fragments. Nomenclature for the seeds follows Clapham *et al* (1987) and Kloet and Hincks (1977) for Coleoptera. In addition, calyx and flower fragments of *Trifolium* sp. (clover) were found.

The molluscs and Coleoptera suggest that the ditch held stagnant water. Indeed, the aquatic snails, *Lymnaea truncatula, L. palustris* and *Anisus leucostoma* will all tolerate seasonal drying. The water beetles, species of *Agabus* and *Helophorus*, readily visit temporary bodies of water. The seeds give little indication of aquatic conditions apart from a single seed of *Polygonum hydropiper* (water pepper), an annual of bankside habitats and shallow water. The majority of the seeds were from plants of terrestrial habitats, with very few seeds from plants obligate to wetlands. These results imply that the site was relatively well-drained for most of the year. It is possible that the land alongside the causeway experienced brief episodes of flooding during the Roman period, but this did not result in the deposition of aquatic biological remains. Any floodwaters drained away sufficiently quickly that marsh vegetation did not develop on the site.

Conditions on the site seem to have been very open, with no indication from the plant or invertebrate remains of woodland or scrub. The seeds were mostly from annual weeds of disturbed ground, especially *Atriplex* sp. (orache), *Polygonum aviculare* agg. (knotgrass) and *P. persicaria* (red shank) followed by seeds of grassland herbs, such as *Leontodon* sp. (hawkbit). This agrees well with the soil evidence for arable along one side of the causeway and grassland on the other side. Doubtless some of the seeds were from weeds which grew on the disturbed ground of the roadway itself (*P. aviculare*, for example, being very resistant to trampling), but the possible waterlogged fragment of wheat grain suggests an arable origin for some of the seeds. The Coleoptera included several grassland species, for example the weevil *Mecinus circulatus*, which feeds on *Plantago lanceolata* (ribwort plantain).

Table 1: Waterlogged seeds from the Roman road excavation

Latin Name	*Common Name*	*Number*
Ranunculus cf. *acris*	meadow buttercup	1
R. cf. *repens*	creeping buttercup	6
Barbarea vulgaris	yellow rocket	1
Cerastium sp.	mouse-ear chickweed	1
Stellaria media gp.	chickweed	1
S. graminea	stitchwort	1
Montia fontana	blinks	1
Chenopodium polyspermum	all-seed	5
Atriplex sp.	orache	17
Chenopodiaceae indet.		3
Filipendula ulmaria	meadowsweet	1
Potentilla anserina	silverweed	1
P. reptans	creeping cinquefoil	1
? Rosaceae indet.		12
Aethusa cynapium	fool's parsley	1
Pastinaca sativa	wild parsnip	1
Polygonum aviculare agg.	knotgrass	24
P. persicaria	red shank	29
P. hydropiper	water-pepper	1
Polygonum sp.		3
Rumex conglomeratus	sharp dock	1
Rumex sp.	dock	5
Urtica urens	small nettle	1
U. dioica	stinging nettle	3
Plantago major	great plantain	1
Carduus or *Cirsium* sp.	thistle	2
Hypochoeris radicata	cat's ear	1
Leontodon sp.	hawkbit	16
Sonchus asper	sow-thistle	7
Juncus effusus gp.	rush	10
J. articulatus gp.	rush	10
Carex sp.	sedge	1
cf. *Triticum* sp.	wheat	1
Gramineae indet.	grass	5
Total		175

Table 2: Mollusca from the Roman road excavation

Latin Name	*Number*
Carychium sp.	2
Lymnaea truncatula	1
L. palustris	1
Anisus leucostoma	3
Vallonia sp.	2
Total	9

Table 3: Coleoptera from the Roman road excavation

Latin Name	*Number*
Notiophilus sp.	1
Amara sp.	1
Agabus bipustulatus	1
Agabus sp. (not *bipustulatus*)	1
Helophorus aquaticus or *grandis*	1
Helophorus sp. (*brevipalpis* size)	2
Megasternum obscurum	1
Xantholinus linearis	1
Aphodius sp.	1
Phyllotreta nigripes	1
Longitarsus sp.	1
Apion sp.	1
Sitona sp.	1
Mecinus circulatus	1
Total	15

DISCUSSION

DATING

There was considerable doubt as to the date of the road before the excavation took place. The 1989 evaluation did not provide positive dating evidence, but the artefacts recovered from the excavation are sufficient to date the road in broad terms. They cannot, however, provide accurate phasing information.

The evidence of the coinage is useful but must be treated with caution. A late third-century radiate (2) found lying on the road surface (2197) may have been a contemporary loss or could have derived from the same source as the limestone metalling. Five other coins were found either on or within the gravel spread or the slumped soil to the east of the agger, both of which had probably originated from erosion of the agger. One coin (6) is unidentifiable, three (3, 4 and 5) are mid fourth-century bronzes and one (1) is a silver *denarius* of Caracalla (A.D. 201). These coins suggest that the road continued in use into the late Roman period.

Only a small quantity of pottery, of early Roman date, was recovered even though a substantial volume of the buried soil sealed beneath the road surface was excavated. Two possible second-century small rim sherds were found in a slumped layer (2194) at the south-west end of the agger. No pottery was found in any of the four sections across the east side/quarry ditches. Two layers (2012 in cut 2014 and 2178 in cut 2179) in the west side ditch (2244) contained a base sherd of a probable early Roman vessel, a Samian Drag. 35 rim sherd of second century date, and a local grey-ware flanged bowl also of probable second century date.

The paucity of pottery and finds in general reflect this part of the road's remoteness from either the town of Irchester or any other contemporary Roman occupation. No pottery or artefacts of post-Roman date were found, although seven prehistoric worked flints were recovered mainly from the buried soil of the agger.

The limited dating evidence and the road's resemblance to other dated examples leaves little doubt that it is Roman, although its date of construction cannot be established with certainty. It is tempting to suggest that the road was not built until the second century as no earlier coins or pottery were recovered. The Roman town at Irchester had developed by this period, originating as a *vicus* which had grown up around an early fort. The town was fortified in the second half of the second century A.D. (Burnham and Wacher, 1990, 142–148). Irchester certainly survived into the early fifth century and it is likely that the road continued in use into this period and perhaps beyond.

THE DITCHFORD ROAD IN A NATIONAL CONTEXT

While Roman roads have been exhaustively researched by Ivan Margary, resulting in his authoritative study of all those in Britain (1973), and by the *Viatores* (1964) studying those in the south-east Midlands, surprisingly few have been subjected to modern detailed excavation techniques. Many roads have only been excavated as a secondary objective of much larger excavations. Consequently accurate information on a wide range of road types is rare. The stretch of road excavated in 1994 represents less than 15 per cent of the visible length of the route where it crosses the Nene valley, but it has provided a useful insight into the detailed construction of this particular road which can be compared with other similar roads in Northamptonshire and elsewhere.

The metalled road was up to 10.5 m wide, with a more lightly metalled berm which was 4 m wide on its east side. Erosion of the gravelled road surface on top of the agger makes an accurate assessment of its original width more difficult but it was certainly at least 8 m wide, although it would have had a significant camber. Later plough damage to its east side was considerable but the eastern berm continued along the agger. The height of the agger is also uncertain but it would originally have projected at least 0.6 m above the contemporary Roman ground surface.

The precise width between the side ditches is equally hard to establish. It has proved possible to phase the ditches on either side of the road, but it is not possible to relate this phasing stratigraphically between the two sides since two periods of ditch existed on the east and three on the west side. The width between side ditches was between 18 m and 20 m in the road's early stages. The apparent recutting of the ditches on the inside line in the later stages reduced the width to between 13 m to 16 m. The 1989 evaluation trenches (OAU 1989) showed that the width between ditches had reduced further to 12 m further south towards the River Nene, although no phasing evidence was present. Side ditches are frequently between 19.5 m and 26.5 m apart (Margary, 1973, 21), indicating a degree of standardisation.

Roman roads varied considerably in width, and the agger and roadside ditches were frequently much wider than absolutely necessary for the road's use. Margary has suggested (1973, 21) that *c.* 10 m seems to have been the maximum on important roads, while the many smaller routes were between 5 m to 8 m wide down to a minimum of 3 m. The width of the Ditchford road clearly denotes its importance in this context. At Aldwinkle (Jackson and Ambrose, 1976), 17 km to the north-east, the gravel and limestone road (Margary Route 57A) was 6.4 m wide between parallel ditches 10.6 m apart where it also crossed the Nene Valley. The size of the associated timber bridge suggests that this route was also an important trunk road rather than a local trackway. Further north at Corby this same road was sectioned by machine in 1977 (Brown and Hannan, 1978) revealing a 12.2 m wide-road between side ditches *c.* 21 m apart.

Three metalled roads sealed beneath alluvium have been excavated at Thornborough, Bucks (Johnson, 1975). Two forded the river Twin, a tributary of the river Ouse. The smallest of the roads was only 3.5 m wide on a low clay agger, whereas the other two were up to 10 m wide. One of the latter two survived as a slightly hollow gravel surface.

Sections have also been dug across some of the more well-known major routes, such as Watling Street at Kilsby, Northants (Brown and Hannan, 1978), Ermine Street at Scampton, Lincs (Green and Rahtz, 1959) and Akeman Street at Asthall, Oxon (Stevens and Myres, 1926). These indicate that widths ranged from 10.4 m with 5 m wide berms on either side to as little as 6 m wide even for major routes. Furthermore it has been demonstrated that the width of individual roads varied significantly along their lengths, with Akeman Street ranging between 5 m and 8 m wide over a distance of less than 1 km (Atkinson, 1942). Clearly the width of any Roman road provides a guide to its importance, but caution must be exercised in the interpretation of individual sections.

Little of use can be ascertained from the construction technique of the Ditchford road. The agger comprised soil and quarried gravel providing a well-drained base and raising the road above general ground level. Materials were usually derived locally from quarry ditches or pits alongside the road, and the use of both to provide a gravel road surface has already been discussed. The use of both limestone and ironstone to provide a more durable surface is also very common. Both materials were locally available, with substantial outcrops around the modern town of Irchester less than 1 km to the south. It was noticeable that both stone types were rarely larger than 100 mm across, although several larger stone slabs were found in the fill of the western side ditch (2244) in Trench B.

The most unusual aspect of the road is the change in both the method of construction and the longitudinal level along a relatively short stretch (Fig 4). It was originally believed that this had resulted from the road overlying an earlier palaeochannel, but this supposition was shown to be incorrect by the excavation. The road surface descends at least 0.5 m over less than 20 m, changing from a cambered gravel surface on a pronounced agger to a limestone and ironstone metalled road constructed directly on top of the gravel subsoil in a slight hollow way caused by removal of the soil cover. Much of the road survives as a visible agger to the south of the excavated area, where it has not been affected by palaeochannels and/or is covered by deeper alluvium.

If the agger had been continuous across the entire width of the flood plain it would undoubtedly have acted as a low dam during periods of inundation. This would have been counterproductive resulting in increased flooding of the valley upstream. One or more gaps in the agger would have countered this effect by allowing flood waters to drain freely along the valley. It is probable that the lower metalled road surface was one such 'crossing' point. Unfortunately the destruction of the road by the railway to the south of the excavation makes an accurate measurement of the width of the 'crossing' impossible, although it is unlikely to have been much less than 50 m. The use of stone metalling rather than gravel would have provided a more durable surface during periods of flooding when this part of the road would also effectively become a fording point. The incline from the highest point of the agger to the lowest point of the road would have been sufficiently smooth to have allowed wheeled vehicles to travel over the 'crossing' point, and this is illustrated by the longitudinal section along the road (Fig 4). The apparent 15 m-wide gap between the end of the agger and the metalled road surface is more difficult to explain, but may originally have been covered by a layer of gravel over the gravel subsoil making any distinction between the two very difficult.

The Roman town of Irchester was located at the junction of three major roads (RCHME, 1979, 95–6; Burnham and Wacher, 1990, 142–148). Road 170 from Dungee Corner, Road 570 from *Durobrivae* and a road from Duston approached the town from the south, east and west directions entering it through the respective gates. No north gate has been recognised, but a projection of the excavated road and earthwork across the river Nene meets the town at its east gate. It is impossible to establish why the road did not leave the town directly from its north side on the basis of the available evidence, but it may have followed a natural ridge in the gravel surface north of the river Nene. This would have made it very difficult to achieve satisfactory access into a north gate; it was easier to continue the road straight on to the east gate. The northern destination of the earthwork is uncertain, although it may have extended as far as the large Roman settlement at Kettering (Dix, 1986–7, 105).

The limited environmental evidence indicates that the road was in a very open environment, with no evidence of local woodland or scrub. A study of the sediments to either side of the road and the plant remains suggests that the land to the west was primarily grassland, whereas to the east it was arable. Roman ploughing to the east of the road had resulted in the rapid accumulation of silt in the roadside ditch followed by encroachment over the eastern berm. The excavation provided no evidence of post-Roman activity along the road or its margins, with the exception of a possible brief episode of ploughing in the late Saxon or early medieval period, prior to the onset of the main period of alluviation.

THE MEDIEVAL CAUSEWAY EXCAVATION
by Graham D. Keevill

with contributions from Leigh Allen, Paul Booth, Philippa Bradley, Gordon Cook, Dr Mark Robinson and Dale Serjeantson.

CIRCUMSTANCES OF DISCOVERY AND METHODOLOGY

The watching brief in the gravel pit had been in progress for almost a year when the pit manager, Ron Binder, noticed the presence of limestone sealed under alluvium and overlying the natural gravel. The limestone was exposed during machine stripping of the alluvial overburden at the very edge of the pit, close to the river (Fig 2). Fortunately Mr Binder also managed the Stanwick pit where English Heritage and OAU had been undertaking separate but extensive excavations (Neal, 1989; Keevill, 1992), and he recognised the potential significance of the limestone. He therefore alerted the author, who was Project Officer for the watching brief. The site was visited immediately, and it was apparent that a structure of some kind had been discovered. It was not clear what this might be, but Mr Binder readily supplied a 360° mechanical excavator so that investigation could take place. Controlled stripping of the relevant area under the author's supervision on 5 August 1992 revealed approximately 45 m of metalled limestone causeway running from south-west to north-east and turning through approximately 90° to the south-east. The feature continued for an unknown distance beyond the edge of the pit, and was associated with a palaeochannel which had already been noted and recorded during the watching brief. The extant channel of the river Nene apparently represents the modern course of the palaeochannel.

A basic record of the causeway was made at this stage. Detailed excavation, however, was not the responsibility of ARC Central as the planning condition had stipulated only a watching brief and had not required any contingency for unexpected discoveries. ARC Central were fully prepared to allow continued access to the site and offered further use of their machines, and indeed they very kindly made substantial alterations to their extraction programme to ensure that the causeway was not destroyed immediately without further record. Discussions then took place between OAU, Northamptonshire Heritage (then the Curatorial Section of the Northamptonshire Archaeology Unit) and English Heritage concerning how the excavation should be undertaken, and English Heritage agreed to fund the work. ARC Central continued to provide access and assistance throughout the excavation, which took place during November 1992. The exposed part of the causeway was then removed during extraction in December, and a detailed record of the pit face was made at this stage as it provided the full sequence of deposits including the palaeochannel, alluvial deposits over it, the causeway and the subsequent mass deposition of alluvium.

The causeway had been exposed in August 1992, but had not been manually cleaned. Partial damage had occurred during the initial unsupervised machine stripping around the causeway, especially at the west end, and a small area on the north side had already been removed during mineral extraction. It was therefore agreed that approximately 60 per cent of the surface area would be manually cleaned and fully recorded in plan, representing the best-preserved area (see Fig 6 and Plate 4). Hand excavation down to natural then covered 25 per cent of the structure, equating

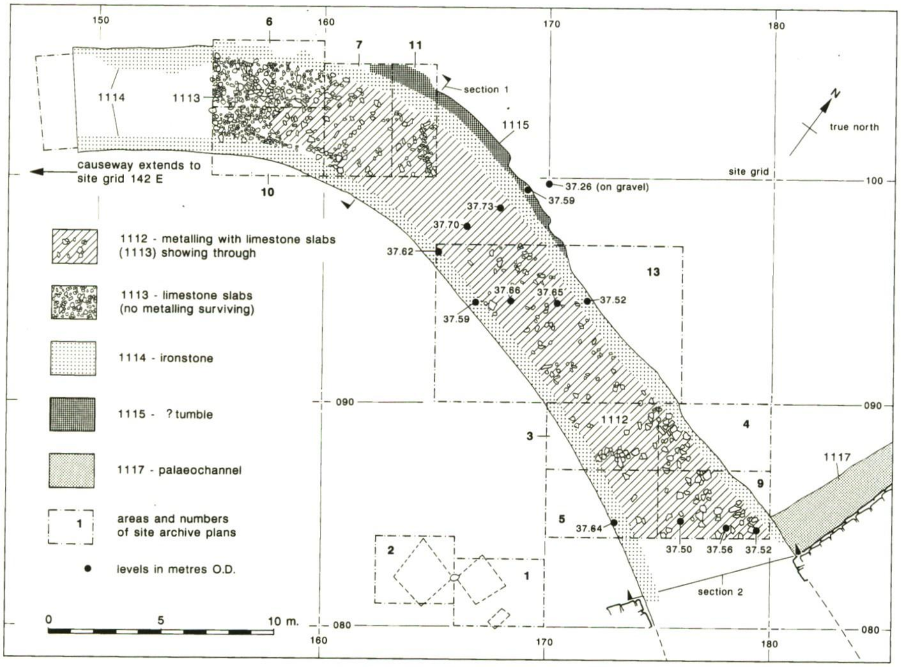

Fig 6 Ditchford Pit, Wellingborough: site plan of the medieval causeway showing all excavated areas.

Plate 4 Ditchford Pit, Wellingborough: view of the medieval causeway excavation looking north-west (OAU).

to most of the areas on site plans 6, 7, 10 and 11, and 3–5 and 9 as shown on Figure 6. Both lateral and longitudinal sections were drawn. Planning was undertaken on an arbitrary site grid, which was tied in to the Ordnance Survey National Grid with an Electronic Distance Measurer. Levels related to Ordnance Datum were also taken so that the causeway was fully recorded in three dimensions.

The purpose of the excavation was to define the character of the causeway, and to recover dating evidence which would determine whether it was of Roman or medieval date. This in turn would define whether the feature was related to Irchester Roman town and especially the Cherry Orchard cemetery, or to the medieval hamlet at Chester-on-the-Water. It was assumed that the causeway was associated with a river crossing, and the dating also had critical implications in this respect: if the feature was Roman it would have had to bridge the river, but a ford was more likely if it was medieval. In either case the relationship of the causeway to the local sequence of alluviation was also important (Robinson, 1992).

Post-excavation analysis has focused on the questions of date and environment. Radiocarbon determinations have established that the causeway is of medieval origin. Dr Mark Robinson has provided detailed evidence for the contemporary environment in the immediate vicinity. He has also been able to establish the site's relationship to the alluvial sequence of the Nene valley. It is clear that elements of the alluviation recorded around the causeway reflect localised variations which are to be expected so close to the river.

THE STRATIGRAPHY

The natural geology comprised gravel terrace deposits. These consisted of interstratified medium coarse sand (light yellow-brown) and fine to medium/coarse gravel (white – grey, orange, red-brown), 1119, overlying blue clay which was exposed at the bottom of the pit. The sand/gravel varies in depth up to a maximum of c 2.5 m, and the upper surface (as stripped by ARC) was somewhat uneven. A slight ridge ran broadly east–west in the south-western corner of the area. A palaeochannel (1117) ran from north-north-east to south-south-west along the east edge of the extraction area and cut the gravel surface (Figs 2 and 6). The width of the channel could not be determined within the limit of the pit, but trial trenching showed that it was at least 15 m wide and approximately 1 m deep, with a fairly shallow edge on the exposed north side. The channel veered slightly to the west as it approached the south face of the pit, and was infilled with organic sediments (1118) containing some large pieces of wood. The top of the channel infill lay at 36.86 m above OD, compared to an average surface level for the natural sand/gravel of 37.6 m; the channel thus lay in a slight valley.

The gravel surface and the top of the palaeochannel fill were overlain by layers of sandy clay with a flint/gravel content of up to 40 per cent (1116, 1122 over natural sand/gravel 1119; 1125 over channel fill 1118). This was noted over an extensive area of the pit in section (see Fig 7), but was not always present between the causeway and the natural surface. The layer was typically no thicker than 0.1 m where present. There was slight evidence for cultivation of these soils, in that there had been limited resorting of medium-coarse gravel within the matrix.

A layer of blue-grey inorganic, non-calcareous clay (1126, up to 0.8 m thick) overlay context 1125 and was sealed by a layer of yellow-brown clay (1123, 1124). The causeway was cut into the yellow-brown clay as it crossed above the edge of the palaeochannel. This sequence of deposits was not present below the causeway at grid point 175/85 showing that there was a marked slope to the edge of the channel from this point.

The causeway (structure 1111) was typically 5.4 m wide, broadening to 6.6 m as it crossed over the palaeochannel (Fig 6, Plate 4). The structure consisted of ironstone lumps (1114), especially concentrated along the edges of the causeway, overlain by rough-quarried limestone slabs in a mixed sand/crushed ironstone matrix (1127). A surface of limestone slabs (1113) had been laid flat over these deposits; the surface was typically 4 m wide and 0.1 m thick. A layer of crushed ironstone and sand with occasional sandstone slabs (1112) had been laid over layer 1113 to a maximum thickness of 0.07 m (Figs 6 and 7, Plate 5). This deposit appeared to represent refurbishment of the structure, but it was not present west of grid point 158/103, perhaps because of surface erosion. Localised areas of pitched limestone slabs (1115) immediately beyond the north edge of the causeway also represent erosion of the structure.

The causeway began at grid point 142/100; no trace of limestone slabs or metalling was seen west of this point despite careful monitoring of machine stripping. The gravel surface was exposed at a slightly higher level in the western part of the area. The causeway sloped gently from west to east, and then from north to south as it turned to approach the palaeochannel. The highest point at the west end lay at 38.08 m above OD, falling to c 37.9 m as the structure turned towards the east, and to 37.5 m as it crossed over the channel. The latter was 0.75 m to 0.9 m below the causeway at this point. The structure appeared to be built or compressed into a hollow in layer 1123/1124 where it crossed the palaeochannel.

There was some evidence for deliberate cambering of the causeway surface, with some attention paid to the relatively sharp corner. The levels were fairly even at the west end, with a slight slope from the centre towards either edge of the structure. As the surface continued eastward, however, the highest point tended to be closer to the outside (north) edge of the causeway with a longer slope to the inner edge. The camber had evened out again where the channel was crossed. Relevant levels are presented on Figures 6 and 8, and more detail will be found in the archive.

Twenty-five horseshoes and ten horseshoe nails were found within and on the surface of the causeway during the watching brief and excavation. A further four horseshoes and one nail

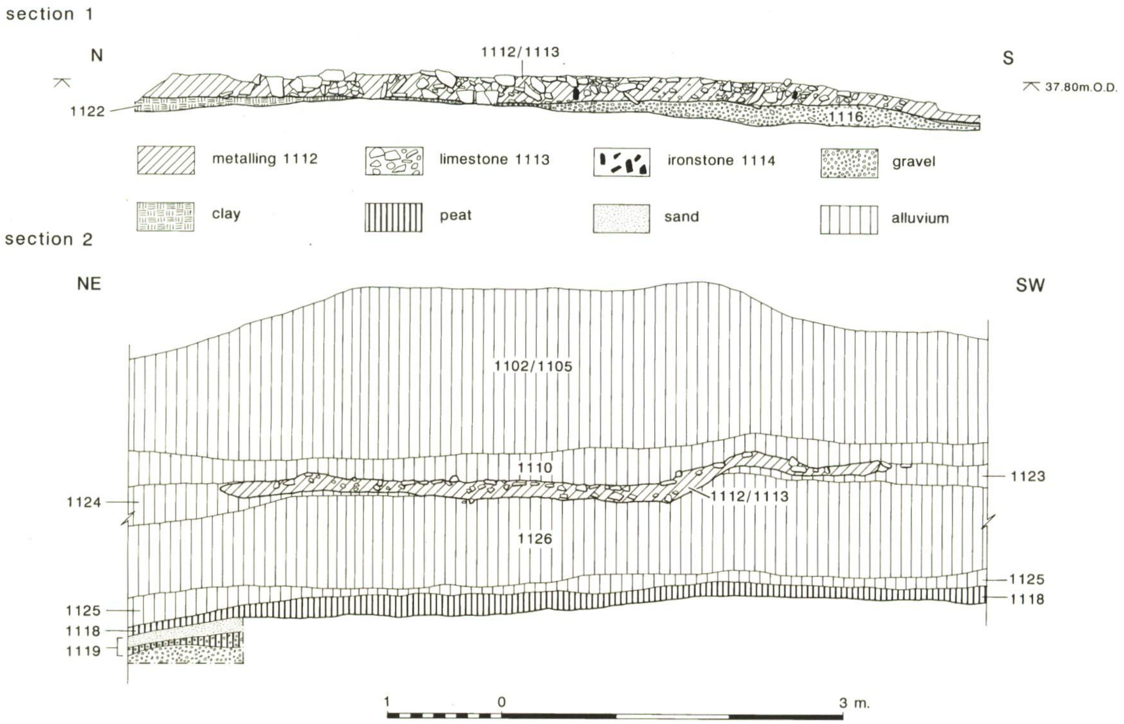

Fig 7 Ditchford Pit, Wellingborough: the medieval causeway and alluvial sequence, sections 1 and 2

Plate 5 Ditchford Pit, Wellingborough: the medieval causeway – detail of the structure in section, looking south-east; the edge of the palaeochannel can be seen in front of the pit face to the left of the causeway (OAU).

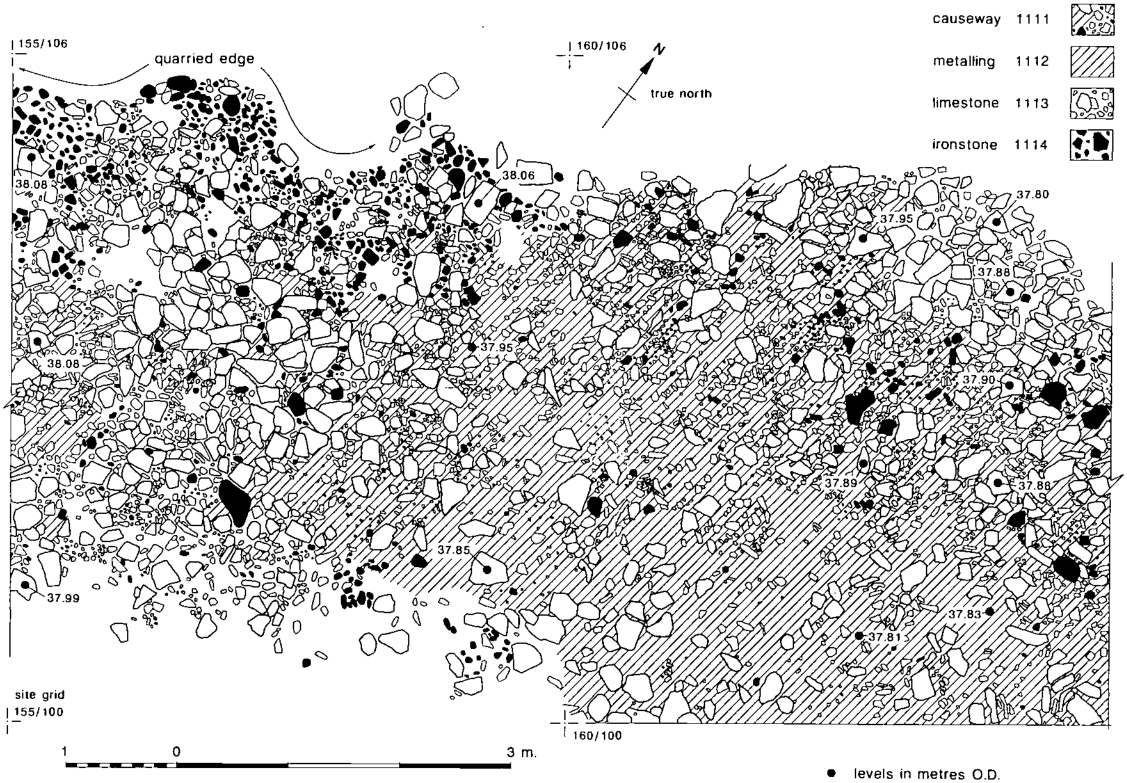

Fig 8 Ditchford Pit, Wellingborough: detailed plan of the medieval causeway (site plans 6, 7, 10 and 11 on Figure 6).

were found at the interface between the causeway and the underlying gravelly clay layer (1116) at the west end of the structure. Sixteen of the horseshoes and all of the ten nails from the causeway were concentrated in the fully excavated area at its east end in a line across it centring on grid point 175/84 (full details, including a FastCad plot, will be found in the archive). There were no apparent clusters either of horseshoes or nails within this group, but the concentration of finds in such a small area must be significant. Only one horseshoe was found during full excavation of an area of the same size towards the west end of the structure. Some of the horseshoes may have been incorporated into the causeway during its construction, but others were certainly from its surface and must have been 'lost' contemporaneously with the structure's use. How such loss occurred must be open to question, but closeness to the river may have led to regular checks on the state of shoeing and perhaps some renewal of shoes.

There was no evidence for the provision of quarry or drainage ditches. Some possible features were examined to the west of the causeway during machine stripping by ARC, but these proved to be natural lenses of silty clay in the upper surface of the gravel. Deposits of blue-grey inorganic clay along and overlying the north and south edges of the causeway (contexts 1106 and 1107 respectively; not illustrated) were interpreted as fills of flanking ditches when the causeway was first exposed, but subsequent examination showed that these were in fact alluvial deposits. They merged into a deposit (1108) of very similar character, typically 0.1 m thick and extending over the entire causeway surface, and for several metres to either side. This layer was mostly removed by machine during the initial exposure of the causeway. Its stratigraphic relationship with layers 1106 and 1107 was uncertain, but they were probably broadly contemporary. Layers 1106 and 1107 overlay a layer of humic clay with a strong organic content (1110) at the south-east end of the causeway. This deposit was up to 0.3 m thick. Three horseshoes were found in layer 1106.

The contexts overlying the causeway were sealed by a sequence of alluvial clays (1101–2, 1105, 1109 and 1120–1) of essentially identical character. Interfaces between the layers were generally indistinct, but typically there was greater cohesion (through saturation) and mottling at lower levels (1105, 1121 and 1109). The upper deposits (i.e. 1101, 1102 and 1120) tended to crack and collapse in section through drying. The maximum depth of deposits was approximately 2.5 m over the palaeochannel, with a typical depth of c. 1.8 m elsewhere. Layers 1102 and 1105 are illustrated on Figures 7 (section 2) and 9. The uneven upper surface of the section was caused by the initial machine stripping of overburden. The

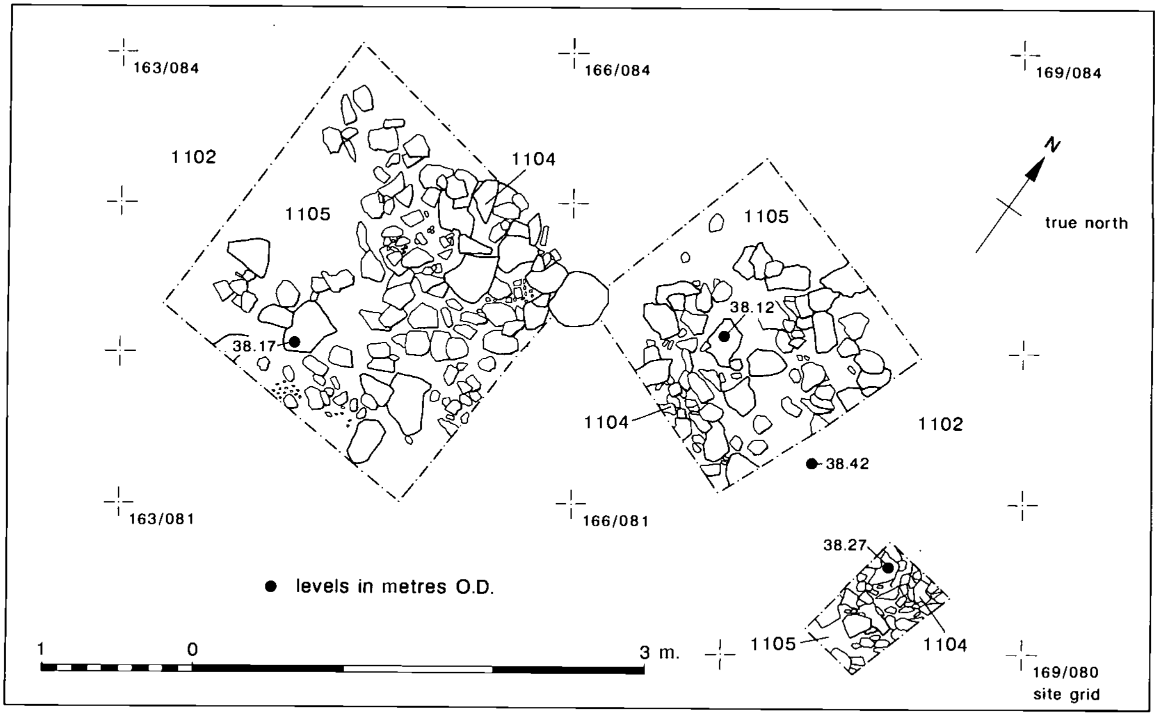

Fig 9 Ditchford Pit, Wellingborough: detailed plan of the post-medieval limestone surface 1104.

interface between layers 1102 and 1105 could not be clearly defined.

An area of limestone slabs (1103; not illustrated) overlying layer 1105 and sealed by 1120 was seen in the south face of the pit at 198/89.75. The area was at least 3 m long (east–west) and 1 m wide, but could not be traced any further; it was not noted north of the section during the watching brief, but this may simply be an accident due to the timing of visits. The upper surface, which undulated considerably, lay at c 38.3 m above OD. A second area of limestone slabs and pieces (1104) was noted around grid point 166/82 (Fig 9), lying on alluvium 1105 and sealed by alluvium 1102. The limestone was first exposed during machine stripping, and three small areas were excavated by hand covering an area of approximately 5 m (east–west) × 4 m. Subsequent observation during the watching brief did not add any further data on the extent and/or character of the layer, which again lay at the very edge of the extraction area. The surface of 1104 was very uneven, with individual stones lying between 38.12 m and 38.33 m above OD; this level is substantially above that of the medieval causeway immediately to the east (37.5 m), but is closer to the level of the causeway and gravel ridge to the north. There was no evidence for the careful construction manifested in causeway 1111. Contexts 1103 and 1104 were 30 m apart and demonstrated that layers 1102/1120 and 1105 represented different stages of alluvial deposition even though these layers were otherwise virtually indistinguishable.

THE FINDS

by L. Allen

Two pieces of worked flint were found. Philippa Bradley reports that both are broken flakes. One (Small Find 11, context 1106) has breaks at the proximal and distal ends and some lateral damage. It is probably a blade fragment, of fairly good quality flint. The other (SF 27, context 1112) also has damage to the proximal and distal ends with more extensive lateral damage. The quality of flint is similar to that of SF 11.

A single sherd of Roman pottery (weight 10 g) has been identified by Paul Booth. It was recovered from the alluvium sealing the palaeochannel at the north-east corner of the pit during the watching brief. The equivalent context in the excavation is probably 1126 (pre-causeway alluvium). The sherd is part of a foot ring base from an Oxfordshire colour-coated vessel. The form is not certain, but is likely to be Young (1977) type C51, a hemispherical flanged bowl. The date range is after the mid 3rd century, and more probably late 3rd to 4th century.

Two pieces of tile were recovered. SF 6 (weight 425 g) was found during the initial exposure of the causeway, in alluvial clay 1106. The sherd is part of the left flange of a *tegula*, broken immediately in front of the flange. The fabric is heavily shell-tempered. SF 39 (weight 255 g) was recovered from the causeway (context 1113) during the excavation, and consists of an undiagnostic body sherd. The fabric is the same as SF 6.

Table 4: Summary of ironwork from the medieval causeway excavation by context

Context	Nail	Unident	Type A	Horseshoe Type B	Type C	Misc obj	Total
1103						1	1
1104	1						1
1106				1			1
1111		1	1				2
1112	4	3	7	3	1		18
1113	1			1		1	3
1114	5		3	3	1	1	13
1115			2			1	3
1116	1			2	2		5
Unstrat	2		2				4
TOTAL	14	4	15	10	4	4	51

A small undiagnostic strip of leather (SF 34) and a fragment of worked wood (SF 10) were recovered from context 1116. The worked wood is incomplete but appears to be structural, with a tenon at one end. It had been squared fairly crudely, and both ends had been broken. The fragment was submitted for radiocarbon dating and has therefore been destroyed. The piece was drawn before transfer to the Scottish Universities Research and Reactor Centre at East Kilbride for dating; the drawing is in the archive.

The ironwork from the site includes 29 horseshoes, 14 fiddle key nails and four miscellaneous fragments. These have been catalogued with relevant measurements taken from x-radiographs and a summary of the finds is provided in Table 4 and full details are in the archive. The horseshoes have been divided into the following three types:

Type A. There were 15 examples of horseshoes with narrow (14–19 mm) but thick webs. There are three nail holes in each arm punched from the front. The nail holes are either round or rectangular, with deep lozenge shaped countersinkings which push the edge of the shoe out to produce a lobate outline (Fig 10, No 62).
Type B. There were 10 examples of horseshoes of a heavier type than A with broader webs. There are three or four rectangular nail holes in each arm with narrow rectangular countersinkings. The outline of the horseshoes is plain, and calkins are rare (Fig 10, No 57).
Type C. There were four examples of horseshoes with broad webs containing three or four square or rectangular nail holes in each arm without countersinkings. This type is characterised by the angular shpae of the inner profile (Fig 10, No 31).

Horseshoes are very common finds on medieval sites reflecting the importance of horses both for transport and as draught animals. The 29 horseshoes recovered from the excavation all appear to be medieval in date. Examples similar to type A recovered from excavations in London (Clarke 1995, 96–6), Oxford (Goodall 1980, 191) and Winchester (Goodall 1990, 1055–6) indicate a date range for this type of shoe beginning just after the Norman conquest and continuing throughout the 12th century until they are superseded by type B, a heavier form of horseshoe. Examples similar to type B recovered from London (Clarke 1995, 96) and Winchester (Goodall 1990, 1056) indicate that this type of shoe was introduced alongside type A and became predominant in the late 13th and early 14th century until it was replaced at the end of the 14th century. Evidence for type C horseshoes in London suggests an early 14th-century introduction for this type, but they become predominant in the 15th century (Clarke 1995, 97). Similar examples were found in post-medieval contexts at Winchester (Goodall 1990, 1066–7).

THE ANIMAL BONE

by D. Serjeantson

The small amount of animal bone recovered during the excavations was assessed at the Centre for Human Ecology, University of Southampton. The intention was to provide a basic record of the assemblage and, if possible, to determine whether the species present, their size and conformation or the treatment of the bones had any implications for dating the causeway. The work was undertaken in mid-December 1992 as part of the post-excavation assessment stage as defined in MAP 2 (English Heritage 1991). No further work was recommended on the assemblage, and this note is an edited version of the assessment.

The species identified positively (cattle and horse) do not provide any firm dating evidence, and sizes are compatible with both the Roman and medieval periods. There was no positive evidence for human modification of the bone, although the bones are likely to have been deposited by human agency as the sample comprises domestic animals. The foal is a possible exception to this.

A silty clay layer (1116) underlying the causeway contained a cattle radius with an unfused distal end from an immature animal, and a cattle humerus. The proximal end of the latter had been gnawed by a carnivore. The two bones could be from the same animal. No human modification was evident, although the surfaces of both have the randomly oriented scratches and striations typical of bones which have suffered water transport. The size of the bones is within the range of Roman and medieval cattle.

Twelve small fragments were recovered from the surface (1112) of the causeway. All were bleached, eroded and worn. The bones included three limb bone splinters of a fairly robust

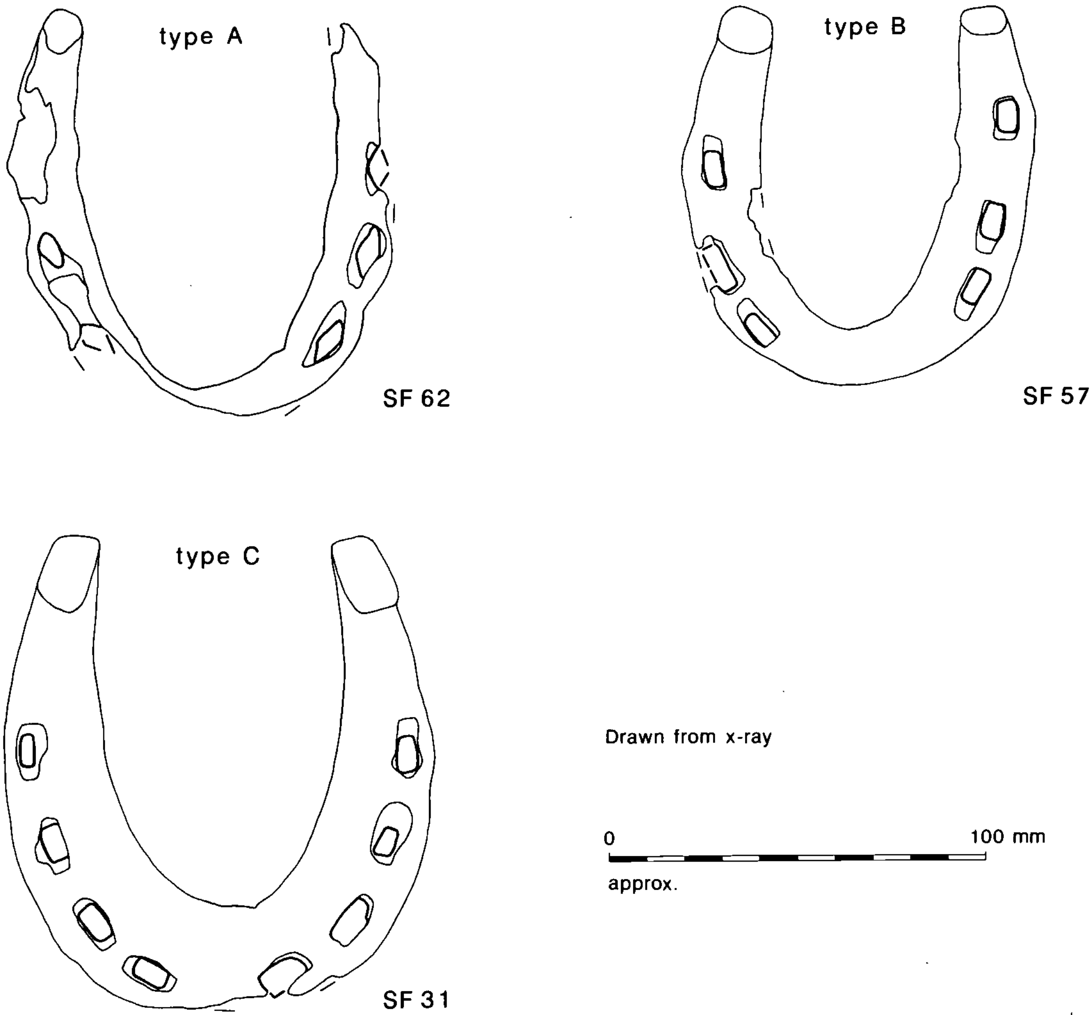

Fig 10 Ditchford Pit, Wellingborough: the medieval causeway, horseshoe types A (SF 62), B (SF 57) and C (SF 31).

large mammal, and a larger fragment of limb bone of a large mammal (?horse radius); the latter was stained to a colour closer to the bone from the alluvium.

Part of the skeleton of a very young equid, probably a newborn foal, was recovered from layer 1106, an alluvial deposit on the north-east edge of the causeway. Fragments of skull, vertebrae, some ribs and a right metatarsus were found. There is no indication on the bones to say whether this was a foal which was deliberately buried or one which died and became incorporated into the alluvium. The size and conformation of the bones give no clue to the date of deposition.

Two rib fragments of a large mammal (horse or cattle) and an undiagnostic fragment were recovered from the later causeway (1103). These fragments are not diagnostically datable.

THE ENVIRONMENTAL EVIDENCE

by Dr M. Robinson

The relationship of the causeway to alluvial sediments was recorded during the excavation, and samples were taken of organic sediments and pieces of wood from the causeway. On the main body of the floodplain the limestone rubble of the causeway lay almost directly on the surface of the Pleistocene gravels, with only about 0.1 m or less of sandy clay to clay separating them. The causeway was sealed by 1.0 m or more of non-calcareous alluvial clay. There was no general organic preservation in these deposits, but pieces of wood had been preserved both under the causeway and on its surface, perhaps as a result of compaction of the sediments caused by the dumping of the rubble and the use of the causeway at a time of a rise in the water table.

The causeway continued towards the extant channel of the River Nene. The channel of the Nene was formerly wider than at present, and the area of excavation extended into channel sediments. The section provided by the face of the gravel pit (Fig 7, section 2) showed that the margin of the channel had already been silted almost to the contemporaneous level of the floodplain when the causeway was constructed. Organic sediments at the bottom of the channel showed much later root penetration from woody plants. Approximately 0.85 m of inorganic non-calcareous gleyed alluvial clay lay between these sediments and the causeway. The latter was 0.15 m thick in the pit face and appeared to have been set in a hollow in the alluvium. A hollow above the causeway was filled with 0.25 m – 0.30 m of grey-brown humic clay. A further 1.50 m of inorganic non-calcareous alluvial clay lay above this. Samples were taken of the organic material from the bottom of the channel (sample 1), the humic clay over the causeway (sample 2) and also a piece of wood from amongst the stones of a repair or addition to the causeway (sample 3).

0.5 kg of sample 1 was sieved down to 0.2 mm and scanned for macroscopic plant remains. 1 kg of sample 2 was sieved down to 0.2 mm and sorted for macroscopic plant and insect remains. The results are listed in Tables 5–8, nomenclature for plants following Clapham *et al* (1987) and nomenclature for Coleoptera following Kloet and Hincks (1977). The waterlogged wood has been identified as follows: worked wood under causeway (SF10), Pomoideae (hawthorn, apple etc): wood in repair to causeway (sample 3), *Salix* (willow); and wood on causeway surface, *Quercus* and *Salix* (oak and willow).

The organic deposit at the bottom of the channel (sample 1) contained a few seeds of aquatic and waterside plants including *Schoenoplectus lacustris* (bulrush) and *Filipendula ulmaria* (meadowsweet). Buds of *Salix* sp. were the only non-root tree/shrub remains. A seed of *Thalictrum* that was apparently not *T. flavum* (meadow-rue) suggests a late Devensian or earliest Flandrian date for the deposit.

The causeway appeared in the face of the gravel pit to be in a hollow and it was possibly kept clear of sediment because it was leading down to a ford. One effect of the hollow was that when sediment finally accumulated in it, it remained waterlogged. Sample 2 from this deposit contained a strong element of seeds of aquatic and marginal plants, particularly reedswamp species. These included *Veronica* S. *Beccabunga* sp. (water speedwell), *Typha* sp. (reedmace), *Alisma* sp. (water plantain), *Schoenoplectus lacustris* (bulrush), *Sparganium erectum* (bur-reed) and *Glyceria* sp. (reed-grass).

The majority of the Coleoptera were terrestrial species. However, the aquatic species included elmid beetles from the genus *Oulimnius*, which require clean, well oxygenated flowing water. There were several species of *Donacia* which feed on aquatic vegetation including *D. crassipes* on *Nymphaea alba*, (white water-lily) and *Nuphar lutea* (yellow water-lily) and *D. semicuprea* on *Glyceria aquatica* (reed-grass). The other insects were mostly from orders or families with aquatic larvae that probably lived in the river: Odonata (dragonflies), Trichoptera (caddis flies) and Chironomidae (midges).

The terrestrial plant and insect remains suggested open conditions. There was no evidence for trees or shrubs apart

Table 5: Waterlogged seeds from the medieval causeway excavation

Latin name	***Common name***	***Number***
Ranunculus cf. *acris* L.	meadow buttercup	5
R. cf *repens* L.	creeping buttercup	11
R. S. *Batrachium* sp.	water crowfoot	1
Brassica nigra (L.) Koch	black mustard	1
Coronopus squamatus (Forst.) Asch.	swine cress	1
Cerastium cf. *fontanum* Baum.	mouse-ear chickweed	1
Myosoton aquaticum (L.) Moen.	water chickweed	1
Stellaria media gp.	chickweed	2
Potentilla anserina L.	silverweed	1
P. reptans L.	creeping cinquefoil	1
Callitriche sp.	starwort	9
Berula erecta (Huds.) Cov.	water parsnip	1
Oenanthe aquatica gp.	water dropwort	2
Rumex conglomeratus Mur.	sharp dock	3
Rumex sp.	dock	10
Urtica dioica L.	stinging nettle	3
Veronica S. *Beccabunga* sp.	water-speedwell	30
Rhinanthus sp.	yellow rattle	9
Mentha cf. *aquatica* L.	water mint	3
Senecio cf. *aquaticus* L.	marsh ragwort	1
Anthemis cotula L.	stinking mayweed	1
Achillea sp.	yarrow	8
Carduus sp.	thistle	1
Centaurea cf. *nigra* L.	knapweed	1
Leontodon sp.	hawkbit	2
Sonchus arvensis L.	field milk-thistle	1
S. asper (L.) Hill	sow-thistle	1
Taraxacum sp.	dandelion	6
Alisma sp.	water-plantain	61
Sagittaria sagittifolia L.	arrow-head	2
Potamogeton sp.	pondweed	8
Juncus effusus gp.	tussock rush	10
J. bufonius gp.	toad rush	30
J. articulatus gp.	rush	10
Sparganium erectum L.	bur-reed	3
Typha sp.	reedmace	21
Schoenoplectus lacustris (L.) Pal.	bulrush	9
Carex sp.	sedge	2
Glyceria sp.	reed-grass	22
Graminea indet.	grass	21
Total		316

Table 6: Other waterlogged plant remains from the medieval causeway excavation

Latin name	***Remains***	***Common name***	***Number***
Bryophyta	– stem with leaves	moss	+
Chara sp.	– oospore	stonewort	10
Salix sp.	– bud	willow	6
Salix sp.	– capsule	willow	5
Trifolium sp.	– flower	clover	1

Table 7: Coleoptera from the medieval causeway excavation

Latin name	***Minimum No. Indiv.***
Lonicera pilicornis (F.)	1
Trechus obtusus Er. or *quadristriatus* (Schr.)	1
Bembidion biguttatum (F.)	2
B. guttula (F.)	1
Bembidion sp.	2
Pterostichus sp.	1
Haliplus sp.	1
Hydroporus sp.	2
Agabus bipustulatus (L.)	1
Gyrinus sp.	1
Helophorus aquaticus (L.)	1
H. grandis Ill.	1
H. cf. *obscurus* Muls.	2
Helophorus sp. (*brevipalpis* size)	14
Cercyon sp.	1
Megasternum obscurum (Marsh.)	1
Cryptopleurum minutum (F.)	1
Ochthebius cf. *minimus* (F.)	3
Limnebius papposus Muls	2
Lesteva longoelytrata (Gz.)	1
Carpelimus sp.	1
Platystethus nodifrons (Man.)	2
Anotylus rugosus (F.)	5
A. sculpturatus gp.	3
Stenus sp.	2
Lathrobium sp.	1
Gyrohypnus sp.	1
Philonthus sp.	1
Gabrius sp.	2
Tachyporus sp.	4
Aleocharinae indet.	3
Aphodius cf. *sphacelatus* (Pz.)	2
Aphodius sp.	1
Dryops sp.	1
Oulimnius sp.	2
Athous sp.	1
Agriotes obscurus (L.)	1
Agriotes sp.	1
Meligethes spp.	2
Atomaria sp.	1
Anisosticta novemdecimpunctata (L.)	1
Stephostethus lardarius (Deg.)	1
Corticariinae indet.	1
Anaspis sp.	1
Donacia crassipes F.	1
D. impressa Pk.	1
D. semicuprea Pz.	4
Phyllotreta atra (F.)	1
P. vittula Redt.	1
Longitarsus spp.	15
Apion sp.	3
Strophosomus faber (Hbst.)	1
Sitona cf. *lineatus* (L.)	5
Hypera punctata (F.)	1
Ceutorhynchus atomus Boh.	5
Ceuthorhynchinae indet.	3
Total	122

Table 8: Other insects from the medieval causeway excavation

Latin name	***Remains***	***Number***
Odonata indet.	– adult	1
Heterogaster urticae (F.)		2
Anthocorinae indet.		1
Saldula S. *Saldula* sp.		2
Aphrodes sp.		1
Homoptera indet.		1
Trichoptera indet.	– larva	7
Trichoptera indet.	– case	4
Hymenoptera indet.		6
Chironomidae indet.	– larva	+
Diptera indet.	– puparium	1
Diptera indet.	– adult	4

from a few buds and seed capsules of *Salix* sp. (willow), perhaps from trees lining the river bank. There were few seeds of annual weeds of disturbed ground and the main terrestrial vegetation seems to have been grassland. Some of the seeds were from plants which occur under a variety of management regimes, such as *Ranunculus* cf. *repens* (creeping buttercup), *Achillea* sp. (yarrow) and *Taraxacum* sp. (dandelion). However, there is also an element which is particularly characteristic of alluvial hay meadows which are mown around mid-summer and then grazed, including *Ranunculus* cf. *acris* (meadow buttercup), *Centaurea* cf. *nigra* (knapweed), *Rhinanthus* sp. (yellow rattle) and *Leontodon* sp. (hawkbit).

The terrestrial Coleoptera mostly comprised a grassland fauna with elaterids such as *Athous* sp. and *Agriotes obscurus* that feed on the roots of grassland plants. The Coleoptera also suggest that the grassland was managed as hay meadow, with species of *Apion* and *Sitona* that feed on *Trifolium* spp. (clovers) and *Lathyrus* spp. etc (vetches and vetchlings) being more than twice as abundant as scarabaeoid dung beetles such as *Aphodius* sp. Species of *Longitarsus*, leaf beetles which are favoured by hay meadow conditions, were the most numerous beetle from the site.

RADIOCARBON DETERMINATIONS

by G. Cook

Two samples were submitted to the Scottish Universities Research and Reactor Centre at East Kilbride for radiocarbon dating. One was a worked fragment of *Pomoideae* (SF 10; reference GU-5439) sealed below the causeway and therefore providing a *terminus post quem* for its construction. The other was an unutilised piece of *Salix* recovered from the resurfacing of the causeway at its south end (sample 3; reference GU-5440). The calibrated date ranges provided in Table 9 have been calculated using the maximum intercept method of Stuiver and Reimer (1986), and are quoted in the form recommended by Mook (1986) with end points rounded outwards to 10 years. The probability distributions have been calculated using OxCal (v2.1) (Bronk Ramsey, 1994) and the usual probability method (Stuiver and Reimer, 1993). All the calibrations have been calculated using the data published by Stuiver and Pearson (1986).

Table 9: Radiocarbon determination results from the medieval causeway excavation

Laboratory number	Radiocarbon age (BP)	Calibrated date range (1σ)	Calibrated date range (2σ)
GU-5439	940 ± 60	cal AD 1010 – 1170	cal AD 980 – 1230
GU-5440	640 ± 50	cal AD 1280 – 1400	cal AD 1270 – 1410

DISCUSSION

Dr Robinson's analysis of environmental material from the palaeochannel showed that the organic deposit at the bottom of the channel contained a few seeds suggestive of a late Devensian/earliest Holocene date for the fill, and this would be consistent with the physical location and height above Ordnance Datum of the feature relative to the causeway and the modern river channel. The palaeochannel had already silted up almost to the contemporaneous level of the floodplain when the causeway was constructed. At the bottom of the channel were organic sediments which showed much later root penetration from woody plants. The occurrence of alluvial clay in the channel at Ditchford beneath the causeway and therefore pre-dating general alluviation of the floodplain is similar to the sedimentary sequence observed in a palaeochannel at West Cotton (Robinson, 1992, 199). A large body of alluvial clay in the West Cotton palaeochannel post-dated Neolithic sediments but pre-dated mid-Saxon flax retting activity.

Dating evidence for the causeway relies substantially on the horseshoes and the two radiocarbon dates, but fortunately these are unequivocal in dating the construction and use of the causeway to the medieval period. Such structures are a distinctive feature of medieval landuse on the floodplain of the middle Nene (Steane 1974, 135–6), in marked contrast to the rarity of metalling on medieval roads elsewhere in the country (Steane, 1985, 108; Taylor, 1979, 111–52). This date has a major implication for the method of crossing the river (assuming that there was a crossing rather than a wharf, for instance); a Roman road here would have bridged the Nene, but the river would have been forded during the medieval period (Dr Mark Robinson, pers. comm.). The radiocarbon dates therefore proved that the causeway would have approached a ford, and that there was very little likelihood of a timber bridge being present. This was important because dewatering during extraction could have affected preservation even beyond the actual limits of the pit.

Steane (1974, 134) has pointed out that fords on the river Nene tended to be replaced by bridges in the medieval period, but it seems highly unlikely that anything so elaborate would have been justified – or affordable – in the case of a minor settlement such as Chester-on-the-Water (RCHME, 1979, 96). A bridge was built just downstream at Ditchford Mill (McKeague, 1988–9), however, and another important bridge was provided at Irthlingborough. These bridges had to have long spans because the river was broader and shallower than it is today (Steane, 1974, 135–6). This of course would make fording relatively easier.

A map of 1756 (Plate 6) provides extremely useful information regarding the post-medieval layout of fields and buildings around Chester House and the former site of Chester-on-the-Water. The map was redrawn for publication by RCHME, but the drawing can be compared to the modern Ordnance Survey 1:1250 maps of the area if one assumes that it is an accurate tracing from the original (in the Northamptonshire Record Office). The 1756 survey and the modern map actually match remarkably well. The course of the river Nene, the situation and disposition of the main buildings around Chester House and the major field boundaries correspond very closely, although there are a number of significant differences in the river. The stream or mill race running between Mill Hill and Mill Holm, for instance, does not survive as an active channel. A small island shown in the middle of the southern river channel on the 1756 survey does not exist today; interestingly, this island lies extremely close to the postulated crossing-point of the Roman causeway evaluated in 1989 and partly excavated in 1994 (see above). The main deviation between the two maps, however, is in the course of the main channel immediately to the east of the osier bed shown on the 1756 survey; the latter shows the river continuing in a more or

Plate 6 Ditchford Pit, Wellingborough: 1756 plan of the environs of Irchester (part of the Overstone Collection, NRO Map 605; copyright Northamptonshire Record Office).

less straight eastward course, but the river now turns sharply north-north-east to pass under the railway viaduct. Presumably the channel was diverted when the railway and its associated earthworks were built.

Further comparison of the 18th-century and modern maps provides a possible context for the medieval causeway. One cannot be sure that the 18th-century field boundaries reflect medieval ones, but their survival into the present day within the known medieval landscape of Chester House and Chester-on-the-Water at least suggests that they are primary medieval features. Not all of the boundaries depicted in 1756 survive, but a significant number do, especially to the east of Chester House and the farm. The most important boundary for the purpose of this report is the east side of Old Cherry Ground and Mill Hill, which runs downhill and meets the stream or mill leat referred to above. This boundary survives intact today, even to the point of stopping short of the main river channel at a point which coincides remarkably accurately to the south bank of the stream/leat. The importance of this line can be seen very clearly on Figure 2, because the medieval causeway on the north bank of the river is aligned on a crossing-point which corresponds exactly with the north end of the boundary. One can therefore suggest with some confidence that the causeway was built to provide access to the north bank of the Nene from the east side of Chester-on-the-Water and its fields. Presumably the causeway branched away from the Roman one, which certainly could still have been in use providing access to the west side of Chester House and the farm.

The construction of the causeway is notable for the lack of flanking ditches and the materials used in its surface. The former is perhaps surprising, although the general lack of gravel in the structure makes it clear that quarry ditches or pits would have been unnecessary. The principal materials were limestone and ironstone. The former would be readily available from local quarries, although reuse of Roman materials from Irchester or even the Roman causeway cannot be ruled out given the medieval date of the structure. It follows that some of the horseshoes found within the matrix of the causeway could also be derived from a Roman context, although a medieval date can be accepted for all of them. Ironstone was available immediately to hand. There are substantial deposits of the stone on the south bank of the Nene around Irchester, and indeed these sources have been extensively quarried in the modern period, much to the detriment of the area's archaeology (RCHME, 1979, 91–6). A very similar limestone causeway was found during the English Heritage excavations at Stanwick Roman villa, approximately 6 km north-east of the Ditchford site. The Stanwick causeway was initially thought to be of Roman date (Dix, 1986–7, 16), and numerous horseshoes were found there also. A mid-Saxon radiocarbon date (680–890 cal A.D. at 68 per cent confidence; HAR 8526) from a palaeochannel beneath the causeway, however, established that it must be of later Saxon or medieval date (information from Central Archaeology Service).

The length of the causeway deserves further comment. No westward extension of the structure was found, despite very careful observation during machine stripping of the alluvial overburden. It is possible that the causeway did originally extend further to the west but that erosion (perhaps by major overbank flooding) removed it. This could only have happened, however, if the excavated portion of causeway had already been covered by alluvium and therefore protected. This process was certainly demonstrable during the excavation, but the west end was not overlain by the blue-grey inorganic clays which covered the lower part of the structure to the east. It is therefore difficult to accept that a significant amount of stone was eroded away to the west, but this implies that the causeway was very localised indeed on the approach to the river. This is plausible, as the gravel surface to the west was higher than the level of the causeway, and indeed there seemed to be a slight natural ridge running up to the structure which might have made the construction of a causeway unnecessary until the end of the ridge was reached.

The alluvial sequence in the Nene valley has recently been described by Dr Mark Robinson (1992), summarising the detailed work undertaken during the Raunds Area Project and on other sites. The radiocarbon date for the wood from beneath the causeway of A.D. 980–1230 (cal 2σ) centred on A.D. 1100 fits well with evidence from the Raunds area for an early 12th century onset of seasonal flooding on the Nene floodplain. At West Cotton, there was early medieval ridge and furrow on the floodplain but between 1100 and 1150 a flood embankment was constructed around the settlement (A. Chapman, pers. comm.). Eventually the ridge and furrow was covered by alluvium. The humic clay above the causeway contained a flora and fauna characteristic of a medieval alluvial hay meadow. Deteriorating conditions within the floodplain would make access across the river from Chester-on-the-Water difficult, and provision of a causeway would have been essential.

The radiocarbon date of A.D. 1270 – 1410 (cal 2σ) for the wood from amongst the stones of the repair to the causeway suggests that the hay meadow was perhaps late medieval. One of the major uses of the Nene floodplain in the medieval period was for hay meadow (Robinson, 1992, 204). The radiocarbon date also suggests that most of the alluvium which post-dated the causeway construction was late medieval or post-medieval in date. It has been argued that the alluviation was a consequence of the cultivation of the Nene catchment, which only reached its maximum extent during the early 14th century and declined following the Black Death of 1349 (Robinson, 1992, 206). The radiocarbon calibration gives two equal peaks of probability for the date, one centred just before A.D. 1300 and the other centred on A.D. 1370. The earlier of these dates would be consistent with this interpretation (as would the probable date range of most of the horseshoes), although it would imply that most of this alluvium was deposited in the first half of the 14th century. There is some evidence from West Cotton that sedimentation was extremely rapid. Optical stimulated luminescence (OSL) measurements on the alluvial clay showed that it had not been fully bleached by sunlight while in suspension in the floodwaters (J. Rees-Jones, pers. comm.). Sedimentation in the West Cotton area appears largely to have been complete by the end of the 14th century because a complete but crushed 14th-century pot was found below the topsoil on the surface of the alluvium (S. Parry, pers. comm.).

Two later limestone structures were found on the south edge of the pit in the same stratigraphic position within the alluvial sequence and at approximately the same height OD. The features were crudely built, and they were separated by c 30 m. One cannot be certain that the two are part of a single entity, although this seems likely. It is possible that they form part of another causeway with a similar function to the medieval one, but they could also be part of a hardstanding or wharfage on the river. It is impossible to provide a firm date for the structure(s), but their position within the sequence of alluvium over the medieval causeway suggests a late medieval or post-medieval date.

GENERAL CONCLUSION

The watching brief and excavations at Ditchford have provided extensive information on the use of the river Nene's floodplain from the Roman through to the post-medieval periods. It has been possible to correlate this data with continuing studies of the regional environment, with special reference to the sequence and dating of alluviation. The watching brief in the pit was still in progress when this report was being completed (March 1996).

Published with assistance from English Heritage

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