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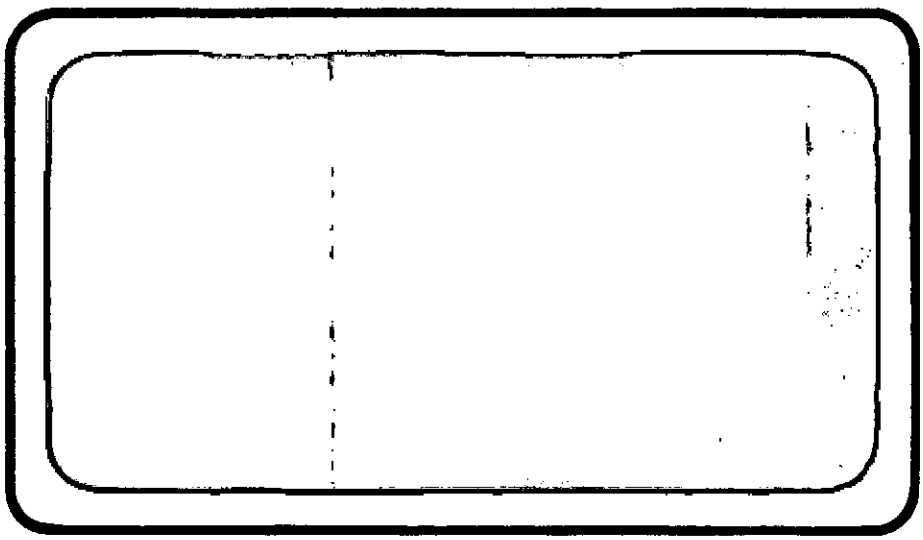

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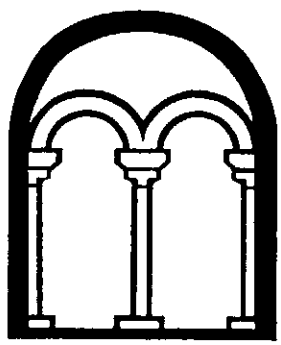

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WARREN VILLAS QUARRY EXCAVATIONS BEDFORDSHIRE

Part 1 Post excavation assessment of the potential for analysis

Planning Department
Bedfordshire County Archaeology Service

May 1995

Report 95/4

THE PREHISTORIC, IRON AGE, ROMAN AND SAXO NORMAN SITE AT WARREN VILLAS QUARRY, BEDFORDSHIRE

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THE PREHISTORIC, IRON AGE, ROMAN AND MEDIEVAL SITE AT WARREN VILLAS QUARRY, BEDFORDSHIRE

1 SUMMARY

The Neolithic, Iron Age, Roman and medieval site at Warren Villas Quarry lies on the flood plain and gravel terrace of the River Ivel in eastern Bedfordshire (TL1827 4698). The site has been progressively excavated since 1989 in advance of quarrying by RMC through their subsidiaries Hall Aggregates and St Albans Sand and Gravel.

The site is of national importance because of the surviving evidence of riverside settlement activity from the Iron Age, Roman and medieval periods. The archaeology was protected by alluvial material deposited on the lower flood plain; a rise in the water table at the end of the Iron Age resulted in a wealth of waterlogged evidence surviving from this period (Robinson 1992). Of considerable interest is a series of wattle lined tanks, the remains of medieval flax retting pits or a fish weir.

The site is of considerable importance because of its place within the wider context of the Archaeology Service's investigation of the landscape in the Biggleswade/Sandy area (Dawson 1994, Shotliff 1994) and because of the contribution the site will make to the wider regional understanding of the development of the Ouse and its tributaries (Dawson 1995, Cook 1992).

The quarry at Warren Villas has been excavated over several seasons. Funding has been supplied by both English heritage and the developer. The latter was initially Hall Aggregates until the re-organisation of RMC, when St Albans Sand and Gravel took over extraction of minerals on the site.

In this document only the English Heritage funded sites are assessed. In the UPD it is proposed that all the Warren Villas sites are brought together as one report although the funding remains separated. This endorses the concept of landscape study, addressing issues raised in Exploring Our Past and other more specific period based recommendations generated by prehistoric, medieval and Roman Societies. Integration of the EH funded areas and the developer funded elements will be dealt with in section 2, the integrated research aims in the Updated Project Design.

The report is bound in two separate volumes:

Part 1: Assessment of Potential

Part 2: Updated Project Design

Part 1 of the document is based on a review of the results of excavation which took place from 1989 to 1990, and which were part funded by English Heritage. It takes account of more recent excavations which were wholly funded by the developer. Section 2 briefly describes the project background, and in sections 3-9 individual areas

of evidence, (structural, ecofactual and artefactual), are assessed for their potential for further analysis. Section 10 summarises the overall potential for further analysis.

In **part 2** of the document, section 2 outlines the aims and objectives of the post excavation proposal; section 3 the format of the publication and potential; Sections 4-10 detail the methods to be employed in achieving the aims identified in section 2; section 11 outlines the programme and resources required and section 12 the costs of analysis. A bibliography is provided for both parts 1 & 2 in the final section.

2 PROJECT BACKGROUND

2.1 Introduction

The site at Warren Villas is one of several cropmark sites (HER 3527) known from the Sandy-Biggleswade area. Previous work at the site had been limited to a watching brief during which a single late Roman boxwood comb was recovered from a ditch in 1989 (Sf 293). Preliminary interpretation suggested that the site comprised a core area in which two ring ditches were located and an area of indeterminate linear cropmarks. In 1989 the ring ditches were cordoned off and excluded from the area of quarrying.

Excavation in an area east of the ring ditches began following the discovery of waterlogged wood during a routine watching brief in 1989. During this period clearance of a field boundary ditch and excavation of the exposed sections suggested that the aerial photograph evidence had been misleading and the ring ditches were a conflation of intersecting boundary ditches made visible by changes to the water table.

The Warren Villas project in 1989 began as a small salvage excavation funded by Hall Aggregates which, as the extent of surviving water-logged remains became clearer, was extended with English Heritage support (BCCAS: *Excavations at Warren Villas Quarry 1989/90*). The first period of work, to February 1991, became the subject of a post excavation project design to assess its potential for analysis (Warren Villas, Bedfordshire: Project Design for Assessment of Potential for Analysis 1992) which was submitted to HBMC in April 1992. This document, Part 1 Assessment of Potential; Part 2 Updated Project Design, is the completion of that process.

Excavation at the site during the first campaign continued over a two year period from Easter 1989 to February 1991, ultimately extending across 1.88ha. This area is referred to as Area 1, including the western access road, see fig 1. The excavation revealed landscape elements from the late post glacial through to the post-medieval period.

Date	Area	Funding
1989-91	Area 1 including the West haul road	Hall Aggregates, Bedford County Council & English Heritage
1992	Area 2 Kiln site	Hall Aggregates
1993	Area 3/4 Quarry set-aside	Hall Aggregates
1994	Area 5 Quarry salvage	Hall Aggregates
1994	Area 6 Quarry extension and Seddington	St Albans Sand & Gravel Plc

Table 2.1 The main campaigns at Warren Villas:

Subsequent to 1991 archaeological work at Warren Villas has been undertaken in concert with the quarry programme. It has been funded by the developer, comprises Areas 2-6 (fig 1), and has extended the area of investigation to include the cropmark sites west of the 1989-91 site. Undertaken during the construction of various haul roads, areas set aside from quarrying or in advance of quarrying, the excavation regime has varied according to the circumstances of extraction.

The excavations were undertaken by Bedfordshire County Council Archaeology Service, directed by Michael Dawson (Senior Archaeological Field officer), supervised by Anthony Maull (Assistant Field Officer). This assessment was carried out by Michael Dawson, Holly Duncan (Artefacts Manager, Non-ceramic Artefacts), Anna Slowikowski (Artefacts Manager Ceramics) and commissioned specialists.

2.2 Current situation (May 1995)

The archaeological evidence from Warren Villas is at various stages of processing from a MAP 2 Assessment to a recently completed period of fieldwork evaluation. It is clear that the project as a whole represents a significant portion of the landscape and a considerable opportunity exists to produce a single report based on all these excavations.

The principal period components of ***all*** the evidence recovered from Warren Villas are:

Environmental evidence of landscape development on the river margins from the earliest post glacial period to the mid 14th century AD.

Prehistoric evidence of activity possibly associated with the river, including dug features and suggestions of ritual deposition of flint in an abandoned water course.

Evidence of an Iron Age field system.

Evidence for the increasing marginalisation of farming on the flood plain at a time of rising water levels in the 1st century BC (Robinson 1992).

Late Iron Age and Roman period settlement on the gravel terrace during which time pottery production was undertaken at the site.

Some evidence of Saxon period activity following a period of site abandonment probably in 5th and 6th centuries.

Saxo-Norman settlement evidence probably contemporary with riverside activity represented by dendrochronological felling dates of 1084 to 1125 for timber structures excavated in 1989-90.

The phases of activity outlined above can be separated into two categories. In the first, *all areas*, except the Iron Age and Roman settlements have been extensively excavated prior to destruction by quarrying. In the second category, the Iron Age and Romano-British settlement areas (c .57ha), minimal sampling c2% of identified features was undertaken before the site was reburied as part of a management agreement to protect it from further damage.

2.3 The assessment

English Heritage contributed to the excavation of the area which yielded the most extensive waterlogged evidence between the west access road and the river. The original aims of the project which were stated in a project design presented to English Heritage in April 1990 were as follows:

2.3.1 To generate an environmental history for the site (research aim 6.2)

2.3.2 To identify the pattern of landuse and adaptations brought about by climatic and political change (research aim 6.3)

2.3.3 To identify areas of cereal cropping, processing and to investigate growing regimes (research aim 6.4)

2.3.4 To use environmental data to help create a chronological framework for the development of land boundaries (research aim 6.5)

2.3.5 To identify crop rotations especially those which include flax and cereals (research aim 6.6)

2.3.6 To determine agricultural practice and environmental conditions through the study of macro and micro plant remains (research aim 6.7)

2.3.7 To clarify the dating sequence and function of the site through the artefact assemblage (research aim 6.8)

2.3.8 To examine the evidence for rural mortuary practice (research aim 6.9)

2.3.9 To refine the dating sequence of the site and to contribute to the dendrochronological profile of the region (research aim 6.10)

2.3.10 To further our knowledge of early carpentry by the study of wooden artefacts (research aim 6.11)

2.3.11 To study the evidence for fish traps and determine any seasonal relationship with flax retting (research aim 6.12)

2.3.12 To determine the use of pottery vessels with perforations (research aim 6.13)

3 THE STRUCTURAL EVIDENCE

3.1 FACTUAL DATA

3.1.1 Site definition

The limits of this site are difficult to define due to its landscape component. In practical terms it is defined by areas set aside for preservation, old quarry workings, the location of the present Manor Farm and geophysical survey towards Seddington village. The entire site comprises a portion of medieval settlement and landscape, the remains of at least 50% of a Romano-British settlement (an unexcavated area may contain the rest) and elements of contemporary Roman landscape, and prehistoric evidence for agricultural and possibly ritual activity.

This section addresses issues raised by the area excavated with funding by English Heritage.

3.1.2 Quantity of material and records

The structural site archive comprises:

Record type	Quantity
Contexts	1440
Plans & Sections	228
Photographs	47 monochrome films/44 slide films
	5 colour print films

Table 3.1 quantification of site records

All site records have been entered onto a computer database using dBase IV software.

3.1.3 Range and variety

The excavation at Warren Villas addressed by this assessment took place during the two year period from Easter 1989 to February 1991. The context record includes a variety of feature types, including post glacial hollows, an early prehistoric ring ditch, an area of Iron Age field boundaries, an area of Roman field boundaries, medieval structures, including waterlogged wood remains, and evidence of post medieval river management.

The analysis of the excavated evidence led to the clear definition of five periods during which there was human activity at the site, but did not include structural evidence of settlement from any period. This evidence was investigated later in areas funded by the developer.

During the assessment all context records have been examined, a matrix constructed and a preliminary phasing established using stratigraphic and artefactual data.

3.1.4 Additional data

In 1989 a ground probing radar survey was carried out to help define the area of waterlogged remains. The survey was extensive covering over 2ha along the west bank of the Ivel. However analysis by Dr C Stove was incomplete and the company which conducted the survey is now defunct. Only a single copy of the printed data from the survey exists and the survey cannot be analysed or re-interpreted.

3.1.5 Provenance: the provisional phasing

The data set, which comprises the context records, photographs and radar survey and additional observations made during excavation, has been assembled for the purpose of assessing its potential for analysis. The structural evidence of human activity at Warren Villas has been grouped into five broad phases based on the stratigraphic record and the ceramics spotdating.

Phase	Quantity/contexts	Description
1	184	Natural river course, tributary and stream, periglacial pool and gravel terrace.
2	317	Prehistoric: river deposits (flint); penannular ring ditch; Iron Age field boundaries
3	727	Roman: extensive field system; some structural evidence
4	193	Medieval (Saxo-Norman): hurdle lined pits; occasional ditches
5	19	Post medieval: altered river course; recent agriculture

Table 3.2 Summary of principal phases of activity at Warren Villas.

3.1.6 Means of collecting the data

In the areas which are the subject of this assessment, excavation was undertaken without a fixed sampling policy. The complex nature of the site led to the excavation of over 50% of all features with some structures, in particular the hurdle lined tanks, excavated to 100%. In the North Access road and the Salvage Area all features had a 2m wide hand-excavated section. 38% of features on the West Access road were hand-sectioned (1m sections); the remaining features were machine-sectioned. In addition all human burials were completely excavated as were selected pits and ditch sections. No sieving took place on the site, although a metal detector was used, and no quantification of the collection rate was carried out.

3.2 POTENTIAL FOR FURTHER ANALYSIS

(Numbers refer to research aims cited in the Warren Villas Project Research Design, April, 1990)

To generate an environmental history for the site
(Research aim 6.2)

The features excavated at Warren Villas provide evidence of riverside/flood plain activity from the post glacial period onwards. The date of this activity is based on stratigraphy, flint material and soil analysis. In each of the phases from early prehistory onwards there were sufficient cut features to provide samples from which an environmental history of the site may be generated. The viability of these samples is discussed in the environmental assessment but the phases identified from stratigraphy and artefact assessment can provide the framework for an environmental history of the site.

To identify the pattern of landuse and adaptations brought about by climatic and political change
(Research aim 6.3)

The extensive excavations of ditched boundaries in the area close to the river provided good evidence of sedimentation patterns as well as environmental and artefactual evidence of the type of activity carried out in this area. The contextual evidence from cut features is complemented by evidence of layers of alluvial material; together with the environmental data it has high potential for contributing to an understanding of changes brought about by landuse or climatic factors.

There is sufficient contextual data to identify some specific processes such as ploughing in the late Iron Age and Roman periods and ritual activity in the Bronze Age. Environmental sampling will throw light upon the conditions under which these processes were taking place and contribute to the identification of these processes. For example the environmental assessment has shown that a mould board plough was being used in very wet conditions.

Political change is a difficult area of analysis, but this part of the research aim is intended to target the impact of the Roman period on the Iron Age landscape. As with the other research aims the contextual data provides a framework within in which the occurrence of new artefacts and environmental data can be assessed. During the assessment it has become clear that activity at the site increased after the conquest and that many new ditched land boundaries were created. These were almost certainly dug to facilitate drainage as well as defining land plots associated with the settlement partly excavated in 1993. This evidence, together with that of environmental changes and artefactual data, therefore has potential to identify changes brought about by the Roman occupation.

To identify areas of cereal cropping, processing and to investigate growing regimes
(Research aim 6.4)

The structural record has the potential to establish the framework for the study of plant and molluscan assemblages. In addition the evidence of plough marks in two dated horizons provides evidence for the use of technological innovations such as the mould-board plough. There is good potential therefore to identify areas of cereal cropping during the late Iron Age and Roman periods.

The identification of growing regimes will be pursued through the environmental analysis.

To use environmental data to help create a chronological framework for the development of land boundaries
(research aim 6.5)

The evidence from the structural record provides sufficient information to subdivide the site into five phases based on stratigraphic relationships and ceramics data. The potential for enhancing the dated sequence with the addition of species data is high.

To identify and explore the evidence for flax processing
(research aim 6.6)

The stratigraphic record has low potential to contribute specific information that will generally improve our knowledge of flax retting. 19 pits were identified cut into the gravel in the medieval period (phase 4). These were lined with wattle hurdling and contained waterlogged wooden and ceramic artefacts. Uses for these pits may be defined through combining stratigraphic and artefact data.

To determine agricultural practice and environmental conditions through the study of macro and micro plant remains (research aim 6.7)

The structural data also has potential to contribute to this aspect of the research aims which will primarily be achieved through comparison between alluvial and sedimentation patterns and environmental evidence.

To clarify the dating sequence and function of the site through the artefact assemblage
(research aim 6.8)

The structural evidence has considerable potential for this aim. During assessment preliminary phasing, outlined above (section 3.1.3, table 3.1), based on ceramics spot dating and stratigraphy has provided a dated sequence for activity at the site. It has also provided a framework within which to investigate the function of artefacts at the site (see above research aim 6.6). Thus analysis of artefacts and stratigraphic data will lead to clarification of the phasing and allow this to contribute to the environmental history of the site.

To examine the evidence of rural burial practice
(Research aim 6.9)

A single prone inhumation and 6 cremations were recovered during excavation. The prone burial has not been dated (a C14 date is proposed) but the cremations were found either in urns or in simple hollows. The proximity of the cremations to land boundaries provides the basis for wider investigation of this phenomenon at other similarly dated sites (Philpott 1991, 30-36).

To contribute to the regional dating sequence based on dendrochronology
(Research aim 6.10)

The stratigraphic record has the potential to provide the structural context for the dendrochronological aspect of the work.

To pursue further knowledge of carpentry from wooden artefacts recovered from the waterlogged deposits
(Research aim 6.11)

The structural record has no potential to contribute to this aspect of the research aims except to provide a framework for the deposition of such items.

To study the evidence for fish traps and determine any seasonal relationship with flax retting
(Research aim 6.12)

The structural record has limited potential to contribute to this aspect of the research aims providing a framework for the analysis of these processes.

To determine the use of pottery vessels with perforations
(Research aim 6.13)

The structural record has no potential to contribute to this aspect of the research aims except to provide a structural context for the deposition of these ceramics.

3.10 STORAGE AND CURATION

The structural record is presently held in A4 lever arch files and on Asaflex drafting film at St Mary's Church Archaeology Centre, Bedford. Microfiche copies have been made of context sheets and all other data sheets and paper records relating to the site; there are also paper copies of all the site drawings. All the copies are held at County Hall, Bedford. The archive is fully indexed.

4 THE CERAMIC ASSEMBLAGE

4.1 FACTUAL DATA

4.1.1 Quantification

Pottery

The material was recorded by fabric type and form; quantification was by sherd count, vessel count and weight. The information was then computerised to facilitate manipulation of the data. The pottery from Warren Villas consists of 3028 Iron Age and Roman sherds from 1162 vessels weighing 43930g in total. In addition there are two Beaker vessels consisting of three and four sherds respectively, and a possible Neolithic sherd. These have been examined by Dr. D. Tomalin and no further analysis is necessary. B Dickinson examined the samian assemblage and identified a minimum of 50 vessels from a total of 118 sherds; an additional 3 sherds were unstratified and not used in the quantifications. A small quantity, 27 sherds in total, of post-Roman pottery was also found.

All quantitative statements and tables in this report are based on the sherd count. One of the cremation vessels, described below, consists of 324 sherds. To avoid undue bias this has been counted as one for assessment purposes, making the total sherd count 2713.

The material from the topsoil and other unstratified pottery has not been quantified. A scan to note sherds of intrinsic interest and to establish if there are any new fabric types will be sufficient.

Building Material

The building material was quantified by sherd count and weight. Additional small fragments were recovered from bags of pottery and these will be recorded at the analysis stage. A total of 140 sherds, weighing 11008g, was recovered from Area 1, including roof tiles, brick/floor tiles, daub/fired clay and a single example of a possible kiln bar. It was clear that some of the pieces belonged to the same fragment although these pieces were not put together, nor were they recorded as such, at this stage.

4.1.2 Provenance

Pottery

Table 4.1 below shows the relative quantities of pottery from the different types of feature on site. The figures are expressed as a sherd count and as a percentage of the total.

Context type	Sherds	% TOTAL
Ditches	1858	68.6%
Layers	366	13.5%
Pits	358	13.1%
Cremations and graves	65	2.3%
Natural deposits (tree bowls and ponds)	36	1.3%
Structural	15	0.6%
River channel	8	0.3%
Other	7	0.3%
TOTAL	**2713**	**100%**

Table 4.1 Quantity of pottery, by sherd, from different feature types

It is evident that a large proportion of the pottery (81.7%) derives from ditches and pits. These are the contexts usually regarded as the least susceptible to contamination, at least in their lowest fills. However, in the case of Warren Villas 1 the high proportion of pottery from these features is somewhat misleading since the condition of the sherds suggests a high level of residuality and re-deposition (see section 1.3). Forty-four contexts produced samian pottery.

Table 4.2 indicates the distribution across the site, by area, of the pottery in its chronological group.

Area	Prehist	E-MIA	LIA	Rom	Sax	Saxo-Norman	Med	Post-med	TOTAL
N Access road			3						**18**
NE Quad		55	11	8					**74**
NE/NW Quad		1	14	14					**29**
NE/NW/SE Quad		1	1	36	3	1			**42**
NE/SE Quad		4	4	8					**16**
NW Quad	3	154	37	30	6				**230**
SE Quad	5	94	116	363	3	1			**582**
W Access		103	162	282	26	1			**576**
Tank		70	596	303		4	9	9	**668**
Salvage		67	40	48					**478**
TOTAL	**8**	**549**	**984**	**1107**	**38**	**7**	**9**	**11**	**2713**

Table 4.2 Distribution of pottery, by sherd, across the site (see fig.1 for location of areas)

The early prehistoric pottery is all residual in later contexts. The Iron Age and Roman pottery is spread across the site, but with concentrations of early-middle Iron Age pottery in the NW quadrant; late Iron Age pottery in the West Access road and the Tanks (section 4.1.4), and Roman pottery in the SE quadrant, the W Access road and the Tanks. Distributions across the site might distinguish discrete areas of activity, in

particular areas of rubbish disposal and dumping outside the area of the settlement, especially within the ditches, where most of the pottery occurs.

The West Access road contains 21.2% of the pottery from the site. This area is less disturbed than the rest of the site, particularly the waterlogged area, and will repay further study. It will be most informative when the pottery from the non-English Heritage funded excavation, immediately to the south-west of Area 1, has been examined.

The distribution of samian pottery (table 4.3), by sherd, across the site, corresponds to the concentrations of the Roman pottery in general (table 4.2).

Area	Samian
N Access	14
NE Quad	
NE/NW Quad	2
NE/NW/SE Quad	9
NE/SE Quad	
NW Quad	
SE Quad	20
W Access	11
Tank	44
Salvage	14
TOTAL	**118**

Table 4.3: Distribution of samian across the site

The cremations

Two cremations accompanied by ceramics (there are 6 cremations in all) were recovered from the excavation. The first (fill 219) was encountered in the Salvage area to the south of the main area of excavation. It was accompanied by three vessels: a large shelly jar of fabric type R07C; a vessel of fabric type F03 and a samian ware bowl. Damage by machine means that it is not possible to say whether any of the vessels contained the cremation itself. Only a few bone fragments survive, but it is likely that the large shelly jar was the cremation urn, and the other smaller vessels were accessories. Two sherds of fabric type F30 might be intrusive.

The second cremation was found at the north-west end of the site. This contained an abraded lid-seated shelly jar, comprising six sherds of fabric type R07C, and seven sherds of a vessel of fabric type F30. The latter has a pitted interior suggesting domestic use as a container, possibly for acidic substances, prior to its use as an accessory vessel. The cremation also contained a small, intrusive Saxon sherd, although this identification is as yet only provisional. Only small fragments of human bone were found and it is not clear if the cremated bone was deposited within one of the vessels or was buried un-urned.

Phasing and date range

The provisional phasing is as follows:

- phase 1 Natural features
- phase 2 Prehistoric
- phase 3 Roman
- phase 4 Medieval
- phase 5 Post-medieval

These date ranges will be refined at a later stage, in the light of the analysis of the non-English Heritage funded areas of excavation.

The pottery assemblage shows a wide date-range, from the Neolithic to Post-medieval periods. The majority of early prehistoric pottery, however, was found redeposited in later features. The Iron Age pottery in contexts of phase 2 shows a lesser degree of residuality than other periods; the contexts allocated to this phase are less mixed and the pottery in better condition. This may be helpful in refining the stratigraphical data as pottery from all phases of the Iron Age are present. The high proportion of Iron Age and Roman pottery in post-Roman phases shows a high degree of residuality and re-deposition in these later phases.

The West Access road, however, appears to contain less residual pottery than elsewhere, although two contexts, 1049 and 1140, provisionally dated to phase 3, contain a high proportion of Iron Age and Roman pottery which might all be residual. Two sherds in a shelly fabric, although recorded with the Roman pottery, might be Saxo-Norman. This would then concur with the evidence of the carbonised wheat grains from these contexts, which indicate a Saxon or medieval date (see section 8).

Pottery group	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	TOTAL
Early Prehistoric		5	3			**8**
Early-middle Iron Age	7	362	180			**549**
Late Iron Age	3	63	703	203	12	**984**
Roman	3	61	872	143	28	**1107**
Saxon		5	30	3		**38**
Saxo-Norman		1		5	1	7
Medieval				9		9
Post-medieval			1		10	11
TOTAL	**13**	**497**	**1789**	**363**	**51**	**2713**

Table 4.4 Quantities of pottery, by sherd, within phase

samian	phase 2	phase 3	phase 4
	5	81	29

Table 4.5 Samian by sherd, within phase

The distribution of the pottery through time (table 4.4) indicates a high level of residuality, particularly in the post-Roman phases. The samian distribution across the phases (table 4.5) reflects this. B Dickinson reports, "only seven contexts contained samian which is potentially useful for dating purposes. The rest consists of either residual, re-deposited or intrusive material. The samian ranges from the Neronian-Flavian period to the second half of the second century, but not necessarily much beyond A.D.160. The vessel types represented belong to the standard range found in Britain in the first and second centuries A.D. and no form occurs in unusually large quantity. Of possible relevance to the interpretation of the site may be the concentration in the second century of Hadrianic and/or early Antonine material and the absence of East Gaulish, and consequently, third century samian."

Building Materials

Context type	**Roof tile**	**Brick/floor**	**Daub/fired clay**	**?Kiln bar**	**TOTAL**	**%**
Ditches	6	12	87	1	106	74.7
Layers	5	7	2		14	9.8
Pits	3		1		4	2.8
Cremations and graves						
Natural deposits	1				1	0.7
Structural						
River channel	13				13	9.2
Other	1		3		4	2.8
TOTAL	**29**	**19**	**93**	**1**	**142**	**100**

Table 4.6 Quantities of building material from different feature types

Table 4.6 shows the quantities of building material from the different types of feature on site. The figures are expressed as a sherd count and as a percentage of the total. As with the pottery, the largest quantity comes from ditches (74.7%). The small quantity and its fragmentary nature indicates piecemeal disposal and re-deposition.

Area	Roof tile	Brick/floor	Daub/fired clay	?kiln bar	TOTAL
N Access	1				**1**
NE Quad			17		**17**
NE/NW Quad					
NE/NW/SE Quad					
NE/SE Quad		1			**1**
NW Quad	1		16		**17**
SE Quad	1		5		**6**
W Acess	4	5	51	1	**61**
Tank	21	13	1		**35**
Salvage					
Other	1		3		**4**
TOTAL	**29**	**19**	**93**	**1**	**142**

Table 4.7 Distribution of building material across the site

Table 4.7 shows the distribution of the different categories across the site. The W Access trench produced the largest quantity of building material, of all categories, but particularly the daub/fired clay, which was concentrated in this area. The rest of the building material was more scattered.

Category	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	u/s	TOTAL
Roof tile			7	16	5	1	**29**
Brick/floor			13	1	5		**19**
Daub/fired clay		4	85	1		3	**93**
?kiln bar			1				**1**
TOTAL		**4**	**106**	**18**	**10**	**4**	**142**

Table 4.8 Quantification of building material by phase

The distribution of the building material through time (table 4.8) shows a predominance of mainly post medieval tile in phase 4 and a concentration of daub in phase 3. The tiles in phase 3 are of Roman date and their small quantity confirms the distant location of any substantial structures. The daub/fired clay in phase 3, although difficult to date, is likely to be Roman. More than half of the daub (57%) was found in the West Access trench, suggesting the presence of flimsy structures in this area. The few fragments found in contexts of phase 2 appear to have a higher organic content than the daub in the other phases and could be the only pieces dated to the Iron Age.

4.1.3 Range and variety

Pottery

Type Series

The type series is listed below in chronological order. The pottery was looked at by C Going, who confirmed the identification of the Roman types. New types or those that have not been published previously are marked with an asterisk (*).

EARLY PREHISTORIC			*TOTAL*	*8*
	Neolithic			1
	Beaker			7
EARLY-MIDDLE IRON AGE			*TOTAL*	*549*
F01A	Fine flint			64
F01B	Coarse flint			1
F14	Fine handmade mixed			5
F15	Coarse handmade mixed			20
F16	Coarse shelly			32
F17	Grog			28
F18	Fine sand and shell			1
F19	Sand and organic			224
F21	Shell and organic			7
F22	Grog and organic			6
F23	Grog, shell and sand			27
F26	Carinated forms			3
F28	Fine sand			34
F29	Coarse sand			45
F30	Sand and calcareous			52
LATE IRON AGE			*TOTAL*	*984*
F03	Grog and sand			56
F04	Organic			7
F05	Grog and shell			12
F06A	Fine grog			9
F06B	Medium grog			53
F06C	Coarse grog			46
F07	Shell			131
F08	Shell and grog			53
F09	Sand and grog			236
F25	Harsh sandy			11
F33	*	Grog and sand		88
F34	*	Grey sandy		282
ROMAN			*TOTAL*	*1110*
R01	Samian ware			118
R03A	Fine white ware			24
R03B	Gritty white ware			38
R03C	Smooth white ware			1
R05A	Orange sandy			19
R05B	Fine orange			6
R06	Greyware (misc)			44
R06A	Greyware (Nene Valley)			62
R06B	Greyware (coarse)			484
R06D	Greyware (micaceous)			20
R06E	Greyware (calcareous)			15
R07C	Gritty black ware			12

R09A		Pink grogged		13
R11D		Oxford colour coat		4
R11E		Oxford mortaria (white)		6
R12A		Nene Valley mortaria		10
R12B		Nene Valley colour coat		37
R13		Shelly		137
R14		Red-brown harsh		12
R19		Amphora		3
R21		Mortaria (misc)		2
R22A		Hadham oxidised		6
R23		Roughcast colour coat		7
R35	*	R/B grog		25
R36	*	Orange gritty		2
SAXON			*TOTAL*	*38*
A		Sandy (Iron Age or Saxon)		24
A16		Saxon - coarse sandy		7
A19		Sand and organic		7
SAXO-NORMAN			*TOTAL*	*7*
B01		St Neots type		6
C12A		Stamford ware		1
MEDIEVAL			*TOTAL*	*9*
C09		Brill/Boarstall type		1
E02		Late medieval oxidised		8
POST-MEDIEVAL			*TOTAL*	*11*
P01		Glazed earthenware		3
P13		Tudor green		1
P37		White salt glazed		5
P45		Transfer printed		2

Early Prehistoric

Eight sherds of early Prehistoric pottery were recovered. Of these, three Beaker sherds, belonging to the same vessel, were found in ditch context 767. The identification of this vessel has been confirmed by D Tomalin who reports, "the decoration of this conjectured single vessel has been executed with fine comb point impressions set in horizontal lines to form Clarke's (1970) motif 1. The number of impressed lines within the zones appears to range from four to five with plain zones of similar width dividing up the scheme. This style can be readily matched with beakers of Case's (1977) Middle Period and it can be similarly equated with Lanting and Van der Waals (1972) step 3. In terms of Clarke's earlier beaker classification this vessel would fall in his postulated Wessex-Middle Rhine group (Clarke 1970)." The ditch, however, has been allocated to phase 3 on stratigraphical grounds, making these sherds residual, although they are of intrinsic interest because of the relative rarity of early Prehistoric pottery. Four additional Beaker sherds, all from different vessels, were recovered from soil samples from pit 1306, allocated to phase 2. The only other pottery from this context was a single sherd of late Iron Age pottery. A single sherd of Neolithic pottery was recovered from layer 883, allocated to phase 2. It was small, badly abraded and clearly re-deposited.

Iron Age

The early-middle Iron Age pottery makes up 20% of the total, 549 sherds, while the late Iron Age pottery makes up 36% of the total, 984 sherds. This forms the largest chronological grouping on the site.

All the fabric types belonging to the early Iron Age are known from other sites in the county. There are, however, two new late Iron Age types, F33 and F34, which should be incorporated into the Bedfordshire Pottery Type Series. There is a possibility that some sherds identified as Saxon on their sand-tempered fabric may belong to the Iron Age (see Saxon below).

Twenty three early Iron Age vessels with recognisable rim forms could be identified (table 4.6).

Early Iron Age forms	**No of vessels**
rectangular/flattened rimmed jars	9
simple everted rimmed jars	4
upright-rimmed jars	6
inturned-rimmed jars	2
hammerhead-rimmed jars	2

Table 4.9 Early Iron Age forms

The forms tabulated above are typical of the region with upright-rimmed jars being a common feature at such sites as Stagsden, north Bedfordshire (BCAS in prep), and Puddlehill, south Bedfordshire (Matthews 1976). Rectangular/flattened rimmed jars similar in form to the Warren Villas examples have been found at the Iron Age settlement site of Salford, mid Bedfordshire (BCAS in prep), and Chamberlains Barn, south Bedfordshire (Slowikowski in prep).

Many of the Iron Age vessels from Warren Villas have evidence of decoration surviving despite some abrasion. Vertical "twig-brushing" and finger-impressed or notched rims have been noted and both are a common feature from other sites in the region (Elsdon 1993). Of the late Iron Age vessels, 99 had recognisable forms (table 4.7).

Late Iron Age forms	**No of vessels**
cordoned jars	36
lid seated jars	31
everted rimmed jars/bowls	18
storage jars	11
pedestal jars	3

Table 4.10 Late Iron Age forms

Roman

The Roman pottery makes up 41% of the assemblage, 1107 sherds. The bulk of this pottery, about 90%, is the product of local manufacture, including shelly wares, grey wares and grog tempered wares. The presence of a pottery kiln in Area 2 of the non-English Heritage funded excavation suggests that at least a part of the grey ware assemblage might comprise the products of this kiln (Slowikowski and Dawson 1994). Imports consist mainly of regional varieties from the Nene Valley, Oxfordshire, and Hertfordshire.Two hundred and fifty seven vessels had recognisable forms; these are tabulated below (table 4.11).

Roman Forms	**No of vessels**
jars	189
bowls	37
mortaria	13
flagons	7
platters	3
amphora	3
'dog dishes'	2
jugs	1
folded beakers	1
poppy head beakers	1

Table 4.11 Roman forms

Little decoration was noted on the local Roman pottery; there was some burnishing (often in a lattice pattern), cross-hatched panels between cordons, and incised wavy line decoration. A crude white slip, similar to that used at the Warren Villas kiln was also noted on eleven sherds. Among the finewares the presence of painting, barbotine, rouletting, and stamping on the Hadham wares, was recorded.

The samian pottery

B Dickinson reports, "a total of 118 sherds of samian, plus 3 unstratified sherds, representing a minimum of 50 vessels, was recovered. The material comprises:

- South Gaulish 35 sherds 19 vessels
- Central Gaulish (Les Martres-de-Veyre) 7 sherds 5 vessels
- Central Gaulish (Lezoux) 79 sherds 26 vessels

There are 4 stamped plainware vessels, two with identifiable stamps, and 26 decorated sherds, representing 10 bowls. None of them came from key contexts."

Saxon

The pottery provisionally identified as Saxon comprises jars and bowls in simple, hand-made forms, and comprises 38 sherds, 1.4% of the total. The fabric is quartz sand tempered with no other distinguishing inclusions visible either to the eye or under a x20 microscope. It is indistinguishable from some of the early Iron Age pottery, particularly sherds which are undiagnostic of form, and are reduced to grey or black in colour. This problem has also been identified at other sites in the region for example

Thurleigh (BCAS in prep). All decorated pieces have decoration characteristic of the Iron Age, and these have been allocated to the Iron Age. There are no Saxon stamps. This situation might be clarified when the stratigraphical phasing has been refined. Any outstanding anomalies will be clarified using thermoluminescence which can readily determine which sherds are of which category. This work could help tp resolve a difficulty found not only in Bedfordshire but in the general region.

Saxo-Norman and medieval

Small quantities of Saxo-Norman and medieval pottery were recovered, sixteen sherds in total. Seven sherds were of Saxo-Norman date, corresponding to the date of the flax-retting activities on the site and the settlement in Area 6 of the non-English Heritage funded excavation. The pottery is fragmentary and consists of single sherds, with the exception of a late medieval jug which comprises eight sherds.

Post-medieval

Eleven sherds of post-medieval pottery were recovered, mainly of 17th or 18th century date. A complete bowl was recovered from layer 1. A single sherd of Tudor Green, dating to the 15th century was also recovered from layer 1.

Evidence of use throughout the phases

Among the physical evidence of use on the pottery were sooting (both internally and externally), visible residues, secondary holes and abraded interior surfaces, although see also section 4.1.4 on the poor condition of the pottery.

Sooting

Eleven percent of sherds have evidence of sooting. This was especially common in the Roman period on lid-seated cooking jars, although other forms of jar, as well as bowls, were also sooted. The lid-seated jars are sooted externally up to a distinct line which indicates where the lid would have been placed. Although the use of lids can thus be demonstrated no ceramic examples were found suggesting the use of other, non-ceramic, materials.

External sooting of this type is evidence that the vessels were used on a fire. The vast majority of sooted sherds (99%) are of Roman date, whilst the remaining 1% date to the Iron Age. This results from either a higher degree of surface abrasion within the Iron Age assemblage (sooting rarely washes off completely during processing), or the possibility that these vessels were used to heat their contents not on a hearth, but by some other method such as heated stones.

The majority of sooted sherds was sooted externally although 35 sherds (6 vessels) were only sooted internally and 9 sherds (three vessels) were sooted over the breaks. Sooting over the breaks indicates either that the vessel broke on the fire or that it was burnt after it was discarded. One sherd shows evidence of having been sooted over a patch of spalling. Spalling, when part of the surface of the vessel wall is blown away, occurs either at the manufacturing stage or during use, when the pottery is not sufficiently dry or is subjected to drastic temperature fluctuations. The presence of sooting over such a mark suggests that either imperfect pottery were being used or that the spalling occurred during use on the hearth.

Residues
There are few instances of vessels with visible residues. Three late Iron Age and two Roman vessels had internal white residues. These have been laid aside for residue analysis at a future date. No analysis is envisaged at this stage, either for visible or invisible residues, because of work-programming and resource difficulties (see section 4.2.3 below).

Secondary holes
Eight vessels have holes pierced through them. A cordoned jar has two holes, pierced prior to firing, through its neck. They may have been for suspension or the attachment of a lid. The remaining seven vessels, all dating to the late Iron Age or early Roman period, have holed bases. One example, a large complete lid-seated jar has a neatly executed and countersunk central hole surrounded by a circle of six smaller holes. The holes were pierced through the base of the pot after firing and therefore represent a modification in its original function.

Of the other examples, one jar has four holes, two jars have one and one jar, though incomplete, appears to have a large central hole and five or six smaller peripheral perforations. One vessel has an extremely rough hole in the base which may have been made accidentally. Only one vessel exhibits a regular, drilled hole pierced before firing. All the vessels with holed bases were found in the waterlogged area and may have been used in conjunction with other riverine activities.

Abrasion/wear marks
Thirty-three sherds show evidence of severely abraded or pitted internal surfaces; they are unabraded elsewhere. This suggests that the contents were vigorously stirred or that the vessels were used as containers for acidic substances, causing the shell inclusions to dissolve out. No other wear marks, either on the rims or the bases, were noted even though the assemblage was carefully examined. This was due to the level of general abrasion on the pottery.

Building Materials

Very little structural ceramic material was found in Area 1, reflecting the fact that the nucleus of settlement had not been excavated. Table 4.12 indicates the range and variety of building material, and its date. The different categories are described more fully below.

Category	Undated	Iron Age	Roman	Med/P Med	TOTAL
Roof tile			8	21	**29**
Brick/floor		11	2	6	**19**
Daub/fired clay		4	89		**93**
?kiln bar	1				**1**
TOTAL	**1**	**15**	**99**	**27**	**142**

Table 4.12 Quantities of different categories of building material

Roof tile

Twenty-nine roof tiles were identified. The eight Roman tiles comprised two fabric types: an orange sandy type and a fine sandy type. Both appeared, on visual examination, to be the same as tile fabrics occurring at the villa site at Newnham Marina, Bedford (BCAS in prep). The 21 medieval/post medieval tiles also divide into two fabric groups: orange sandy and white. Only two tiles were in the white category and these are of Gault clay, deposits of which are found in the south of the county. The method of attachment to the roof was recorded. Nine had holes (eight round and one square), and five had nibs placed off centre. The use of nibs is not common in this region, although this might be a chronological difference, with the use of holes for peg or nail attachments being a later feature.

Brick/floor tile

A total of nineteen brick/floor tile sherds was recorded. These two categories have been counted together because, although very different in the medieval and post medieval periods, there is little to distinguish them in earlier periods. The Iron Age bricks/floor tiles are ceramic blocks that were not necessarily used in the building of major structures. They are known from Iron Age settlements, sometimes associated with hearths, and kiln sites (Swan 1984, 110). For purposes of this assessment, these blocks have been included with the brick/floor tiles. The high number of these Iron Age bricks/floor tiles is somewhat misleading as it is probable that the eleven sherds came from a total of three fragments. They have a high organic content and few other inclusions. The Roman bricks/floor tiles numbered only two and these were residual in later contexts. They are of the same orange sandy fabric as the roof tile but have been distinguished from them by their greater thickness. These identifications need to be confirmed and comparisons made with the other material from the non-English Heritage funded excavation. Four post medieval bricks were also found.

Daub/fired clay

Ninety-three sherds of daub/fired clay were recorded, the majority coming from contexts dating to the Roman period, with only four sherds dated to the Iron Age. The fabric of the Roman daub/fired clay was sandy with varying amounts of grog, calcareous and organic inclusions. The Iron Age fabric was primarily organic tempered. Over half of the daub/fired clay was found in one area, in the West Access trench, suggesting the presence of a flimsy structure here in the Roman period.

?Kiln bar

A single fragment of a possible kiln bar was recorded. It is rectangular in section and 38mm thick, in an organic tempered fabric. Kiln bars are usually made in the same fabric as the pottery products from a kiln. The fabric of the possible kiln bar is organic tempered, probably precluding it from having been used in the kiln excavated in Area 2 which produced only sand tempered pottery. No kiln bars were found in the kiln. Kiln furniture in a similar organic fabric, however, was found on the kiln site at Stagsden, north Bedfordshire, where it is dated to around the Conquest period. Kiln furniture is not likely to travel far from its place of use and this may point, although very tentatively, to pottery manufacture in the area in the very early Roman period.

4.1.4 Condition

Pottery

The condition of the pottery is generally poor with 21% of sherds showing varying degrees of abrasion. In general, the pottery was too abraded to distinguish wear marks. Many sherds, especially from the waterlogged areas of the site, have become encrusted with iron deposits. The cremation vessel from context 219 had to be conserved prior to lifting because of its fragmentary state. Sample sherds, however, have been left unconserved for fabric analysis.

Recognisable forms make up 26% of the total, while 74% are undiagnostic of form. This points to a fairly high degree of fragmentation within the pottery as a whole. This seems to be most pronounced in the Iron Age assemblage although this may in part be explained by the poorer firing of Iron Age pots in relation to Roman examples.

The Tank area contained water-logged deposits which contained a high percentage of pottery (25%) but also the greatest degree of residuality. Eight features from the water-logged area which contain Roman pottery (including complete pots in some cases) also contain medieval and post-medieval leather and wooden artefacts (see section 5.1.3). This indicates a high degree of river action causing the pottery to be re deposited, and it is consequently only of intrinsic interest. Less residual pottery was recovered from the West Access trench than elsewhere on the site.

Building Materials

Most of the building material comes from securely dated contexts, with only four residual and one intrusive piece. None of the daub/fired clay appears to be residual, and would repay further study. The rest of the building material, although securely dated, is too small a sample to repay detailed analysis.

4.1.5 Data collection method statement

Pottery

The pottery was laid out in context order and the type series defined. The pottery was coded according to the Bedfordshire Pottery Type Series. All the Roman pottery is known in the area although several fabric types have not been published before; two new Iron Age types were recognised (see type series above). The pottery was quantified by vessel, sherd count, and weight. The difficulty of accurately recording rim percentages of hand-made vessels does not make this a worthwhile exercise for the Iron Age and Saxon pottery. The Roman pottery, however, will be quantified by rim percentage at the analysis stage in accordance with the recommendations of English Heritage's survey of Roman pottery (Fulford and Huddleston 1991, 52). Evidence of use, manufacture and decoration were recorded. This was entered onto a computer database to allow ease in data manipulation. All the pottery was looked at by C Going; the early Prehistoric pottery was examined by D Tomalin; P Blinkhorn looked at

examples of the sandy Iron Age and Saxon pottery, and B Dickinson examined the samian pottery. Their comments are incorporated into the above assessment.

Building Materials

The building material was recorded by context. A fabric type series was defined and the material recorded by fabric, sherd count and weight. Any abrasion present was noted; in addition, tile form (*tegula, imbrex* etc), thickness, type of roof fastening and shape of peg hole were recorded for the tile; thickness was recorded for the brick and presence of surfaces and impressions recorded for the daub/fired clay.

4.2 POTENTIAL FOR FURTHER ANALYSIS

4.2.1 Introduction

The potential to generate ceramic information from Warren Villas I, when taken alone, is only moderate. Taken together with the pottery from the non-English Heritage funded excavation (Areas 2-6), however, the potential is far greater, leading to an understanding of the development and exploitation of this part of the Ivel valley. The condition of the pottery from Warren Villas I is such that residuality, re-deposition and water action have been major causative factors in the formation of the site. The pottery, particularly that from the West Access road, can still be used, to a limited degree, to help refine the phasing of the site and, in conjunction with the pottery from the other areas, help to determine the function, economy and nature of the settlement and the associated features on Area 1.

4.2.2 Breakdown by chronological group

The following is a breakdown of the pottery by chronological group, and the building material, detailing its potential for further analysis.

Early Prehistoric
Quantification: Eight sherds, less than 1% of the total assemblage.
Specific project objectives: *Research Aim 6.8* - The early prehistoric pottery will help to place the site within its chronological framework. Potential for analysis beyond the confirmation, quantification and parallels is low because of the residual nature of the pottery.
New research questions: None.
Regional and national research: The pottery will contribute to our existing knowledge of regional types of pottery, adding to the distribution of material in the Ivel valley. The pottery is of intrinsic interest due to the relative rarity of early Prehistoric pottery.

Iron Age
Quantification: The sherds total 1533, making up 56.5% of the total assemblage.
Specific project objectives: *Research Aim 6.8* - The Iron Age component is a major part of the assemblage, comprising over half of the total number of sherds. The full chronological range of Iron Age vessels is present, and the pottery should help to clarify the dating sequence, and help to refine the provisional phasing. The potential for clarifying activities in the restricted area of the field systems is only moderate. Most of the pottery would have been thrown into pits and ditches as rubbish. These features are away from the main focus of settlement therefore making it difficult to relate the pottery to its original place of use.
Research Aim 6.9 - By comparing the late Iron Age cremation vessels with others of this date, our knowledge of mortuary practices in the late Iron Age and into the early Roman period will be furthered. It will be possible to place the Warren Villas cremations within the regional distribution of burials of this type.
Research Aim 6.13 - Eight vessels had holes bored through their bases. Occurrences of this are relatively common on late Iron Age sites across the country (eg Beckford, Hereford and Worcester (J Evans pers comm); Verulamium, (Wheeler and Wheeler

1936); Tollard Royal, Cranborne Chase (Wainwright 1968)), as well as a number of sites within Bedfordshire, among them Ursula Taylor School, Clapham; Norton Road, Stotfold, and Stagsden. However, their relationship to form, fabric and other evidence of use has not yet been determined, and the pottery from Warren Villas has good potential to do this. Residue analysis, of both visible and invisible residues, might help determine the uses to which these vessels were put. However, there are work-programming difficulties in the few laboratories that analyse residues. In addition, the nature of the holes, which are always secondary, means that it cannot be certain that they correspond to the residues. Potential is therefore low, although sherds have been laid aside should the possibility of such analysis arise.

New research questions: A definition of the sand-tempered types will be made by comparison with the similar fabric of the Saxon pottery. This will be confirmed by thermoluminescence. This will help to define the fabrics used in these periods, clarifying and expanding the Bedfordshire Pottery Type Series. (see **New Research Aims** below)
Regional and national research: The Iron Age pottery will help to place the whole site into its temporal and spatial contexts, adding to our knowledge of regional ceramic distributions in this period.

Roman
Quantification: The sherds total 1110, making up 40.9% of the total assemblage.
Specific project objectives: *Research Aim 6.8* - The Roman component is an important part of the assemblage, although comprising less than half of the total. This pottery only has moderate potential to clarify the dating sequence because of the high level of contamination, particularly in the waterlogged area. The pottery does not relate closely to the main focus of settlement, away from this area of the site, although it may clarify patterns of disposal and dumping, by the nature of the sherds and their ratio to both weight and number of vessels. The samian pottery has high potential to refine the dating of seven of the contexts within which it is found. These contexts show little contamination. There are, in total, 44 contexts in Area 1 which contain samian pottery. *Research Aim 6.9* - By comparing the cremation vessels with others of this date, our knowledge of mortuary practices in the late Iron Age and into the early Roman period will be furthered (see Iron Age above).
New research questions: The presence of a kiln producing early Roman pottery, in Area 2 of the non-English Heritage funded excavation, gives added potential for defining the economy of the site (see **New Research Aims** below). A comparison with the greywares from the whole site will determine whether the kiln produced pottery for the immediate settlement or, by comparison with similar pottery from the small town of Sandy (c.1km away), whether it was being marketed in nearby centres.
Regional and national research: Fulford and Huddleston (1991) have pointed out the importance of local coarsewares; the imported finewares are relatively well-known. A complete type series for the Roman pottery of this region has not yet been fully established; the pottery from Warren Villas will go some way in helping to achieve this end. Together with the major assemblage of pottery from Sandy, and the pottery from the other, non-English Heritage funded, areas of the site, the pottery from Warren Villas I has good potential for establishing the pattern of ceramic use for this area. The samian pottery will contribute to the pottery database for the area around Warren

Villas and Sandy as a whole. The distribution of the pottery across the region will determine the level of outside contacts and place the site in its regional framework.

Saxon
Quantification: The sherds total 38, making up 1.4% of the total.
Specific project objectives: *Research Aim 6.8* - Establishing the presence of Saxon pottery will extend the chronological framework for the site to this period.
New research questions: Analysis of the sand-tempered fabric of this pottery will help to distinguish it from visually similar early Iron Age pottery (see **New Research Aims** below). This will enable a clarification and expansion of the Bedfordshire Pottery Type Series, and a refining of the chronology of the site.
Regional and national research: The presence of Saxon pottery will place this site in its temporal framework, adding to the distribution of Saxon pottery throughout the region.

Saxo-Norman and medieval pottery
Quantification: Together these two chronological groups total sixteen sherds, making up less than 1% of the total.
Specific project objectives: *Research Aim 6.8* - The small quantity of Saxo-Norman and medieval pottery has low potential for anything other than confirming activity in this period, already determined by the presence of the leather and the water-logged wood remains. When taken together with the pottery found in the settlement area (Area 6) of the non-English Heritage funded excavation, the level of potential for further analysis is far greater, enabling these two areas to be linked thereby determining the place of use of the pottery of this date from Area 1.
New research questions: None
Regional and national research: The presence of Saxo-Norman and medieval pottery will help to place the site in its temporal framework, adding to the known distribution of pottery of this date in the region.

Post-medieval
Quantification: The sherds total eleven, making up less than 1% of the total.
Specific project objectives: *Research Aim 6.8* - The small quantity of post-medieval pottery has low potential for anything other than confirming or establishing activity in this period. The complete bowl from context 1 is of intrinsic interest only.
New research questions: None.
Regional and national research: The presence of post-medieval pottery will help to place the site in its temporal framework, adding to the known distribution of pottery of this date in the region.

Building Materials
Quantification: The building material totalled 142 sherds.
Specific project objectives: *Research Aim 6.8* - The small quantity of building material will be of only moderate help in confirming the phasing for the site. The concentration of daub in one area of the site will determine the presence of structures in this area.
New research questions: None.

Regional and national research: The comparison of the fabrics with other building material in the region (eg Newnham Marina, Bedford) will determine the level of outside contacts, and place Warren Villas in its regional context.

4.2.3 Overview of potential by research aim

The following is an overview of the potential for further analysis, discussed more fully by chronological group above.

Research Aim 6.2: To generate an environmental history for the site
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.3: To identify the pattern of land use and adaptations brought about by climatic or political change
The pottery from Area 1 alone, has limited potential to address this issue, although it does provide the basis of a chronological framework for changes in the landscape at the time of the Roman conquest. In the 1st century AD the kiln in Area 2 of the non-English Heritage funded excavation (see **New Research Aims** below), is evidence of a change in landuse patterns directly related to the creation of the Roman province. The pottery, when considered with assemblages in neighbouring areas such as the Roman small town of Sandy, has high potential to address this aim.

The building material has no potential to address this research aim.

Research Aim 6.4: To identify crop rotations, especially those which include flax and cereals
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.5: To generate a clear dating framework through the extensive peat deposits and occasional charcoal deposits
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.6: To identify and explore the evidence for flax processing in the Roman period.
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.7: To determine agricultural practices and environmental conditions through the study of macro and micro plant remains.
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.8: To clarify the dating sequence and function of the site through the artefactual assemblage.
Due to the levels of residuality and intrusion, particularly in the waterlogged area, the pottery evidence has only moderate potential to refine the site phasing and determine a

dating framework. Functional aspects of the site such as re-deposition associated with rubbish disposal will be determined through the condition of the pottery and in comparison with environmental data. Although Warren Villas I is peripheral to the main area of settlement, the pottery has moderate potential to link it with the settlement area, and define activity areas. The samian pottery has only moderate potential to help refine the dating of the site, although it will refine the dating for a small number of individual contexts.

Because of the small sample recovered, the building material has only low potential to help in the refining of phasing on the site. The daub/fired clay, however, does have moderate potential to determine the existence of structures on the site, because of its concentration in one area.

Research Aim 6.9: To examine the evidence of rural mortuary practice in Roman Britain
The examination of the cremations will place the site in its temporal and spatial context in relation to mortuary practices in the late Iron Age and the early Roman period. Comparisons will be made with other cremation burials known in the region, among them the early excavations in Sandy, and, more recently, Salford, Kempston, Ruxox, Toddington, Odell, Harlington, Deepdale and Norton Road, Stotfold in Bedfordshire, Duston in Northamptonshire and Welwyn in Hertfordshire. The pottery has good potential to address this research aim.

The building material has no potential to address this aim.

Research Aims 6.10: To refine the dating sequence of the site and to contribute to extending the dendrochronological profile of the region
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.11: To further our knowledge of early carpentry by the study of the wooden artefacts
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.12: To study the evidence for fish trapping and determine any seasonal relationship with flax retting.
Neither the pottery nor the building material has any potential to address this research aim.

Research Aim 6.13: To determine the function of pottery vessels with perforations
Perforations in bases, bored post-firing, are relatively common in the late Iron Age and the early Roman period. They have been published from a number of sites across the country (see **Iron Age** 4.7.4). Analysis of the relationship of these holes to form, fabric and type of site, however, has not been published. The pottery from Warren Villas I has good potential to add to this assemblage of data, and, by comparison with other occurrences, to determine if there is a pattern in their use. The potential for determining their actual purpose, however, is low. Although residue analysis might

clarify their purpose, the laboratory work-load and the lack of certainty that the residues and the holes are associated, indicate that this analysis has little potential to address this question.

The building material has no potential to address this research aim.

New Research Aims
New research questions, not previously pinpointed in the original aims and objectives, are as follows:

The pottery industry
This new research aim is linked to Research Aim 6.3. The discovery of a kiln producing early Roman pottery, in Area 2 of the non-English Heritage funded excavation (Slowikowski and Dawson 1995), has laid more emphasis on the question of sources of the pottery and the economy and exploitation of the site and its landscape in terms of the pottery industry. Besides eleven greyware sherds, representing three vessels, tentatively identified as kiln products, a fragment of possible kiln bar was found. A comparison of the greywares, in relation to their form, fabric, decoration etc, both on the site and in the assemblage from the neighbouring small town of Sandy, with the kiln products, will determine whether the pottery was destined for immediately local consumption or was supplying the nearby market. The pottery has good potential to address this new research aim.

The Iron Age and/or Saxon pottery
The similarities between the fabrics and methods of manufacture and firing of the sand-tempered types of the early Iron Age and the Saxon period, has raised the question of identification. Full fabric analysis, including thin sections, and confirmation by thermoluminescence, will determine this question. The potential, therefore, to determine whether activity on the site continued into the Saxon period, or whether there was a break, is high.

4.8 STORAGE AND CURATION

Potential for long term storage, for both the pottery and the building material, is good; no further treatment is necessary. The ceramics have been marked and varnished where appropriate, and stored by context in plastic bags within acid-free cardboard boxes. Pottery for illustration will be boxed separately in publication number order. With the exception of topsoil and other unstratified material, all the ceramics should be kept, in accordance with the guidelines of the Society of Museum Archaeologists (1993). Suitable arrangements for transfer and accessioning to Bedford Museum, on completion of publication, have been made.

5 REGISTERED AND NON CERAMIC BULK ARTEFACTS

5.1. FACTUAL DATA

5.1.1 Quantities

The excavations yielded 280 registered artefacts including 7 flint tools and a stone axe. The bulk artefacts assemblage consists of 12 nails and 243 flint tools and flakes. Three hundred and eighty-three samples of hurdle (several samples containing more than one species) and structural timbers were taken during the excavation. Of these 39 were also assigned 'Sf' numbers on the following basis:

1. they were recognisable as objects;
2. they retained worked surfaces (e.g. stake points), tool signatures and blade profiles.

The original small finds register, timber record sheets and context assemblage sheets form part of the site archive.

5.1.2 Provenance

The date range of the artefact assemblage from Warren Villas spans the period from the prehistoric to the post-medieval/modern and includes:

- a small Mesolithic/early Neolithic (60 pieces) and a larger late Neolithic/Bronze Age (183 pieces) assemblage of flint and a stone axe;
- a small group of 12 structural timber samples and 3 wooden objects, the latter, on current ceramic evidence, dating to the mid (two pieces) and late (one piece) Iron Age;
- a Roman assemblage of 62 structural timber samples and 65 objects, spanning the first through the fourth centuries, mainly metalwork;
- a possible Saxon disc brooch;
- a medieval assemblage of leather, metalwork and, based upon dendrochronological dates, wooden objects and hurdle-lined tanks (290 samples);
- a post-medieval to modern assemblage of metalwork (10 objects) and leather (22 objects).

A comparison between the typological dating available at present and the area of recovery (see fig 1 and table 5.1) indicates that:

- medieval and post-medieval activity is almost entirely restricted to the area of the waterlogged tanks;
- Roman activity is restricted to the SE quadrant, the Tanks and the West Access road;
- finds in the NW, NE quadrants and the North Access road were of a restricted date range of Mesolithic/early Neolithic and late Neolithic/Bronze Age.

Area	Meso/ E Neo	L.Neo/ Bronze Age	Mid/late Iron Age	Roman	Saxon	Medieval	P-med/ modern
N Access	22	7					
NE Quadrant	7	33					
NW Quadrant	5	13					
SE Quadrant	8	111	2	8		1	
W Access	2	5		8			
Tank	3	7		43	1	50	25
Salvage	3	7					

Table 5.1 Artefacts recovery area compared with typological date

Both intrusive and residual elements are apparent within the artefact assemblage. In the NW, NE and SE quadrants residuality is restricted to the occurrence of Mesolithic through Bronze Age flint artefacts, as illustrated below. These areas produced 72% of the flint assemblage and although the bulk of this would appear, from present phasing, to be residual, it should be noted that the flint is in mint condition. This, along with the presence of both unabraded beaker sherds (see section 4.4.3) and late Neolithic/Bronze Age flint in context 1306, suggests that the flint has not moved far from its original place of deposition.

Phase	Quantity
1.0 (Natural)	1
2.0 (Prehistoric)	81
3.0 (Roman)	87
4.0 (Medieval)	5
5.0 (Post-medieval)	1
Total	**175**

Table 5.2 Flint occurrence by phase in the NW, NE and SE quads

A limited degree of intrusion is apparent in the SE quadrant in the form of two Roman coins in phase 2 and a single shoe fragment, thought to be c 800-1125 in date, in Phase 3.

The Tank area has a much higher degree of disturbance. This is particularly apparent when considering the leather assemblage, which has been instrumental in identifying much of this disturbance.

Context		Roman	Medieval	Post-med	Modern
Phase 3	821			4	
	902		1		
Phase 4	2		1	1	2
	10				1
	855			5	
	857		1		
	1157		1		
	1162		1		
	1180		1		
	1181		1		
	1204		2		
Phase 5	1	1		2	2
	7			3	

Table 5.3 Occurrence of datable leather in the Tank area by phase and context

This level of disturbance is further illustrated by an examination of the occurrence of all typologically dated finds in phases 3 - 5.

Typological date	Phase 3	Phase 4	Phase 5
Roman	15	24	2
Medieval	2	6	
Post-med/modern	4	9	10

Table 5.4 Typologically dated artefacts within phases

The majority of this disturbance is however restricted to five contexts (2, 7, 821, 822 and 855). Once phasing is refined, and a clearer picture gained of the process of deposit formation, it is hoped that the level of intrusive objects at least will diminish.

Little or no disturbance is apparent in the assemblage from the West Access road, typological dates consistently corresponding with the phasing.

5.1.3 Range and Variety

The Warren Villas project started in 1989 (see section 2.3) following a monitoring visit, which was expanded in stages over 1990 and 1991. The sampling policy varied due to time and financial constraints of the developers. The criteria for the sampling strategy was largely driven by the need for dating evidence in order to elucidate stratigraphic relationships. A metal detector was in use to ensure full recovery of metalwork. No sieving was carried out. The Tank area was fully excavated. In the NE, NW and SE quadrants every feature was sectioned and generally a 50% sample of each feature was hand-excavated. In the North Access road and the Salvage Area all features had a 2m hand-excavated section. Thirty-eight percent of features on the West Access road were hand-sectioned (1m sections), the remaining features were machine-sectioned. The varied sampling strategy is to a certain extent reflected in the recovery rates of the finds (see below), although the bias evident in the Tank area is largely due to better preservation conditions. However the spatial distribution of artefacts may also reflect the chronological sequence of activity (see section 5.1.2).

Area	Quantity	%
NE Quadrant	1	0.4
NW Quadrant	5	1.8
SE Quadrant	17	6.2
West Access Road	10	3.6
Tanks	226	82.5
Salvage Area	1	0.4
Unstratified	14	5.1
TOTAL	274	100%

Table 5.5 Quantity of Registered Artefacts (excluding flint) by Area of Site

The material range of registered artefacts is presented below (table 5.6).

Material	Quantity	Comment
Silver (AG)	2	coins
Bone (BO)	1	
Copper Alloy (CA)	81	40 coins
Iron (FE)	17	
Flint (FL)	7	
Glass (GL)	4	
Leather (LE)	39	103 fragments
Lead Alloy (PBA)	75	
Stone (ST)	14	
Wood (WO)	39	
TOTAL	**280**	

Table 5.6 Registered artefacts by material type

Excluding the wood and prehistoric stone/flint assemblage (see below), the registered and bulk artefacts have been assigned to 37 simple name or class groups (see section 5.1.5).

Simple name	Quantity	Simple name	Quantity
awl	1	ring	7
buckles	4	rod	4
brooch	6	scrap (leather)	3
bullet (musketball)	1	sealbox	1
button	4	sheet	21
coin	42	shoe	33
door fitting	1	spearbutt	1
earring	1	spindlewhorl	1
fragment	1	strip	4
hinge	1	strap (leather)	1
handle	1	strapend	1
hook	2	stud	2
horseshoe	2	tube	1
horse pendant	2	tweezers	1
ingot (or weight?)	1	vessel	6
knife	4	waste (metalwork)	11
nail	12	weights (fishing)	55
panel (leather)	2	whetstones	2
quern	2		
		TOTAL	**245**

Table 5.7 Simple Name or class groups and quantity

These simple name groups can be allocated to eleven functional categories (see section 5.1.5) as set out below.

Category	Quantity
Fastenings and Fittings	16 (including 12 nails)
Household	8
Craft and Industry	19 (including leather and metal waste)
Multipurpose blades and sharpeners	7
Writing	1
Commerce	42
Animal Trappings	4
Weaponry (including hunting implements)	57 (including 55 fishing net and line weights)
Personal	50 (including 33 shoe fragments)
Toiletry	1
Unknown or multi-functional use	40

Table 5.8 Artefacts by functional category (excluding wood and flint)

The category of weapons and hunting implements contains the greatest quantity of objects. The largest single class within this category is that of fishing weights; 55 in total, 9 of stone and 46 of lead. The stone weights are comparable to Mynard's type IIa (1979) and are described as simple weights, with grooves for ties, used as net sinkers. The Warren examples however vary in size, weight and shape. Only two appear to have been purposefully shaped with a wide channel for the tie, these resemble examples in Mynard's figure 7, 40-44 (1979). The remaining weights are not consistent in shape and the grooves appear to have been formed by wear and not purposefully channelled.

Of the 46 lead weights, 6 forms were recognised (fig. 2). Types 1 - 5 have been identified as net weights, used to weigh down the foot of a net, and can be paralleled from other medieval assemblages (Steane and Foreman 1988, fig 15). The sixth form is unparalleled and it is of interest that this form of lead weight was the only type to be recovered from tank fills (tanks [1168] and [1511]).

One spearbutt, of the 'doorknob' type (Raftery 1982; 1984) was recovered from a Phase 3 ditch fill (882). This spearbutt is one of only three recognised from England; a second spearbutt was recovered from the nearby excavations of Sandy, while the third was found at Rushall Down, Wiltshire in 1897-9. These objects were previously thought to be restricted in distribution to Ireland and Scotland. The dating of spearbutts is not precise, the chronology of the Irish specimens resting almost entirely on Scottish examples (Raftery 1984, 125). Scottish evidence does generally indicate a date of first and second centuries AD. Raftery argues in favour of the development of the spearbutt having taken place in north-east Ireland, and then spreading to Scotland (Raftery 1982, 78). The occurrence of doorknob spearbutts at both Warren and Sandy does raise questions as to the accepted distribution pattern of these objects and their origin.

Leather Assemblage

Quita Mould reports "the assemblage has a wide date range extending from possibly the Roman period to the later nineteenth century. The majority of the leather items recovered are fragmentary shoe components, principally of medieval and post-medieval date. Three thick rectangular panel fragments were found of unknown function; two of the fragments (Sf 22) being possibly torn from the drive belt of heavy machinery; the other (Sf 16) possibly from heavy upholstery. A fragment of strap (Sf 25) was found in topsoil (context 1). A single piece of primary and secondary waste was also found."

Wooden objects

Of the 40 wood objects (including the handle from composite iron object Sf 157) recovered, 34 have had their species identified. Their occurrence, by phase, is set out below.

Species	Phase 2	Phase 3	Phase 4	Phase 5	Unphased
Boxwood					1
Oak	2	2	18	1	
Ash	1		2		
Willow/ Poplar			2		
Pomoideae			2		
Maple			1		
Hazel			1		
Birch			1		
unidentified		1	5		
Totals	**3**	**3**	**32**	**1**	**1**

Table 5.8 Wooden artefacts by species and phase

Due to delays in the conservation programme (see section 5.1.5), only very provisional simple name identifications of some of the objects are available at present. These identifications resulted from a quick scan on site by Carol Morris and will need further analysis, following the completion of conservation. Only one object (Sf 162) a fish or eel trap, has undergone both conservation and analysis. This proved to be a 'trumpet' fish trap, usually used in combination with a weir (Watts, AML forthcoming). Provisional identifications of the other objects include a rake, possible spade, pulley support or axle, handle, wedges, pegs, a barrel stave, a fishing float and a shoe patten. The gouged timber (Sf 277) from context 1409 (SE quadrant) is of particular interest as the deposit has been allocated to Phase 2.

At present the purpose of the wattle-lined tanks remains uncertain. Flax retting has been suggested and it is possible that some of the implements may be associated with this activity. The fish trap and possible float, in combination with the 55 weights of stone and lead, could indicate piscatorial activity at least in the vicinity of the tanks, if not reuse of structures. Full cataloguing will assist in ascertaining what activities were being carried out in this area and may indicate the function of the tanks themselves.

Structural Wood

Fifteen different species of wood have been recorded in the assemblage. Species identification is still awaited on a further 35 samples so this range may be increased. Species presence by phase is presented in table 5.9.

Species	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Alder	*				
Birch	*			*	
Oak	*	*	*	*	*
Ash		*	*	*	
Hazel		*	*	*	
Pomoideae		*	*	*	
Prunus		*	*	*	
Dogwood			*	*	
Elm			*	*	
Field maple			*	*	
Salicaceae			*	*	
Beech				*	
Elder				*	
Erica				*	
Yew				*	

Table 5.9 Structural wood species by phase

Provisional identifications of the function of the timber samples were made during recording. Not all samples could be ascribed a function, nor did all the samples show signs of working, several appearing to be roots, twigs and stumps.

Based upon these preliminary identifications, it appears that a limited amount of evidence exists for a hurdle or revetment structure, in the form of six rods and five stakes, in Phase 2. Phase 3 also produced remains of rods, sails, stakes and uprights (a total of 50 samples). The bulk of the wood assemblage however was from Phase 4, excavations revealing large sections of intact hurdle stretching well over two metres. Large numbers of samples of rods, sails, stakes and uprights were taken. Chips of wood, wedges, pegs, beams and squared timbers were also noted and may indicate a degree of woodworking being carried out. There was some evidence for reuse of worked timbers.

Evidence for coppiced rods and sails was noted on 56 hurdle samples (458 pieces); this occurred only in Phases 3 (5 samples, 13 pieces) and 4 (51 samples, 445 pieces). Rowena Gale reports "the time of coppicing or felling was variable. Although most samples were cut during the dormant period (circa September to March), some appeared to have been cut just as growth commences and a few after a period of new growth but before the end of the growing season. Sometimes a mixture of all three occurred within one hurdle. This is somewhat unusual as coppice rods used for hurdles are usually cut and worked immediately; traditionally hurdle-makers prefer winter cut

rods (Edlin 1949). There are two possible explanations for this apparent anomaly: the rods were harvested in very early spring from stools with differential growth patterns; additional rods may have been worked into the structure at a later date, for example repairs to hurdles". In contrast, it was noted during recording that much of the larger roundwood timbers suggested draw felling from an unmanaged woodland resource (pers comm Richard Darrah). Further study may indicate if particular methods of woodland management were practiced for some species, while others were gathered randomly, and whether this differed between phases.

The high quality of preservation of the wood surfaces associated with clear tool signatures enabled the identification of tools from the blade edge impressions. Tool marks survived on 264 samples (270 pieces). Evidence exists for the hewing, splitting, planing and sawing of wood; a single piece was lathe-turned. Holes were either gouged (Timber 371 Sf 277 Phase 2.0) or augered. Both the tool marks and blade profiles indicate the use of axes, heavy splitting wedges, planes, saws, billhooks and one possible draw knife.

Tools	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Axe	*	*	*	*	
gouge		*			
billhook			*		
splitting wedge			*		
auger				*	
plane				*	
draw knife				*	
lathe				*	
saw				*	*

Table 5.10 Presence of tool marks by phase

Tool signatures survived on 65 samples, the majority from Phase 4 deposits. During recording the same tool signature was noted on three samples [timber nos. 126, 135, 277 all from structure 999], indicating that these uprights were made within a narrow timeframe. Thirty-one timbers with tool signatures were from structures which have been dated by dendrochronology.

Phase	Number of samples
2	2
3	9
4	54
Total	**65**

Table 5.11 Presence of tool signatures by phase

Dendrochronological dates were obtained from seven timbers (Hillam 1991, AML 44/91). These timbers formed part of, or were directly associated with, four

structures/hurdles - 88, 857, 941 and 999 - which in turn were situated in one of two tanks - 46 and 856.

Timber No	Fill/ Structure No	Cut/Tank No	Felling Date
39	88	46	1084/5 winter?
41	88	46	1087/8 winter?
43	88	46	1106/7
90	857	856	1125/6 winter?
175	941	856	1125/6
176	941	856	1125/6 winter?
124	999	856	1106 summer?

Table 5.12 Dendrochronological dates by timber and structure numbers

Flint and prehistoric stone assemblage

The flint assemblage, totalling 243 pieces is the second largest assemblage of Mesolithic to Bronze Age date from such a restricted area in Bedfordshire north of the Chilterns (per comm Robin Holgate). It can be broadly divided into two groups, Mesolithic/early Neolithic and late Neolithic/Bronze Age.

The Mesolithic/early Neolithic group totals approximately 60 pieces and includes blades (11), bladelet cores (2), cutting blades (5) and a truncated blade. This range of tools is suggestive of task-specific activity.

The remainder of the assemblage, 183 pieces, is thought to date to the late Neolithic/Bronze Age and is predominantly debitage (flakes and cores), but also includes scrapers (14 including thumbnail, D-shaped and end scrapers), knives (1), cutting flakes and blades (9), piercers (1), and arrowheads (four chisel and one barbed and tanged). A single stone hand axe was also recovered. The range of tools and debitage is suggestive of domestic activity.

5.1.4 Condition

The condition of the artefacts varied depending on the area of the site they were recovered from. Overall, the flint assemblage is in mint condition with little abrasion evident. Generally all the metalwork recovered from the Tank area survived in fair to good condition, some of the copper alloy objects retaining their original 'golden' colour, due to anaerobic conditions. Sixteen of the seventeen iron objects were recovered from the waterlogged Tank area suggesting both a higher preservation level within the tanks and a higher acidity level in soils outside this area. Greater levels of corrosion however were noted on the metalwork from contexts with post-medieval disturbance.

The structural timbers and wooden artefacts generally survived in fair to good condition, many of the structural timbers retaining bark. A few timbers were in poor condition, disintegrating prior to species identification (20), while a further 7 suffered vandalism. Large sections of hurdles were uncovered intact, although preservation

was considered impracticable. The leatherwork was also recovered in a fairly good state of preservation.The metalwork from the non-waterlogged areas survived in poor to fair condition.

Prior to conservation the leatherwork was gently washed, placed in a self-seal plastic bag, with excess air removed, and frozen. It was transported in this state to the lab. On initial advice received (non-EH), six of the structural timbers (including two small finds) were stored in a freezer. These were later transported frozen to the AM lab. Following revised advice from the AM lab, the remaining timbers were stored wet, until they could be transported to the lab.

A total of 55 registered finds of metalwork were selected by the Artefacts Manager for conservation/radiography (table 5.13). All the leather and wooden objects were selected for conservation. The remaining structural timbers were recorded, sampled for species identification, and where appropriate, dendrochronology. Fifteen samples were submitted for dendrochronological analysis, of which seven samples were suitable (Hillam, AML Report 44/91; see table 5.12).

All the metalwork and smaller objects of wood and leather were submitted to Adrian Tribe, EH conservator based at West Malling. Five reports were written giving details of the work carried out and information retrieved during the conservation process (KCMS reports 7-8, 10-11, 14) and these, along with the x-rays (KCMS 1754 - 1759; 1897; 1911 - 1912), form part of the archive. Due to the size limitations of the freeze-drier at West Malling, the larger items of wood and leather were submitted to the AM Lab. A single boxwood comb, recovered during an earlier monitoring visit, was previously conserved at York.

Material	**Quantity**	**Lab**
Leather	32	West Malling
Leather	7	West Malling
Wood	1	York
Wood	4	West Malling
Wood	*34	AML (plus a handle of Fe implement SF157)
Iron	17	West Malling
Copper Alloy	36	West Malling
Silver	2	West Malling
TOTAL	**128**	

**a further object was sent for conservation but upon cleaning it was found to be tangled roots*

Table 5.13 Registered Artefacts sent for Conservation (by material)

5.1.5 Means of Collecting Data

Artefacts other than wood

In accordance with Bedfordshire Archaeology Service's Procedures Manual (Section 2.2.9) each registered artefact was recorded on an object record card and its identification or simple name (cf BAT 1.1.2), context, material and condition noted. These records were then entered onto a computerised database which has been linked with the structural database allowing analysis of the registered artefacts by phase, area, context/feature and object type. The bulk artefacts were identified by type, date, where applicable, and manually recorded and quantified. The date range of the flint assemblage was ascertained by a scan of the manufacturing techniques (including hard versus soft hammer and thickness of butt), flint quality and diagnostic tool types. Assessment of the flint was undertaken by Dawn Enright in consultation with Robin Holgate. All artefacts were then assigned to functional categories (cf BAT section 1.1.1) in order to facilitate integration and interpretation of the site as a whole.

The leather (39 registered artefacts totalling 103 fragments), was examined and assessed by Quita Mould. The assessment was produced from data collected during the preparation of a report and catalogue of the material from the 1989-90 excavations in December 1990 and the rapid scanning of a further seven items excavated subsequently. Appendix 1 comprises the leather report submitted; aspects of this report are integrated into the overall assessment of the registered and bulk non-ceramic artefacts assemblage.

Coin identification (42 in number) was carried out by RM Trevarthen.

Wood

R Darrah, C Morris, R Gale, J Hillam, A Tribe, J Watson, G Edwards, S Watts and P Gentil, assisted by H Parslow, have all been involved in the recording, identification and conservation of the wood to date. Due to unavoidable delays at the Ancient Monuments Laboratory, the conservation programme of 35 objects (including the handle of composite object Sf 157) has not yet been completed and therefore the projected joint specialist meeting proposed in the MAP1 to MAP2 project design has not yet taken place. The conservation programme for the 35 objects is now scheduled for completion by early 1995. Due to the rarity of such assemblages and the precise felling dates provided by dendrochronological analysis (see table 5.12), the completion of conservation, the identification of function of the objects and a joint specialist meeting are considered of high priority in the analysis stage.

To date the basic recording and sub-sampling has been completed by P Gentil under the supervision of R Darrah. This included recording the quality, conversions and cross-sections of the timbers and their tool marks. Recording was carried out on Museum of London Timber recording sheets. Samples were allocated into three categories; disposed after recording, saved until the excavation report is completed, and those selected for conservation. Sub-samples for dendrochronology and species identification were also taken.

Fifteen samples were sent to Jennifer Hillam for dendrochronology, seven of which were useable. The results (Hillam, AML report 44/91) proved not only to be precise, down to the year and season of felling, but unexpected. Prior to this, the waterlogged areas were though to be of Roman date, corresponding to the activity in the other quadrants of the site. The presence of medieval and post-medieval finds was ascribed to later disturbance. The dendrochronological results indicate that uprights for structures 88, 941 and 999 were felled in the late eleventh and early twelfth centuries.

Species identification of 241 registered structural samples (totalling 709 pieces of wood) was carried out by Rowena Gale (see Appendix 2 for full report). A further 68 samples were identified during initial recording by Richard Darrah and Paula Gentil. Twenty-seven samples disintegrated, or were subject to vandalism, prior to species identification being carried out. Species identification of c 37 artefacts was carried out by the AM lab prior to conservation (pers comm Jacqui Watson). A further ten samples await species identification following consultation with wood specialists. The information available at present, including timber numbers, where appropriate Sf numbers, species identification, context, phase and identification of function (eg hurdle, uprights, object) have been entered onto a computerised database. Upon completion of conservation and functional identification of the 34 objects at the AM Lab, this database will require revision.

5.2 ASSESSMENT OF POTENTIAL

(numbers refer to research aims cited in the Warren Villas Project Research Design, April, 1990)

To generate an environmental history for the site.
(Research aim 6.2)

A study of the wood species and quantities by phase will serve not only to indicate woody vegetation growing in the locality, but also any changes in the environment that may have occurred over time. In particular, a study of the quality and growth patterns of the timbers from Structures 88, 857, 941 and 999, for which precise dendrochronological dates are available, will contribute to establishing the type of woodland being exploited in the late eleventh to early twelfth century. This information, combined with evidence from pollen, seeds, molluscs and peat deposits (see section 8), has good potential to contribute to the generation of an environmental history of the site.

To identify the pattern of land-use and adaptations brought about by climatic and political change.
(Research aim 6.3)

The presence of coppiced wood within the hurdles indicates some woodland management was being practised in Phases 3 and 4. The unusually large number of hurdles available for examination gives the opportunity to compare the criteria for selection of rods (i.e. by stem diameter or age) and establish evidence of variations of these criteria between the species included. It may be possible to distinguish the range of species that were coppiced and compare these with evidence from earlier phases.

Comparison of numbers of annual growth rings to diameter on the larger timber samples will clarify the evidence for draw felling. Further study may suggest particular methods of management for some species (e.g. for use as poles and posts). Possible flax retting and piscatorial activities have been identified from Phases 4 and 5. These activities contribute to defining the pattern of land use over time. This will be clarified by a comparison of types of activity represented in the artefactual record with environmental evidence. Hence there is good potential to contribute to identifying the chronological pattern of land use in relation to climatic change.

To identify and explore the evidence for flax processing, in the Roman period; to refine the dating sequence of the site and to contribute to extending the dendrochronological profile of the region.
(Research aims 6.6 and 6.10)

The dendrochronological dates obtained from the uprights of four hurdles from two tanks have revealed that these features are medieval, rather than Roman (6.6), in date. There are a possible 19 tanks in total (one [1511] possibly a recut of tank [1168]). Analysis of the relationships between these tanks, in combination with the absolute

dating from structures within tanks 46 and 856 (see table) and construction techniques, will assist in refining the chronology of these features. Cross-matching of tool signatures has indicated that at least one structure [999] was constructed within a narrow timeframe.

The function of the tanks remains uncertain, although a number of factors indicate the possibility that they were used for flax retting:

- the site is situated on flat land immediately adjacent to a river, but possibly utilising a channelled water supply, while the gravel terrace would have provided an area for drying the flax (Higham 1989);
- there is a concentration, when compared to the rest of Bedfordshire, of hemp-related fieldnames in Northill and adjacent parishes which is suggestive of an important local crop. Although these fieldnames date to the early 16th and early 17th centuries, they are most likely a survival from earlier times;
- a number of the environmental samples assessed from the tank fills contained seeds and capsule fragments of flax, however none contained concentrations sufficient at this stage to establish that the tanks were used for retting.

The recovery of a fish/eel trap and assorted lead and stone weights suggests an alternative function for these tanks, that of fishponds/fish weirs. However a number of factors argue against this interpretation;

- no fish-scales or bones were identified from the assessed environmental samples;
- a survey of literature on excavated fishponds indicates that, where lined, it is with clay, and not hurdling. Fish weirs are of a more similar construction to the structures at Warren but the cut tanks and undulating nature of the Warren structures is contrary to that of excavated fish weirs (White 1984; Losco-Bradley and Salisbury 1988);
- the fish-trap itself appears to have been placed into a cut [1579] which itself cut the uppers fills of tank [1511];
- only two of the lead weights, both of type 6 (see fig 2), were found in the tank fills. Five of the waterworn stone weights were recovered from tank fills (tanks 17, 46 and 1168) but as tank or river retting required the bundles to be weighted down, these objects may equally well have been associated with retting rather than fishing.

Once analysis of the environmental samples has been completed and the question resolved as to whether the tanks were originally intended to be utilised for flax/hemp retting, analysis of the techniques and sequence of construction of the tanks and hurdles, and possible maintenance (see section 5.1.3, structural wood), can be undertaken. There is therefore good potential to address Research Aims 6.6 and 6.10.

To clarify the dating sequence and function of the site through the artefactual assemblage; to further our knowledge of early carpentry by the study of the wooden artefacts; to study the evidence for fish trapping and to determine any seasonal relationship with flax retting.
(Research aims 6.8, 6.11 and 6.12)

The typological date range of the artefactual assemblage spans seven chronological periods; late Mesolithic/early Neolithic, late Neolithic/Bronze Age, mid to late Iron Age, Roman, medieval and post-medieval to modern, with the seventh represented by a single Saxon brooch. The assessment indicated the possibility that some of these periods, in particular prehistoric and medieval, have distinct locational foci - the majority of the prehistoric assemblage recovered from the NE, NW and SE quadrants (see fig 1 and table 5.1), while the medieval component was in the main restricted to the Tank area. Analysis of the artefact typologies has good potential to refine the provisional dating and this along with distribution analysis, will contribute to a greater understanding of the activity/occupation sequence on the site. This information in turn will be related to the findings from the ongoing investigations of the areas immediately adjacent to the excavation (WV II - VI). Evidence from these recent investigations indicates that all periods of activity identified in the assessment are present. In particular the recovery of prehistoric, Roman, Saxon and early medieval artefacts will place the evidence from Warren I in context, thereby building up a more coherent picture of the site as a whole.

Analysis of the artefacts by function has good potential to assist in determining the nature of activity/occupation by period. For instance, based upon the preliminary findings of the assessment, the Mesolithic/early Neolithic flint assemblage is suggestive of a task specific activity, whereas the late Neolithic/Bronze Age assemblage is of a domestic nature. The range of Roman artefacts, including household equipment, personal adornment and toiletry implements, is suggestive of domestic activity, whereas the medieval assemblage appears, on present evidence, to be associated with specific activities - flax retting and fishing.

Of particular importance is the assemblage of wooden objects. Analysis of form and manufacture has good potential to reveal much about carpentry techniques (including the tools utilised) of the medieval, and to a lesser extent Iron Age, periods. The identification of these objects will contribute to a greater understanding of the activities being carried out, while those objects from the tank fills may assist in confirming their use as flax retting pits.

Full analysis of the forms of, and parallels for, the stone and lead weights must be undertaken to confirm the provisional typology. A closer examination of the structure and layout of the tanks, along with environmental and stratigraphical analysis of the tank fills, should be undertaken in relation to the position of the fishtrap and weights. This should clarify the original, intended use of the tanks, and whether the fishing implements indicate subsequent, opportunistic use of surviving retting water channels for the netting and trapping of fish.

New research aim

The occurrence of 'doorknob' type spearbutts from both Warren Villas and neighbouring Sandy extends the geographical distribution pattern of these objects, prior to this almost totally restricted to Ireland and Scotland (Raftery 1982; 1984). A very cursory scan of published finds assemblages from selected Roman sites yielded two further possible examples from England; one from Buckinghamshire (Neal 1987, fig 24 no 39) and one from Northumberland (Bidwell 1985, fig 44 no 94). These preliminary findings would appear to indicate that these objects are perhaps both more common and more widely spread than previously thought, and that hitherto they have gone unrecognised. Further library research may serve to expand the distribution of these objects, confirm and possibly refine their suggested dating and contribute to the debate as to their geographical origin. The presence of weaponry of what appears to be native tradition (Raftery 1982, 78) on both military (Vindolanda, Magiovinum) and non-military settlements (Warren Villas and Sandy), is of interest in light of the oft quoted Roman law forbidding civilians to carry weapons.

5.8 STORAGE AND CURATION

Once all conservation has been completed, all the material will be appropriately packaged to ensure, as far as possible, its long-term preservation. The material will eventually be deposited in Bedford Museum. The following points should be noted;

1. the metalwork: the RH within the air-tight boxes in which this material is stored must be regularly monitored. An RH indicator card will be placed in every box and as soon as the RH rises above 20%, the silica gel must be removed, regenerated and replaced;
2. the non-metal: these items should be stored in as stable an environment as possible, preferably at an RH of 50-55% and a temperature of 19-20 degrees Celsius.

6 HUMAN BONE (T A Jackman)

6.1 FACTUAL DATA

6.1.1 Quantity and provenance

The total amount of human bone recovered from Warren Villas is small comprising:

- 1 inhumation
- 6 cremations (1329g cremated bone)
- 898g burnt bone in residues

The record comprises: context sheets, site inhumation record sheets, slide and monochrome prints. drawings at 1:10; 1:20.

6.1.2 Provenance, Range and Variety

A single cremation is provisionally dated to the 1st half of the 2nd century AD based on a samian accessory vessel (219) (see ceramics section 4.1.2). The remaining 5 cremations are undated.

The inhumation was sealed by an horizon containing abraded pottery dated to 1st/2nd century AD.

6.1.3 Means of collecting the data

100% sampling of the features containing cremated bone was carried out and the inhumation was fully recovered although some of the phalanges are missing probably disturbed by animals. This assessment was undertaken by rapid scan and weight of the bone assemblages.

6.2 POTENTIAL FOR FURTHER ANALYSIS

To examine the evidence of rural mortuary practice
Research aim 6.9

For the cremations a minimum number of individuals can be calculated and examination made for demographic and pathological information. Potential also exists to remark on cremation technique. Due to the small size of the assemblage, this material has low potential for addressing this aim and contributing to greater understanding of cremation practice.

The inhumation although dated to the 1st/2nd century AD on the basis of stratigraphy is a lone burial and has low potential to address this research aim (see Part 2 UPD).

7 ANIMAL BONE (A F ROBERTS)

7.1 FACTUAL DATA

7.1.1 Quantities

This assessment refers to the English Heritage funded area of the excavations.

Forty one boxes of bones were recovered (44 x 22 x 18cm), containing about 136 kg of bones. They were recovered by hand and there was no sieved material.

7.1.2 Provenance

The phasing is broad and bone is found in every phase, and in 236 contexts. Over half of these contexts (128) are dated to the Roman period; 53 to the Iron Age, 41 to the Medieval, 10 to Phase 1 and 4 to the Post medieval.

7.1.3 Range and variety

The species present are almost entirely domestic: cattle, horse, sheep/goat (no goat was noticed in the initial survey), pig, dog, cat and chicken. Red deer (Cervus elaphus) is represented in the main by antlers, and the single goose and duck bones may be wild or domestic.

Cattle bones are the most numerous in every phase; horse bones have a high frequency in the Roman period due to burials. There are few sheep/goat and pig bones; dog remains are mostly found as burials, particularly in the Iron Age. The single cat bone comes from a medieval context.

The bones present a good age range from neonate horse?, calf and piglet, to old specimens represented by very worn teeth. There are indications of trauma and bone change in cattle and dog. There are good numbers of long bones from most species, which can be measured, and teeth, which can provide details of wear.

7.1.4 Condition

The bones are well preserved, some having been waterlogged. They have been washed, bagged by context and stored in standard boxes. No further conservation is required.

7.2 ASSESSMENT OF POTENTIAL

To generate an environmental history
(Research aim 6.2)

The Warren Villas animal bones can provide good information on the use of animals in the Iron Age and Roman periods. The prevalence of cattle and horse bones over sheep may indicate the nature of animal husbandry demanded by the environment. The bones from the medieval phase may indicate a change to this

use. The information from the Roman period can be contrasted with the bones from the nearby settlement of Sandy. The small amount of bone from Phase 1 will be of interest for the rarity of bone from this period. The bone from the post medieval period can be ignored.

8 PLANT MACROFOSSILS (M R ROBINSON)

This report was approved by Ms K Foley, Head of AM Lab, 19th March 1992

8.1 FACTUAL DATA

During 1989-91, Mr M Dawson conducted a large scale excavation by the Bedfordshire Council Archaeology Service on the floodplain and terrace edge of the River Ivel in advance of gravel extraction at Warren Villas. The project was partly funded by HBMC (England).

The earliest feature on the site was a penannular enclosure of possible Bronze Age date. This was overlain by ditches of Iron Age date which had in turn been truncated by a plough soil with signs of cross-ploughing. During the early Roman period, numerous ditches were dug on the floodplain and gravel terrace. Further ploughing, this time unidirectional and leaving asymmetrical plough marks, took place on the floodplain. In the mid-Roman period, peat formation occurred on the floodplain filling the abandoned Roman ditches, although activity on the gravel terrace continued until the late 4th century. During the medieval period, alluvium was deposited over the peat. In the late 11th and early 12th centuries, a series of wattle-lined rectangular pits and ditches with hurdles were cut into the edge of a channel of the River Ivel.

8.1.1 Quantity and provenance

Several visits were made to the site and an on-site environmental archaeology assistant employed by the County Archaeological Service. Visits for sampling were also made by Mr J Greig and Mr Richard Macphail.

About 80 samples were floated for carbonised plant remains, 350 samples taken for waterlogged plant and invertebrate remains and 20 samples taken for molluscs. Separate wood samples were taken for identification by Mrs R Gale.

8.1.2 Range and variety

Carbonised plant remains

The carbonised flots were scanned rapidly. They fall into three groups. Carbonised plant remains were almost absent from the pre-Roman samples. The Roman samples from the floodplain were exceptionally rich in very well preserved spelt wheat chaff. Weed seeds, threshing debris of barley and some grain was also present. Some of the samples contained badly preserved waterlogged cereal remains. Many of the putative "Roman" samples from gravel terrace (West Access Road) contained short grains of a free-threshing wheat and chaff of spelt wheat was absent. This is strongly suggestive of Saxon or medieval date for these features and it is possible that the Roman pottery found in some of them was residual.

Waterlogged plant remains

The waterlogged samples can be considered under four headings on the basis of the rapid scanning of a representative range of them.

The Early Roman Ditches
Waterlogged deposits were present in the bottoms of some of the deeper early Roman and possibly Iron Age ditches on the floodplain. They tended to contain seeds from plants of damp disturbed ground and in one sample (Context 517) there were many buds of *Populus* sp. (poplar). Some of these samples contain relatively high concentrations of well-preserved insect remains.

The Plough Marks
Surprisingly, organic remains survived in the asymmetrical plough marks, which had probably been created by the use of a mould-board plough. The weed flora of such species as *Isolepis setacea* (brittle scirpus) and *Polygonum persicaria* (redshank) suggests that ploughing was taking place under very wet conditions.

The Peat Deposit
The peat which formed in the partly filled early Roman ditches and on the general surface of the floodplain was sedge peat. The best sequence was in a hollow left by a Pleistocene channel.

The Early Medieval Pits and Ditches
These samples contain a strong riverine element including seeds of *Nuphar lutea* (yellow waterlily) and shells of flowing water molluscs such as *Bithynia tentaculata*. There are also seeds from plants of marshy and disturbed habitats. Several of the samples contain seeds and capsule fragments of *Linum usitatissimum* (flax) but in none so far examined was the concentration sufficient to establish that the pits were used for flax retting.

Molluscs

The samples of alluvium over the peat contain shells of both aquatic and terrestrial molluscs. Some of the samples are suggestive of alluviation occurring on a floodplain which supported tall herbaceous vegetation such as sedge tussocks or hay meadow.

8.2 POTENTIAL FOR FURTHER ANALYSIS

The excavator hopes that it will be possible to establish the environmental floral/ faunal history of the site (*research aim 6.2*) and to show the landscape usage from the Iron Age to medieval periods. He would like to associate environmental and structural evidence in the Iron Age and Roman periods, particularly where some indication of field usage can be deduced (*research aim 6.4*). The plough marks and rich deposits of spelt chaff are regarded as being of special interest (*research aim 6.5*). It is hoped that flax remains can be identified from the medieval features (*research aim 6.6*).

Recommendations

The full analysis of the samples for macroscopic plant remains (excluding wood) and invertebrates would take of the order of four years without assistance. However, work on such a scale is neither practicable for the Unit nor justifiable on academic grounds. It is possible to identify three research themes which have important implications extending beyond the site and two more of relevance to site interpretation.

1. The Early Roman Plough Soil
Examples of ancient plough soils which have remains of their contemporaneous vegetation preserved in them are extremely unusual and there are probably no other British examples where preservation has been found to be as good as at Warren Villas. A detailed study of the samples from the plough marks will give results as important as those obtained from the analysis of *plaggen* soils in the Netherlands.

2. The Floodplain Hydrological and Environmental Sequence
The site provides a particularly good opportunity to establish the hydrological and alluvial sequence for this part of the Ouse drainage basin. The transition to peat formation in the partly filled early Roman ditches gives well-dated evidence for a rapidly rising water table. The study of sediment type and degree of preservation of organic remains in relation to the site stratigraphy will enable the basic sequence to be determined, while the analysis of biological remains from the peat and alluvium will show the changing floodplain vegetation.

3. The Rich Early Roman Carbonised Assemblages
The sampling at Warren Villas and also at Stanwick Roman Villa, Northants, have revealed large, almost pure deposits of burnt waste from de-husking and final cleaning of cereals. It is possible that the majority of carbonised assemblages that have been studied from Roman sites represent no more than reworked material from such rich deposits. It is therefore important to establish the nature of these rich assemblages. The subsequent waterlogging of the spelt wheat chaff has resulted in it being very well preserved. Some of the rachises show apparent intermediate characters between hulled and free-threshing hexaploid wheat. This aspect too is worthy of further investigation.

4. The early Roman Waterlogged Deposits.
The study of a *limited* number of early Roman waterlogged deposits would provide useful information on the site environment during this period of its occupation.

5. The Medieval Pits and Ditches
Analysis, again of a limited number of samples, ought to be able to establish whether the pits were being used for flax retting and the general conditions in the vicinity of the pits.

Other possible work

There is so little pre-Roman carbonised material from the site that only very limited work would be possible on it. It is not recommended that any work be done on the samples from the West Access Road in view of the uncertainty over the dates of these contexts.

9 SOIL MICROMORPHOLOGY (R McPHAIL)

9.1 FACTUAL DATA

9.1.1 Quantification

Four undisturbed samples for soil micromorphology (samples A-D) and associated bulk samples (x1 - x5) were taken from three profiles (Table 9 1). This enabled the study of Iron Age (B & C) and Roman (A & D) ploughsoils both from two locations each. All four undisturbed samples were impregnated with crystic resin and manufactured into thin sections at the Institut National Agronomique, Paris-Grignon (Guilloré 1985; Murphy 1986). Thin sections were briefly described according to Bullock et al (1985) employing the guidelines of Courty et al (1989). These thin sections were studied to evaluate their potential for recording:

i) Iron Age cultivation history and its micromorphological signature,

ii) the heirarchy of features that may be used to monitor in detail the formation of the Roman ploughsoil and changes undergone by this soil as it got wetter (i.e. rises in the watertable, flooding, peat formation and alluviation), and

iii) more tentatively any soil micromorphological differences that can be related to use of an ard versus a mouldboard plough.

9.2 POTENTIAL FOR FURTHER ANALYSIS

The soils at Warren Villas provide opportunities to:

i) study two types of ploughsoils from the same site that had suffered increasing soil wetness, so as to evaluate agronomic conditions for the two cultures, Iron Age and Roman;

ii) more broadly to permit the investigation of these ploughsoils within the context of ard and mouldboard ploughsoils across the country.

The microfeatures of sites of increasing wetness have been investigated, for example, from Uxbrideg, Middlesex (Lewis et al 1992) and from the Avebury and West Overton areas of Wiltshire (Limbury 1992). Peat and alluvial sequences from the Midlands, which result from increased wetness, were monitored by Robinson (1992). He carried out a specific investigation of seeds from the Roman ploughsoil at Warren Villas.

Field and soil micromorpholoy data are presented in table 9 1. The soil micromorphology apparently suggests that Iron Age cultivation in the flood plain of the River Ivel took place under drier conditions than that experienced by the Romans in the 2nd /3rd century AD. (Robinson 1992). This is indicated, for example, by there being only a weakly ferruginous brown soil matrix in sample C. The ferruginised vertical rooting, that clearly relates to the overlying peaty gley

soil formation evidently post-dates brown soil formation here. The soils at Warren Villas can be presently termed pelo-calcareous alluvial gley soils (Thames association; Hodge et al. 1983). Scanning of the thin sections also revealed features (Fe & Mn mottling, organic matter preservation, ferruginisation of roots) seemingly indicative of Roman agriculture being increasingly affected by a rising water table that eventually led to peat growth and alluviation across the site (Profile 1). Textural features (dusty coatings and soil separations; samples C & D) said to result from cultivation (Jongerius 1970, 1983) appear to be present at Warren Villas. The Roman ploughsoil also has a microfabric that clearly resembles the one formed under similar wet arable conditions at Phoenix Wharf (MacPhail et al, 1990). In addition, Roman mouldboard ploughsoils which became similarly inundated have been assessed from the Scole-Stuston road improvement, Suffolk. Soils from both of these sites (Phoenix Wharf and Stuston) can be compared to results from a number of soil types experimentally cultivated using replicas of ancient implements (eg Gebhardt 1992). Thus, the soil micromorphological investigation of ploughsoils at Warren Villas takes place within a developing understanding of a) ancient arable soils and b) sites suffering increased waterlogging (Bouma et al 1990).

Table 9.1 Profile 1: north face of ditch

Sample No	Depth	Context	Stratigraphy	Micromorphology
x1		501	0-18cm; very dark grey to very dark greyish brown (10YR3/1-3/2)	
x2		502	18-29cm; black (7.5YR2/0) peat containing bleached sand and few stones.	
A (x3)	33-41cm	Bottom of 502; 503/549	29-40cm; Roman mouldboard ploughsoil; very dark greyish brown (10YR3/2) humic sand with common ferrugionous mottles and few stones	Poorly sorted sand with gravel-size flint; dusty brown fine fabric with silt -size quartz and mica, humus, charcoal and plant remains. Fine and coarse soil separations. Upper part of sample is dominantly an amorphous organic peaty mixture, whereas lower part of the slide is more dusty and charcoal-rich. Few root channels and ferruginous mottles present. Development of increasingly wet ploughsoil as recorded from the lower to the upper part of the slide.
		989	40-41 (43)cm; Roman ditch upcast	

B (x4)	48-56 cm	883	41(43)-53 cm; Iron Age cross cut (arded) dark brown (10YR3/3) loamy sand with abundant stones and common mottles	Massive gravelly deposit with sub vertical coarse root-lined channels; strongly iron and manganese stained (mottled) fine fabric; humus and fine charcoal present; coarse (earthworm?) channel infill of humic silt; other voids can contain yellowish silty clay (alluvium?); few partially iron replaced root systems occur within the fine matrix, and exhibit probable Oribatid-like organic excrements. Ploughed ditch upcast with possible evidence of increasing soil wetness including alluvial inundation.
			53+ cm; Iron Age ditch upcast?	

Table 9.2 Profile 2; adjacent to Roman ditch

		1403	Roman ditch-fill upcast (ditch 522)	
C(x5)	0-7.5cm	1434	0-35+ cm; dark yellowish brown to yellowish brown (10YR4/4-5/4) lomy sand Iron Age subsoil with criss cross ard marks	Massive fine to coarse sand with gravel to small-stone-sized flint and few coarse iron stained vertical root channels; dark brown moderately ferruginous fine fabric with rare fine charcoal; coarse and fine soil separations and poorly formed dusty clay coatings; secondary calcite infills occur in upper part of thin section. Possible evidence of ploughing and weathering of calcareous gravel and subsoil dump.

Table 9.3 Profile 3; north edge of site

D	0-7.5cm	549 over 660	Very dark greyish brown (10yr3/2) Roman mouldboard ploughsoil	Sand with dirty brown dusty fine fabric in lower subsoil part of the slide. This part also includes poorly formed dusty clay coatings in some voids. Upper, Roman ploughsoil part of thin section is strongly humic with charcoal in the fine fabric; possibly daub (?) and burned mineral material occur. Patches of ferruginous staining are present and occasional vertical root channels can be partially infilled with peaty silts. Evidence of possibly manured Roman ploughsoils. Subsoils also showing probable impact of either Iron Age or Roman cultivation and later site flooding.

10 SUMMARY OF POTENTIAL FOR FURTHER ANALYSIS

This summary assesses the original research aims of the English Heritage funded excavation at Warren Villas Quarry. It indicates the potential for further work on some aims and identifies new aims. Table 10.1 classifies the degree of potential which is further elaborated in the updated project design.

To generate an environmental history for the site
(Research aim 6.2)

The site archive has considerable potential to create an environmental history of the site, based on soil micromorphology and environmental data in relation to the site stratigraphy with the contextual data providing a framework for the environmental history.

The focus of the study will be the late Iron Age and Romano-British periods in these periods the Romano-British plough marks and early Roman waterlogged deposits will provide detailed evidence of the wider environment. Peat horizons in the post Roman period will complement evidence from nearby Biggleswade where rising water-tables were responsible for changes in the settlement pattern of the Ivel Valley.

Deposits in the later medieval period will provide information about the environment of the pits; information from the waterlogged wood will provide evidence of environmental changes.

To identify the pattern of land-use and adaptations brought about by climatic or political change
(Research aim 6.3)

Identifying the patterns of land-use at Warren Villas will depend upon all groups of evidence which have high potential to address this aim. In particular the Late Iron Age and Romano-British periods, where areas of sedimentation and ploughing have been identified, has good potential to identify land-use patterns. Artefactual and contextual evidence has the potential to provide a chronological framework whilst environmental data has the potential to yield evidence of land-use practices including woodland management in the medieval period. The potential to assess whether changes are the result of climatic or political changes will require comparison with evidence from the wider region.

To identify areas of cereal cropping, processing and to investigate growing regimes (Research aim 6.4)

The potential to explore the cereal crop rotation at Warren Villas will be approached through the environmental data recovered from the early Roman ploughsoil. This has very high potential to address this aim.

To generate a clear dating framework through extensive peat deposits and occasional charcoal deposits
(Research aim 6.5)

The samples taken from the excavations have only low/negligible potential to generate chronological information.

To identify crop rotations especially those which include flax and cereals
(Research aim 6.6)

The potential to identify and explore flax retting through the evidence at Warren Villas is moderate, depending upon the results of plant macrofossil analysis and the structural evidence from the hurdle lined tanks.

To determine agricultural practices and environmental conditions through the study of macro and micro plant remains
(Research aim 6.7)

This research aim is dealt with more fully under research aims 6.2 and 6.3. The environmental evidence has high potential for the late Iron Age and Roman periods.

To clarify the dating sequence and function of the site through the artefactual assemblage,
(Research aim 6.8)

There is good potential to achieve this aim using all classes of data, but especially stratigraphic relationships and ceramics. Artefacts such as flint and other registered finds will contribute to analysis of areas outside the late Iron Age and Roman periods; dendrochronology has been shown to be especially useful in dating the hurdled pits.

To examine the evidence for rural mortuary practice
(Research aim 6.9)

There is high potential to address this aim using ceramics analysis and spatial distribution in comparison with regional trends.

To refine the dating sequence of the site and to contribute to extending the dendrochronology profile of the region
(Research aim 6.10)

This research aim has already been partially achieved through the dendrochronological dates gained from the hurdle uprights; further potential exists to integrate this data with the wider site (see research aim 6.5) .

To further our knowledge of early carpentry by the study of wooden artefacts
(Research aim 6.11)

Analysis of the wooden artefacts has good potential to reveal much about carpentry techniques.

To study the evidence for fish traps and determine any seasonal relationship with flax retting
(Research aim 6.12)

The potential to achieve this research aim is low due to the unchanging nature of fishing technology and the paucity of evidence for piscatorial activity in clear stratigraphic relationship with the flax retting evidence.

To determine the use of pottery vessels with perforations
(Research aim 6.13)

The pottery has high potential to address this aspect of the research aims.

New research aims:

In addition to the research aims summarised above the assessment of potential has thrown up several areas of potential from the ceramics and artefacts evidence:

Re-appraisal of the `doorknob' spear butt.

Examination of pottery production on the site

Analysis and definition of differences between Iron Age and Saxon pottery.

Table 10.1 Summary of extent of potential shown by various classes of data to address the research objectives.

Research Aim	Structural evidence	Ceramic vessel evidence	Ceramic building material evidence	Registered and non-ceramic bulk artefacts	Human bone	Animal bone	Plant macrofossils	Soil micromorphology
6.2 Environmental history	***	-	-	***	-	***	***	***
6.3 Patterns of landuse	***	*	-	***	-	-	***	***
6.4 Identify areas of cereal cropping	*	-	-	-	-	-	***	-
6.5 Dating framework for land boundaries through environmental evidence	***	–	–	–	–	–	**	-
6.6 Identify crop rotations	*	–	–	***	-	-	***	-
6.7 To determine agricultural practice and environmental conditions	*	–	–	–	–	–	***	-
6.8 Clarify dating sequence of site through artefacts	-	**	*	***	-	-	-	-
6.9 Evidence of rural mortuary practice	**	***	-	-	*	-	-	-
6.10 Contribute to dendrochronological profile of region	-	-	-	***	-	-	-	-
6.11 Study of early carpentry	-	-	-	***	-	-	-	-
6.12 Evidence for fish traps	-	-	-	***	-	-	**	-
6.13 Use of perforated pottery vessels	-	***	-	-	-	-	-	-

Key: High potential ****; Good potential ***; Moderate potential **; Low potential *; No potential -

Table 10.2 New Research Aims identified during the assessment

Research Aim	Structural evidence	Ceramic vessel evidence	Ceramic building materials	Registered and non-ceramic bulk artefacts	Human bone	Animal bone	Plant macrofossils	Soil micromorphology
6.14 The early Roman Pottery Industry	-	***	-	-	-	-	-	-
6.15 The Iron Age and/or Saxon Pottery	-	***	-	-	-	-	-	-
6.16 Doorknob spearbutts	-	-	-	***	-	-	-	-

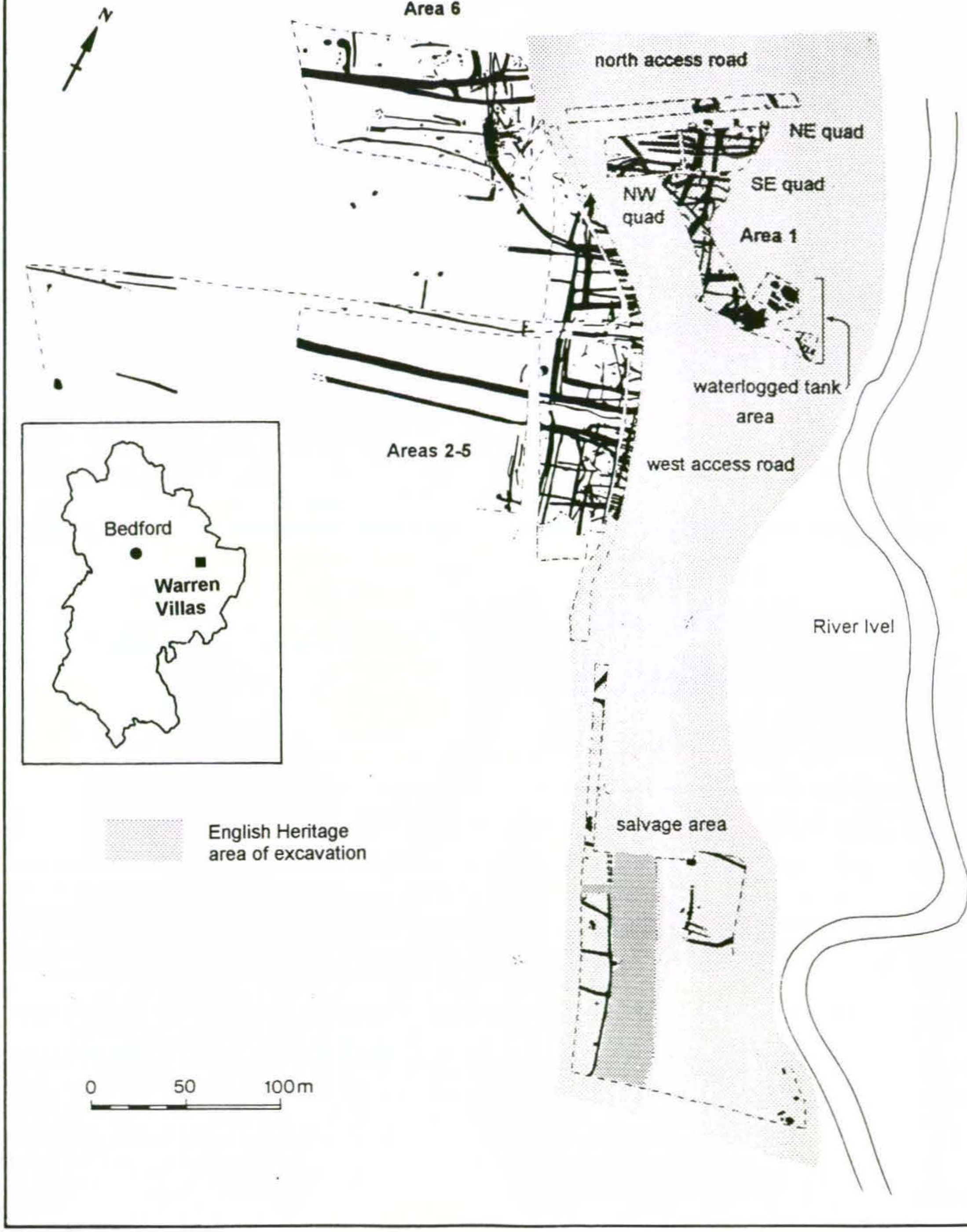

Fig. 1: Areas of excavation at Warren Villas

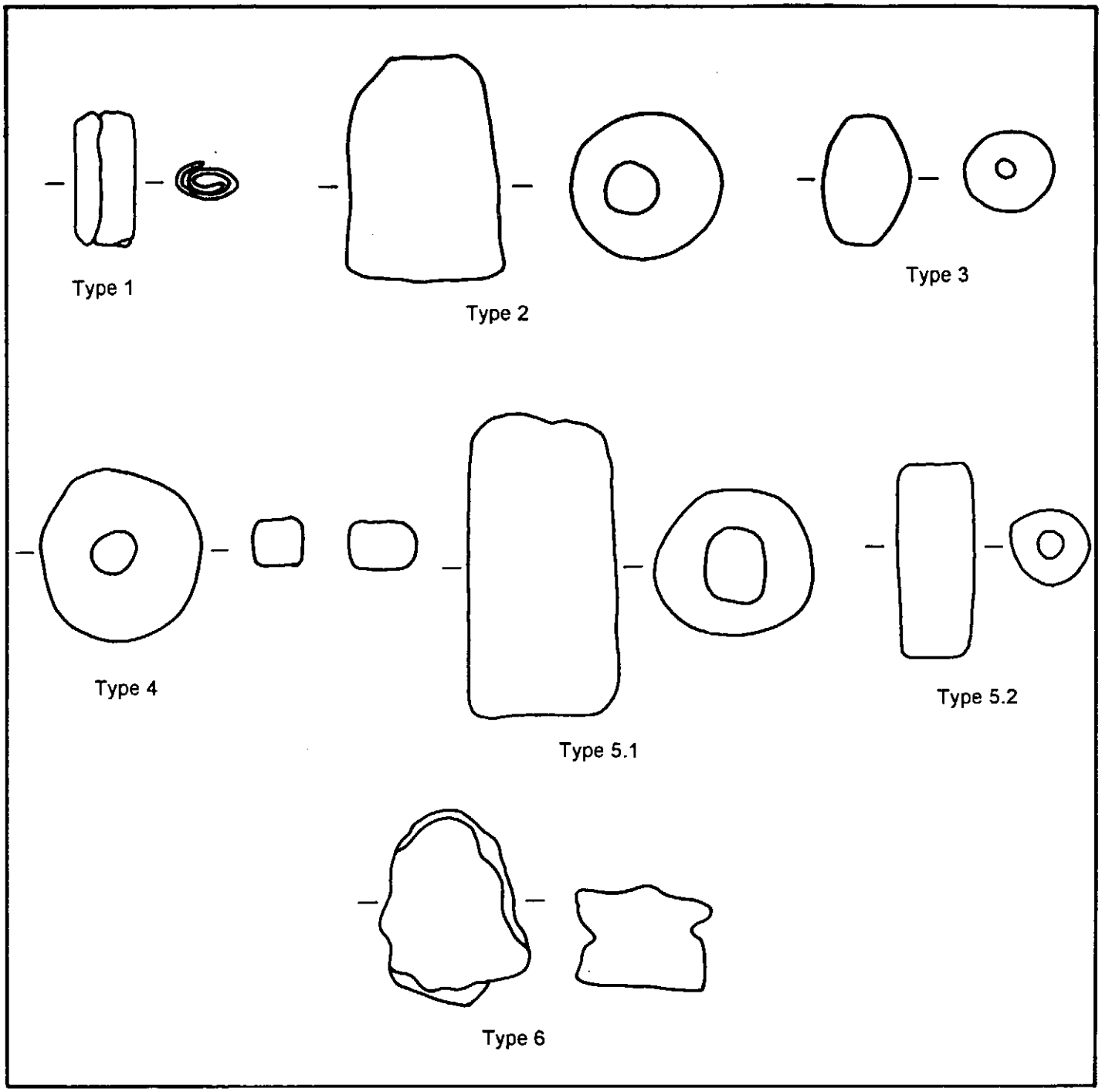

Figure 2: Lead weights from Warren Villas: provisional typology. Scale 1:1.

Appendix 1

WARREN VILLAS, Sandy, Bedfordshire

LEATHER ASSESSMENT

Methodology
The assessment has been produced from data collected during the preparation of a report and catalogue of the material from the 1989-90 excavations in December 1990 and the rapid scanning of a further seven items excavated subsequently.

Factual data:
103 items of leather were recovered from 15 contexts and a single item was found unstratified (sf 21). The leather was examined following conservation by freeze-drying, consequently it is in a stable condition and suitable for long term storage.

The assemblage has a wide date range extending from possibly the Roman period to the later 19th century. The majority of the leather items recovered are fragmentary shoe components, principally of Medieval and Post Medieval date. Three thick, rectangular panel fragments were found of unknown function; two of the fragments (sf 22) being possibly torn from the drive belt of heavy machinery, the other (sf 16) possibly from heavy upholstery. A fragment of strap (sf25) was found in topsoil (context 1). A single piece of primary and secondary waste was also found. No obvious collection bias was observable.

Statement of potential:
The leather is of value as an independent dating tool helping to clarify the dating sequence of the site (research design April 1990,13 6.8). Despite having few stylistic features remaining, the method of construction of the shoe components is discernible in most cases enabling a broad date/period to be assigned and the degree of contamination of the deposit to be gauged (see appendix 1: broad dating of the leather by context).
The fragments of shoe components found in the fills of the waterlogged tanks (sf 69 con 857; sf 156 con 1162; sf 163 con 1191) are of Medieval turnshoe construction compatable with the dendrochronological dating. The thonged construction of the shoe fragments (sf 154 cont 998) supports the tentative Saxon date assigned to pottery from the same ditch (con 997).

The fragmentary nature of the assemblage precludes the recognition of datable shoe styles in all but two Post Medieval examples and, together with its small size, makes the leather of no potential value to regional or national research priorities. No new research questions have arisen during assessment.

Appendix 1: Datable leather by context

Watching Brief:
Context 1 (topsoil):
A fragment with whip stitching possibly from a one-piece shoe of Roman date (sf 23), various shoe components of welted construction including remains of a buckled shoe of 18th century style (sf 24,28) and a Blucher boot of earlier 19th century date (sf 24), and a bottom unit of riveted construction of later 19th century date (sf 9).

Context 2:
Clump sole repair probably of Medieval date (sf 10) and two rectangular panel fragments (sf 22) likely to be modern.

Context 7:
Fragments of welted soles and uppers (sf 15,19,20) of Post Medieval date.

1989-90 Excavations:
Context 10:
Rectangular panel(sf 16) similar to that found in context 2 above, likely to be modern.

Context 820: no datable leather

Context 821:
Remains of two welted shoes likely to date to the earlier 19th century (sf 63, 65/66).

Context 855:
Welted bottom unit fragments (sf 68, 264,265,269,270) of Post Medieval date.

Context 857:
Clump seat repair (sf 69) likely to be of Medieval date.

Context 902:
Fragment of clump repair (sf 154) likely to be of Medieval date.

Context 998
Fragments of sole and upper with thonged lasting margin (sf 154), a construction used during the Anglo-Saxon and earlier Medieval period (9th/10th-late 11th/early 12th century).

Context 1157
Vamp fragment (sf 155) probably of turnshoe construction and Medieval date.

Context 1162
Turnshoe sole (sf 156) of Medieval date.

Context 1180
Turnshoe sole fragments and clump seat repair (sf 160) of Medieval date.

Context 1181
Turnshoe fragments (sf 163) of Medieval date.

Context 1204
Clump seat repairs (sf 166,167) likely to be of Medieval date.

Appendix 2

14 JAN 1993

WARREN VILLAS, BEDFORDSHIRE: WOOD IDENTIFICATION

Rowena Gale

Preparation and examination

Approximately 709 samples of waterlogged wood were examined and identified. The samples represented mainly roundwood from hurdles (rods and sails) and stakes. Although some deterioration of the cell wall structure had occurred the preservation of the material was generally good.

Thin sections were made from each sample to show the transverse, tangential longitudinal and radial longitudinal planes. These were mounted in 50% glycerol on microscope slides and examined using a transmitted light microscope at magnifications of up to x400. The anatomical structure was matched to authenticated reference material. Measurements of the diameters of most samples of roundwood was recorded. The number of annual growth rings present on the rods and sails was noted and, where possible, the season at which the stems had been cut.

Results

Abbreviations: R = roundwood; D = diameter; AR = annual growth rings; Season sample felled/coppiced: S = spring, Su = summer, A = autumn/ winter.

Sample Structure Identification

BOX 1

1	24	*Fagus* sp., beech, R, D 9+ cm (minimum), slow-grown
2	24	*Fagus* sp., R, D 5.75 cm, slow-grown
4	24	*Fagus* sp., R, D 9+ cm
7	24	Family Salicaceae which includes *Populus* sp. and *Salix* sp., poplar and willow, R, D 9 cm, fast-grown (some AR 0.75 cm)
8	24	Salicaceae, R, D 9+ cm (minimum)
9	24	*Fagus* sp., R, D 6 cm
10	28	17 rods:

	AR									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
D <1 cm											
Salicaceae	-	3A	1S	2A	2S&A	-	-	-	-	-	
D 1 cm											
Salicaceae	-	-	-	-	1	2A	1A	-	-	-	
D 1.5 cm											
Corylus (hazel)		1A	1A	1A	-	-	-	-	-	-	-
Salicaceae	-	-	-	2A	-	-	-		-	-	

11 24 Salicaceae, R, D 5 cm
12 24 Salicaceae, R, D 6.5 cm

BOX 2
13 24 Salicaceae, R, D 9 cm
14 24 Salicaceae, R, D 7 cm
15 24 Salicaceae, R, D 5.5 cm
18 26 *Prunus* spp., which includes *P.avium*, wild cherry, *P. padus*, bird cherry, *P. spinosa*, blackthorn, R, D 8 cm
19 42 21 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1 cm												
Corylus	-	-	1A	-	3S	2A	1S	1A	-	-	-	-
D 1.5 cm												
Corylus	-	-	-	-		1S	2A	2S	-	2S	1S	-
D 2 cm												
Corylus		-	-	-	-	-	-	2A	2A	-	-	1S

20 25 *Ulmus* sp., elm, fast-grown
21 25 *Ulmus* sp., R, D 6 cm
22 25 Salicaceae, R, D 3 cm, AR 9

BOX 3
23 42 *Fraxinus* sp.,R, D 8 cm
24 42 Salicaceae, R, D 5.5 cm
25 88 20 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	-	1A	2A	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus	-	-	1A	-	8S&A	7A	1A	-	-	-	-	-

6 88 *Corylus* sp., R, D 3 cm, AR 10
7 88 *Corylus* sp., R, D 2 cm, AR 10
8 88 9 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	1	1	-	-	-	-	-	-	-	-	-
Erica/ Calluna	-	-	-	1	-	-	-	-	-	-	-	-
D 1 cm												
Corylus	-	-	2	2	1	1	-	-	-	-	-	-

29 88 12 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1.5 cm												
Corylus	-	-	-	1A	3A	1A	2A	-	-	-	-	-
D 2 cm												
Corylus	-	-	-	-	-	-	2A	1A	1A	-	1A	-

BOX 4

30 88 9 sails:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 2-3 cm												
Corylus	-	-	-	-	-	1A	2A-	1A	1A	2A	1A	-
Pomoideae	-	-	-	-	-	-	-	-	-	-	-	1A

31 88 15 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1 -1.5 cm												
Corylus	-	-	1A	2A	2A	1A	1A	1A	-	-	-	-
D 2 cm												
Corylus	-	-	-	-	-	1A	-	1A	3A	1A	-	-

32 88 *Corylus* sp., R, D 2 cm, AR 4, A

33 88 *Corylus* sp., R, D 2 cm, AR 5, A

34 88 *Erica* sp./*Calluna* sp., numerous stems, D 1-2 cm

35 88 Salicaceae, R, D 6 cm, AR 8, A

36 88 Rosaceae, subfamily Pomoideae which includes *Crateagus*, hawthorn, *Malus* sp., apple, *Pyrus* sp., pear, *Sorbus* spp., rowan, whitebeam and wild service tree, R, D 9 cm, AR 6+

38 88 *Acer* sp., field maple, R, D 5.5 cm, AR 15+, A

40 88 *Quercus* sp., oak, R, D 4.5 cm, AR 34, slow-grown

44 88 *Quercus* sp., R, D 4 cm, AR 19, pith flecks and tyloses suggest unhealthy growth pattern

45 88 *Quercus* sp., R trimmed

46 180 *Betula* sp., birch, R, D 11.5 cm, AR *c.* 28+

49 199 *Alnus* sp., alder, R, D 10 cm

BOX 5

55 198 *Alnus* sp., R, D 5+ cm, AR 8+

56 186 *Quercus* sp., R, D 14++ cm, slow grown

61 271 Salicaceae, R, D 5 cm, AR 5+

62 271 Salicaceae, R, D 1.5 cm, AR 3+

66 171 *Alnus* sp., R, D 6+ cm, AR 15+

71 537 Pomoideae, R, D 1.25 cm, AR 9

72 537 Pomoideae, R, D 2.5 cm, AR 14

76 571 *Corylus* sp., R, D 4 cms, AR 16, A

78	575	*Quercus* sp., R, D 2.25, AR 13
79	597	*Fraxinus* sp., ash, R, D 2 cm, AR 6
80	758	*Quercus* sp., R, charred and incomplete

BOX 6

81	754	*Corylus* sp., R, D 3.5 cm, AR 13, A
83	754	*Corylus* sp., R, D 3.5, AR 11+
84	970	*Quercus* sp., R, D 3.5, AR 20, S
85	756	Pomoideae, R, D 2 cm, AR 10+
86	756	Pomoideae, R, D 3.5 cm, AR 9+
87	755	*Quercus* sp., R, D 4 cm, AR 5, S, fast-grown
88	755	*Quercus* sp., R, D 5.5 cm, AR 5, fast-grown
92	855	*Ulmus* sp., heartwood
94	857	*Corylus* sp., R, D 1.25, AR 5, A
98	502	*Acer* sp., R, D 3 cm, AR 11, ?S/Su
99	971	*Prunus* sp., R, D 1.5 cm, AR 7, A
100	990	*Prunus* sp., R, D 2 cm, AR 14, A
101	990	*Prunus* sp., R, D 2.25, AR 10, A
102	990	*Prunus* sp., R, D 2 cm, AR 12, A
104	994	*Quercus* sp., R, D 7.5 cm
105	857	Pomoideae, R, D 6+ cm, AR 14+
106	942	Salicaceae, R, D 10 cm
107a	942	Salicaceae, R, D 14+ cm

BOX 7

108	1402	Salicaceae, R, D 5 cm, AR 7+
109	1402	Salicaceae, R, D 7, AR 3+, fast grown
110	857	Pomoideae, R, D 13 cm, AR 5+
113	857	*Sambucus* sp., elder, R, D 4 cms, AR 3+
114	998	*Quercus* sp., R, D 2.5 cm, AR 4, A
115	998	*Quercus* sp., R, D 2.75 cm, AR 9
116	998	*Quercus* sp., R, D 2 cm, AR 13, S
117	998	*Quercus* sp., R, D 2.5 cm, AR 8, S
119	857	Salicaceae, R, D 2.5 cm, AR 5, S
120	998	*Quercus* sp., R squared
125	998	Pomoideae, R, D 3 cm, AR 8. A
126	999	Salicaceae, R, D 15 cm
127	1536	Salicaceae, R, D 8 cm, AR 4+, A
128	998	*Quercus* sp., R, D 4.5, AR 4+, Su/A

BOX 8

130	990	*Taxus* sp., yew, R, D 3 cm, sapwood: (outer 0.5 cm) AR 22, mainly very narrow growth rings but 3 very wide in central region, heartwood: AR unknown.
131	998	*Quercus* sp., R, D 2+ cm, AR 4, A
132	998	*Quercus* sp., R, D 5+ cm, AR 14, S
135	999	Salicaceae, R, D 8 cm, fast-grown
136	999	Salicaceae, R, D 9+ cm, outer surface charred
137	999	Salicaceae, R, D 6 cm
140	999	*Quercus* sp., R, D 4 cm, AR 15, A

142 857 Salicaceae, R, D 5 cm
145 998 *Acer* sp., R, D 4 cm, fast-grown
151 998 *Corylus* sp., R, D 1.25 cm, AR 5
157 857 *Sambucus* sp., R, D 4.5 cm
161 1180 *Acer* sp., R, D 3.5 cm
163 1180 *Betula* sp., portion of R
172 1199 *Quercus* sp., R, D 2.5 cm minimum, AR 14
173 1199 *Corylus* sp., R, D 2.5 cm
177 1203 2 sails: a. *Ulmus* sp., R, D 2 cm, AR 5, S
b. Salicaceae, R, D 1.5 cm, AR 4, S
179 958 Pomoideae, R, D 1.5 cm, AR 14+

BOX 9

180 1184 3 samples:
a. *Sambucus* sp., R, D 1.75 cm, AR 2, A
b. *Quercus* sp., R, D 1.25 cm, AR 2, A
c. *Quercus* sp., heartwood, ? sliver of timber

181 908 *Erica* sp./ *Calluna* sp., a number of stems, D <0.2 - 1 cm

182 857 *Quercus* sp., heartwood

184 941 1 sail + 19 rods:
Sail: *Corylus* sp., R, D 1.5 cm, AR 8, A
Rods:

	AR											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1 - 1.5 cm												
Corylus	-	-	2A	-	4A	-	-	-	-	1A	-	-
D 1.5 - 1.75 cm												
Acer	--	-	-	1A		1A	-	-	-	-	-	-
Corylus	-	-	-	1A	2A	1A	-	1A	-	1A	4A	2A

185 941 2 sails + 18 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 12, A
b. *Corylus* sp., R, D 1.25 cm, AR 4, A
Rods:

	AR											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	3A	4A	1A	1A	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus	-	-	5A	1A	2A	1A	-	-	-	-	-	-

186 941 3 sails + 15 rods:
Sails: a. *Corylus* sp., R, D 1.75 cm, AR 3, A
b. *Corylus* sp., R, D 1.25 cm, AR 4, A
c. *Acer* sp., R, D 1.5 cm, AR 6, A

Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	3A	2A	-	1A	-	-	--	-	-	-	-
D 1 - 1.75 cm												
Acer	-	-	-	1A	-	-	-	-	-	-	-	-
Corylus	-	-	7A	-	1A	-	-	-	-	-	-	-

187 941 *Corylus* sp., R, D 1.5, AR 3, A

188 996 3 sails + 13 rods:
Sails: a. *Prunus* sp., R, D 1.25, AR 4, A
b. *Corylus* sp, R, D 1.5 cm, AR 4, Su/A
c. *Prunus* sp., R, D 1.25 cm, AR 6, A

Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1.25 cm												
Acer	-	-	-	-	2A	1A	-	-	-	-	-	-
Corylus	-	3A	2A	-	1A	4A	-	-	-	-	-	-

189 996 2 sails + 4 rods:
Sails: a. *Corylus* sp., R, D 1.5, AR 6, A
b. *Corylus* sp., R, D 1.5, AR 5, A

Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1-1.5 cm												
Corylus	-	-	2A	-	-	1A	-	-	-	1A	-	-

190 1223 2 sails + 3 rods:
Sails: a. *Corylus* sp., R, D 3 cm, AR 17, A
b. *Acer* sp., R, D 1.5 cm, AR 15

Rods:

	AR						
	18	*19*	*21*	*22*	*23*	*24*	*25*
D 2 cm							
Acer	1A	1A	-	-	-	-	1A

191 753 *Quercus* sp., R, D 3.75 cm

192 753 *Corylus* sp., R, D 1.5 cm, AR 8+

193 882 *Corylus* sp., R, D 2 cm

199 1194 2 sails + 14 rods:
Sails: a. *Corylus* sp., R, D 2 cm, AR 3, A
b. *Corylus* sp., R, D 2 cm, AR 7, A

Rods:

	1	2	3	4	5	6	7	8	9	10	11	12
D 1 cm												
Corylus	-	-	1A	-	3S&A	-	-	-	-	-	-	-
Salicaceae	-	-	-	-	-	-	3A	-	-	1A	-	-
D 1 - 2 cm												
Corylus	-	-	-	2A	-	1A	-	1A	-	-	-	-
Salicaceae	-	-	1A	1A	-	-	-	-	-	-	-	-

BOX 10

200 1194 *Corylus* sp., R, D 2.75 cm, AR 7

201 1194 2 sails + 8 rods:
Sails: a. *Corylus* sp., R, D 2.25 cm, AR 5, A
b. *Corylus* sp., R, D 2.25 cm, AR 9, A
Rods:

	1	2	3	4	5	6	7	8	9	10	11	12
D <1 cm												
Salicaceae	-		2A	-	-	-	-	-	-	-	-	-
D 1-1.25 cm												
Corylus	-	-	-	2Su	-	4Su	-	-	-	-	-	-

202 1194 5 sails + 21 rods:
Sails: a. *Corylus* sp., R, D 2.25 cm, AR 6, Su
b. Salicaceae, R, D 1.5 cm, AR 5, A
c. *Corylus* sp., R, D 1.5 cm, AR 4, A
d. *Corylus* sp., R, D 1.5 cm, AR 3, Su
e. Salicaceae, R, D 1.5 cm, AR 6, A
Rods:

	1	2	3	4	5	6	7	8	9	10	11	12
D <1 cm												
Corylus-	-		4Su	4Su	-	-	-	-	-	-	-	-
Salicaceae	-		1A	-	1A	-	-	-	-	-	1A	-
D 1.25 - 1.75												
Corylus	-	-	-	3Su	4Su	2Su	-	-	-	-	-	-
Salicaceae	-	-			-	1Su	-	-	-	-	-	-

203 1194 2 sails + 21 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 9, S
b. *Corylus* sp., R, D 1.25 cm, AR 5, Su

Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus-		1Su	2Su	-	-	-	-	-	-	-	-	-
Fraxinus		1Su	1Su	-	-	-	-	-	-	-	-	-
D 1 - 2 cm												
Corylus		-	1Su	2Su	6Su&A	3Su&A	-	1Su	-	-	-	-
Salicaceae		-	-	-	-	1A	-	-	-	1A	-	-

204 1194 2 sails + 17 rods:
Sails: a. *Corylus* sp., R, D 3.25 cm, AR 7, Su
b. *Corylus* sp., R, D 2.25 cm, AR 6, Su
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	1Su	3Su	-	-	-	-	-	-	-	-
Salicaceae		2A	2A	1A	-	-	-	-	-	-	-	-
D 1.5 - 2 cm												
Corylus	-	-	-	1Su	3Su	-	-	-	-	-	-	-
Salicaceae		-	-	-	-	-	-	-	-	-	-	1A
D 2+ cm												
Corylus	-	-	-	-	1Su	-	2Su&A-		-	-	-	-

205 1194 *Corylus* sp., R, D 1.75 cm, AR 11, Su
206 1194 *Corylus* sp., R, D 2 cm, AR 6, Su
207 1194 *Corylus* sp., R, D 3 cm, AR 7, Su
208 1194 *Corylus* sp., R, D 2.5 cm, AR 6, A

BOX 11

212 1182 Salicaceae, R, D 5 cm
214 1194 Salicaceae, R, D 8 cm
215 1194 Salicaceae, R, D 10 cm
216 1194 Salicaceae, R, D 14 cm
217 1194 Salicaceae, R, D 12+ cm
218 1194 Salicaceae, R, D 8 cm
219 1194 Salicaceae, R, D 3 cm
220 1194 Salicaceae, R, D 5 cm
221 1194 Salicaceae, R, D 10 cm
222 1194 Salicaceae, R, D 4.5 cm
223 1194 Salicaceae, R, D 6 cm
224 1194 Salicaceae, R, D14 cm

BOX 12

225 1194 Salicaceae, R, D 4 cm
226 1194 Salicaceae, R, D 9 cm
227 1435 Salicaceae, R, D 3 cm
228 1435 Salicaceae, R, D 4 cm

229 1435 Salicaceae, R, D 2.25 cm
230 1435 Salicaceae, R, D 5 cm
231 1435 salicaceae, R, D 2 cm
232 1435 Salicaceae, R, D 2 cm

BOX 13

233 1435 3 sails + 17 rods:
Sails: a. Salicaceae, R, D 3 cm, AR 3+
b. Salicaceae, R, D 2 cm, AR 4, Su
c. Salicaceae, R, D 2 cm, AR 6, Su
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Salicaceae	-		7Su&A	1Su	-	-	-	-	-	-	-	-
D 1.25 - 2 cm												
Salicaceae	-		6A	3Su&A	-	-	-	-	-	-		-

235 1402 3 forked stems (? sails) + 6 rods:
Forked stems: a. Salicaceae, R, D 3 cm, AR 3+
b. Salicaceae, R, D 3 cm, AR 6, A
c. Salicaceae, R, D 3 cm, AR 6, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D < 1 cm												
Salicaceae	-		1A	-	-	1A	-	--	-	-	-	-
D 1 - 2 cm												
Salicaceae	-		-	1A	2A	1A	-	-	-	-	-	-

236 1402 2 sails + 19 rods:
Sails: a. Salicaceae, R, D 1.75 cm, AR 4, A
b. Salicaceae, R, D 1.5 cm, AR 7, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Salicaceae	2		4	6	-	-	-	-	-	-	-	-
D 1 - 2 cm												
Salicaceae	-		4A	1Su/A		-	1Su	-	-	-	-	-

238 1428 Pomoideae, R, D 3 cm
243 1364 Salicaceae, R, squared
244 1364 Pomoideae, R, D 2.25 cm

252 25 1 sail + 13 rods:
Sail: *Corylus* sp., R, D 2 cm, AR 6, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Cornus (dogwood)	-	-	2	-	-	-	-	-	-	-	-	-
D 2 cm												
Corylus-	-	-	-	-	-	2A	3A	-	1A	3A	-	-
D 2.75 - 3 cm												
Corylus -	-	-	-	-	-	-	-	1A	-	1A	-	-

253 28 4 sails: a. Salicaceae, R, D 2.25 cm, AR 5, A
b. Salicaceae, R, D 2.25 cm, AR 5, A
c. Salicaceae, R, D 2.25 cm, AR 5, A
d. Salicaceae, R, D 2.25 cm, AR 5, A

254 37 2 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1.25 - 2 cm												
Corylus -	-	-	1A	1A	-	-	-	-	-	-	-	-

255 1402 Salicaceae, R, D 5.5 cm
256 1402 Salicaceae, R, D 4.5 cm
257 1402 Salicaceae, R, D 2.5 cm

BOX 14

242 1364 Salicaceae, R, D 3.5 cm
258 1402 Salicaceae, R, D 6 cm
259 1513 2 sails + 13 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 5, A
b. *Sambucus* sp., R, D 1 cm, AR 2, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus-	-	-	-	-	1A	-	-	-	-	-	-	-
Fraxinus	1Su	1A	-	-	-	-	-	-	-	-	-	-
*Sambucus*1	-	-	-	-	-	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus-	-	1A	1A	3Su&A2Su		-	-	-	-	-	-	-
Fraxinus-	-	-	-	-	-	-	-	-	-	-	-	2A

264 942 3 sails + 4 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 6, A
b. *Sambucus* sp., R, D 1.5 cm, AR 2, A
c. *Sambucus* sp., R, D 1.25 cm, AR 2, A

Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Sambucus	1A	3A	-	-	-	-	-	-	-	-	-	-

BOX 15

265 942 1 sail + 13 rods:
Sail: *Sambucus*, R, D 0.75 cm, AR 2, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	2A	-	-	-	-	-	-	-	-	-	-
Quercus	-	-	-	-	2A	-	-	-	-	-	-	-
Sambucus	1	1A	1A	-	-	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus	-	-	-	-	3A	-	-	-	-	-	-	-
Fraxinus	-	-	-	-	-	-	-	-	-	1A	-	-
Quercus	-	-	-	-	-	1A	-	-	-	-	-	-
Salicaceae		-	-	-	-	-	1A	-	-	-	-	-

266 942 1 sail + 10 rods:
Sail: *Corylus* sp., R, D 1.25 cm, AR 6, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	2A	-	-	-	-	-	-	-	-	-
Fraxinus		-	-	-	1A	-	2A	-	-	-	-	-
Sambucus	1	-	-	-	-	-	-	-	-	-	-	-
D 1.5 -2 cm												
Fraxinus	-	-	-	-	-	1A	-	-	2A	-	-	-
Salicaceae		-	-	-	-	-	-	-		-	1A	-

267 942 2 sails + 20 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 5, A
b. *Sambucus* sp., R, D 1 cm, AR A,
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	1A	4A	2A	-	-	-	-	-	-	-	-
Sambucus	1	-	-	-	-	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus	-	1A	1A	1A	3A	4A	1A	-	-	-	-	-

268 1182 Pomoideae, R, D 2 cm, AR 9
269 1182 Salicaceae
270 1182 Salicaceae, R, D 2.25 cm, AR 3, A

272 942 *Sambucus* sp., R, D 2.75 cm, AR 2, A

BOX 16

275 1182 Salicaceae
276 999 Salicaceae, R, D 4 cm, AR 19, A
278 1530 Salicaceae, R, D 2.5 cm, AR 8, A
279 999 *Acer* sp., R, D 6 cm, AR 11+
281 999 *Corylus* sp.

282 942 3 sails + 11 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 4, A
b. *Corylus* sp., R, D 1.25 cm, AR 5, A
c. *Corylus* sp., R, D 1.25 cm, AR 4, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	3A	-	-	-	-	-	-	-	-	-
D 1 - 1.5 cm												
Corylus	-		2A	2A	-1A	1A	1A	-	-	-	-	-
Salicaceae		-	-	-	-	-	1A	-	-	-	-	-

283 1530 Salicaceae, R, D 4 cm, AR 14, A
285 1408 *Prunus* sp., R, D 4.5 cm

BOX 17

287 1536 Salicaceae, R, D 2.5 cm
288 1536 Salicaceae, R, D 4.5 cm
289 857 *Erica* sp./ *Calluna* sp., stem
290 924 *Corylus* sp., R, D 6 cm
291 1529 Salicaceae, R, D 3 cm
292 1530 *Corylus* sp., R, D 3 cm, AR 10
293 1536 *Corylus* sp., R, D 1.75 cm, AR 5
295 1402 Salicaceae, R, D 5 cm, AR 5, A
296 1178 *Acer* sp., R, D 3.5 cm, AR 15
301 922 *Corylus* sp., R, D 6 cm, AR 9, A

BOX 18

302 1187 *Fraxinus* sp., R, D 5 cm
303 922 Pomoideae, R, D 2.5
304 883 Pomoideae, R, D 4 cm
305 883 *Cornus* sp., R, D 4 cm
306 883 *Quercus* sp., R, D 4.5 cm
307 883 *Corylus* sp., R, 2 cm
308 922 *Quercus* sp., R, 3.5 cm

309 1534 20 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	-	-	2A	-	-	-	-		-	-
Salicaceae	-	-	-	-	1A	-	-	-	-	-	-	-
D 1 - 1.25 cm												
Acer	-	-	-	-	1A	-	-	-	-		-	-
Cornus	-	-	-	-	-	-	-	-	2A	-	-	-
Corylus	-	1A	-	2A	2A	3A	2Su&A2		2A	-	-	-

310 1534 Salicaceae, R, D 8 cm
311 1534 *Ulmus* sp., R, D 6 cm
312 922 *Quercus* sp., R, D 6 cm
316 924 *Quercus* sp, portion of sapwood.
317 1528 *Corylus* sp., R, D 2 cm
318 1528 *Corylus* sp., R, D 2 cm, AR 9
319 007 *Quercus* sp., heartwood
320 002 Salicaceae, R, D 4 cm
326 10 Salicaceae, R, D 3 cm
327 10 *Corylus* sp., R, D 3 cm
329 922 *Quercus* sp., R, D 2 cm

BOX 19

330 922 Pomoideae, R, D 4 cm
335 1528 *Corylus* sp., R, D 1.5 cm
336 1528 *Corylus* sp., R, D 3 cm
337 1528 *Prunus* sp., R, D 2.25 cm
338 1528 6 rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	-	1A	-	1A	2A	-	-	-	-	-	-
Prunus	-	-	-	-	-	-	-	1A	-	1A	-	-

341 1317 Salicaceae, R, D 4 cm
342 1317 Salicaceae, R, D 4 cm
343 1530 Salicaceae, R, D 4 cm
344 1530 *Corylus* sp., R, D 3 cm, AR 6, A
345 1530 *Quercus* sp., R, D 2.75 cm

BOX 20

347 1529 *Quercus* sp., fast grown
348 1529 *Corylus* sp., R, D 6 cm
351 1529 Salicaceae, R, D 12 cm
352 1182 Pomoideae, R, D 6 cm
353 1182 *Fraxinus* sp., R, D 8 cm
354 1182 Salicaceae, R, D 3.5 cm
355 1246 *Fraxinus* sp., R, D 5 cm
356 1246 Salicaceae, R, D 5.5 cm
357 1246 Salicaceae,R, D 3.5 cm

359 984 *Quercus* sp., R, D 8 cm
365 855 Salicaceae, R, D 18+ cm
366 1603 Salicaceae, R, D 1 cm
368 1364 Salicaceae, R, D 3.5 cm
369 1364 Salicaceae, R, D 6 cm
370 1364 Salicaceae, R, D 7 cm

BOX 21

372 1624 1 sail + 22 rods:
Sail: *Corylus* sp., R, D 1.5 cm, AR 7, A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D <1 cm												
Corylus	-	1A	2A	-	-	-	-	-	-	-	-	-
Salicaceae	-	-	-	2A	-	-	-	-	-	-	-	-
D 1 - 1.75 cm												
Corylus	-	-	1A	3A	8A	3A	2A	-	-	-	-	-

373 1624 *Corylus* sp., R, D 2 cm, AR 8, A
374 857 Salicaceae, R, D 5.5 cm, fast grown
375 941 Salicaceae, R, D *c.* 18 cm
377 1624 *Quercus* sp., R, D 2.75 cm, AR 7, S
378 1624 *Quercus* sp., R, D 10+ cm

BOX 22

381 1624 4 sails + 10 rods:
Sails: a. *Corylus* sp., R, D 1.5 cm, AR 5, A
b. *Corylus* sp., R, D 1.25 cm, AR 7, S
c. *Corylus* sp., R, D 1.25, AR 4, A
d. *Corylus* sp., R, D 1 cm, AR 10 A
Rods:

	AR										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
D 1 -1.5 cm												
Corylus	-	-	-	1A	-	-	-	1A	1Su	-	-	-
Salicaceae	-	3A	1A	3A	-	-	-	-	-	-	-	-

382 1624 *Corylus* sp., R, D 2 cm, AR 5, A
383 1624 *Quercus* sp., R, D 5 cm
385 855 Salicaceae
386 24 4 samples: a. *Corylus* sp., R, D 3 cm
b. Salicaceae, R, D 3 cm, AR 8, S/Su
c. *Quercus* sp., R, D 3cm, AR 6, A
d. *Corylus* sp., R, D 1.75 cm, AR 6, A
388 24 4 samples: a. Pomoideae, R, D 3 cms, AR 17, A
b. Pomoideae, R, D 2.5 cm
c. *Corylus* sp., R, D 2.25 cm, AR 7, Su
d. *Corylus* sp., R, D 2 cm, AR 9, A
389 24 Salicaceae, R, D 0.75 cm, AR 1
390 24 Salicaceae, R, D 0.75 cm, AR 1

391	24	Salicaceae, R, D 0.5 cm, AR 1
392	24	*Corylus* sp., R, D 2.25 cm, AR 4, A

Comments

1. The genera identified included:
   Broadleaf trees and shrubs
   Acer campestre, filed maple
   Alnus sp., alder
   Betula sp., birch
   Cornus sp., dogwood
   Corylus sp., hazel
   Erica sp./ *Calluna* sp., heather or ling. The anatomical structure of *Calluna vulgaris* and some species of *Erica* is very similar.
   Fagus sp., beech
   Fraxinus sp., ash
   Rosaceae, subfamily Pomoideae which includes *Crateagus* sp., hawthorn, *Malus* sp., apple, *Pyrus* sp., pear, *Sorbus* spp., rowan, whitebeam and wild service tree. The members of the Pomoideae are very similar anatomically.
   Prunus spp., which includes *P.avium*, wild cherry, *P. padus*, bird cherry, *P. spinosa*, blackthorn.
   Quercus sp., oak
   Sambucus sp., elder
   Salicaceae which includes *Salix* sp., willow and *Populus* sp., poplar. It is not possible to separate these genera reliably using anatomical features alone.
   Ulmus sp., elm

   Gymnosperms
   Taxus sp., yew

2. None of the samples examined included areas showing the "heel" typical of coppice stems. However, many samples originated from fast-grown stems, with wide annual growth rings comparable to those characteristic of coppice stems. This was particularly noticeable in the hazel and willow/poplar samples, and these species were also those most frequently identified from the samples.

3. It was noticeable from the structure of the rods and sails that the time of coppicing or felling was variable. Most samples were cut during the dormant period, i.e. some time between the end of the growing season (*circa* September) and the start of spring growth (*circa* March), but some appeared to have been cut just as growth commenced and a few after a period of new growth but before the end of the growing season. Sometimes a mixture of all three felling times occurred within one hurdle. This is somewhat puzzling since coppice rods used for hurdles are usually cut and worked immediatly (freshly cut rods are more pliable than seasoned or partially dried rods). Traditionally, hurdle-makers prefer winter cut rods (Edlin 1949), but a possible explanation here may be that the rods were harvested in very early spring from stools

with differential growth patterns (i.e. some still dormant while others were breaking into new growth). Alternatively, additional rods may have been worked into the strcucture at a later period.

References

Edlin, H. L. 1949. Woodland crafts in Britain. Batsford.

Appendix 3

Warren Villas, Bedfordshire: Conservation assessment for the waterlogged wooden artefacts.

The site of Warren Villas contained Iron Age, Roman, and Medieval features. Part of the site was waterlogged and produced a quantity of wood and leather that was probably related to flax retting and fishing. A selection of structural and small industrial artefacts for conservation has been made so that they can form part of the permanent site archive, and their proposed study and conservation by the Ancient Monuments Laboratory is presented below.

Leather:

The 7 pieces of leather have been freeze-dried from 15% glycerol.

Wood:

1. The selected objects include: around 40 excavated pieces comprising an axle and various small industrial items possibly associated with flax retting. In addition two soil blocks containing basketry were lifted by the AML.

2. Excavation of the soil blocks in the laboratory revealed that (920788) was a fragmentary fish trap (Watts, report enclosed), but the other (912109) turned out to be just dislocated fragments of roundwood and was no longer required for conservation.

3. A species identification has been undertaken for all the objects or their component parts (see enclosed table). Their condition was assessed during the same operation or by visual examination.

4. Technological study
This is to be undertaken after conservation by an appointed specialist.

5. Proposed conservation
The condition of these items suggests that they would respond to conservation by freeze-drying after pretreating with combined PEG solutions (a mixture of 400 and 4000 grades). The single items were put into pretreatment together at the beginning of March 1993. The articulated pieces are being treated separately and were started later. It is anticipated that freeze-drying will begin in April 1994, and it is expected that all the items should be finished by the end of 1994.

6. After freeze-drying it should be possible to store this material in normal store conditions, that is below 25°C, and between 45-65% RH.

Jacqui Watson March 1994

OBJECTS FROM WARREN VILLAS

WOOD AML No.		Object	Comments	Identification
920821	29 : 24:3	object	frozen	
920822	32 : 38:324	wedge	frozen	
920823	197 : 1196:241	object	Long notched piece with iron staining	oak
920824	303 : 820:91	object	3 pieces	oak
920825	306 : 1408:286	object		* ash
920826	307 : 924:315	object	2 pieces	oak
920827	308 : 1529:339	object		oak
920828	196 : 1364:237	basket		
920829	212 : 999:118	object	upright	* oak
920830	161 : 857:97	object	Long piece, surface eroded in places by netting	* oak
920831	157a : 1162:239	handle	2 pieces	* willow or poplar
920832	189 : 857:197	rake	Back in two pieces, separate peg/tine peg pomoideae	* back is ash and
920833	191 : 1198:210	shoe patten	Heavy iron staining	* possibly birch
920834	192 : 1177:213	flax basher		oak
920835	200 : 1182:262	peg	2 pieces	* willow or poplar
920836	256 : 745:349	lid	iron stained	oak
920837	273 : 525:69	plank	radial surface	oak
920838	274 : 855:363	blade		* willow or poplar
920839	275 : 855:360	object		oak
920840	289 : 922:328	handle		* pomoideae
920841	211 : 922:280	plank		oak

OBJECTS FROM WARREN VILLAS

WOOD AML No.		Object	Comments	Identification
920842	290 : 857:284	barrel		slow grown oak
920843	291 : 1199:251	spade		slow grown oak
920844	294 : 1182:149	wedge	iron staining	oak
920845	295 : 1180:154	wedge	2 pieces	* maple
920846	296 (x2) : 1180:158	wedge	4 pieces	oak
920847	297 : 1199:245	peg		* oak
920848	298 : 1182:261	wedge		oak
920849	299 : 1182:271	object		oak
920850	300 : 924:297	object		* ash
920851	301 : 1530:299	peg		not identifiable
920852	302 : 922:332	peg	2 pieces	oak
920853	304 : 1163:144	wedge	2 pieces	oak
920854	305 : 1180:162	wedge		oak
920855	309 : 1199:246	peg	2 pieces, difficult to section	* oak

OBJECTS FROM WARREN VILLAS

LEATHER

AML No.			Object	Comments	Identification
920671	16	10	object		
920672	22	602	object		
920673	264	855	footwear		
920674	265	855	footwear		
920675	269	855	footwear		
920676	270	855	footwear		
920677	271	855	object		
920788			object	fish trap	Hazel (Wendy Carruthers)

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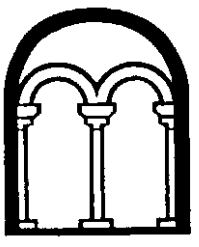

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