Jennings Yard, Windsor

A Closed-Shaft Garderobe and Associated Medieval Structures

Wessex Archaeology

by John W. Hawkes & Michael J. Heaton

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with contributions by
Michael J. Allen, J. Bourdillon, W.J. Carruthers, R. Davidge, R. Gale, F. Healy, L.N. Mepham, J.M. Mills, C.A. Morris, Q. Mould, J. Pidgeon and P. Robinson

illustrations by
J. Cross, S.C. Garrett, S.E. James, K.M. Nichol and J. Vallender

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Front cover: An artist's impression by Liz James of the 13th century building with garderobe at Jennings Yard, Windsor

Back cover: The excavations, from the roof of Windsor Royal Theatre looking north, showing the causeway and Building 4112

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Abstract

Excavations at Jennings Yard car park, Thames Street, Windsor, carried out in the autumn of 1987 by Wessex Archaeology, revealed evidence of substantial medieval buildings in addition to prehistoric artefacts and post-medieval deposits. Remains of three separate successive masonry buildings — one incorporating an en suite garderobe — spanning the years AD 1150–1600, were recorded associated with other structures and features including a possible 'moat' and revetted causeway. Artefacts included local and foreign pottery, metalwork, waterlogged leather and woodwork. Amongst environmental samples a rosemary seed was recovered from an unusually early context (13th/14th century) and a group of eight horse skeletons from a narrow ditch was examined in detail.

Following abandonment of the medieval buildings and other structures, the site was used as an orchard during much of the post-medieval period prior to the development of small-scale 19th century industries.

Analysis of the medieval remains has allowed for tentative reconstruction of the building and their functions which, together with analysis of the stratigraphical deposition of other features, goes some way towards documenting early property development on the site.

1 Introduction

1. Historical Introduction

Windsor lies in the Thames Valley 35 km upstream from London. The medieval core of the town is located on a chalk spur adjacent to the castle, some 200 m to the south-east of the present course of the river (Fig. 1). The level of the underlying chalk drops away steeply north of the castle, and is over 10 m below present ground level near the south bank of the Thames, where it is overlain by gravel and alluvial brickearth.

The castle dominates the town physically and historically. Founded in about 1070 as part of a chain of defences guarding the western approaches to London, the castle outlived the decline of its strategic usefulness to become a favoured royal resort for the enjoyment of the sport provided by the emparkment of Windsor Forest.

The development of New Windsor south of the castle gates at the expense of the pre-Conquest settlement and royal residence at Old Windsor, 3 km downstream, continued throughout the 12th century. At this time, expansion beyond the original area was evident; the riverside suburb of *Underore* ('under the slope'; Gelling 1971–2, 29) was well situated to exploit the potential for trade and transport presented by the River Thames, and its area included an important ford, replaced by Windsor Bridge some time before 1236. *Underore* was certainly in existence by the second quarter of the 12th century, when the manor was given by Stephen to Reading Abbey.

The precise boundaries of *Underore* are, however, unknown, although topographical references in documents make it clear that its centre was situated on the downstream (east) side of Windsor Bridge. The parish boundaries of *c.* 1700 (following Astill 1978, fig. 19) place the site of Jennings Yard within Clewer parish on the fringes of the likely 12th century settlement, for which documentary sources have not been available.

2. Archaeological Potential: Previous Work

Despite the historical importance of the area (summarised in Astill 1978, 64), redevelopment of the riverfront in the vicinity of Windsor Bridge has resulted in a very limited archaeological response. Something of the potential for excavation-based topographical and environmental studies was revealed by the results of an engineer's borehole survey undertaken in the preparation of redevelopment proposals for Jennings Yard and the River Street car park (details in archive). Some of the boreholes produced evidence for organic clays and silts above the gravel, interpreted as the infilled courses of former river or stream channels by comparison with similar deposits previously extensively excavated elsewhere in the county at Reading (Hawkes and Fasham forthcoming).

The redevelopment of the site of the former theatre and latterly ABC Cinema in Thames Street (located Fig. 1, reported in summary only in Hawkes 1983–85) provided an opportunity to examine a site within *Underore* in the vicinity of the river. Given severe constraints on time and funding, and the evidently disturbed nature of the site, only limited objectives were pursued. Specifically, these were to test for the presence of any former river channels and reclamations to determine date and alignment, and to establish other parameters likely to provide useful guidelines for future archaeological work in the area.

The wholly negative results nevertheless did enable an appraisal of the topography of the lower town. The absence of channels or reclamations across the site strongly suggested that the river course(s) indicated by the boreholes were distinct braids from, or meanders of, the main channel, and not part of a process of gradual encroachment by settlement northwards from near the foot of the castle. The probability that the site of *Underore* was, at least during some part of its post-glacial history, effectively an island separated by a braid of the Thames from the main part of the town influenced the approaches taken to the excavation of the Jennings Yard site.

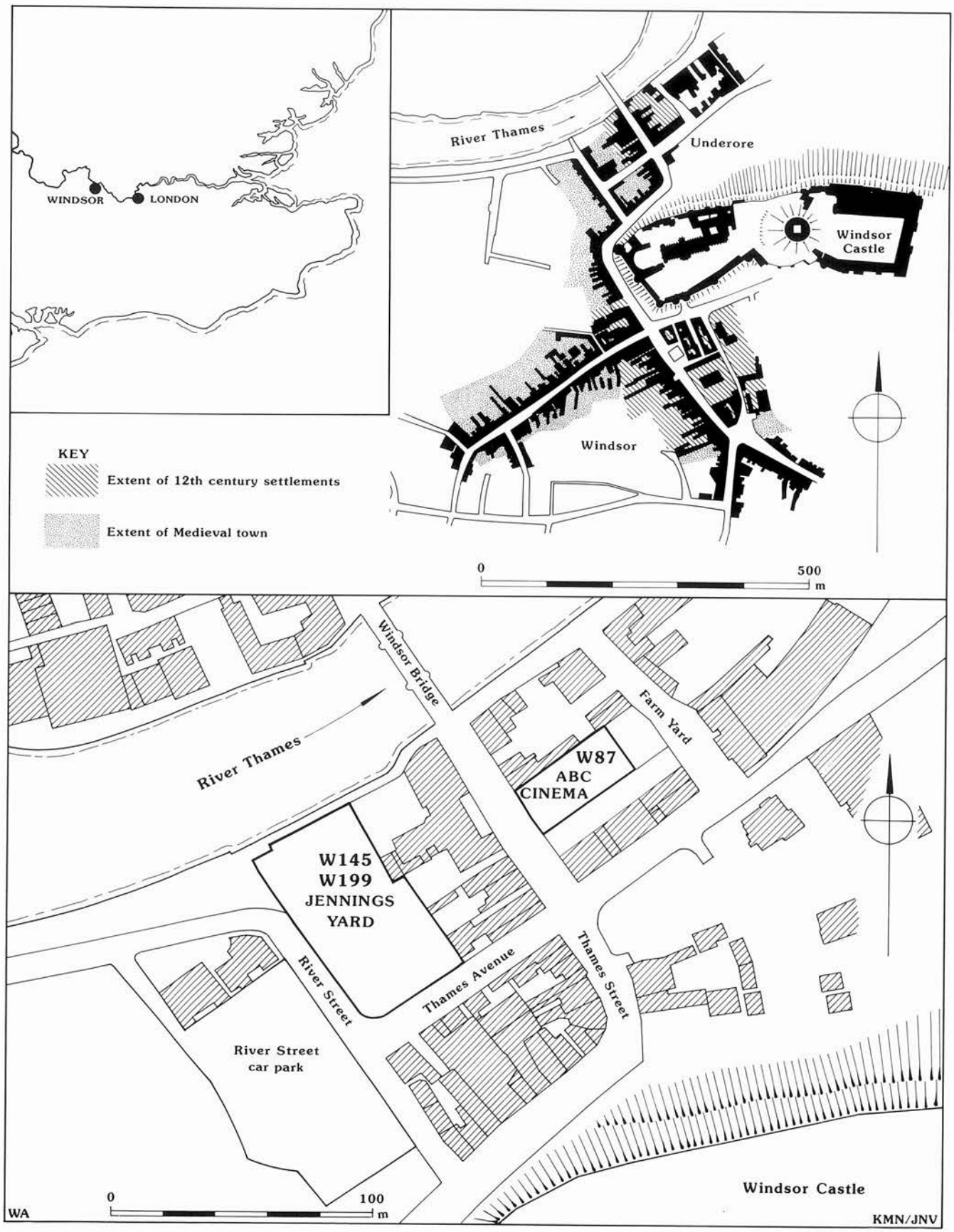

Figure 1 New Windsor: location of excavation sites within the medieval town

2 The Evaluation, 1986 (Site W145)

The site of Jennings Yard is situated on the corner of River Street (to the south-west) and Thames Avenue (to the south-east), and covers an area of some 3250 m^2 extending down to the Thames riverside walk which bounds the site to the north (Fig. 1). Formerly occupied by light industrial buildings, at the time of the evaluation much of the central area of the site had been cleared for use as a temporary car park with only with the range of buildings fronting River Street still standing.

The site was already the subject of a valid planning consent, but reapplication for a new, revised scheme offered an opportunity to carry out archaeological investigation during September 1986 by permission of the site owner and developer, City Securities Ltd. The potential area was limited by the presence of old diesel tanks and services on the Thames Avenue frontage, and evaluation strategies were further restricted by the need to maintain vehicle access to the rear of the yard.

1. Evaluation Strategy

The purpose of the evaluation was to establish the nature and survival of archaeological deposits, to assess their likely value and significance, and to consider the degree of damage and disturbance likely to result from the proposed redevelopment. Although some interpretation to determine likely archaeological worth was necessary, it was never anticipated that an evaluation would provide the quality or quantity of evidence to properly explain the history and evolution of the site.

The nature of the evaluation was principally determined by two factors. Firstly, it was felt desirable to restrict any necessary damage to the site to a minimum; a significantly wider trench would not in any case have been possible due to buildings still occupying the development site. Secondly, the anticipated depth of deposits would have led to unsafe working conditions without substantial shoring. It was decided that shuttering, with the consequent loss of opportunity for recording the trench sides and additional time requirement leading to the examination of a significantly smaller area, would hamper data recovery to a greater extent than restricting the evaluation to a machine-only exercise.

The trench, *c.* 2 m wide, was excavated at right-angles to the river (Fig. 2), this orientation being considered as providing the best opportunity for locating earlier channel alignments and associated riverside features. The trench was necessarily discontinuous to allow vehicle access to the remainder of the site.

The trench was dug in sections (Trenches A to K), and, once the levels of the archaeological deposits had been established, it proved possible to excavate by machine whilst maintaining some stratigraphic control, thus allowing finds to be retrieved from broadly identifiable contexts. As safe access into the trench was not possible, however, the recovery of finds and the recording of stratigraphic detail was constrained.

2. Physical Evidence

Due to the excavation method employed it was not possible to trace all individual layers from trench to trench, and disturbances (such as the brick-lined well occupying almost all of cut G) created additional discontinuities. The composite schematic section (Fig. 2) is, however, capable of broad interpretation. Additional information from borehole logs and Wessex Archaeology's earlier inspection of some of the borehole samples are included where relevant. Detailed descriptions of excavated contexts are held in archive. The sequence was as follows:

1. The surface of the river valley gravels was located at depths between *c.* 2.5–3.5 m below present ground level (*c.* 17.25–17.75 m OD); the range of depths and the gradient sloping from north to south conformed to the pattern observed on borehole trials. There was no discernible archaeological content in these gravels.

2. Immediately above the river gravels in Segments A through to E, and also G and K, context 2/5 comprised a deposit of yellow-brown silty clay, considered alluvial in origin, which contained quantities of charcoal. A single sherd of medieval pottery (not closely datable) was recovered, probably from the surface of the layer. More securely from within the alluvium were a small number of struck flint flakes. This layer can be equated with the non-organic alluvial clays noted in borehole logs. Underlying organic deposits in Segment K between the alluvium and the gravel were interpreted as former river channel material. Potentially of early (immediately post-glacial) date, these deposits were not re-examined by the later main excavation.

3. The earliest archaeologically interpretable deposits were those infilling a feature cut through 2/5 (contexts 7, 9, 10, 11, and 12). This was a steep-sided cut with a shelved profile and flat bottom, considered to be artificial. Its southern extent was masked by a post-medieval well. The feature was seen to be at least 10 m wide at the top, 6 m wide at

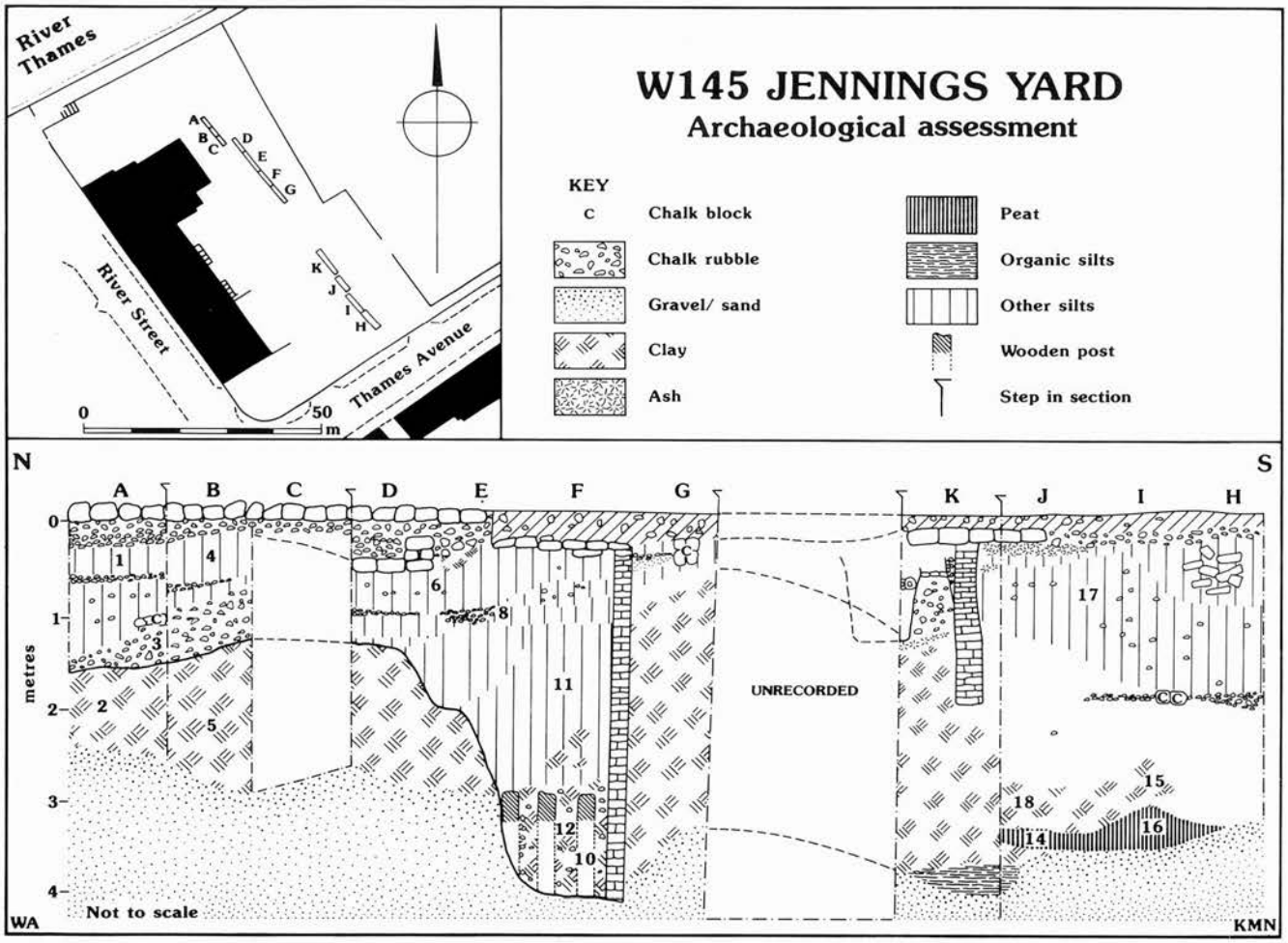

Figure 2 Jennings Yard evaluation (W145): location of trench (Segments A–K) and observed axial section

the base, with a depth of *c.* 2.8 m, as measured from the level from which it was cut.

Its lowest fill (10/12) was a gravelly silt-clay with abundant organic inclusions. Quantities of leather and wooden artefacts were recovered from these levels (*below, Chapter 4.10, 4.11*), and substantial squared, probably oak, posts were noted but not removed. This deposit was interpreted as the natural silting of an artificial or canalised stream channel; pottery from overlying deposits suggested a date pre-*c.* AD 1250, but no earlier than *c.* 1150 on the basis of the presence of roof tile between the timber posts, although leatherwork of later (16th century) date suggested a recut of this channel not evident during excavation.

The interpretation and chronology of this channel has been revised following further excavation (*see below*). The upper level of this layer (which was also the uppermost level of survival of perishable artefacts, timber posts and organic matter incorporated within the layer), was at the approximate height to which ground water rose and stabilised, *c.* 2.75 m below present levels, *c.* 17.65 m OD. Indications of 'silty peat' in the nearby borehole 5 could also have related to this channel.

Activity on the clay bank north of the channel may have been contemporary with this episode. Context 3, a soil layer containing quantities of chalk and some early 13th century pottery, supported a wall of chalk blocks, for which there was no direct dating evidence. Probable later 13th century pottery recovered from a depth of 1.5 m in borehole 8, is likely to have derived from the surface of the alluvial clay (context equivalent to 2/5) forming the south bank of the channel.

The overlying deposits filling the remainder of the channel, contexts 7, 9, and 11, were also silt-sized particles, thought possibly to have been channel silts from which the organic component had been lost through desiccation. The method of excavation precluded close examination of *in situ* deposits, and re-examination during the main excavation suggests that interpretation of these levels as deliberate backfilling would be more appropriate. Two sherds of late 12th or early 13th century pottery were recovered.

4. Immediately over the reclaimed channel and chalk block wall a compacted chalk spread was observed in Segments A–D, interpreted as the floor of a building, the walls of which were not evident in the trench. Overlying deposits of brown, chalk-flecked silt loam, contexts 1, 4, 6 and 8, contained small quantities of early 13th century pottery.

5. South of the 'berm' of alluvial clay in Segments G and K another sequence of organic channel silt material, also containing wooden and leather artefacts, was overlain by later infilling. The channel was not defined by an identifiable cut, and it could not be determined whether it was natural or artificial. However, the different silt patterns observed across the excavated segment of this channel and the thick mats of undecomposed vegetation lying beneath these silts suggested a channel of a different nature to that observed in cuts E and F. Stratigraphically unlinked to the latter, the channel represented by contexts 14, 15, 16, 18, and 19 contained pottery likely to date between the 15th and 17th centuries overlain by 17th and 18th century reclamation (context 17). Organic alluvium from boreholes 3 and 4 could have related to this channel.

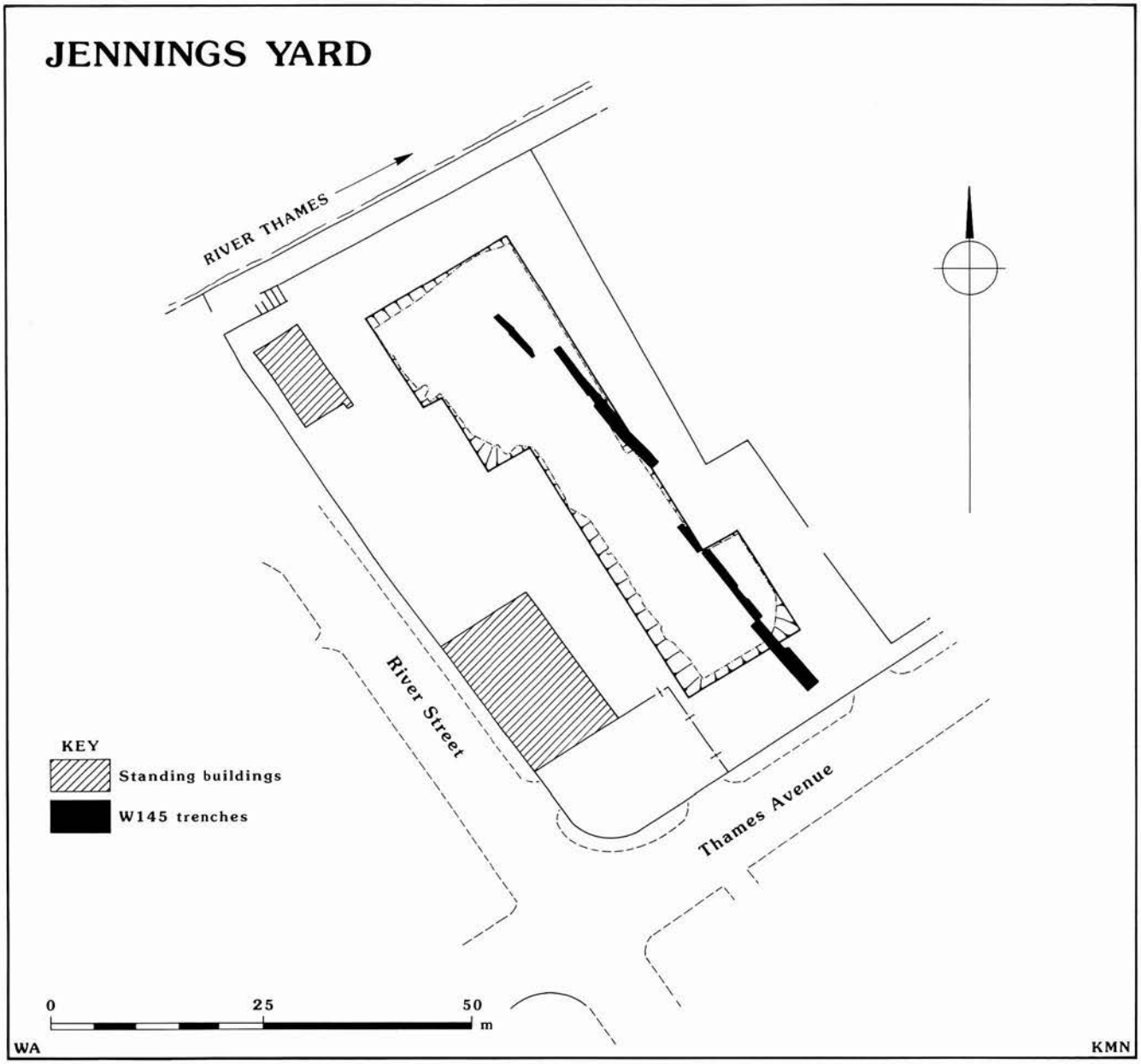

Figure 3 Jennings Yard main excavations (W199) location of main excavation trench

3 Jennings Yard Excavations 1987 (Site W199)

1. Introduction

Following evaluation, the archaeological potential of the site, justifying further excavation was defined as follows:

1. Controlled excavation at greater depth, with suitable dewatering equipment where necessary, would establish the presence and nature of the prehistoric occupation suggested by the presence of flint artefacts.
2. The potential quality of the evidence was considered to be good enough to allow the dating and relationship of the two excavated channels to be confirmed, although the possibility of refining the chronology for the infilling of the channels beyond the level already achieved had not been established.
3. Excavation of a larger area of channel deposits and examination of the silting pattern would allow better informed topographic models to be developed.
4. Excavation of larger areas of channel deposits would allow interpretation of timber structural remains located but not explained during evaluation.
5. Excavation of the channel edges and riverfront should establish whether the channels were natural or artificial in origin, the extent of any subsequent channel modifications, and more precise alignments.
6. Excavation of a wider area of riverfront should establish the existence and nature of any industrial activity and wharfage.
7. A larger collection of artefacts from known contexts and structures would help in establishing the status of the site and allow connections with the castle and town to be explored.
8. Larger scale excavation could reveal details of the later medieval settlement of the area and later occupation.

Provision for further excavation was made in a Section 52 agreement under the *Town and Country Planning Act* 1971 incorporated in the planning permission for the revised development scheme, and excavation took place between August and November 1987.

The demolition of some parts of the remaining buildings on site increased the available area for excavation. Within the constraints imposed by the need to keep clear of site boundaries and to accommodate at least some of the excavated spoil on site, it was decided to open the largest possible area (Fig. 3). Available funding inevitably meant that excavation within this area would have to be selective, but it was considered that tactical priorities could only be determined in the light of some knowledge of the overall layout of the site, albeit at late stratigraphic levels.

The upper *c.* 0.3 m of car park hoggin and cobbled surfaces were removed by machine down to levels of approximately 19.70 m OD, a depth suggested by the evaluation as lying immediately above the levels of archaeological interest, although this was varied where potentially pre-modern deposits were uncovered at higher levels. The material from the initial machine strip was carted off site.

At an early stage in the clearance of the site it became obvious that detailed predictions based on the evaluation were inaccurate in many respects. In particular there was a greater depth of post-medieval deposits across the site, and the extent and complexity of the walls and robbing trenches of building footings was greater than had been anticipated. The extra time necessary to resolve these elements was only partly offset by a reduction in the area of stream channel present, and the excavation could only be completed with the assistance of additional funding from the County and Borough councils. Some further consideration of the value and limitations of the evaluation in predicting the archaeological content of the site is given in the final section of this report (*Chapter 5*).

2. Report and Archive Organisation

The development of the site is summarised in the events diagram, Figure 4. Within this narrative, the prehistoric and medieval elements are the subject of separate reports, and the post-medieval aspects of the site are considered in less detail than the earlier periods. Phases 1 to 6 are used here in preference to the rather more complex archive references, although these are also shown on Figure 4 to assist potential users of the archive. A full explanation of the archive reference system will be found in the introduction to the Level III stratigraphic report housed with those records.

3. Phase 1: Pre-Medieval

Introduction

Evidence for limited prehistoric activity in the north-eastern corner of the site had been recovered by the evaluation, and further indications were recovered from the subsequent excavation. Limited

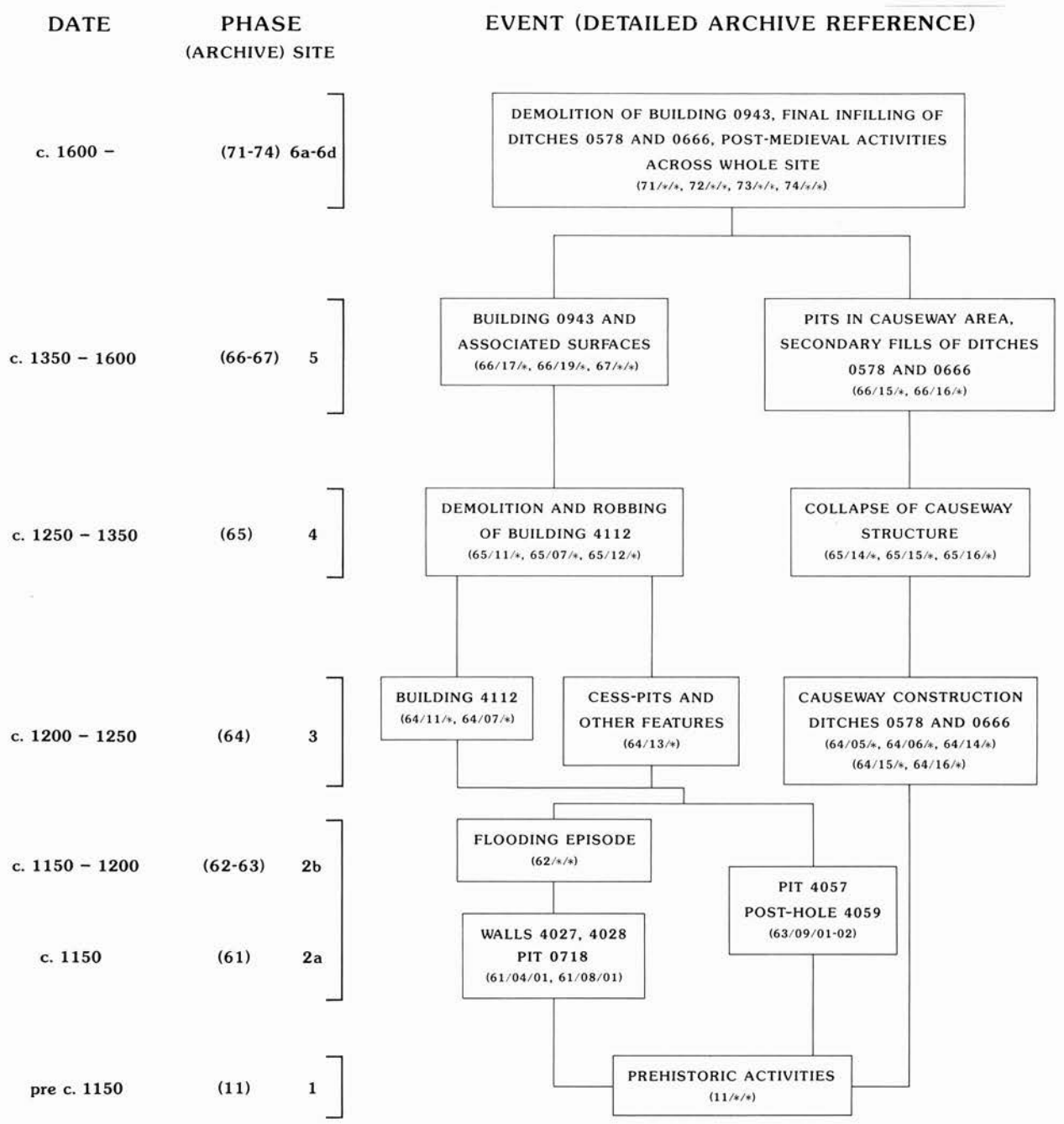

Figure 4 Principal events by site phase and archive reference (= all catalogue entries)*

quantities of Romano-British pottery were also recovered.

The range of evidence relating to the pre-medieval period comprised:

1. an irregular feature 0719 within the brickearth surface;
2. the flint industry contained within this feature, within the brickearth deposits immediately above and immediately below 0719, and dispersed residually across the north-eastern corner of the site;
3. the mollusc assemblage contained within 0719;
4. a small quantity of largely residual pottery of probable late Bronze Age and Roman date.

Feature 0719 (Fig. 9)

This feature was observed in the north section of cess-pit 0718, but could not be clearly defined in

plan despite the excavation of two small sondages across it. Surviving as a V–profiled area of iron-stained discolouration within the brickearth, 0.65 m deep and up to 1.3 m wide, the feature is likely to have been of natural origin, possibly a root-hole or tree-hollow. The top of 0719 was sealed by thin lenses of brickearth (0724 and 0728), which in turn lay beneath medieval surfaces.

The feature and the brickearth lenses immediately above and below it cannot be closely dated, although the associated flint assemblage suggests that these upper levels of alluvial silt are likely to have been accumulating in the Mesolithic period. The brickearth deposits were not examined elsewhere on the site.

Lithic material, by F. Healy

Note: This report was submitted in 1989.

Description

Context
Most struck flint (817 pieces) came from the Phase 1 deposits described above (Table 1). They were excavated in two adjacent sondages with a combined area of approximately 5 m^2, and consisted mainly of successive alluvial silts, some (0725, 0729) underlying and some (0724, 0728) overlying the fills (0720, 0726) of an apparently natural feature 0719. The remainder of the collection (213 pieces) was residual in later contexts, almost entirely concentrated in the north-eastern area of the site (*see archive for distribution*).

Raw material
The collection consists entirely of flint. Most, if not all, is nodular, and freshly derived from a chalk source or sources, apparent most clearly in the small quantities of chalk remaining in surface cavities. The cortex is unrolled and of varying thickness, lining internal hollows, as in Figure 5, No. 4, as well as covering the surface of the nodules. The flint ranges from brown to light grey in colour, often mottled with lighter, cherty patches and occasionally containing fossil and crystalline inclusions. The more substantial fragments of irregular waste suggest that the maximum dimensions of the original nodules ranged between 40 and 150 mm.

The north face of the hill on which Windsor Castle now stands, less than 500 m from the excavated area, was formerly a river cliff of the Thames. The hill itself is an inlier of Upper Chalk, recorded as containing 'large, irregular shaped flints' (Dewey and Bromehead 1915, 12–14), which would have been visible and accessible in the cliff face. This was the probable source of the raw material used on the site, and is the only substantial exposure of chalk in the immediate area, where Cretaceous strata are largely overlain by later deposits (ibid, figs 1 and 2). The nearest extensive exposure of the Upper Chalk lies some 8 km to the west, between Bray and Wargrave, where it is also flint-bearing (ibid, 10; Ford 1987, fig. 2).

Condition
'Race', a calcareous, water-deposited encrustation, occurs on much of the collection. Cortication is sporadic and takes the form of blotchy, uneven surface whitening. The most conspicuous surface alteration is a ferruginous patina which has rendered some pieces a bright orange colour. This must have resulted from the same processes which produced the iron-rich deposits recorded in contexts 0719 (above).

A few artefacts are burnt; most are relatively fresh. The incidence of breakage among flakes and blades varies slightly between the two sondages (60% in the western and 70% in the eastern), but shows no consistent difference between the deposits pre-dating feature 0719, those filling it, and those overlying it. Most of the chips (defined as pieces less than 1 cm^2) are small fragments of originally larger artefacts; only a few are microdebitage. Edge damage, as distinct from breakage, is slight. This suggests that the material has moved little, an impression strengthened by the presence of refitting flakes among the material from 0720.

Composition (Table 1)
The composition of the collection is uniform throughout the deposits of Phase 1 and later contexts, marked by a scarcity of cores and retouched forms and a relatively high frequency of blades. This suggests derivation from a single source, as does the presence of joining fragments of a single nodule in layer 0728 and underlying layer 0729. 'Blade' is used in the visual sense of a parallel-sided, proportionately narrow flake. In addition to two burins, including Figure 5, No. 12, there are further, less convincing examples which may simply have been longitudinally split blades.

Technology
The irregular waste results from the breaking-up and testing of flint nodules. Some were abandoned at this stage; others were worked down further, on the evidence of thick, irregular, cortical or mainly cortical flakes, and of largely non-cortical fragments of irregular waste. Of the six cores, only one, Figure 5, No. 2, seems to have formed part of a larger block. Others, like Figure 5, No. 1, retain the cortex and surface curvature of the smaller nodules on which they have been worked. All are irregular, and Figure 5, No. 2 is the only one with any blade scars.

Core rejuvenation flakes comprise two core tablets, including Figure 5, No. 4, one flake from a core face, and three narrow flakes such as Figure 5, No. 3, struck along a platform edge.

Most (63.8%) of the complete, unretouched flakes and blades from Phase 1 deposits are non-cortical. The dimensions shown in Figure 6 under-represent the frequency of small flakes and blades, such as Figure 5, No. 6, many of which are fragmentary. Bimodality of flake shape (Fig. 7)

Table 1: worked flint

Phase 1											
Context	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*Total*
0619	–	–	–	2	–	–	–	–	–	–	2
0720	1	2	3	37	13	–	–	–	3	–	59
0724	–	2	–	187	57	29	1	–	–	1	277
0725	–	–	1	62	13	3	–	–	–	–	79
0726	1	4	–	60	11	3	–	–	–	–	79
0728	–	17	–	145	29	–	1	–	–	1	193
0729	2	7	2	89	28	–	–	–	–	–	128
Total	4	32	6	582	151	35	2	–	3	2	817
	0.5%	3.9%	0.7%	71.3%	18.5%	4.3%	0.2%		0.4%	0.2%	
OtherPhases											
2b	2	–	–	61	16	19	–	1	1	–	100
3	–	–	–	60	21	–	–	1	1	–	83
4	–	1	–	10	2	–	–	–	–	–	13
5	–	–	–	4	–	–	–	–	–	–	4
6a	–	–	–	2	–	–	–	–	–	–	2
6b	–	–	–	3	2	–	–	–	–	–	5
6d	–	–	–	2	–	–	–	–	–	–	2
Modern	–	–	–	1	–	–	–	–	–	–	1
Unstrat.	–	–	–	3	–	–	–	–	–	–	3
Total	2	1	–	146	41	19	–	2	2	–	213
	0.9%	0.5%		68.6%	19.3%	8.9%		0.9%	0.9%		
Overall total	6	33	6	728	192	54	2	2	5	2	1030
	0.6%	3.2%	0.6%	70.6%	18.7%	5.2%	0.2%	0.2%	0.5%	0.2%	

1 = cores; 2 = irregular waste; 3 = core rejuvenation flakes; 4 = flakes; 5 = blades; 6 = chips; 7 = microliths; 8 = scrapers; 9 = serrated blades; 10 = burins

reflects the fact that the removals fall into two groups: broad, generally hard-hammer struck flakes, often with plain butts and sometimes ending in hinge-fractures, and narrow, generally soft-hammer struck blades, such as Figure 5, No. 5, often with linear or punctiform butts and with feather terminations. Many are irregular in the sense of having twisted profiles, less than straight edges, or both, as in the case of Figure 5, No. 7.

Calcined and Burnt Flint (Table 2)
A total of 1690 g of calcined and burnt flint was found with the artefacts in deposits of Phase 1. A smaller quantity from the more extensively excavated later deposits may, like the struck flint in them, have been derived from the same source. Almost all of this material consists of whitened, crazed 'pot-boilers' rather than reddened flint.

Discussion
The blade technology represented in the collection and the limited range of retouched forms are compatible with a Mesolithic date, especially as blades as small as Figure 5, No. 6 are unlikely to have had a use except as microlith blanks or as by-products of their manufacture. The two microliths, Figure 5, Nos 8 and 9, are of forms current throughout the Mesolithic. The nature of the deposits from which the material was recovered makes it impossible, however, to be completely sure that the collection is single-period or to estimate the interval which may have separated its original deposition and its incorporation in them.

The Mesolithic date of the struck flint may extend to the 'pot-boilers' found with it, since demonstrably later material was absent from Phase 1 deposits. The 'pot-boilers' were likely to have resulted from the heating of water, whether for cooking or for other purposes. The function of large accumulations of such material, many of them dated to the Bronze Age, remains the subject of debate (Barfield and Hodder 1987; O'Drisceoil 1988).

There were several indications that the reduction sequence represented in the collection is incomplete:

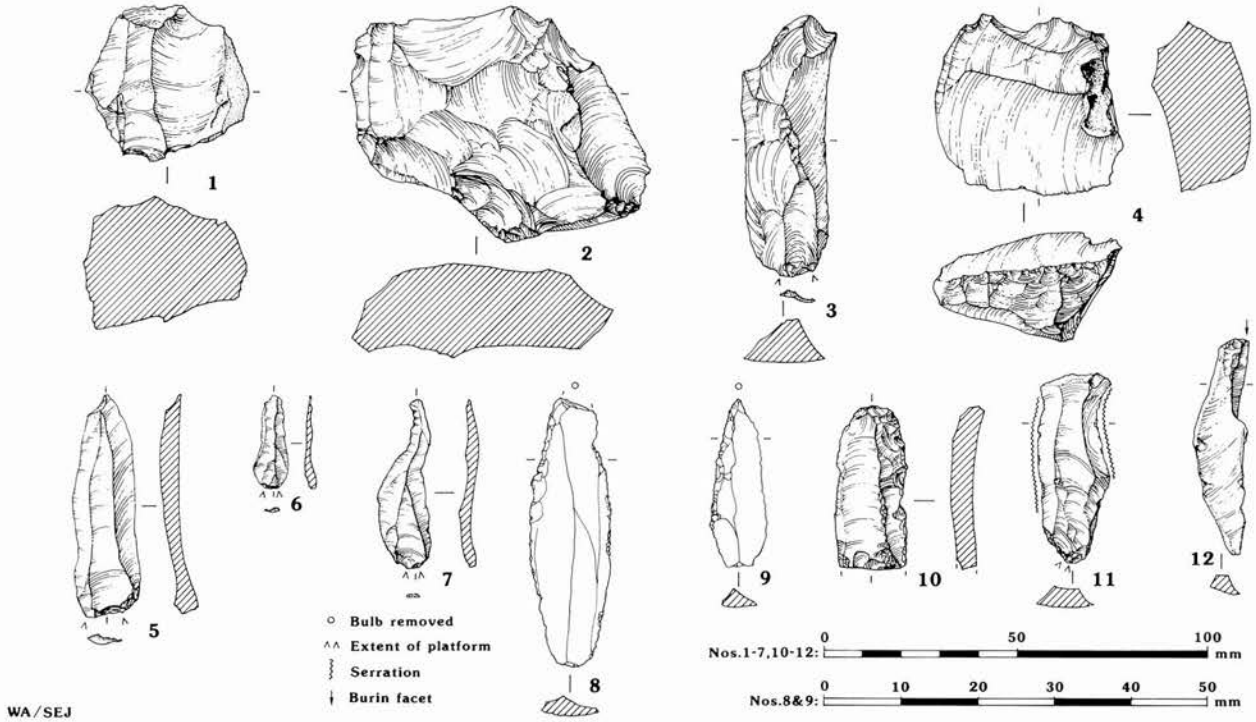

Figure 5 *Worked flint. Scales: Nos 1–7, 10–12, 1:2; Nos 8 and 9, 1:1*

1. The low proportion of cores, 0.5%, and correspondingly low core:flake ratio, 1:183, differ markedly from those of most industries from the Thames Valley and Wessex, irrespective of flint type, date or function (Table 3). It is not possible to use the figures for the Mesolithic sequence at Wawcott III as comparative material, because the author's term 'bashed-lump' includes artefacts which others would class as cores (Froom 1976, 28).
2. The low proportion of cores is unlikely to be due to fluviatile sorting, because *some* cores are present, as is irregular waste of core-like size and weight. Cores were furthermore as rare in the fills of feature 0719 (0720, 0726), which may have undergone little or no movement, as they were in alluvial deposits .
3. The frequency of non-cortical flakes, and the size of some of them (Fig. 6) suggests the working of cores larger than any recovered.
4. Core rejuvenation flakes such as Figure 5, Nos 3 and 4 resulted from the working of carefully-prepared, regular cores unlike any in the collection.
5. The former presence of such cores was also indicated by the blades themselves. The irregularity of many, including Figure 5, No. 7, suggests that they may have been rejects or by-products, some of the more regular, usable blades having been taken from the site. The bimodality of the flake proportions (Fig. 7), which in most industries approach a normal distribution, also suggests that some removals may be missing.

Table 2: weight of burnt and calcined flint in grams

Phase 1 *Context*	*Burnt*	*Calcined*	*Total*
0720	10	104	114
0724	63	499	562
0725	19	10	29
0726	70	208	278
0728	50	355	405
0729	10	292	302
Total	222	1468	1690
Other phases			
2b	16	187	203
3	31	123	154
4	–	126	126
5	9	–	9
6a	–	320	320
6b	369	–	369
6d	–	20	20
Unstrat.	10	366	376
Total	435	1142	1577
Overall total	657	2610	3267

Table 3: core frequency in flint industries from the Thames Valley and Wessex

Site	*Period*	*Total*	*Cores*	*Flakes*	*Cores as % of total*	*Cores: flakes*	*Source*
Jennings Yard Phase 1	Indet. Meso.	817	4	733	0.5%	1:183	
Thatcham	Earlier Meso.	18,402	283	17,236	1.5%	1:61	1
Thames Valley Park, Reading, trenches II, VI, VIa	Later Meso.	2291	89	1922	3.8%	1:22	2
Maiden Castle, Phase 2	Earlier Neo.	7705	88	4967	1.1%	1:56	3
Alington Avenue, Dorchester, long barrow (Phase 21)	Earlier Neo.	1647	41	1163	2.5%	1:28	4
Staines causewayed enclosure, ditches	Earlier Neo.	7764	757	6311	9.7%	1:8	5
Abingdon causewayed enclosure, period 2, inner ditch	Earlier Neo.	684	11	618	1.6%	1:56	6
Hengistbury Head, site 6	Later Neo.	2653	121	2354	4.6%	1:19	7

Sources: 1 = Wymer 1962; 2 = Harding in prep.; 3 = Edmonds and Bellamy 1991; 4 = Bellamy in prep.; 5 = Healy and Robertson-Mackay 1987, 96; 6 = Whittle 1982, 36; 7 = Gardiner 1987, table 8

6. The lack of blade cores distinguished the collection from most Mesolithic assemblages, including local ones. At the Thames Valley Park, Earley, Reading, for example, a similar frequency of blades was accompanied by cores which were not only more frequent (Table 3) but were prepared for the production of blades or bladelets (Harding in prep.). The successive Mesolithic industries of Wawcott III, in the Kennet valley, similarly included numerous regular blade cores (Froom 1976, figs 26 and 27, 31–3).

The restricted area in which Phase 1 deposits were excavated makes it possible that apparently missing parts of the collection remained unexcavated, but lack of typological or technological variation between the two sondages argues against this.

Within these limitations, the material may be seen as the redeposited debris of a riverside settlement, where fires were lit, water was heated, perhaps for cooking, and a few implements were used and discarded. Flint nodules were collected, brought to the riverside, tested, and, if sound, worked into regular blade cores which, perhaps together with some of the blades struck from them, were removed to other locations where flint, at least of comparable quality, was less readily available. Prepared cores are an efficient form in which to transport flint, since waste material has already been removed from them, while blades comprise a portable and adaptable toolkit (Edmonds 1987, 165).

The flint resources of east Berkshire have been summarised by Ford (1987, 3–5), who points out that, while flint of good quality may be obtained from the Upper Chalk, and flint of reasonable quality from the Reading Beds and the Thames gravels, that of other local deposits, including the London Clay, tends to be small and defective. In these circumstances, the transport of chalk flint to surrounding areas is to be expected, and has already been observed.

Within east Berkshire, chalk flint was apparently brought to two Mesolithic sites, one on the Reading and one on the Bagshot Beds, over distances of up to 9 km (Ford 1987, 42, 60). The Jennings Yard collection seems to confirm Ford's suggestion (ibid, 38) that some was transported in the form of cores.

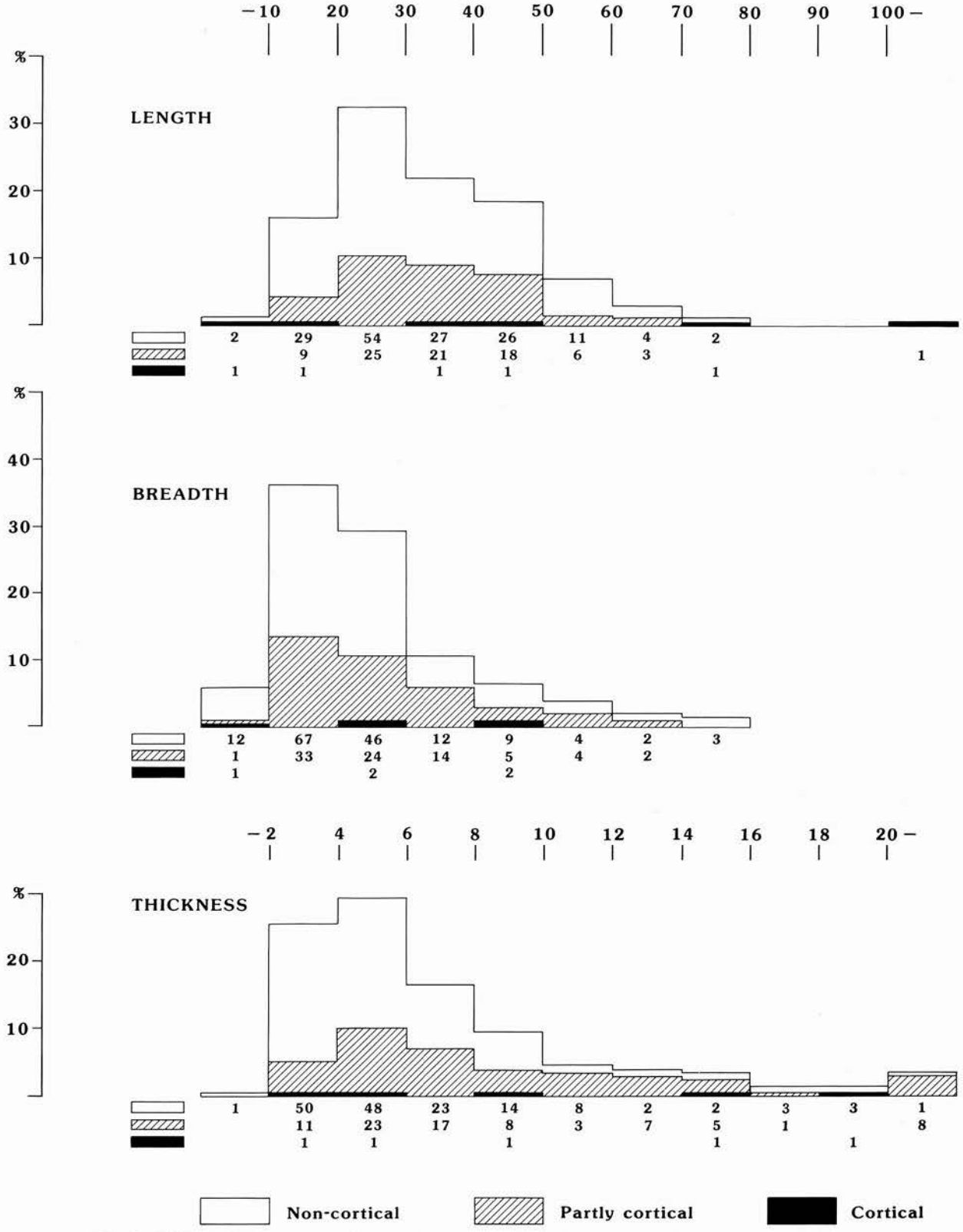

Figure 6 Worked flint: dimensions of complete, unretouched flakes and blades from Phase 1 contexts (Total = 243)

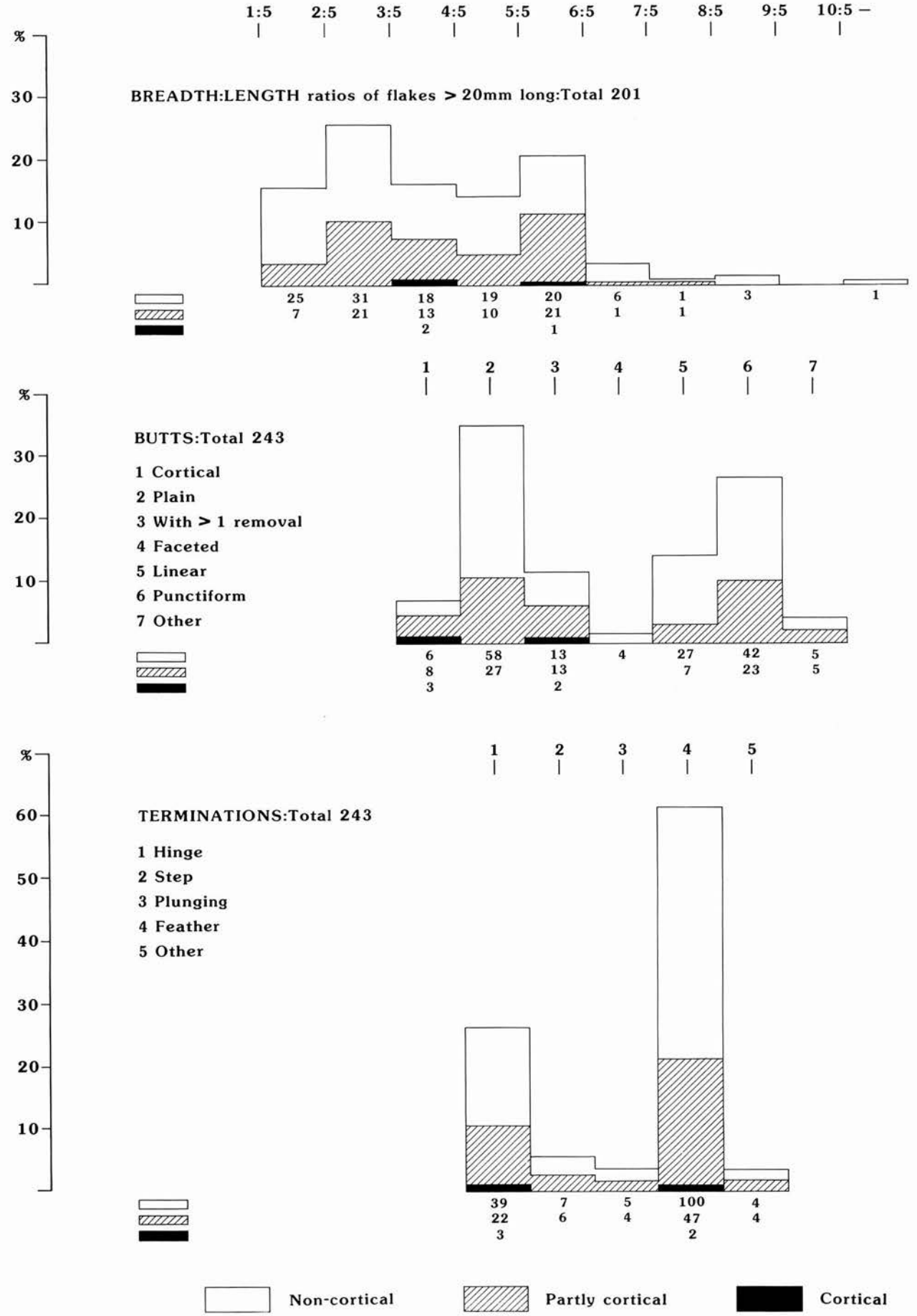

Figure 7 Worked flint: characteristics of complete, unretouched flakes and blades

Mesolithic activity in the Windsor area is attested mainly by finds from the Thames, including fifteen tranchet axes and some probably contemporary antler implements (Wymer 1977, 11–12). In this part of the Thames Valley, pre-farming occupation seems to have been more intense along tributaries such as the Kennet (Froom 1976) or the Loddon (Harding and Richards forthcoming) than on the Thames itself.

The relatively few known Thames-side sites tend to have been found as a result of earth-moving, as at Holyport, Bray, where a large industry was discovered within and beneath flood loam during road-building (Wymer 1977, 5; Ford 1987, 59); another site in the same parish, where an industry was recovered during construction work on a gravel terrace (Ford 1987, 59); the Thames Valley Park, Earley, Reading, where a Mesolithic industry was recovered from silts and relict stream channels in the course of evaluation and subsequent excavation (Harding in prep.); and at Jennings Yard. It may be that living sites, indicated by a wealth of river finds, have largely been obscured by the rising level of the river and by the depositional history of this part of its course.

Fig. 5

Illustrated artefacts have been chosen to show the character of the debitage and the range of retouched forms. Entries are ordered as follows: Category. Raw material. Condition. Descriptive and/or other comment.

1. **Core**. Nodular chalk flint, dark grey with lighter inclusions. Slight, uneven cortication. Phase 1, context 0726.
2. **Core**. Mottled grey flint with lighter cherty inclusions, one of them partly crystalline. Ferruginous patina, slight, uneven cortication. Phase 1, context 0729.
3. **Core rejuvenation flake**. Mottled grey flint with lighter cherty inclusions. Very slightly corticated. Phase 1, context 0720.
4. **Core rejuvenation flake**. Mottled grey flint with lighter cherty inclusions and internal cavity. Heavy ventral cortication. Phase 1, context 0729.
5. **Blade**. Light grey-brown flint with lighter, cherty inclusions. Slight, patchy cortication. Phase 1, context 0729.
6. **Blade**. Mottled grey-brown flint. Phase 1, context 0725.
7. **Blade**. Light, grey-brown flint. Slight, uneven cortication, some edge-damage. Phase 1, context 0725.
8. **Microlith** (edge-blunted point). Grey-brown flint. Corticated. Phase 1, context 0728.
9. **Microlith** (obliquely-blunted point). Grey-brown flint with lighter cherty inclusion. Phase 1, context 0724.
10. **Scraper**. Mottled grey-brown flint with darker opaque inclusions. Subsequent damage to left edge. Residual in Phase 2b, context 0361.
11. **Serrated blade**. Mottled grey-brown flint with lighter cherty and darker opaque inclusions. Slightly corticated. Phase 1, context 0720.
12. **Burin**. Mottled grey-brown flint with lighter cherty inclusions. Corticated. Phase 1, context 0728.

Pottery, by L. N. Mepham

The methodology for the analysis is outlined in the section on the medieval and post-medieval assemblage (*below, Chapter 4.5*).

Pre-medieval material is present in very small quantities. Two prehistoric sherds were recovered: one flint-tempered (fabric type F1), and one shell-tempered (fabric type S1). Both are undiagnostic body sherds, but comparable flint-tempered fabrics have been found in late Bronze Age contexts elsewhere in Berkshire, for instance Aldermaston and Knight's Farm (Bradley *et al.* 1980); while shell-tempered fabrics are known from early to middle Iron Age contexts in south Oxfordshire (eg DeRoche 1978, 41). Roman material is represented by two sherds of samian (fabric type E100), 11 sherds of grey sandy wares (fabric types Q100, Q101, Q102), and one sherd in a coarse grog-tempered fabric (fabric type G100). Apart from the samian, none of the Romano-British fabric types derived from a known source, and no closely datable forms were recovered.

One prehistoric sherd (fabric type F1) was recovered from a horizon above the natural silts, and one Roman-British sherd (fabric type Q101) from an apparently natural alluvial context. All other pre-medieval sherds occurred residually in later contexts.

List of Fabric Types

A type series of representative sherds has been retained by Wessex Archaeology.

F1 Coarse, soft flint-tempered fabric; common (25–30%), poorly-sorted crushed flint <2 mm. Probably late Bronze Age (cf Bradley *et al.* 1980, 266).

S1 Moderately coarse, soft, shell-tempered fabric; sparse (3–5%), poorly-sorted shell fragments <1mm; sparse subangular flint fragments <0.5 mm. Possibly early/middle Iron Age (cf DeRoche 1978, 41).

E100 Samian.

G100 Moderately coarse, soft grog-tempered fabric; sparse grog <1 mm; sparse black oxides <0.5 mm; unoxidised. Romano-British.

Q100 Very fine, soft sandy fabric, slightly micaceous, oxidised. Romano-British, possibly Oxford ware.

Q101 Fine, soft sandy fabric, slightly micaceous; sparse black oxides <1 mm; unoxidised. Romano-British.

Q102 Coarse sandy fabric; common rounded quartz grains <0.5 mm; unoxidised. Romano-British.

Mollusca, by Michael J. Allen

Six bulk samples (2087–2092) were taken contiguously through the iron-rich silts 0720 of feature 0719. The samples were processed following the methodology described by Evans (1972, 44–5) and described in detail elsewhere in this volume.

Table 4: prehistoric Mollusca (Phase 1)

Sample	*2092*	*2091*	*2090*	*2089*	*2088*	*2087*
Context	*0720*	*0720*	*0720*	*0720*	*0720*	*0720*
Feature	*0719*	*0719*	*0719*	*0719*	*0719*	*0719*
Depth (m)	*0.50–0.60*	*0.40–0.50*	*0.30–0.40*	*0.20–0.30*	*0.10–0.20*	*0.0–0.10*
Weight (g)	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*
Terrestrial Mollusca						
Carychium tridentatum	-	-	-	1	2	-
Cochlicopa spp.	-	-	-	-	2	1
Pupilla muscorum	1	-	-	-	-	-
Vallonia costata	1	-	-	-	-	-
Vallonia cf *pulchella*	-	2	-	-	2	-
Discus rotundatus	-	-	-	-	5	3
Nesovitrea hammonis	-	-	-	-	4	-
Aegopinella nitidula	-	-	-	-	-	1
Oxychilus cellarius	1	-	-	-	-	1
Cecilioides acicula	-	-	-	-	2	+
Cochlodina laminata	-	-	-	-	1	-
Clausilia bidentata	-	-	1	2	2	-
Trichia striolata	1	-	-	-	-	-
Cepaea spp.	-	-	1	+	-	+
Freshwater Mollusca						
Valvata cristata	-	-	-	-	3	-
Valvata macrostoma	-	-	-	-	1	-
Valvata piscinalis	-	-	-	-	7	1
Bithynia tentaculata	-	-	-	-	1	1
Lymnaea truncatula	-	-	-	-	2	-
Anisus leucostoma	-	-	-	-	3	-
Total	4	2	2	3	35	8
Taxa	4	1	2	2	13	6
% terrestrial	100	100	100	100	51.5	75
% freshwater	-	-	-	-	48.5	25

All totals exclude *Cecilioides acicula*

The resultant molluscan assemblages were depauperate (Table 4); in only one case did the number of specimens reach double figures. Nevertheless, some general statements of the nature of the environment can be made and a change in those conditions detected.

The assemblages from the basal four samples were particularly impoverished. The specimens present were not particularly abraided or pitted, but were obviously ancient and thus do not represent contamination. Of these four samples, only the basal sample (2092) produced species belonging to Evans' open country category (1972, 198). The open country specimens of *Vallonia costata* and *Pupilla muscorum* were accompanied by the shade-loving species. *Trichia striolata* and *Oxychilus cellarius*. The remaining three assemblages were predominantly shade-loving (Table 4). In general, all that can be said of these four assemblages is that they represent shady and moist environments, and that there is a slight hint that they were preceded by slightly more open and drier conditions.

In contrast, the two uppermost samples (2087 and 2088) contained a number of non-terrestrial Mollusca. Furthermore, shells were more abundant, and most common in the penultimate sample (2088; 0.1–0.2m), albeit only 38 specimens.

The aquatic (fresh and brackish-water) assemblages included *Valvata piscinalis*, *V. cristata*, *V. macrostoma*, *Anisus leucostoma*, *Bithynia tentaculata* and *Lymnaea truncatula*. These are all

typical of slowly-moving small-bodies of water such as ditches and streams. It is an assemblage typical of soft water conditions with muddy and weedy substrates which may be prone to drying out. The terrestrial component was a shade-loving one; with species such as *Carychium tridentatum*, *Cochlodina laminata* and *Discus rotundatus* in particular, which enjoy leaf-litter habitats. *Vallonia pulchella* is noteworthy, as it enjoys very moist grassland habitats which will also suit the shade-loving species *Nesovitrea hammonis*.

The two components described above probably did not cohabit. It is likely that the aquatic portion is, to an extent, allochthonous, and was derived from localised, small-scale, episodic floods. Thus it can be suggested that the assemblage as a whole represented scrubby, dank vegetation adjacent to small streams prone to occasional, perhaps seasonal, flooding. Whether the overall change in the environment during the infill of feature 0719 represented merely localised changes in minor, possibly braided, streams, or a more general trend towards a larger, more regularly inundated floodplain cannot be discerned from a meagre assemblage from a single location. Nevertheless, some hints of anthropogenic interference are provided to suggest exploitation of the floodplain.

4. Medieval and Post-Medieval

Overview

The organisation of the area during the medieval period involved the modification of the underlying brickearth contours. This effectively split the site into a series of stratigraphic blocks largely isolated from each other, and the overall development of the site (Phases 2–6) cannot be reconstructed in detail.

Five basic areas can be defined (Fig. 8):

1. A level platform of truncated brickearth containing buildings, yard surfaces and pits, presumably extending north to the Thames, and cut off from the town by the two ditches 0578 and 0666.
2. A causeway of unexcavated brickearth (0680) linking the platform to deposits to the south, providing access between the ditches 0578 and 0666.
3. The two ditches 0578 and 0666. The eastern ditch (0666) was that located by the evaluation and, on the basis of that evidence, had been interpreted as part of a continuous east–west channel or 'moat'.
4. The southern channel 4120.
5. An area of metalled surfaces between the alignment of ditches 0578/0666 and channel 4120.

The resources of the excavation were concentrated on the first three areas. Preliminary cleaning of the area between the causeway and the southern channel produced little evidence of surviving archaeological deposits, locating only one substantial feature, and demonstrated this zone to have been extensively disturbed by recent activity. Channel 4120 was evidently a major watercourse, the majority of which lay beyond the areas available for excavation, and it was considered that further investigation of the limited area accessible was unlikely to advance significantly the understanding already obtained from the evaluation.

Phase 2

Phase 2, the earliest phase of medieval activity, was defined as the very few contexts demonstrably pre-dating the principal, Phase 3, structure Building 4112 (Fig. 9). Although these levels provided indications of activity on the site immediately before the major medieval episode, the remains were too fragmented to allow any reconstruction.

The only discernible vertical stratigraphy within the sequence of medieval activity on the site was provided by a thin accumulation of redeposited or reworked brickearth. Two subphases are suggested: Phase 2a comprising features underlying this spread; and Phase 2b comprising the brickearth deposit itself, recorded as various contexts but collectively numbered 4031. One other feature directly underlying Building 4112 had no immediate relationship with 4031 and could not be assigned to either subphase.

Phase 2a

Walls 4027 and 4028

Wall 4028 survived apparently *in situ* within an area of disturbance which had removed all overlying or abutting layers, but is presumed to have been associated with wall 4027. Both walls were of similar construction, built of coursed, mortared chalk blocks 0.1–0.2 m^3 (in each dimension), a rather smaller size than that used in the Phase 3 construction. Wall 4028 survived to a length of 2 m, and was 0.4 m thick and 0.5 m high. It was not set into a trench but rested directly on the brickearth surface. The walls are assumed to relate to a structure pre-dating Building 4112.

Pit 0718

The cut and fills around the edge of pit 0718 were sealed by layer 0361, a component of the Phase 2b inundation silts. Although the centre of the pit had been disturbed to a depth of 0.4 m by Phase 3 context 0391, its shape and dimensions were preserved; the pit was subrectangular, 1.6 m x 1.1 m wide, 1.9 m deep, its size and form suggesting it may have been a cess-pit. The primary fill (0722) comprised an orange-brown clay with gravel and unworked flint, and was overlain by an organic layer, 0.3 m thick, the contents of which were consistent with it having been a waterlogged faecal deposit (*below, Chapter 4.14*). The upper fill was

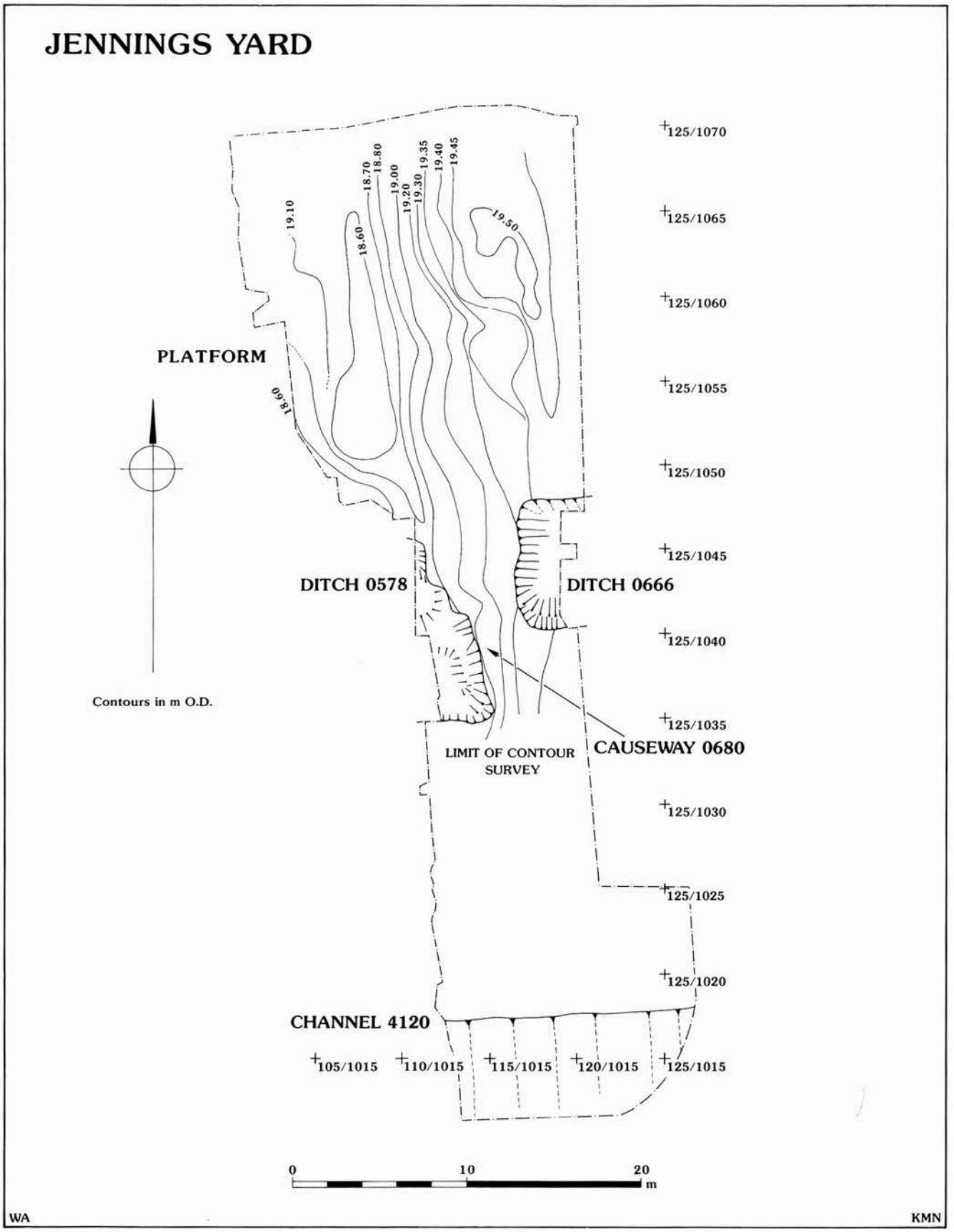

Figure 8 Medieval and post-medieval: site zones

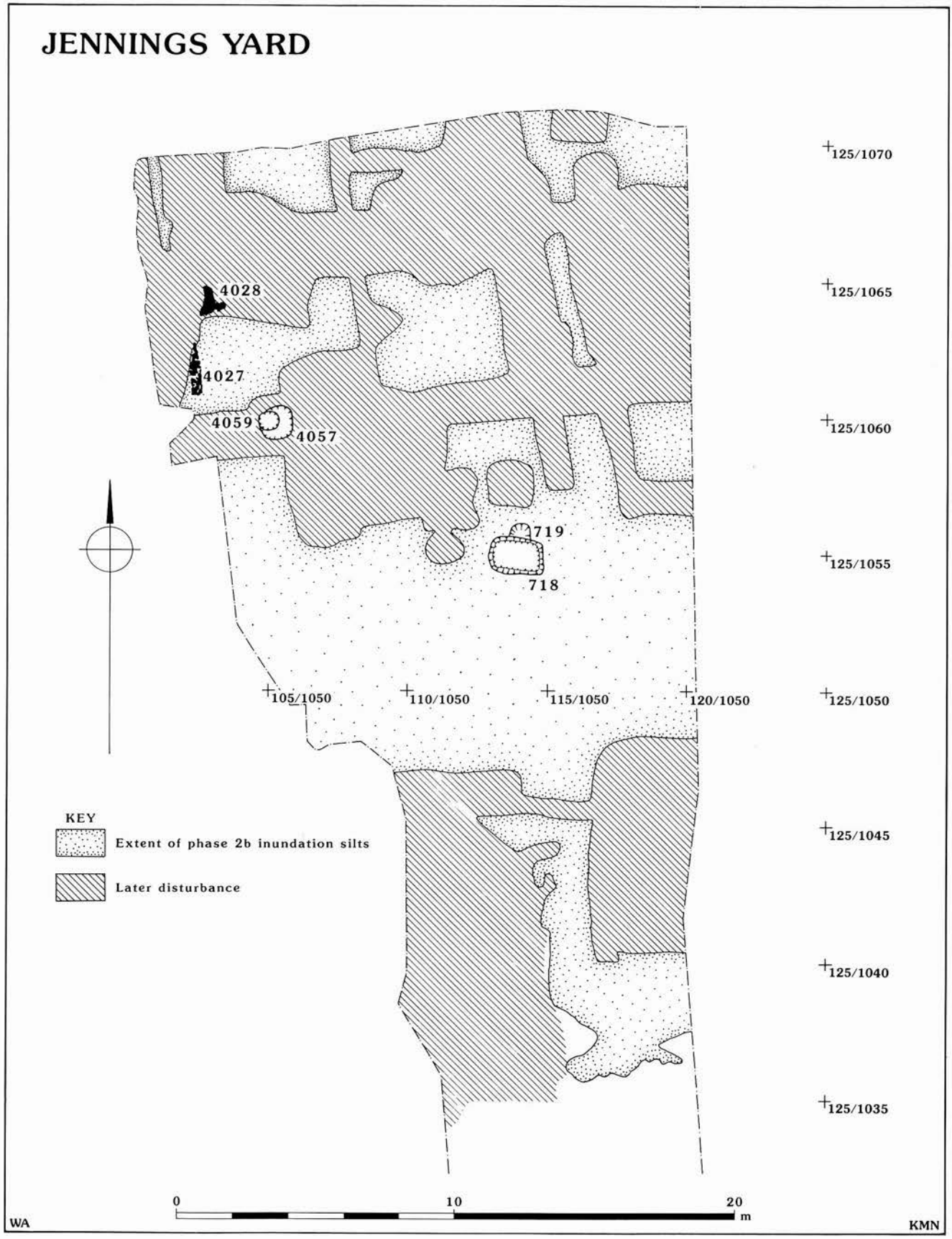

Figure 9 Phases 1 and 2: principal contexts. Note: for the sake of clarity, the initial zero has been omitted from feature numbers on this and subsequent site plans

largely composed of redeposited brickearth. Pottery, including shell-tempered cooking-pots, and the presence of roof tile within the higher levels suggests a date no earlier than the second half of the 12th century.

Phase 2b

The extent of the Phase 2b deposits were limited to parts of the platform and the causeway. It could not be determined whether ditches 0578 and 0666 and the causeway were also constructed at this time; the assumption implicit in the structure of this report, that they were contemporary with Building 4112 and not of earlier construction, cannot be proven.

Context 4031 was composed of alluvial silts similar in consistency to the underlying 'natural' brickearth, although in general somewhat darker and containing sparse finds, largely undiagnostic but not inconsistent with a late 12th century date (*below*). The means of deposition could not be determined, but seems likely to have been due to an episode (or episodes) of flooding from the river.

Other Phase 2 Features

The pit 4057 with post-hole 4059 in its base was not directly related to the Phase 2b deposits, but it was apparently truncated by the construction of the south wall of Phase 3 Building 4112 and was sealed by the Phase 4 post-demolition infill. Although it may conceivably have held a timber to underpin the wall, excavation of the wall trenches elsewhere along the line of the structure revealed no other, similar features which might indicate the use of such a technique.

Pit 4057 was subsquare with sides *c.* 1.3 m and up to 0.9 m deep with a rounded base, filled with a grey-brown gritty silt containing mortar and charcoal. No large components suggesting post-packing were present. Feature 4059, 0.57 x 0.35 m, was a flat-based, straight-sided, subcircular post-hole feature extending 0.13 m below the base of 4057. Its fill included small fragments of chalk packed around its edge.

Phase 3

Within the area of the platform, the construction of Building 4112 together with pits and features other than those described in preceeding phases post-dated the Phase 2b inundation silts. Features associated with the causeway also cut these reworked brickearth deposits, and it is inferred (although it cannot be proven) that the layout comprising Building 4112, adjacent pits and surfaces, the causeway 0680 and its associated elements, and ditches 0580 and 0666, together formed a contemporary group (Fig. 10).

Plate 1 The main building, 4112, and associated pits (shored) from the south-east. Ranging rods in principal wall trenches

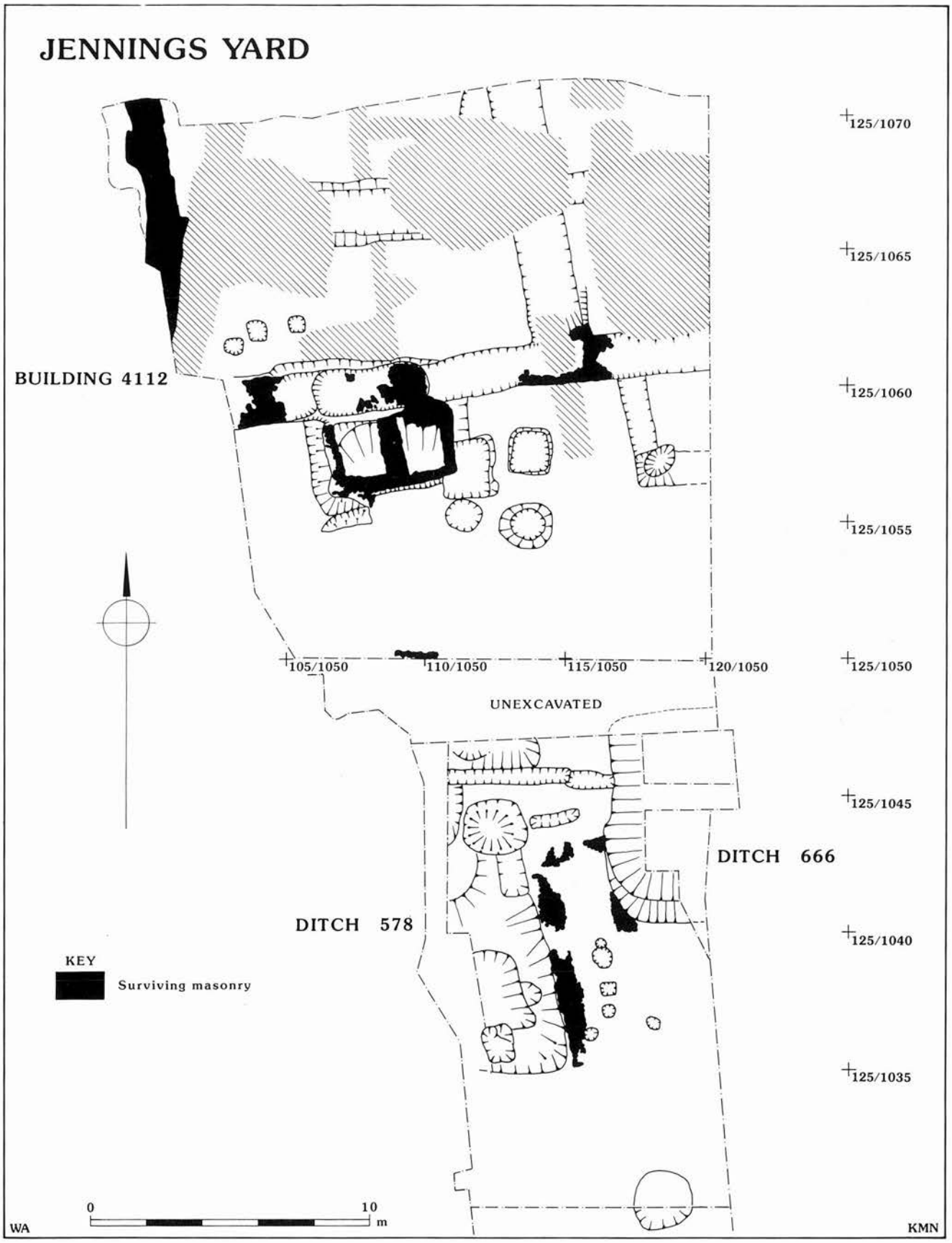

Figure 10 Phases 3–5: principal contexts

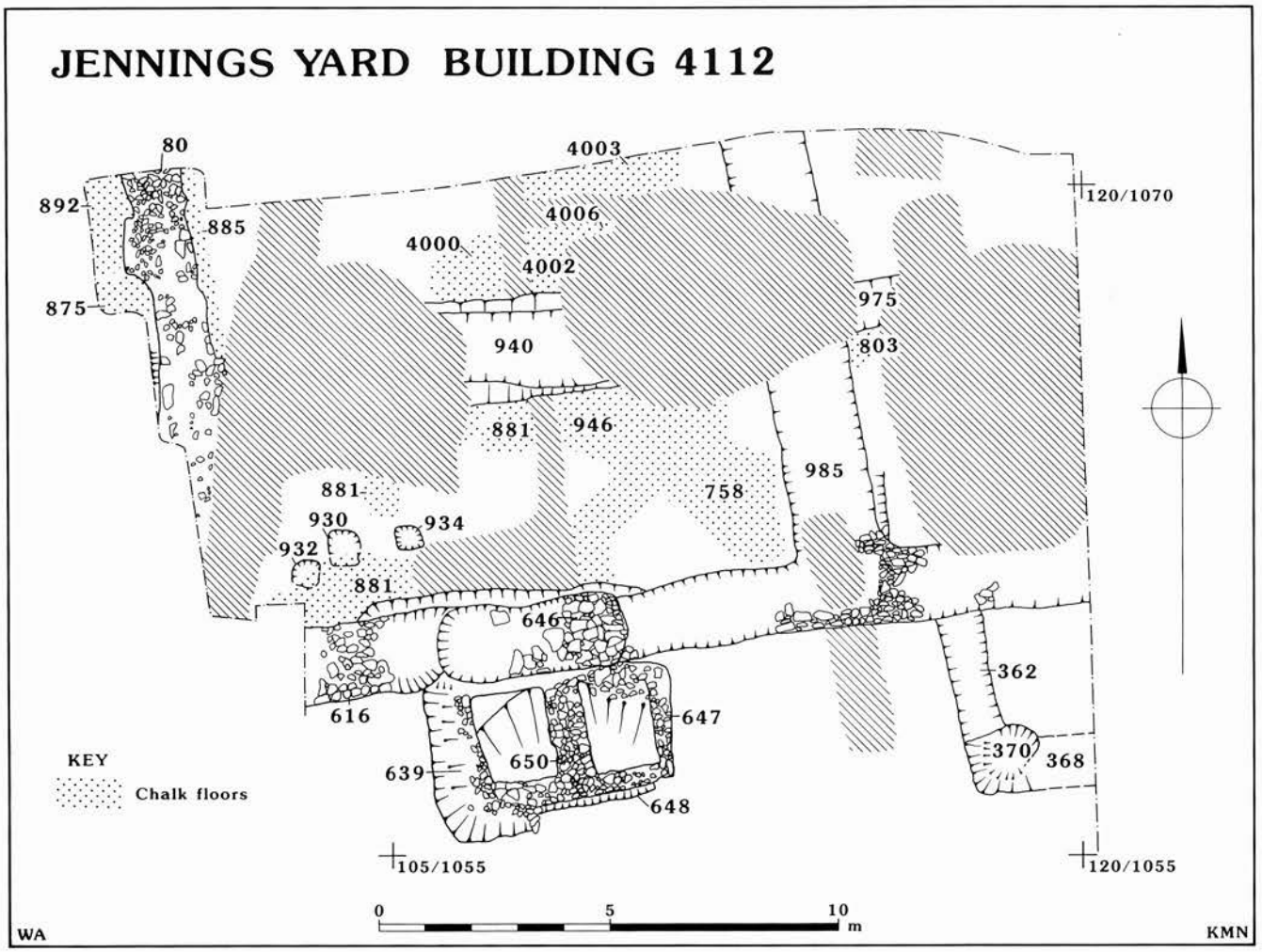

Figure 11 Phase 3: Building 4112

Building 4112

The major feature within the area of the platform was Building 4112 (Figs 10 and 11), represented only by robbed foundation trenches with few surviving lengths of masonry (Plate 1).

The building comprised three separately excavated components:

The main structure 4023
The garderobe 4051
The possible external staircase base 4113.

Data from the excavation of these elements have been used to compile a suggested extended ground plan (Fig. 12).

Main structure 4023

Despite having been extensively robbed, the foundation trenches apparently retained their original profiles and dimensions along large parts of their excavated lengths. The weight of the walls had compacted the alluvial silt in the base of these trenches.

Southern external wall 4114: The south external wall 4114 was set into a regular, flat-bottomed, vertical-sided foundation trench, 1.3 m wide by 0.8 – 0.9 m deep.

A foundation layer of rough undressed chalk rubble (0646), with components up to 0.4 m in any one dimension, was observed beneath masonry 0616 and in the base of the deeper portion of trench adjacent to the garderobe structure 4051. Surviving to a height of one course only, 0616 was 1.5 m wide with a rough rubble core faced on both sides by regular dressed chalk blocks of up to 0.25 m^3.

At the junction of 4114 and 4116 a finer foundation of smaller, dressed, almost rectangular chalk blocks (0985) set into a buff gritty mortar in rough courses survived to a height of 0.84 m, flush with the brickearth surface. The foundation extended across the junction of the two walls but with a definite joint, showing 4116 abutting 4114.

North–south cross-wall 4115: The most westerly of the excavated walls, 4115 is interpreted as an internal cross-wall as the presence of an area of heavily burnt chalk, possibly the site of a hearth (0875), with a chalk surface (0892) to the west of the wall suggest that at least one additional bay existed in this direction beyond the excavated area (not shown on reconstruction Fig. 12). The wall survived

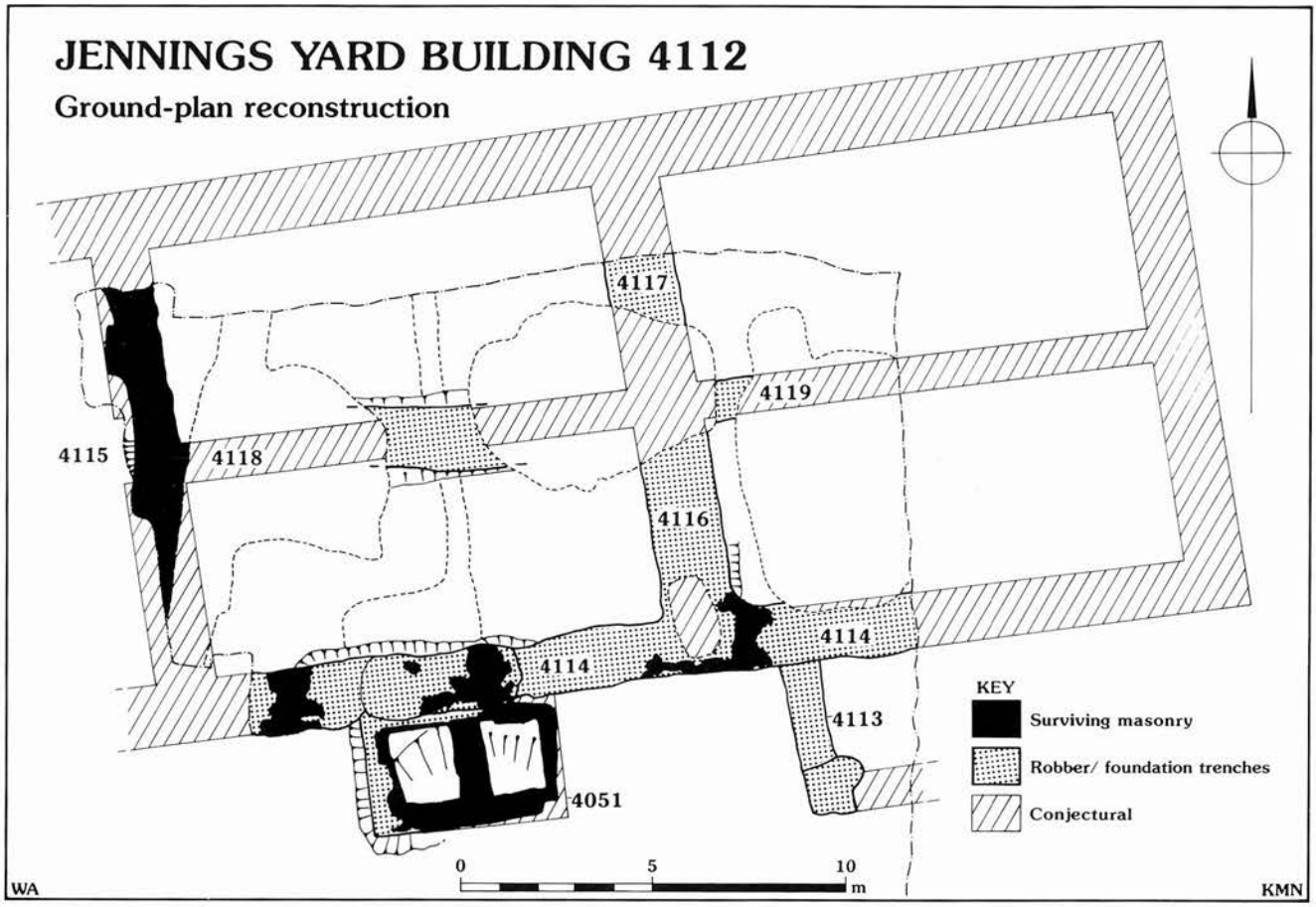

Figure 12 Phase 3: Building 4112, possible ground plan based on excavated bay dimensions

as a single course of above-ground masonry 0080, 1.2 m wide, and was joined at right angles by a short stub of wall 4118. The faced chalk rubble and mortar construction was very similar to wall 4114 (Plate 2).

North–south cross-wall 4116/4117: In comparison with 4114, the north–south internal wall trench (4116 and 4117) was slightly wider at 1.95 m and shallower at 0.4 m deep. Surviving masonry and foundation courses were located only at the immediate junction with 4114.

East–west cross-wall 4118/4119: The original dimensions and orientation of the trench for the western length of the east–west dividing wall (4118) did not survive robbing, and a better estimate of size and direction may be obtained in considering the alignment of the foundation trenches 0940 and 0975 for wall 4119 and the scar on the internal face of wall 4115. This suggested a narrow, 0.9 m wide rubble-cored wall faced on both sides by dressed chalk blocks set in a 0.4 m deep trench. The surviving trench for wall 4119 indicates a wall of comparable dimensions.

Internal surface and other features: The north-west and the south-west bays both contained deposits of laminated gravels, chalk or silt filling depressions in the natural brickearth, including the construction pit for the garderobe structure 4051 (*below*), and providing a levelled surface within the building. Features cut from within the gravel lenses divide the deposits into an upper and a lower dump, although no intermediate surfaces could be identified.

The lowest of these deposits (principally contexts 4036 and 4021) comprised discrete layers of gravel, chalk, or silt showing no clear relationships with the foundation trenches. Two features cut into this lower dump: a linear depression (4015) running along the north edge of the excavation area, and by inference the inside edge of the north wall; and a post-hole packed with chalk blocks (4020) in the centre of the south-west bay (not shown on Fig. 11). The function of these features could not be established, but it is possible that they were connected with the construction rather than the use of the building.

The fills of those two features were indistinguishable from the upper dump of gravels, principally 4010 and 4007. This upper dump, composed of interleaving layers of sand, silt or gravel and chalk rubble was not restricted to the depressions, but spread out to fill the interior of the building completely burying the earlier wall remnant (4028). Three shallow, square features

Plate 2 Phase 3, Building 4112: detail of surviving wall masonry at south end of wall trench 0985 (see Fig. 11), with re-excavated evaluation trench segments in background and foreground

(0930), (0932) and (0934) cut into this gravel surface were partly sealed by later chalk surfaces, and were filled with a distinctive sticky, sandy silt. It is possible that these too were temporary constructions and not permanent architectural features.

Thin spreads of compacted chalk interpreted as floors were present across most of the interior undisturbed by later intrusions in the two bays west of 4116/4117. They appeared as a series of discontinuous spreads, with a maximum thickness of 0.12 m (0885) thinning down to 0.05 m (0881). Layer 0881 overlapped the surviving foundations of wall (0616) to butt against its inside face.

The north-east bay contained a series of fine laminated mortar surfaces, principally 0762 and 0192 (not shown on plan). These in part overlay a deposit of loose chalk rubble 0196, in turn overlying the line of the robbed wall 4119. There was no one easily definable surface within these lenses. The upper surface sloped sharply to the south and east, falling by 0.2 m. It is possible that these layers were composed of destruction dust and rubble, possibly from the structure and rendering of walls at a higher levels, and are not to be interpreted as floors.

The area of burning (0875) immediately west of wall 4115 could not be extensively examined. Its position with regard to the surviving masonry suggests that it may have been recessed into a wall fireplace, although no architectural indications survived.

The Garderobe 4051

The garderobe comprised a square, two-celled structure adjacent to the external face of wall 4114 of the main building, opposite the mid-point of the south-west bay (Plate 3; Figs 11, 13, 14). Robbing had truncated the masonry walls lining the pit at external ground level, and had thus removed any bonding courses uniting the garderobe with the main wall of the building.

Construction of the garderobe pit: The upper edges of the pit (0645) into which the lining wall was built were obscured by robbing, but its form and dimensions were visible at a lower level. It comprised a rectangular, flat-based pit, 4.8 x 3 x 1.8 m deep, base at 17.27 m OD, with vertical sides except to the north, where it had been ramped at an angle of *c.* 20°. This ramp underlay wall 4114 of the main building and extended as far as (but not below) wall 4118, and it must be assumed that the garderobe pit was dug before the main structure was erected. Although shallow by comparison with other medieval garderobes (Wood 1965, 385), the pit was excavated through the brickearth and into

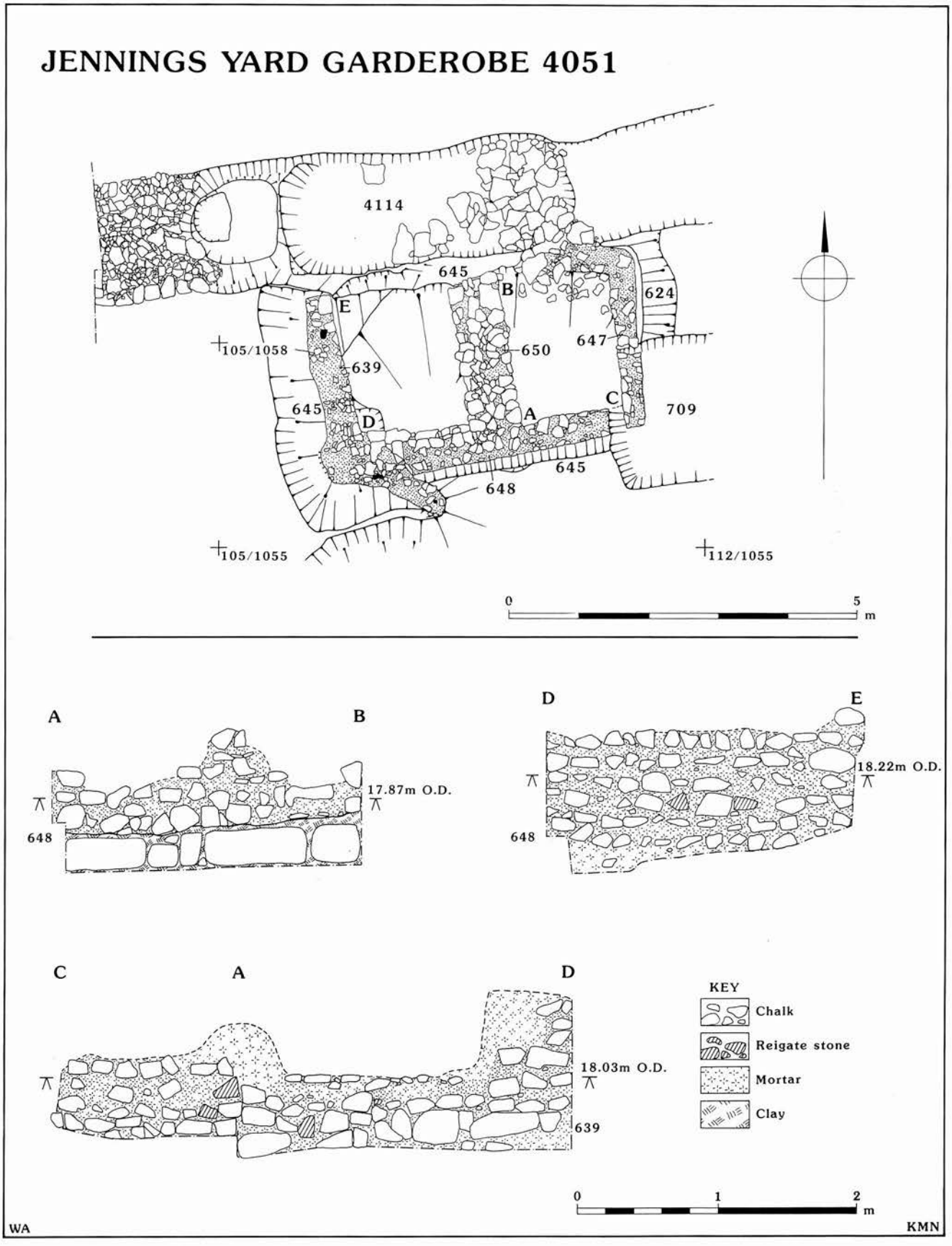

Figure 13 Phase 3, Garderobe structure 4051

Plate 3 The Garderobe, 4051, with cess-fills, viewed from the east

gravel, probably with the intention that it should be free-draining. This northern, ramped part of the pit was subsequently overlain by the foundations for 4114 and backfilled with gravel, chalk and silt lenses previously described.

Extant walls: The excavated pit external to wall 4114 was lined with masonry. Three walls survived around the edges of the pit: 0639, 0647 and 0648, with a central wall (0650) running north–south across the middle. The fourth, north, wall line (0649) survived as a spread of rubble only, and it is possible that the foundations of the main structure 4023 were utilized.

A gap (apparently original) had been left at the junction of walls 0647 and 0648, perhaps to facilitate raking-out one half of the garderobe into cess-pit 0709. All other wall junctions were bonded and the structure was probably a one-period build. No method of access into the western chamber of the garderobe was present. The walls in the pit survived to heights of over 1 m in as many as six courses of small chalk and Reigate Sandstone blocks, each up to 0.3 m^3, set into, and partially rendered with, a hard buff gritty mortar. The stones were mainly ashlars or rough-hewn blocks, with some reused architectural fragments, possibly voussoirs.

The uppermost surviving course of the west wall was laid in a herringbone bond. Some of the sandstone incorporations were dressed blocks, but these could not be removed, the strength of the walls resisting attempts at demolition with the aid of a mechanical excavator. The central wall was the thickest (0.75 m), and therefore presumably carried the greatest structural load; it divided the structure into two equal cells 2.1 x 1.6 m.

The walls rested on massive chalk block foundations that, with the exception of the central wall, protruded to form a slight ledge between 0.1 m and 0.15 m wide. The central wall was based on particularly large chalk blocks, up to 0.75 m in any one dimension, bonded in a clean, grey clay that sat directly on natural subsoil but did not protrude out beyond the base of the wall itself. These foundations were free-standing on the base of the pit.

Base: A layer of degraded mortar (4067), 30 mm thick, lay against the inner faces of the garderobe walls and on the base of the pit. It contained no finds and is assumed to have been a construction deposit, suggesting that any cleansing carried out during the lifetime of the garderobe cannot have been thorough. The base was overlain by a series of organic deposits considered in the environmental report below.

The possible external staircase base 4113

An L–shaped arrangement of shallow, flat-bottomed trenches was situated against the exterior of south wall 4114 of the main building in the area corresponding with the western end of the south-east bay. Its full extent fell outside the area of excavation, and its exact relationship to the main structure had been removed by robbing. Attribution as the remains of an external staircase is wholly speculative but the structure must have been substantial and weight-bearing.

The arrangement comprised two flat-bottomed trenches with vertical sides, 0362 and 0368 approximately 1 m and 1.6 m wide respectively, arranged at right-angles to each other and to the main structure in a L–shape. One arm of this ran approximately parallel to and *c.* 2.8 m from the south wall of the main structure. The east–west length extended beyond the excavated area, and the overall dimension therefore remains unknown.

The natural brickearth forming the base of these trenches was compacted in similar fashion to the base of the foundation trenches of the main structure and is assumed, on that basis, that 0362 and 0368 contained load-bearing members. There was no building material within the fill of these trenches, and it is likely that they were slots for timbers rather than trenches for masonry. A post-hole (0370) at the junction of the trenches might be taken to strengthen the argument for a timber construction.

Date

The extent of the robbing of the building had left few undisturbed contexts relating to construction or use, and these contained only small quantities of material not more specific than 12th to early 13th

century. A single, small (9 g) sherd of Coarse Border Ware (Fabric E450) in the fill of a post-hole in the upper levelling layers in the interior of the building is likely to have been intrusive from later disturbance. Other pottery in stratified contexts directly related to construction or use comprised fabrics and forms all likely to have been current by the end of the 12th or the beginning of the 13th century (Table 5).

It has been argued on stratigraphic grounds that the building of the garderobe pit must have been part of any intial construction phase. The incorporation of Reigate Stone into this part of the fabric may be chronologically significant. Although utilised in the Norman period (Davey 1961, 4), Reigate Sandstone was exploited on an increased scale during the last quarter of the 12th century in structures such as London Bridge (1176) (Clifton-Taylor 1972, 117). In Windsor, non-local building stone is unlikely to have been widely available before the rebuilding of parts of the Castle defences in stone by Henry II between 1173 and 1179, which included the use of Reigate Sandstones.

Table 5: pottery stratified in Building 4112, construction and use (Phase 3)

Context	*No/wt (g)*	*Fabric*	*Description*
Construction: lower levelling layers			
0760	1/6	Q400	Camley Gardens type
	2/90	S402	Shelly Ware
	1/25	S401	Shelly Ware cooking pot FSN 5204 (not illus)
Upper levelling layers			
0933	1/9	E450	Surrey Coarse Border Ware
	1/5	Q402	Oxfordshire-type sandy ware
Building use: floors			
4003	1/15	Q400	Camley Gardens type
Garderobe pit fills			
4052	1/19	S401	Shelly Ware
	1/32	Q408	Oxfordshire-type sandy ware
4053	10/716	Q400	Camley Gardens type cooking pot, Fig. 22 No. 20
4054	2/16	Q400	Camley Gardens type
	4/63	Q401	Oxfordshire-type sandy ware
	2/54	S401	Shelly Ware
4055	3/62	Q400	Camley Gardens yype
	1/36	Q400	Camley Gardens type cooking pot base
	6/253	S401	Shelly Ware cooking pot, Fig. 21 No.2
	1/23	S401	Shelly Ware cooking pot base

Architectural reconstruction

Ground plan (Fig. 12)
Excavations have produced evidence for the full dimensions of only the south-west bay, internally *c.* 12 x 5.2 m. Extrapolation of these dimensions to partly excavated bays implies a building at least 28.5 x 15 m (externally). The length at least is a certain under-estimate, the evidence suggesting further internal surfaces west of wall 4115. The presence of a hearth, possibly recessed into into the west face of 4115, would have prevented a spine wall continuing the alignment of 4118/4119, and the internal layout of the building west of the limits of the site (not included in Fig. 12) is unlikely to have conformed to the pattern uncovered in the excavated area. It is probable that this bay was a cross-wing (as reconstructed for Fig. 36). The maximum width of the building is limited by the River Thames, presently 13 m to the north of the edge of the excavation, and further bays to the north would have been possible.

With so little surviving masonry it proved impossible to determine the location of ground-level openings. The orientation of the causeway towards the south front was focused on the area between the garderobe and the suggested staircase base, with little space for a ground-floor doorway between them. It is possible that there was no ground-floor access on the town-side of the building.

Superstructure
No significant above-ground masonry survived, and consequently any detailed consideration of the superstructure would be entirely conjectural. An assessment of the likely variation in building form can only be attempted with reference to contemporary parallels (considered further below), although some very limited reconstruction may be suggested from the excavated remains.

The dimensions of the wall foundations alone would suggest a building of more than one storey. The form of the garderobe pit, with two cells divided by a wall of some load-bearing potential, implies the confluence of two chutes from separate chambers or separate floors, possibly from ground and first-floor level, but conceivably from a first and second floor. There is no reason to suppose that the building was not entirely stone, although the possibility of a composite construction with timber upper levels cannot be excluded.

Cross-walls 4115 (which would have housed any flue from the suggested wall fireplace) and 4116/4117 (with shallow but broad foundations)

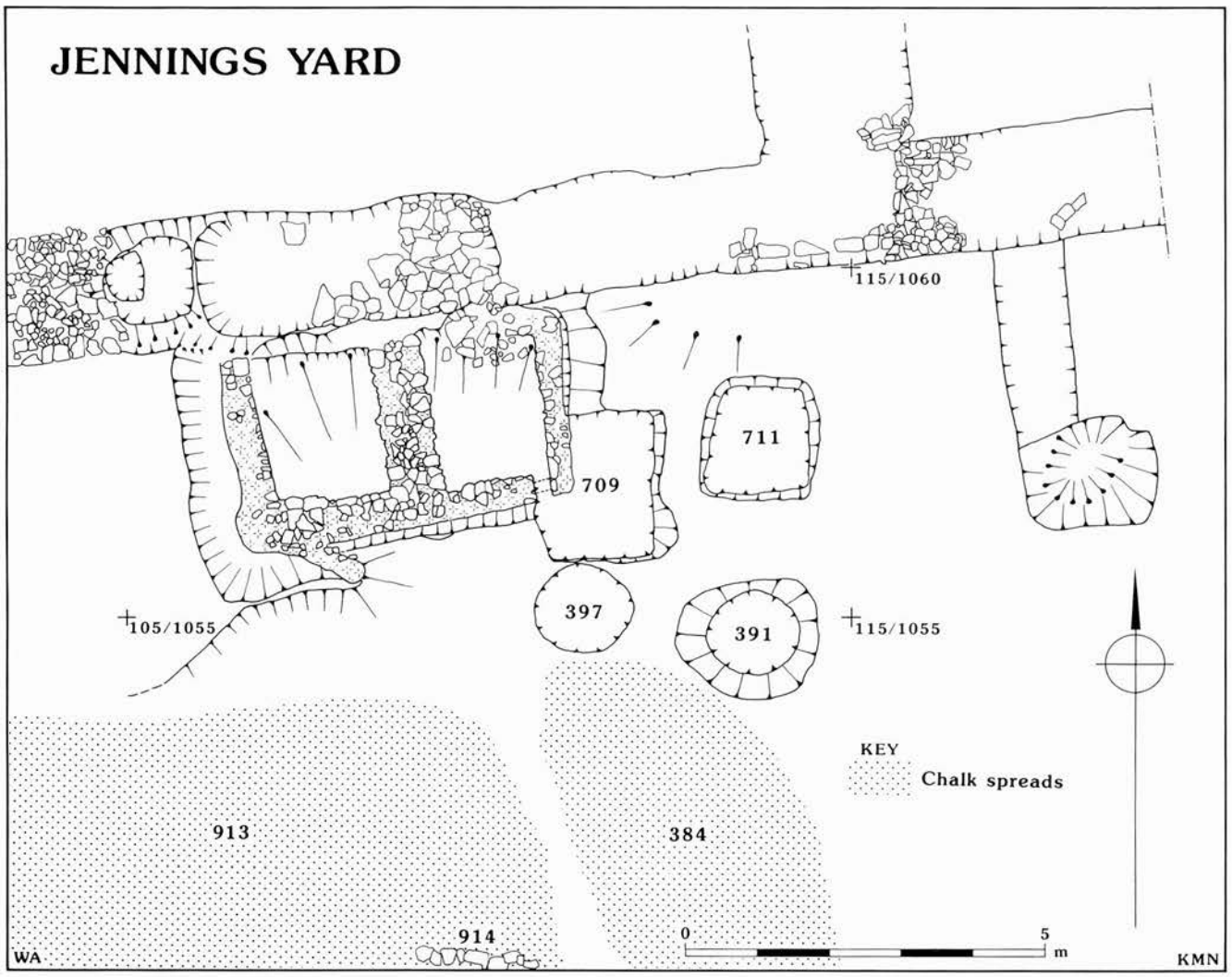

Figure 14 Phase 3 contexts on the platform adjacent to Building 4112

seem likely to have been carried through into an upper storey. At first-floor level, the garderobe would have been centrally placed against the south wall of the chamber corresponding to the south-west bay, and the suggested staircase would have allowed entry into the south-west corner of the room corresponding to the south-east bay. The less substantial spine wall 4118/4119 may have been necessary to allow the full width of the undercroft to be spanned, and it is possible that it formed only the foundations for an open arcade.

Other features on the platform (Fig. 14)

There was no evidence that any of the upcast from the digging of the ditches had been placed on the platform, either dispersed across the area or formed into a bank.

Four features cutting the Phase 2b deposits were excavated immediately to the south of Building 4112, and are likely to have been contemporary with its use. The pits were all sealed by spreads of chalk rubble associated with the subsequent (Phase 4) demolition of Building 4112.

Pit 0709 was subsquare with sides 2 m long, 1.45 m deep with a flat base and vertical sides. This pit had been very close to the south-east corner of the garderobe 4051, cutting through the fill of its construction trench. The shape of the pit in plan had been modified to skirt the east and south walls of the garderobe, although the angle of its cut was visible in the gap between walls 0647 and 0648 (Fig. 13). The primary fill (0716) was a semi-waterlogged green-brown silty clay interpreted as cess, and it seems probable that this was derived from the raking-out of the garderobe.

A second cess-pit, 0711, was subrectangular with rounded corners, 1.55 x 1.85 m, and 1.4 m deep with vertical sides and a flat base. An analysis of samples taken from its primary cess layers produced a very few fragments of mineralised grass or cereal (*below, Chapter 4.14*).

The other two features were both dissimilar in size and shape to the cess-pits. Feature 0397 was subcircular with a diameter of *c.* 1.25 m, 0.5 m deep, with straight sides and a flat bottom. Some compaction of the brickearth in its base might

Plate 4 Phase 3: causeway kerb 0554 and internal post-hole, with top of ditch 0666 in background

perhaps suggest that it had held a post, although its depth seems inadequate to support an upright of the dimensions suggested by its diameter. Feature 0391 may have provided a pair for 0397; of similar diameter, 0391 was, at 1 m, somewhat deeper. It was cut into the upper fill of Phase 2 pit 0718, and no compaction of the underlying layers was noted. The function of these pits/post-holes was not apparent.

Elsewhere, much of the area of the platform south of Building 4112 was covered by a series of chalk and gravel spreads, variously numbered but principally 0913. Of irregular depth between 0.2 m and 0.6 m, the deposits raised the levels across the platform to a minimum of 19.25 m OD and reduced the natural east–west slope to a flatter profile (cf Fig. 8).

The causeway and 'moat' (Figs 15 and 16)

The southern half of the site was, and remained, dominated by a group of structures referred to as the 'causeway' and the 'moat'. These labels are, of course, interpretations, but do reflect the form of the structures if not necessarily their function.

An unexcavated causeway of brickearth (0680) ran approximately north–south linking the platform to the area to the south of the moat formed by the flanking ditches 0578 and 0666 (Plate 4). The edges of these ditches were revetted by chalk block kerbs along the edges of the causeway, with an additional kerb running east–west across the northern end of the neck of the causeway to form three sides of a rectangle. Within and beyond this area a series of slots and post-holes were excavated, interpreted as the remains of a timber walkway along the length of the causeway partly supported by the chalk kerbs.

The primary silts of the moat were reached only in ditch 0666, and here they had been largely removed by the evaluation trench W145. This earlier excavation had produced the majority of the finds which were to be retrieved from these deposits, including mid 16th century leatherwork, albeit not from closely defined contexts.

The presence of seeds of rosemary in the primary levels (*below, Chapter 4.14*), a probable mid 14th century introduction, does not necessarily require a late date to be assigned to the feature, as the possibility that the moat was regularly cleared cannot be precluded. The assumed chronology does imply that the moat outlived Building 4112 as a topographical feature if not as a functioning watercourse.

The Causeway 0680

The causeway consisted of an unexcavated band of brickearth *c.* 2.6 m wide between ditches 0578 and 0666, the terminals of these two ditches forming steeply sloping sides (Fig. 16).

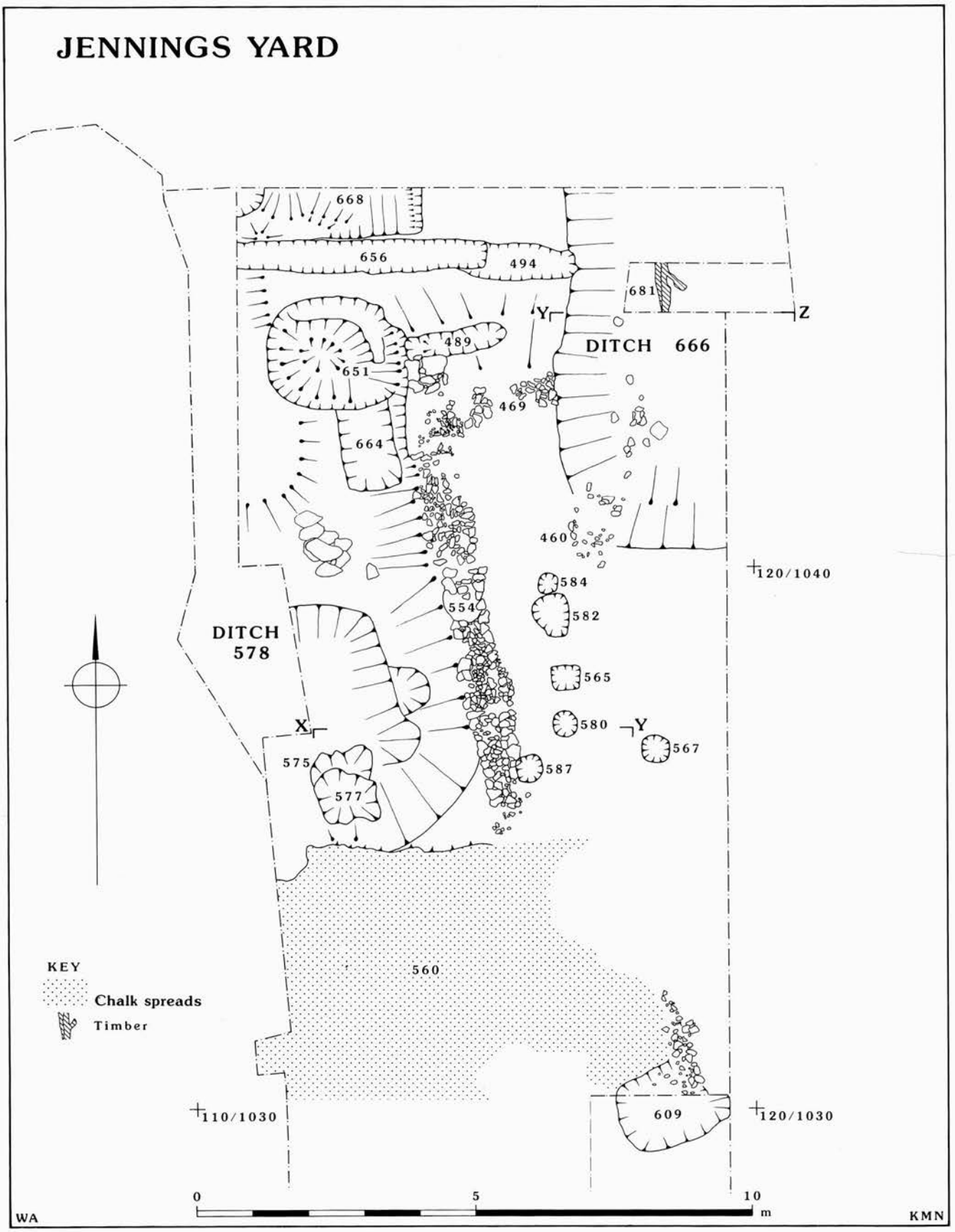

Figure 15 Phase 3–5: principal contexts on the causeway (X, Y and Z locate the section of Fig. 16)

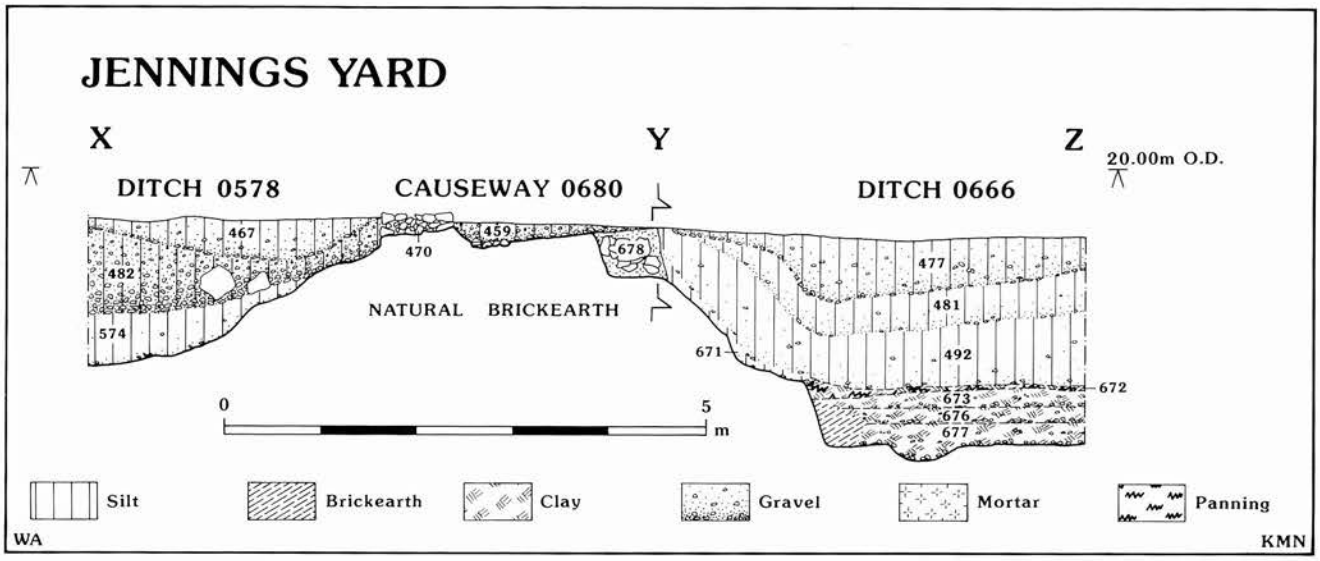

Figure 16 Phases 3–5: staggered section across the causeway (see Fig. 15)

Three kerbs (0554, 0460 and 0469) constructed of chalk blocks retained the causeway against these drops. When complete these kerbs would have formed three sides of a narrow rectangle, 1.60 m wide between inside faces, open at the southern end. Collapse and later activity had, however, largely removed the east kerb and severely truncated the north end of the structure. Each kerb was approximately 0.8 m wide, and survived to a height of 0.3 m formed from a single course of roughly-dressed chalk blocks. Only the east kerb (0460) bore any trace of mortar, the other kerbs being loosely cemented with brickearth. An additional length of kerbing 0914 (shown on Fig. 14) on the platform may have marked the northern bank of ditch 0578.

Beyond the northern kerb, the slot 0489, 0.4 m wide and 0.5 m deep may have represented an extension to the structure in timber. Within the area defined by the kerbs were other post-holes, possibly in pairs: 0567 and 0587 were both 0.4 m in diameter and spanned the width of the causeway at its southern end; 0567 with 0587 and 0580 with 0584 could also be considered to have been paired. Two further features, 0565 and 0582 were slightly larger and not obviously associated (Plate 4).

The form of the structure represented by these features remains unclear. Deterioration of the brickearth surfaces during the course of the excavation demonstrated the fragility of the causeway surface and it seems most probable that a timber, planked walkway would have been necessary to withstand the erosion of even modest volumes of pedestrian traffic.

A series of gravel spreads were found in localised parts of the causeway, but were more extensive to the south, covering the whole of the excavation area in conjunction with compacted chalk surfaces. These deposits together with layers north of the causeway on the platform formed an extensive metalled surface over much of the occupation area, principally 0560.

Ditch 0578

Immediately to the west of the causeway was the squared terminal of ditch 0578. At *c.* 45° the slope into the ditch from the causeway was significantly shallower than the slope into ditch 0666. The two ditches were not precisely aligned. The top edge of the channel had been disturbed and obscured by hollows and small pits dug into the slopes, but the feature was a minimum of 12 m wide, comparable in size to ditch 0666.

Ditch 0578 extended into the excavated area by only 2.6 m, and within the area available a flat bottom was not reached. At the end of the excavation investigations were carried out with a mechanical excavator in an attempt to determine its full dimensions. These further excavations demonstrated the presence of the channel as far as the River Street frontage, although proximity to the site boundary and standing buildings still did not allow the full depth to be established, which must have been greater than 3 m as measured from the top of the causeway. At the depths reached no channel silts were encountered, although an analysis of mollusca (*below, Chapter 4.13*) has shown that the upper levels were sporadically wet.

Ditch 0666

To the east of the causeway was the steep (60°) slope of the squared terminal of ditch 0666. The northern edge of the 'moat' lay beneath an unexcavated baulk, but the total width could be estimated at *c.* 12 m. Excavations revealed a flat base to the 'moat' at *c.* 17.00 m OD (2.5 m below the level of the causeway), although investigations were hampered by the proximity of unconsolidated backfill from the evaluation trench which had first located the ditch but not revealed the terminal.

Revetment: The base of the causeway at the terminal of the channel was retained by a small timber revetment 0681. This was composed of two oak planks 3013 and 3014 laid on edge and butted end-to-end. The planks were 0.3 m wide and 25 mm thick, no complete lengths were recovered, and they were unsupported by posts within the 4 m wide sondage. An upper row of planks had fallen forward into the waterlogged silts that lay against the front the revetment, resulting in localised slumping of the causeway slope. The large posts observed in contexts 10 and 12 of the W145 evaluation exercise would have been sited approximately 1m to the east of this revetment, but only a single oak post (3011 — *further described below, Chapter 4.10*) was recovered by the main excavation.

Channel fill: The primary fills of the channelcomprising the 'moat' coonsisted of a series of waterlogged (and presumably water-lain) deposits of blue clay. These were excavated in 0.2 m spits; numbers 0673, 0676, 0677 (Fig. 16) and the partial spit 0679, but there were no visible distinctions within the 0.6–0.65 m depth. Inundation and cramped conditions made accurate observation difficult. The layer was observed only in a 0.8 m wide slit trench in the base of a sondage excavated under the east edge of the main excavated area, the eastern limits of which were defined by the backfilled evaluation trenches. Its full extent, therefore, is unknown, but it lay at the level of the base of revetment 0681 on a clean fine gravel.

The overlying layer 0672 lay at the level of stabilisation of the present water table, which may have caused post-depositional alteration, in the form of panning. Although apparently an alluvial deposit, 0672 had been contaminated with brick, chalk and gravel from the deposition of the overlying layers. It is likely that this zone produced the demonstrably post-medieval leather from W145 (*below, Chapter 4.11*). Subsequent filling of the channel comprised silt-sized particles with substantial quantities of gravel and chalk inclusions, strongly suggesting that they were dumps rather than desiccated alluvial layers, and certainly not associated with Phase 3 activity.

Phase 4

This phase comprised the demolition of Building 4112 and, by analogy, the slighting of the structure of Causeway 0680. Only robber trenches and spreads of chalk rubble associated with demolition were encountered in the area of Building 4112.

Demolition of Building 4112

On the basis of datable finds, Building 4112 must have been demolished a relatively short time after it had been built, sometime around the middle years of the 13th century. This demolition produced quantities of principally chalk rubble which settled into the tops of earlier features and formed layers over the northern area of the site. At the same time, robbing trenches removed most of the walls of the principal structures leaving the wall trenches infilled with chalk and brickearth deposits containing late 13th century pottery. The robbing of the garderobe 4051 and the main structure 4023 appear to have been separate episodes, with layers of fine alluvial silt interleaved with the demolition contexts relating to these two areas, suggesting at least one episode of flooding. Details of the nature and extent of individual demolition and robbing contexts are described at length in the archive (archive Phase 65; all subdivisions).

It has been suggested (above) that, based on artefactual evidence, the moat remained open at least in part during and beyond this period.

Phase 5

At some time following the demolition and robbing of Building 4112, a smaller, less substantially-founded structure, Building 0943, was constructed partly overlying the southern wall 4114 of Building 4112 (Fig. 17). This could be directly associated with a series of external chalk and gravel spreads over the area of the platform.

Some further filling of ditches 0578 and 0666 is also indicated at this time, although evidence from finds and inferences drawn from post-medieval maps (*below, Chapter 5*) suggests that at least parts of the alignment of the former 'moat' persisted as a property boundary and a physical feature into the 17th century. A series of shallow pits dug into the slopes of the terminal of ditch 0578 was stratigraphically associated with the secondary fills of this feature. Other features dug into the causeway area post-dating an episode of flooding are also included within this phase.

Building 0943

Walls

The building plan recovered was incomplete, comprising three walls free-standing on the unrobbed components of Building 4112, the infilled robber trenches, and demolition layers.

The walls formed three incomplete sides of a rectangular structure, the western end of which lay beyond the excavated area (Plate 5). The walls were of identical build: an unbonded core of chalk rubble (average size 0.1 m), faced internally and externally by roughly-dressed chalk blocks (average size 0.2 m) surviving to a maximum height of 0.4 m in three regular courses. The largest of these facing blocks comprised the lowest course. Where junctions of walls were present, the cores were continuous and the facings apparently bonded. Parts of the structure had subsided to a noticeable extent, particularly the south-eastern corner above the infilled robber trenches of Building 4112.

Internal features

Discontinuous spreads of compacted degraded chalk and mortar (principally 0924 and 0925), up to

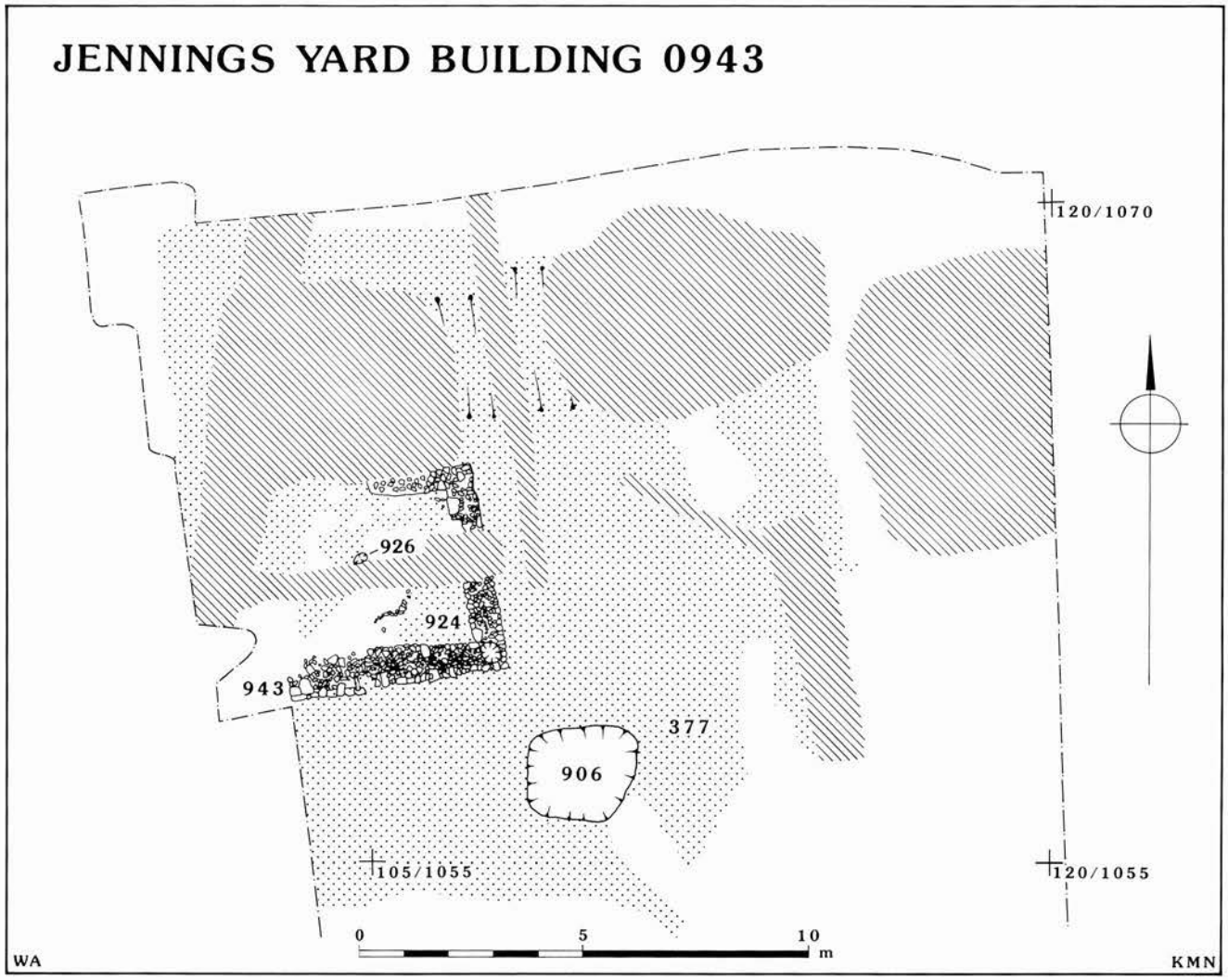

Figure 17 Phase 5: Building 0943

20 mm thick, provided the only evidence for floors. Some subsidence into unconsolidated earlier features in the south-east corner had required additional, thicker deposits of chalk to be laid to maintain a level floor.

There was only one feature within the building, 0926, a post-hole 0.2 m in diameter, packed with chalk blocks and a single brick, and positioned centrally within the building.

External features

Soil layers and rammed chalk surfaces sealing the demolition layers of Building 4112 were found on the north, south, and east sides of Building 0943, principally layers 0100, 0173 and 0992, referred to generically as 0377 (Fig. 17). These deposits appeared to have been laid as a series of thin spreads; all contained fragmentary tile or bricks. These layers were of variable thickness in an apparent attempt to compensate for the differential settlement occurring above backfilled pits and robber trenches.

One instance of this continuous instability was feature 0906, a shallow depression in the surface of layer 0377 which lay directly over the earlier, Phase 3, pit 0711 (see Fig. 14).

Infilling of ditches 0578 and 0666

Assessment of the finds included within the fill of ditch 0666 would suggest that only layer 0672 can be associated with this phase. Ditch 0578 contained a different sequence of deposits, and it is likely that the feature was substantially backfilled at this time, principally with gravel layer 0482 (Fig. 16).

Features on the slopes of ditch terminal 0578

Four features on the upper, eastern slope of the terminal of 0578 cut through layer 0482, but were in turn sealed by the later, tertiary fills of the ditch. Feature 0575 was subsquare, with sides 1 m, V–profiled up to 0.7 m deep, and largely backfilled with tile and rubble. It had been recut to a depth of 0.3 m by pit 0577, also largely filled with tile debris. Feature 0664 was a rectangular pit 1.5 m long north–south and 1 m wide. It had an irregular V–shaped profile with a depth of only 0.15 m. Cutting 0664 was the largest of the group of pits adjacent to the causeway, 0651. This was irregular

Plate 5 Phase 5: Building 0943 and internal and external surfaces. View from the east

in plan but up to 3 m across, 1.4 m deep, and largely filled with redeposited brickearth with sparse chalk fragments.

Features on the causeway

Two features (0656 and 0668) were observed to cut localised areas of reworked brickearth (assumed to have resulted from an episode of flooding) which apparently sealed the features previously suggested as forming structural elements of the causeway in Phase 3. An isolated feature south of the causeway is also considered as part of this phase.

Gully 0494 was recut and extended by 0656 to form a linear slot across the width of the causeway, its western end beyond the area of excavation. Both sections were approximately 0.4–0.5 m wide, with 0656 0.75 m deep and 0494 0.4 m deep. Gully 0656 was largely filled with the articulated partly-complete carcasses of at least eight horses (Plate 6; *below, Chapter 4.12*) in a matrix of brown silt 0655. The gully was scarcely large enough to accommodate these carcasses, and it is possible that the burials had been the primary purpose of the feature. The upper fill comprised deposits of sticky clay 0654.

Pit 0668 was a subrectangular pit, dimensions at least 3 x 1 x 1.4 m deep, which lay partially outside the area of excavation. It was aligned almost exactly parallel with gully 0656 and, where the two features were contiguous at the west end of the site, 0668 could be observed to cut 0656. Its fill was largely of redeposited brickearth, but included quantities of chalk and fragmentary chalk blocks which may have derived from the demolition of Building 4112 or the causeway kerbs.

The isolated feature pit 0609 was situated at the south end of the causeway, where it cut through the Phase 3 metalled surfaces. It was roughly square in plan, sides each 1.50 m, and was 1.5 m deep, with straight sides and a roughly flat bottom. The profile had been distorted by an apparent collapse of the sides.

Date

Limitations in the observed stratigraphy have made it impossible to divide this long phase into a more closely defined series of synchronous events.

There were no datable layers associated with the construction of Building 0943, although internal floor levels contained pottery of medieval fabric types only, including parts of a sandy-ware cooking pot and shell-tempered bowl in layer 0921. Larger collections were obtained from the fills of ditches 0578 and 0666, the pits dug into the slope, and the late pits and gullies (including 0656) on top of the causeway. These also contained medieval fabrics, including jug sherds, with a significant proportion

Plate 6 Phase 5: the horse skeletons in Gully 0656, viewed from the east

of Coarse Border Ware, suggesting a later 14th century emphasis for this episode.

Continuation into the post-medieval period is suggested by the presence of lead-glazed earthenwares in the upper external surfaces associated with Building 0943, sherds occuring also in the layer 0492 of ditch 0578. The recovery of 16th century leatherwork from ditch 0666 during the course of the evaluation confirms that the channel remained open at least in part until a comparatively late date, and the fills are probably best regarded as post-medieval. It will be tentatively suggested that Building 0943 and the alignment of the 'moat' can be identified on a plan of 1607 (*see Fig. 37 and accompanying discussion, below, Chapter 5*).

Phase 6: Post-Medieval

The post-medieval contexts which comprised Phase 6 are described here in outline only, and a more detailed account is in archive. Activities across the site were no longer constrained by the divisions imposed during the medieval period, with only later (modern) disturbance limiting the areas in which Phase 6 deposits were encountered. Finds indicate a broadly 17th to late 18th century date for the phase, although more precise dates can be suggested for certain episodes. No account of modern levels (archive phases 75 and 76) is given here.

Four subphases have been identified:

Phase 6a

Indirect evidence, reviewed in the discussion, below, suggests the continuation of Building 0943 into at least the early part of the 17th century. A series of chalk spreads deriving from its demolition extended across a large area of what was formerly the platform, these layers containing largely (residual) medieval pottery with some stoneware sherds.

Interleaved within spreads of primary demolition rubble were areas of gravel, with further dumps of chalk extending into the southern half of the site. It is unlikely that all of the chalk could have derived from the demolition of Building 0943, and the use of gravel suggests that at least some of this material had been deliberately imported. It is likely that these surfaces represented yard areas associated with buildings not within the excavated area, perhaps on the River Street frontage.

Phase 6b

Cutting through the Phase 6a deposits were a number of small features, including stake- and post-holes and shallow gullies. No convincing plans of fence lines, property boundaries or structures could be reconstructed, although it is likely that the features represented outbuildings and drains within the backland area.

Phase 6c

The Phase 6b features were sealed by further deposits of chalk, in turn cut by an additional series of stake- and post-holes. Also associated with this phase was a larger feature in the area of what had formerly been the northern neck of the causeway. This feature, 0375, was a timber-lined (pine) saw pit, 6.7 x 1.8 m, 0.4 m deep with a primary fill of compressed woodchips.

Phase 6d

Subsequent to the Phase 6c activity, the whole site had been covered by an homogeneous dump of grey-brown soil, presumably imported to the site, up to 0.35 m in depth. This deposit also filled a series of parallel ridges in the underlying chalk surfaces aligned east–west (Plate 7). The troughs of these ridges were *c.* 0.8 m wide and up to 0.3 m deep, and continuous in lengths up to 6 m. Two discrete groups together covered most of the northern area of the site with a 5 m wide, east–west boundary of undisturbed land between them.

It is suggested that the ridges are the result of horticultural activity, probably trenching or triple-digging, in an attempt to provide better drainage through the otherwise impervious compacted, underlying chalk. Such digging would have been standard procedure for breaking new ground in advance of the creation of long-term, deep-rooted plantings, such as apple trees, and the physical remains at Jennings Yard are consistent

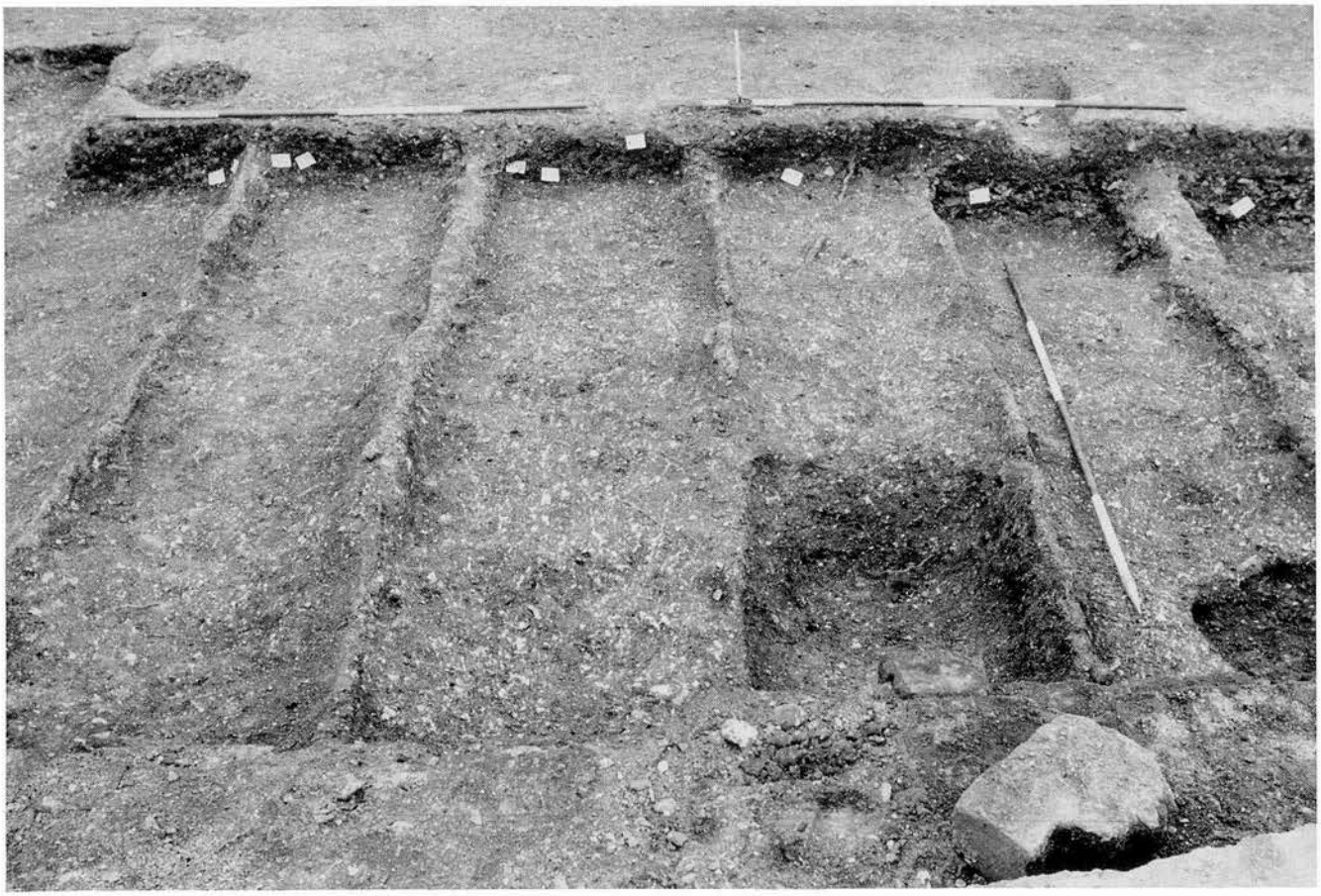

Plate 7 Phase 6: post-medieval horticultural features at the west edge of the trench. View from the west

with what might be expected to result from the method of working outlined by Cobbett in 1829 (1980, 13). An orchard is shown as occupying the northern part of the Jennings Yard site in Collier's plan of 1742 (reproduced in Bond 1984, frontispiece), which can also be identified on the edge of Leonard Knyff's painting of the north prospect of Windsor Castle in about 1708 (reproduced in Hibbert 1964, 81). Inclusions of clay pipe (*below, Chapter 4.6*) suggest a late 17th century date for the dumping of the soil.

4 Medieval and Post-Medieval Finds

Detailed descriptions of the metal objects may be found in the archive together with X–radiographs and reports on the cleaning and conservation of artefacts by M. Brooks (HBMC Wessex Regional Conservator) and XRF reports from the Ancient Monuments Laboratory. LMMC refers to the *London Museum Metalwork Catalogue* (1967).

1. Coins, Jetons and Tokens,
by Paul Robinson

Abbreviations
North = North 1963
Peck = Peck 1970

Of the twelve items recovered, SF 1037 is intrusive in Phase 2, with all other coins and tokens residual in context except for examples in Phase 6d.

1. **George II.** Halfpenny of the Second Issue.
Obverse: GEORGIVS. II.REX.
Reverse: BRITAN NIA
Date: 1752.
Ref: Peck 882
Phase 2, context 0362, SF1037.

2. **Stephen.** Cut halfpenny, BMC type 1 (the 'Watford' type).
Obverse: [+ST] IF [ ]
Reverse: illegible
Date: *c.* 1135–1141
Ref: North 873.
Phase 4, context 0939, SF1083.

3. **Nuremburg copper alloy jeton.**
Obverse: alternate fleurs-de-lys and letters S surrounded by seven stars
Reverse: crowned shield with in chief two fleurs-de-lys and in base a fleur-de-lys between two mullets. On each side three stars.
Date: Mitchener (1988, 331) dates jetons of this class to the period c. 1415–1437, ie after Sigismund appointed Frederick Hohenzollern to his own former office as Burgrave of Nuremburg and before his own death in the latter year. However, this dating seems too early and a date in the middle or second half of the 15th century is more likely.
Diam: 28 mm.
Ref: variety of Mitchener 973.
Phase 6d, context 0321, SF1012.

4. **Henry VII.** Halfpenny. Class I (Archbishop Morton).
Obverse: [ ]
Reverse: CIVI TAS CAN TOR M in centre.
Date: 1487–1488.
Mint: Canterbury
Ref: North 1736. The coin is discussed by Potter and Winstanley (1962, 121), where the specimen in the British Museum is described as being the only one known. Others have since been identified.
Phase 6d, context 0177/0144, SF1077.

5. **Charles I.** Royal farthing token of Richmond type.
Obverse: p.m. shield CARO:D:G:MAG:BRI:
Reverse: FRA:ET:HIB:REX.
Date: 1625–1634.
Ref: Peck 189.
Phase 6d, context 0321, SF1025.

6. **Charles I.**
Obverse: p.m. dagger. CARA D G:MAG:BRI.
Reverse: FRA:ET:HIB:REX
Date: 1625–1640? Contemporary struck counterfeit.
Phase 6d, context 0177, SF0194.

7. **William III.** Farthing.
Obverse: GVLIELMUS• TERTIVS
Reverse: BRITAN NIA
Date: ?1697.
Phase 6d, context 0321, SF1022.

8. **Lead/pewter token.**
Obverse: ?apple tree.
Reverse: wheel.
Date: *c.* 1650–1750.
Diam: 17–19 mm
Phase 6d, context 0321, SF1031.

9. **France or Low Countries, copper alloy jeton.**
Obverse: XAVE MARIA O GRACIA O heater shield with arms of France modern flanked on each side by three annulets.
Reverse: cross *fleurdeliseé* within quatrefoil; A V E M in angles.
Date: late 14th century.
Diam: 28 mm.
Ref: cf Barnard 1917, plate VI, 46.
Unphased (modern), context 0418, SF1080.

10. **James I.** Shilling (broken) of the Third Coinage.
Obverse: p.m. trefoil. IACOBVS.D.G.MA[G. BRIT.E]T.HI.REX.
Reverse: p.m. trefoil. QVAED[EVSCONIVN]XIT NEMOSEPARET.
Date: *c.* 1619–1650?
This is a counterfeit, probably cast. Analysis at the British Museum Research Laboratory shows that the metal is copper

with about 11% arsenic, at least on the surface. There are no remaining traces of a white metal plating, in particular no evidence of silver or tin. Arsenical copper can look very white but it is doubtful whether 11% would be enough to imitate silver.

A counterfeit shilling of James I, also of arsenical copper (4.2% arsenic) with no other traces of plating is published in Mitchener and Skinner (1985, 223). Legislation required that counterfeit coin should be pierced or broken on discovery to prevent it circulating further. (I am grateful to Mrs Susan La Niece for her comments on this coin).

Unphased (modern), context 0308, SF1003.

11. **William III.** Halfpenny.
Obverse: GVLIELMUS• TERTIVS• .
Reverse: BRITAN NIA .
Date: 1700
Ref: Peck 697.
Unphased (modern), context 0210, SF1013.

12. **Uniface lead token.**
Obverse: I.L
Date: *c.* 1650–1750.
Diam: 27 mm.
Ref: cf Dean 1977, nos 70, 77 etc.
Unphased (modern), context 0001, SF1004.

2. Non-Ferrous Metalwork, *by J.M. Mills*

Laboratory X–radiographs of the copper and iron objects were taken by M. Brooks, English Heritage. conservator at the Wiltshire Library and Museum Service Laboratory, who also cleaned selected objects. Metallurgical analyses were carried out by the Ancient Monuments Laboratory.

A total of 116 objects and fragments of non-ferrous metal was excavated. Only four of these were recovered from medieval contexts, a small casket key and a gold plated strip, possibly a

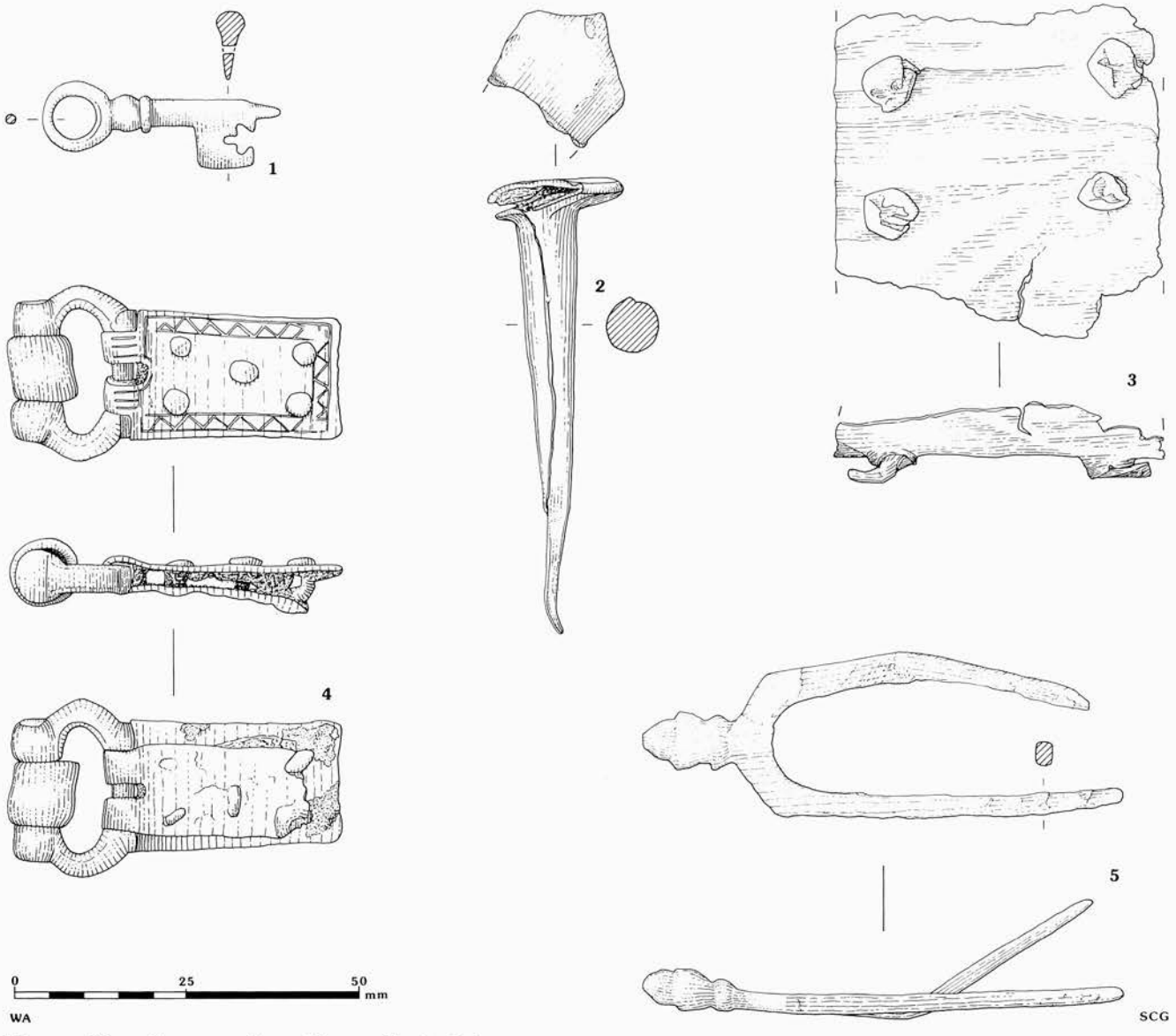

Figure 18 Copper alloy objects. Scale 1:1

bracelet fragment from Phase 4 being two of the most notable non-ferrous metal finds from the site.

The post-medieval collection of non-ferrous objects is dominated by spiral wound wire-headed pins (66 in total) and lace-tags (11). The remaining finds were mainly dress fittings, with occasional nails, fragments and strips. Seven lead artefacts were recovered from the excavations, including the tokens reported on above. The only lead from medieval layers was a fragment of molten lead run-off.

As with the ironwork, there was less non-ferrous metal than might have been expected from an urban site of this date. More strips, sheet fragments and fragments of copper alloy along with rings and twists at least would be expected.

Fig. 18

1. **Small casket key** with solid oval-sectioned stem, moulded below the circular bow. The stem projects beyond the ward which is subsquare in shape with a three-lobed cut in the leading edge. Length 35 mm. Although not intrinsically datable may be compared to LMMC type VII door keys (p.144) which have a date range from the 13th–16th centuries. Phase 4, context 0195, SF1072.
2. **Nail or tack** formed from a shaped sheet of copper alloy. The shank is rolled and the head is formed from the same piece of metal folded out at 90° from the shank and then folded back on itself. The head is polygonal in plan. Length 68 mm. A similar nail, thought to be associated with boat construction, came from Threave Castle, and is dated there to 1455–1640 (Cadwell 1981, fig. 10, 46). Phase 6a, context 0481, SF1081.
3. **Strip fragment** 42 mm wide with four polygonal headed 'rolled' tacks (cf. Fig. 18, No. 2) *in situ*. The shanks of the tacks were all bent/hammered over leaving a gap of up to 1.5 mm between the back of the strip and the shanks, suggesting that the strip or plate was attached to something such as leather or a thin piece of wood. Phase 6b, context 0333, SF1030.
4. **Strap-end buckle**, comprising a buckle with roller (pin missing) and a folded-over plate, the back plate being smaller than the front. Traces of mineralised leather were preserved between the plates. The front is decorated with a zig-zag line between two parallel lines as a border and two sets of three parallel lines were the plates bend. Five rivets remain *in situ* in the central area, with heads *c.* 3 mm diameter. Traces of silver mercury gilding were detected by XRF on the buckle and the front plate. Maximum dimensions: 33 x 26 x 18 mm. Phase 6b, context 0378, SF1064.
5. **Central forked portion of belt chape with acorn-shaped knop**. Length 70 mm. Similar to an example from Goltho (Goodall 1975, fig. 43, 3). Phase 6d, context 0432, SF1043.

3. Iron Objects, *by J.M. Mills*

A total of 186 iron objects and fragments was recovered, of which 122 were nails. Only 36 objects (including 26 nails) were recovered from medieval, contexts (Table 6). The collection lacked tools, knives, personal items such as buckles and

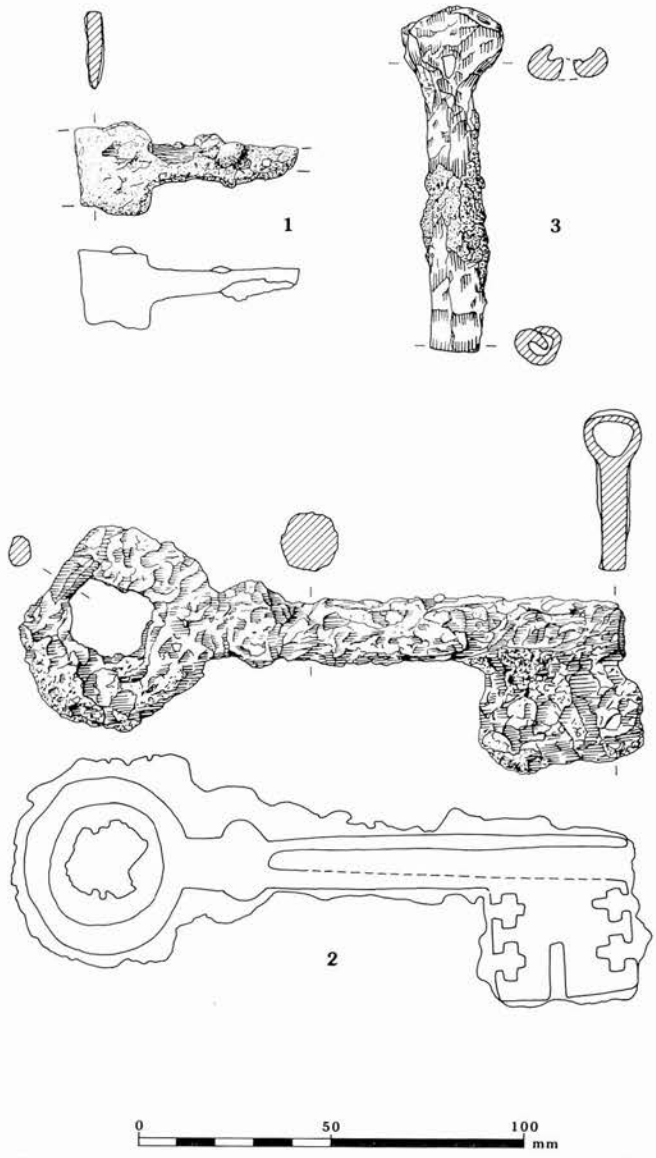

Figure 19 Iron objects. Scale 1:2

purse-mounts, and horse furniture, all of which would normally be expected from a domestic site. Even within the post-medieval assemblage personal and domestic items were absent, the small collection comprising nails and other miscellaneous architectural fittings (strips, hinges, spikes, washers, staples).

Much of the ironwork was poorly preserved, badly corroded and mineralised. Because of this the author has had to rely heavily on X–radiographs for the identification of artefacts, and no exhaustive attempt has been made to classify the nails.

Fig. 19

1. **Knife or tanged tool fragment**, ?blade with whittle tang, length 59 mm. The tang is rectangular

Table 6: ironwork in medieval phases

Phase	*2*	*3*	*4*	*5*	*Total*
Nail/nail frag.	4	13	7	2	26
Strip	1	1	2	1	5
Knife/blade tool	–	–	1	–	1
horseshoe frag.	–	–	1	–	1
Rod/peg	–	–	1	–	1
Key	–	–	1	–	1
Unident.	–	–	–	1	1
Total	5	14	13	4	36

in section *c*.3 mm thick and tapers from 8 mm to 5 mm wide. The 'blade' is *c.* 20 mm wide and appears to be rectangular in section rather than triangular, *c*.2 mm thick. Phase 4, context 0979, SF1075.

2. Large **door key** with rolled stem and intricate, symmetrical wards. The loop is circular. There is a simple moulding at the top of the stem below the loop. Traces of white metal plating (tin or lead tin) were observed on the stem. Length 158 mm. LMMC type II (fig. 42). The date range for this type of key is late 11th–13th century, or later. Phase 4, context 0878, SF1049.
3. **Object** of unknown function with rolled 'stem' opened out at one end and perforated close to the 'stem' by one pear-shaped hole. Length 94 mm, diameter of 'stem' *c.* 10 x 12 mm; width at open end *c*.26 m. Phase 5, context 0903, SF1224.

4. Non-Building Stone,
by M.J. Heaton and J.M. Mills

Portable Objects

Only two stone objects were found within medieval phases; a slate stylus (unillustrated) was recovered from a modern context.

Fig. 20

1. **Object** or fragment of object of unknown function, possibly a burnisher or polisher, comparable to Gettens and Stout 1966, 282–83, fig. 4h. The stone, heavily stained and not positively identified, appears similar to a calcite formed of long, columnar strands. Phase 4, context 0878, SF1051.

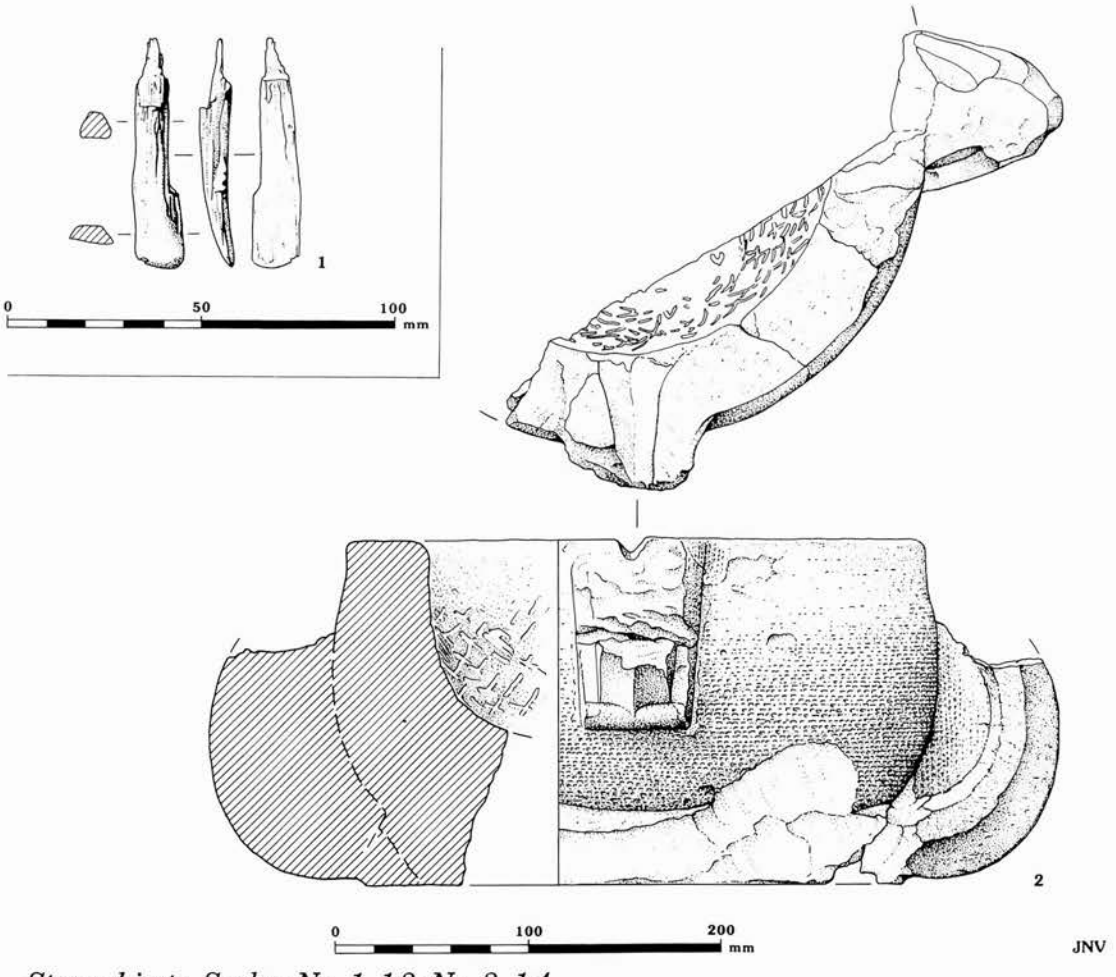

Figure 20 Stone objects. Scales: No. 1, 1:2; No. 2, 1:4

2. Less than 50% of a **Purbeck Marble mortar** in five conjoining fragments. One lug and runnel and a prominent rib are extant. The prominent rib is markedly curved, of hexagonal section and attached to the body of the mortar by a narrower flatter section rib to form a D–shaped appendage on the side of the mortar. Chisel marks are visible on the outer hexagonal part but have been largely polished away. The chisel marks on the adjoining rib are vertical. The squared lug has a double concave front/lower surface with a V–profiled runnel and is set within a wider square base which has a scrolled pediment on its lower side. A very small area of base survives but there is some hint of shaping, perhaps a flange or a wide foot, accounting for aproximately half the total height. The exterior is finished with toothed chisel marks parallel to the rim and the interior is finished with deep cross-hatched chisel marks.

   The rim is not as elaborate as the lug or rib, and is squared with a rounded internal edge. The type seems to be an elaborate version of Dunning's (1977, fig. 156) type 3 having prominent ribs curving outward beyond the side of the mortar, although all illustrated versions of this type have square profiled runnels. Internal diameter *c.* 220 mm, height 167 mm, maximum thickness 48 mm. Probably 14th century. Fragments present in Phase 3, context 0803, SF1263a; and modern, context 0177, SF1263b.

Gravestones

The two gravestones had been reused as covers to modern brick drains at the southern end of the site. Neither are illustrated.

SF1039 Almost complete, shouldered, smooth face with mortar adhering, bevelled edges, rough back. Great Oolite from the Cotswolds. Bears chased inscription: *R B* above *1698* in letters 65 mm high, 47 mm wide, uneven numerals. Dimensions: 545 x 585 mm (max); 355 (min) x 60 mm, modern context 0707.

SF1040 Almost complete, shouldered with smooth but weathered face, smooth bevelled edges and smooth, slightly concave, back. Great Oolite from the Cotswolds. Bears chased inscription:

[Late lamented]
:Eliz(a)(b)(e)(t)h: T(a)lb...
:Dafter of: Thomas
Talbott :who: Dyed
The :2: OF MaY
1666

The top line is illegible, the end of the second line has been obscured by the broken edge of the stone. Upper case letters 40 mm high, lower case 28 mm high, numerals 65 mm high. The colons indicate the positions of pairs of drilled holes, possibly for attaching metal plates with alterations. All surfaces display numerous pecked holes and gouges and possible masons guide-lines. Dimensions 475 x 347 mm (max); 365 (min) x 100 mm, context as SF1039

5. Pottery, *by L.N. Mepham*

Introduction

The pottery assemblage from the 1987 season of excavation at Jennings Yard comprised 4695 sherds (66,716 g). The assemblage included material of prehistoric and Romano-British date, considered in Chapter 2, above, and medieval and post-medieval pottery, discussed here.

It was hoped that examination of the pottery assemblage would help to elucidate the sequence of events on the site during the medieval period, and perhaps throw some light on the function of the various structures excavated. Recognition of the various fabric types present could suggest changing patterns of pottery supply, highlight similarities or differences between Windsor and other known medieval assemblages in the region, and determine whether the position of Windsor on the river had any specific influence on the supply of pottery to the site.

Methodology

The pottery was analysed using the standard Wessex Archaeology pottery recording guidelines (Morris 1989). The assemblage was divided into fabric types, and then fully quantified, both by number and weight of sherds, by fabric type (FT) within each context. In addition, a maximum of fourteen attributes, including details of vessel form, surface treatment, decoration, manufacturing technique and evidence of use, was recorded for each medieval fabric type, and this information was coded for entry on to a database for stratigraphic analysis.

The post-medieval material was examined in less detail. Rim types and, where possible, vessel types, were recorded for all red earthenwares (FT E600, E601) and Surrey white earthenwares (FT E630). The presence of glaze and/or decoration was also recorded for these fabric types. For all other later post-medieval fabrics, eg tin-glazed earthenwares and all stonewares, simple quantification by fabric type was carried out, with no attempt to define vessel types.

In the relative absence of complete profiles amongst the medieval material (only five complete profiles were recovered), the rim sherds have been used to create a Rim Type Series, which incorporates known vessel forms wherever possible. Vessel types have also been defined in a few cases on the basis of decoration type, eg jugs with Rouen-style decoration.

Fabrics and Forms

A hand lens (x8 magnification) and binocular microscope (x20 magnification) were used to divide the pottery into five broad Fabric Groups on the

Table 7: the medieval pottery assemblage by fabric type

Fabric	*No.*	*Wt (g)*	*% of total*	*Wt glazed*	*% fabric in medieval phase*
E410	2	25	<0.1	25	100
E450	200	2960	5.2	2468	83.4
E460	42	571	<0.1	561	98.3
E461	5	17	<0.1	17	100
E500	4	10	<0.1	10	100
Q400	1407	17,996	31.6	2127	11.8
Q401	112	1772	3.1	449	25.3
Q402	220	2509	4.4	17	0.7
Q403	28	442	<0.1	228	51.6
Q404	52	597	<0.1	9	1.5
Q405	187	2705	4.8	888	32.8
Q406	44	843	1.5	214	25.4
Q407	154	1936	3.4	–	0
Q408	47	460	<0.1	–	0
Q409	25	242	<0.1	–	0
Q410	3	26	<0.1	–	0
Q411	22	311	<0.1	284	91.3
Q412	147	2331	4.1	1917	82.2
Q413	34	678	1.2	196	28.9
Q414	3	22	<0.1	22	100
S400	347	5186	9.1	–	0
S401	889	12,254	21.5	1014	8.3
S402	80	1014	1.8	10	1.0
S403	162	2089	3.7	570	27.3
Total	4216	56,996			

basis of the dominant inclusion type or known source: flint-tempered (Group F), grog-tempered (Group G), sandy (Group Q), shell-tempered (Group S), and 'established' wares (Group E).

The five fabric groups were then subdivided into 45 Fabric Types, on the basis of the range and coarseness of macroscopic inclusions; the post-medieval fabric types are all 'established' wares and have been defined on the basis of known or probable source and/or type, eg Westerwald stoneware (FT E670). A summary of the 45 fabric types appears below; numbers and weights for all medieval and post-medieval fabric types are given in Tables 7 and 8. A correlation of fabric types to forms is given in Table 10.

Medieval fabrics

The medieval pottery from Jennings Yard can be divided into sandy, shelly and 'established' wares.

Group Q (sandy wares)

Fifteen sandy fabrics were identified, with a wide range of coarseness of inclusions, from the fine oxidised fabric Q412, to the coarse sandy fabric with flint Q407. The dominant fabric in the group is the moderately coarse sandy fabric Q400, which constitutes 54.8% of the group, and 31.6% of the medieval assemblage as a whole.

Most of the sandy fabrics, both fine and coarse, appear to have been used predominantly for cooking pots (133 rims). Seven cooking pot types were identified, though CP Types 2, 3 and 4 are more commonly found in shelly fabrics. Numbers of vessel forms by fabric type are given in Table 10, and Estimated Vessel Equivalents (EVE) in Table 14.

CP Type 1 Everted rim, flattened or rounded, generally thickened. Necked vessels, with gently rounded bodies. Rims occasionally finger-impressed. Hand-made or wheelthrown. (Fig. 21 Nos 1, 2).

CP Type 2 Upright or slightly everted rim, thickened and rounded and/or flattened. Necked vessels, hand-made. Rims occasionally finger-impressed. (Fig. 21 Nos 3, 4)

CP Type 3 Sharply everted rim, thickened and rounded. Shallow-necked or unnecked vessels. Hand-made with wheel-finished rims. (Fig. 21 Nos 5–7)

CP Type 4 As Type 3 but rim squared. (Fig. 21 Nos 8, 9)

CP Type 5 Upright or slightly everted rims, thickened and rounded, sometimes flattened. Long-necked vessels with high shoulders and almost upright sides, sagging base; base diameter greater than rim. Hand-made with wheel-finished rims. Rims occasionally finger-impressed. (Fig. 21 Nos 10–13)

CP Type 6 As Type 5 but rim squared. Rims occasionally finger-impressed; horizontal grooving around body. (Fig. 21 Nos 14–17)

CP Type 7 Upright or slightly everted rims, slightly thickened, flattened. Vessel form as for Type 5, hand-made with wheel-finished rims. (Fig. 22 Nos 18–20)

Dish/bowl forms are much rarer (12 rims). Two types have been identified:

D/B Type 1 Thickened, rounded rims, sometimes flattened, sometimes internally bevelled. Shallow dishes with sagging base, occasionally knife-trimmed; hand-made or wheelthrown. Rims are occasionally finger-impressed (Fig. 23 Nos 39–42). This form is typical of the 12th century in Berkshire (cf Jope 1947, fig. 4).

D/B Type 2 Everted, rounded rim. Deep bowl with out-turned neck, slight shoulder and sagging base. Only one example, wheelthrown in fabric Q400, partially glazed internally (Fig. 23 No. 43). Jope considers this form to be typical of the 13th century in Berkshire (*ibid.*, fig. 6).

There is a single skillet/pan rim with a tongue-shaped handle, partially glazed, in fabric Q400 (Fig. 23 No. 48).

Jug/pitcher forms are slightly more common (23 rims). The fine oxidised fabric Q412, is restricted to this vessel form, and accounts for nearly half the rims identified; jug/pitcher forms in this fabric have rod or pinched strap handles, often with thumbed decoration (Fig. 22 Nos 23, 26). Decoration is otherwise absent from these vessels, although one or two have traces of possible slip decoration. Vessels are generally, though not always, glazed, and glaze is usually confined to the upper portions of the vessel. Jug/pitcher forms in other sandy fabrics have strap handles, and decoration is restricted almost entirely to incised or stabbed/slashed motifs on the handles (Fig. 22 No. 25); there are two examples of rouletting, possibly both from the same vessel (Fig. 22 No. 27, Fig. 23 No. 29). One example, in the possible early Surrey fabric Q405, has a strap handle with applied thumbed strip (Fig. 22 No. 26).

Some 19.3% of the sandy fabric group by weight is glazed, and glaze appears to be related to vessel form rather than fabric, occurring most frequently on jug/pitcher forms, both in fine and coarse sandy fabrics. There is some evidence that glaze becomes more frequent through time (see Table 15). Decoration, apart from that described above under the various vessel forms, consists of applied thumbed strips and combing, both found only on undiagnostic body sherds. Decoration by fabric type is given in Table 12, and by vessel form in Table 13.

Fabric type Q400 includes all possible examples of material from the Camley Gardens kilns at Maidenhead, Berkshire. It might be expected that these kilns, only 10 km from Windsor, would have supplied a large proportion of the pottery found on the site. The wide range of vessel forms represented in this fabric type, and its occurrence in some quantity in all medieval phases from Phase 2, would suggest a fairly wide date range. Production through the 13th and 14th centuries, and even into the 15th century, has been suggested for the kilns (Pike 1965), and production may in fact have begun earlier. Examples of Q400 are found in probable late 12th century contexts.

Few of the other sandy fabrics have any known or even postulated source. The coarse sandy fabric Q401 includes examples which are comparable to Fabric AG at Oxford (Haldon 1977), though not all of this fabric type necessarily derives from the same source. The white-firing, green-glazed fabric Q414 may be a product of the Surrey whiteware industry; it is slightly finer than Coarse Border Ware (E450, *see below*). Fabric Q405 is also pale-firing, and comparable examples have been found at Reading, for which a possible source in the Hampshire/Surrey kilns has been suggested (Underwood in Hawkes and Fasham forthcoming, fabric Sg). The fine oxidised fabric Q412 is very similar to London-type ware (E460, *see below*).

Group S (shelly wares)

Four shell-tempered fabrics were identified, ranging from the very coarse shelly fabric S400, to the fine, micaceous fabric S403. The predominant fabric in this group is the moderately coarse shelly fabric S401 (59.7% of the group, and 9.1% of the medieval assemblage as a whole).

The range of vessel types occurring in shelly fabrics is virtually the same as that for the sandy wares. Cooking pot forms (CP Types 1–7) are again the most common (92 rims), particularly CP Types 3 and 4 (Fig. 21 Nos 5–9), though CP Types 5, 6 and 7 are more commonly found in sandy fabrics. The coarser fabrics S400 and S402 are restricted to this vessel form. Dishes/bowls are found only in the two finer fabrics (Fig. 23 No. 42), and are again scarce (4 rims). All are Type 1 dishes. There are two skillet rims, both in fabric S401 (Fig. 23 Nos 46, 47).

Jug/pitcher forms (4 rims, 7 bases, 4 handles) are found only in the two finer fabrics. Bases are occasionally thumbed; other decoration is restricted

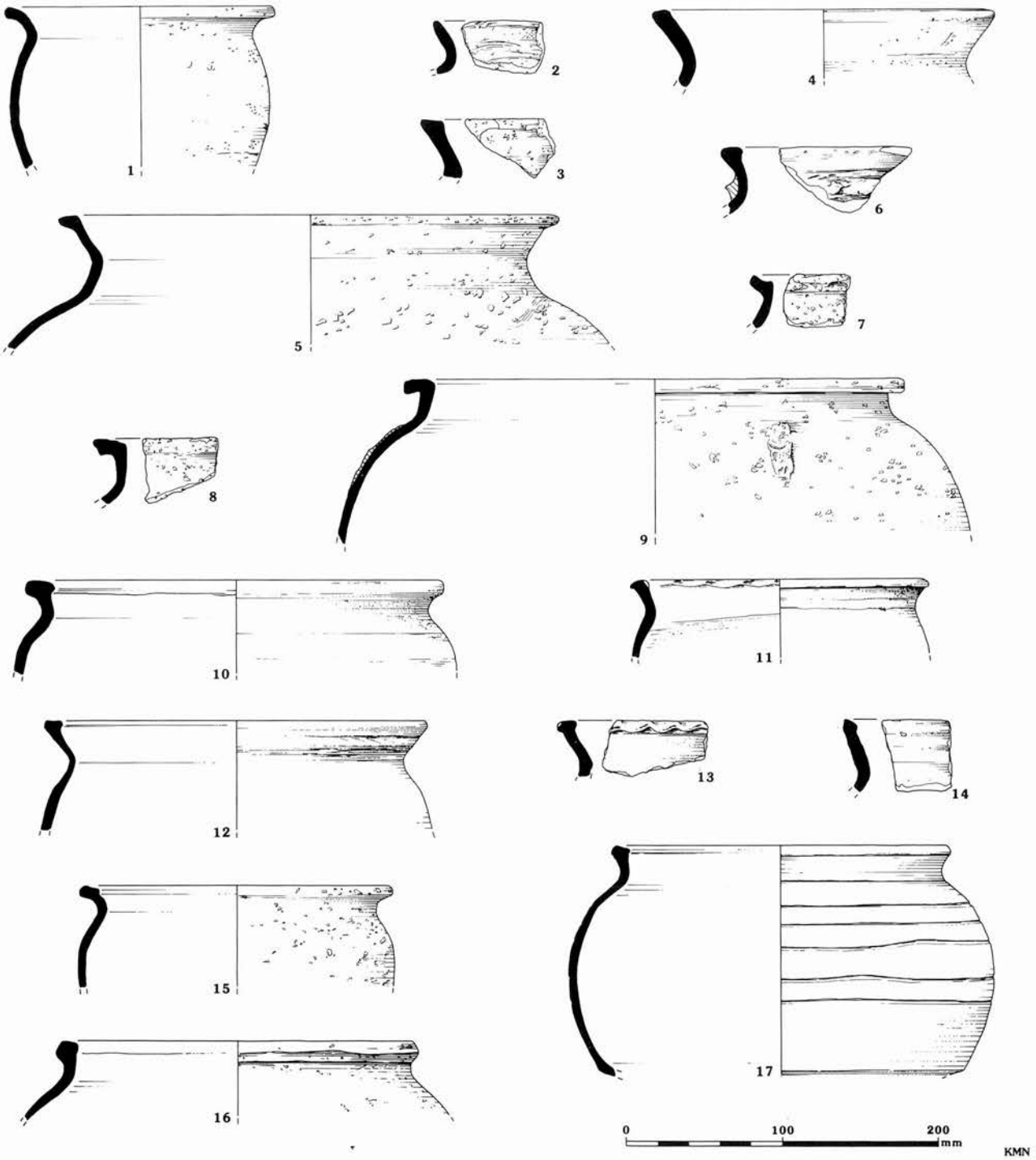

Figure 21 Pottery: Nos 1–17. Scale 1:4

to stabbed/slashed motifs on handles. Only strap handles have been recognised in shelly fabrics. Vessels are splash-glazed, and the glaze is generally restricted to the upper parts of the vessel. Two examples have all-over slip below the glaze, on the exterior and inside the rim.

The three coarser fabrics are hand-made, with wheelthrown or wheel-finished rims. Bodies are wiped, in the case of the coarser fabrics; the finer fabric S401 may have been finished on a slow wheel. Fabric S403 is always wheelthrown. Rims are very rarely finger-impressed; only two examples are known. Bodies, in the two finer fabrics, are frequently combed; the coarser fabrics are rarely combed, but are more frequently decorated with applied thumbed strips.

All fabrics except S400 have at least some glazed sherds; 7.8% of the group by weight is glazed. All glazed diagnostic sherds derive from jug/pitcher forms. There is some evidence that glaze becomes more frequent through time (see Table 15).

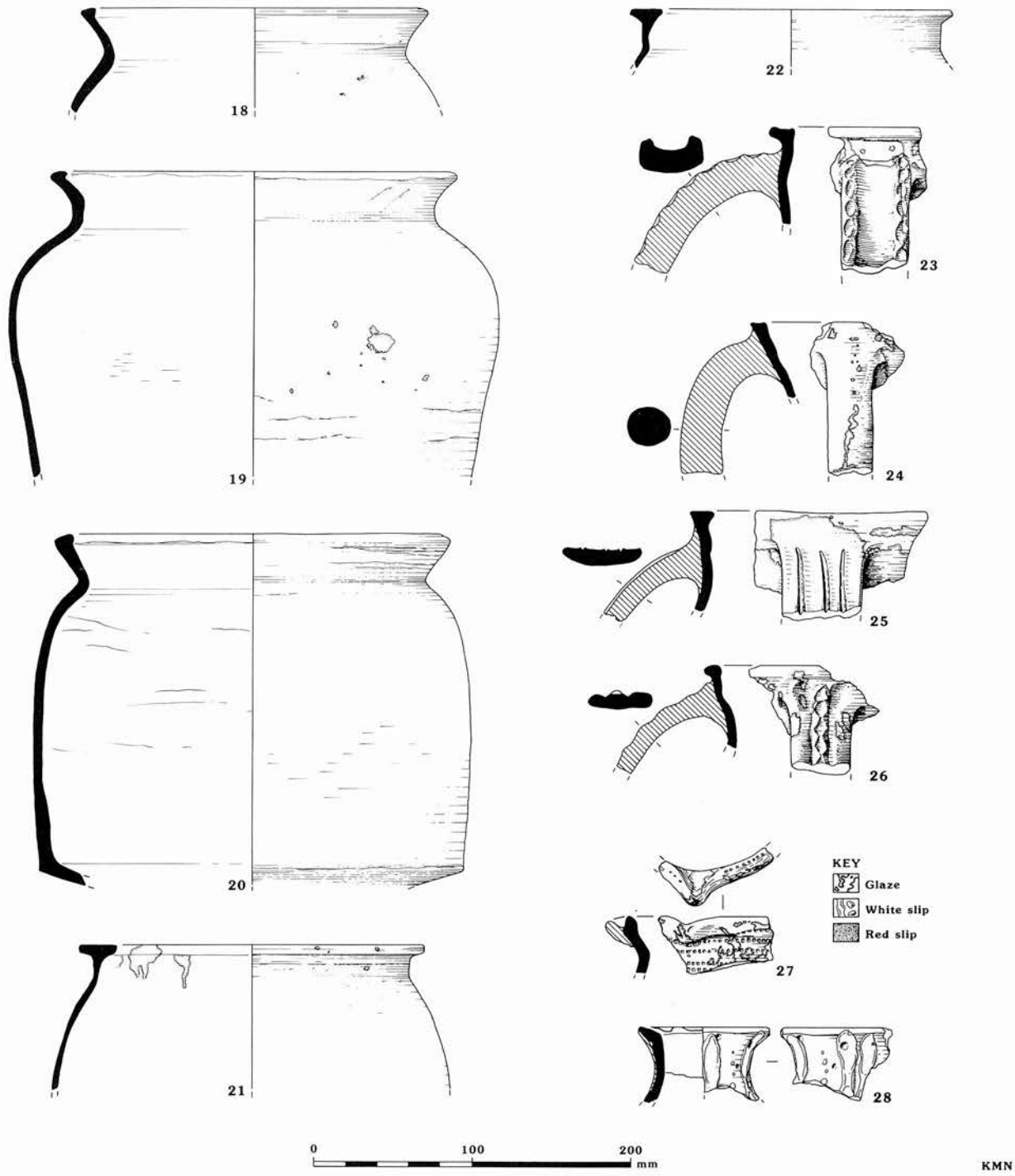

Figure 22 Pottery: Nos 18–28. Scale 1:4

Fabric S401 occurs in quantities which, although not as large as fabric Q400, do suggest at least fairly local manufacture, or a well-used supply route. It is noticeable that both S401 and Q400 are found in very similar vessel forms, with comparable manufacturing and decorative techniques, and it may be that S401, and possibly also fabrics S400 and S402, derive from a kiln in direct competition with the Camley Gardens kilns. Very similar cooking pot forms are found in shelly fabrics in London from the late 12th–mid 13th century, and the trade up-river in these cooking pots has been identified as far as Henley-on-Thames (Vince 1985, 77 and fig. 13, 1). The source of these shelly wares is unknown, but is assumed to be in the London area.

Group E ('established' wares)

Five wares of known source were identified at Jennings Yard: Saintonge white ware (E410),

Coarse Border Ware (E450), London-type ware (E460), Mill Green ware (E461), and Rouen ware (E500). All except Coarse Border Ware derive entirely from glazed jugs, generally decorated.

A small group of body sherds of London-type ware derives from copies of Rouen-style jugs (Fig. 23 Nos 35, 36, 38), with the characteristic applied strip-and-pellet decoration also found on the sherds of Rouen ware from the site (Fig. 23 No. 31). These jugs are found in early 13th century, contexts in London, together with the Rouen ware originals (Pearce *et al.* 1985, figs 25–30 and pl. V), as are jugs with North French-style decoration, a few sherds of which were also identified at Jennings Yard (Fig. 23 Nos 33, 37). Saintonge ware jugs (Fig. 23 No. 32) appear in late 13th century contexts in London (Vince 1985, 51). Mill Green ware appears in small quantities in London from the late 13th–early 14th centuries (Pearce *et al.* 1982).

Coarse Border Ware jugs have strap or rod handles, the former with incised or stabbed/slashed decoration. One example has impressed ring-and-dot decoration. There are no complete profiles, but the lower half of a baluster jug survives (Fig. 23 No. 34). All jugs are partially green-glazed. Coarse Border Ware is also used for cooking pots with wide, flat, sometimes T–headed, rims, always wheelthrown (CP Type 8: Fig. 22 Nos 21, 22; cf Pearce and Vince 1988, fig. 114) and deep bowls with similar rims (D/B Type 3: Fig. 23 Nos 44, 45; cf *ibid.*, fig. 118).

The Coarse Border Ware from Jennings Yard is comparable to material from the Farnborough kilns, which began production *c.* 1450, but could also include examples from other border kilns such as Farnham or Ash, which were in operation earlier, from the mid 13th century. The apparent absence of Kingston and Cheam products from Windsor would be consistent with the suggestion that these kilns were the primary suppliers for the London area, whilst the area to the west would have been more easily supplied from the border kilns (Holling 1971, 67–8). It has been suggested that Hampshire/Surrey wares do not appear in any quantity in East Berkshire until the decline of the Camley Gardens kilns (Underwood in Hawkes and Fasham forthcoming). Evidence from Windsor suggests that there was at least some period of overlap, since both fabrics occur in similar proportions in the latest medieval phase.

Post-medieval fabrics

The post-medieval assemblage has been grouped into fairly generalised fabric types. Early post-medieval earthenwares are divided into red (E600, E601) and white earthenwares (E630), most of the latter probably deriving from the Hampshire/Surrey border kilns, which were producing such wares from the late 16th century until *c.* 1800 (Holling 1971). The red earthenwares occur in much larger quantities, and are likely to be the products of more than one source. Later earthenwares are grouped broadly into tin-glazed wares, creamware, and the later white wares, including transfer-patterned wares. One sherd of Beauvais sgraffito slipware was identified.

Three German stonewares have been identified: Westerwald, Raeren and Frechen. White salt-glazed stoneware has also been separated out; the remaining stoneware has been grouped together.

Table 8: the post-medieval pottery assemblage by fabric type

Fabric	*No.*	*Wt (g)*	*% of total by weight*
E600	235	5173	53.8
E601	11	124	1.3
E630	85	1001	10.4
E670	1	19	<0.1
E671	3	75	<0.1
E672	29	1404	14.6
E673	11	844	8.8
E674	6	41	<0.1
E675	1	24	<0.1
E680	54	533	5.6
E681	2	14	<0.1
E685	1	36	<0.1
E690	16	252	2.6
E699	7	70	<0.1
Total	462	9610	

The Ceramic Sequence

The stratigraphic sequence from the site has been used as a basic framework for the ceramic chronology. Only a very limited amount of internal dating evidence is available, and dating of the pottery is therefore largely based on comparison with material from elsewhere, eg London (Pearce *et al.* 1985; Vince 1985), Reading (Underwood in Hawkes and Fasham forthcoming) and Oxford (Mellor 1976; Haldon 1977).

Some problems of residuality and intrusion can be expected. This is particularly true for Phase 4; a large proportion of the pottery from this phase derives from the fills of the robbing trenches for the Building 4112, and may include earlier material disturbed during robbing activity.

There are several instances of sherds from Phase 4 conjoining with sherds from earlier phases, and several examples of fabric types and vessel forms which would be more consistent with a late 12th–early 13th century date. Sherd size analysis, which might have revealed a smaller mean sherd size for pottery from residual contexts, proved inconclusive here.

Fabric types by site phase are given in Table 9; vessel forms by phase in Table 11.

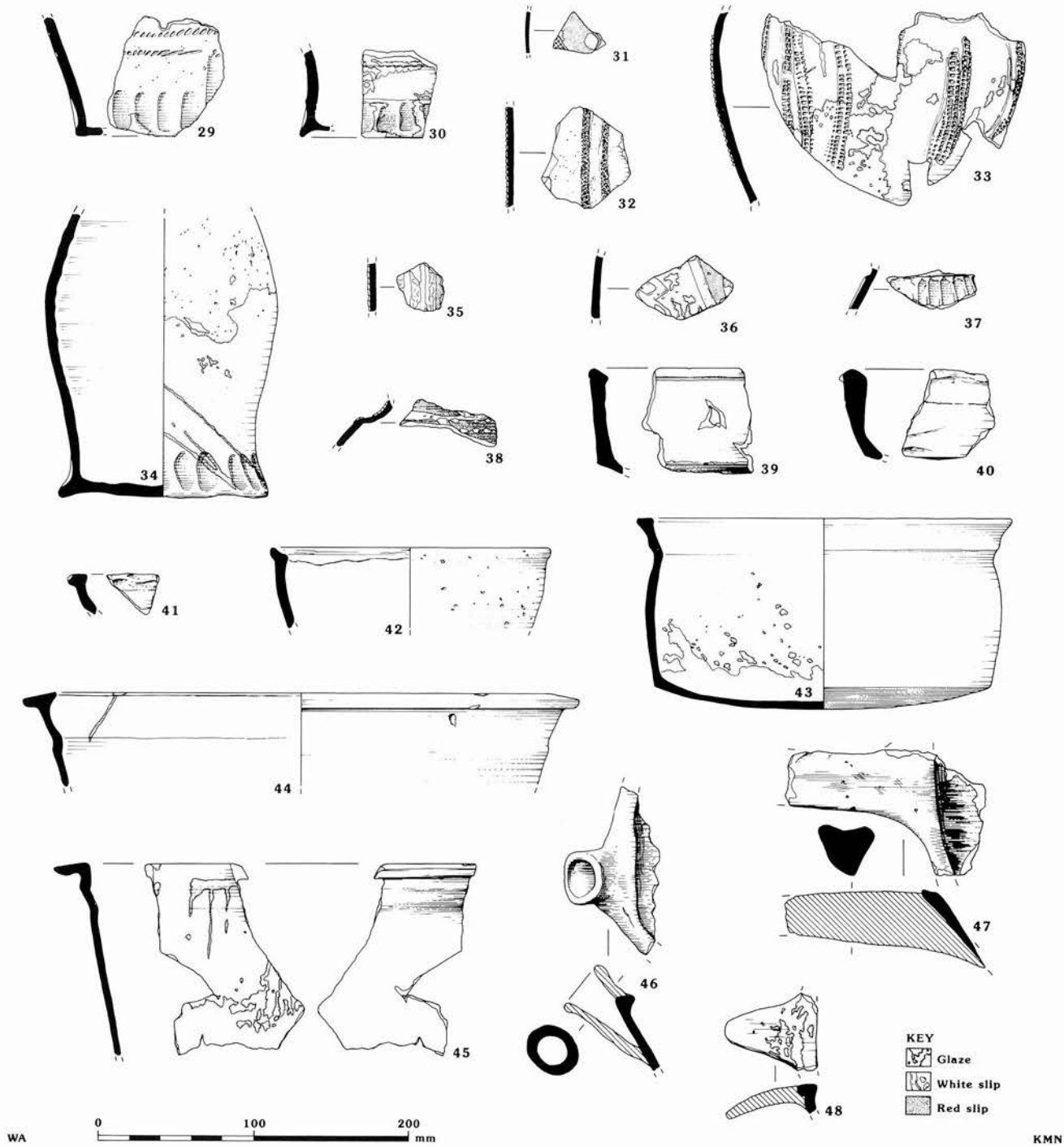

Figure 23 Pottery: Nos 29–48. Scale 1:4

Medieval

Phase 2 is characterised by cooking pots (CP Types 1, 2, 5, 6 and 7; Fig. 22 No. 18) in both shelly and sandy fabrics, dominated by the Camley Gardens fabric Q400, which forms nearly three-quarters of the assemblage in Phase 2. Apart from a single sherd of Q412, there are no fine wares. Glazed jugs in coarse sandy fabrics (Q401, Q405) also appear in Phase 2 (Fig. 22 No. 27, Fig. 23 No. 29).

Phase 3 is again dominated by fabric Q400, though not by such a large margin, and the moderately coarse shelly fabric S401 has become relatively more popular. From this phase onwards, the two fabric types occur in very similar proportions, and in a similar range of vessel forms. Fine wares are found in very small quantities in this phase: London-type ware (E460), and the possible London-type ware Q412. Jug/pitcher forms are found in fabric Q412 (Fig. 22 No. 24), and fine shelly fabric S403; there is also one sherd from a London-type ware Rouen copy jug. Cooking pots are found in CP Types 1, 2, 3, 6 and 7 (Fig. 21 No. 1, Fig. 22 No. 20).

Table 9: Pottery fabric types by phase (percentages calculated by weight of pottery from each phase)

Phase	*2b*	*2*	*3*	*4*	*5*	*6a*	*6b*	*6c*	*6d*	*Modern*
Pre-med	1.2	-	-	<0.1	-	0.3	-	-	0.6	-
E410	-	-	-	<0.1	-	-	-	-	-	-
E450	0.3	1.2	0.4	6.6	30.3	3.1	7.7	16.3	6.9	-
E460	-	-	0.7	0.7	-	6.8	1.0	-	0.6	-
E461	-	-	-	-	-	0.1	0.2	-	0.1	-
E500	-	-	-	<0.1	-	-	-	-	-	-
Q400	65.9	15.1	39.5	30.0	21.2	20.1	19.0	13.7	8.2	1.8
Q401	1.2	18.9	2.6	2.6	0.6	0.8	5.0	9.6	2.3	-
Q402	0.2	-	5.0	5.1	3.2	0.7	3.0	3.4	2.2	-
Q403	1.1	10.3	-	0.6	2.3	-	0.9	-	-	-
Q404	0.8	-	0.2	1.2	0.7	0.9	1.1	-	0.4	-
Q405	0.3	12.6	1.2	3.4	7.1	26.2	4.9	-	1.3	0.2
Q406	2.4	-	0.6	0.5	-	3.3	6.6	-	1.9	1.3
Q407	2.2	2.8	0.8	3.9	3.0	2.3	3.3	3.8	1.0	-
Q408	0.6	7.5	3.2	0.4	1.6	-	0.6	-	1.0	-
Q409	3.4	8.1	-	<0.1	-	-	1.6	-	0.1	-
Q410	-	-	0.4	-	-	-	-	-	-	0.3
Q411	1.6	-	0.2	0.5	0.2	1.6	0.3	-	-	0.2
Q412	0.2	-	5.2	4.4	3.8	6.4	1.0	-	2.0	0.5
Q413	-	-	0.5	0.2	-	1.4	0.5	3.1	3.2	-
Q414	-	-	-	-	0.1	-	-	-	0.2	-
S400	8.1	3.2	1.2	10.8	4.1	8.3	4.5	3.8	1.0	-
S401	6.5	10.3	29.7	23.4	18.7	14.8	16.4	26.1	4.6	0.9
S402	3.1	5.7	0.4	1.3	1.0	0.4	4.5	1.7	1.8	0.2
S403	0.9	4.3	8.2	3.9	0.7	0.7	1.0	-	2.8	-
E600	-	-	-	0.3	1.4	0.6	11.2	8.4	34.1	40.7
E601	-	-	-	-	-	-	0.7	-	1.5	0.2
E630	-	-	-	0.1	-	0.5	2.5	3.4	12.3	3.4
E670	-	-	-	-	-	-	-	-	0.4	-
E671	-	-	-	-	-	-	0.3	-	0.4	0.8
E672	-	-	-	-	-	0.7	0.9	-	2.7	23.0
E673	-	-	-	-	-	-	0.1	-	0.8	15.3
E674	-	-	-	-	-	-	-	-	-	0.8
E675	-	-	-	-	-	-	-	-	-	-
E680	-	-	-	-	-	-	0.3	6.7	4.5	5.0
E681	-	-	-	-	-	-	-	-	-	0.3
E685	-	-	-	-	-	-	0.9	-	-	-
E690	-	-	-	-	-	-	-	-	1.0	3.8
E699	-	-	-	-	-	-	-	-	0.1	1.3
Total No.	421	42	156	2586	172	160	340	27	428	202
Total Wt	3534	602	3158	37,309	2464	3027	3986	417	5252	5207

Table 10: pottery vessel forms by fabric type (based on rims only)

	CP1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*J/P*	*D/B1*	*2*	*3*	*SKI*
E410	-	-	-	-	-	-	-	3	4	-	-	2	-
E460	-	-	-	-	-	-	-	-	1	-	-	-	-
E461	-	-	-	-	-	-	-	-	-	-	-	-	-
E500	-	-	-	-	-	-	-	-	-	-	-	-	-
Q400	1	1	-	1	31	19	11	-	3	7	1	-	1
Q401	-	-	2	2	4	9	1	-	1	-	-	-	-
Q402	2	1	2	2	3	5	-	-	-	2	-	-	-
Q403	-	-	-	-	-	-	1	-	-	-	-	-	-
Q404	3	-	-	-	1	1	-	-	1	-	-	-	-
Q405	-	-	-	-	5	2	1	-	3	-	-	-	-
Q406	1	-	-	-	1	-	1	-	3	-	-	-	-
Q407	2	2	4	2	2	4	1	-	1	1	-	-	-
Q408	-	-	-	-	-	-	-	-	-	-	-	-	-
Q409	-	-	-	-	-	-	-	-	-	-	-	-	-
Q410	-	-	-	-	-	-	-	-	-	-	-	-	-
Q411	-	-	-	-	-	-	-	-	-	-	-	-	-
Q412	-	-	-	-	-	-	-	-	11	-	-	-	-
Q413	-	-	1	-	-	-	1	-	-	-	-	-	-
Q414	-	-	-	-	-	-	-	-	-	-	-	-	-
S400	2	3	14	21	1	1	-	-	-	-	-	-	-
S401	5	10	5	1	10	9	1	-	4	2	-	-	2
S402	-	1	1	2	2	-	-	-	-	-	-	-	-
S403	-	-	-	1	3	-	-	-	-	2	-	-	-
Total	16	18	29	32	63	50	18	3	32	14	1	2	3

Phase 4 produced the greatest quantity of pottery (just over half the total assemblage derived from this phase) but, as noted above, much of this may be residual. Sandy fabric Q400 and shelly fabric S401 together comprise more than half the assemblage from this phase. The coarse shelly fabric S400 becomes more common, and is found mainly in Type 4 cooking pots, which appear for the first time in this phase (Fig. 21 Nos 8, 9). Coarse Border Ware occurs in this phase for the first time in any quantity, although it still comprises less than 7% of the pottery from the phase.

Cooking pots occur in all forms except CP Type 8, the most common being CP Types 5 and 6 (Fig. 21 Nos 2, 3, 5–9, 12–14, 16, 17). Jug/pitcher forms occur mostly in fabric Q412 (Fig. 23 No. 30); this phase also includes most of the examples of London ware copies of Rouen-style jugs (Fig. 23 Nos 35, 36, 38), and all examples of the Rouen ware originals (Fig. 23 No. 31), although both would be more consistent with an early 12th century date.

One sherd of a Saintonge white ware decorated jug (unillustrated) was also recovered from this phase; Saintonge ware is found in late 13th century contexts in London (Vince 1985, 51). Some 13.7% of the pottery from this phase is glazed.

In Phase 5, sandy fabric Q400 and shelly fabric S401 are still present in fair quantities, but from the upper Phase 5 levels (archive phase 67) the dominant fabric is Coarse Border Ware, which comprises nearly one-third of the assemblage in this phase. All other fabrics represented occur as less than 5% of the assemblage. The range of fabrics is more restricted than in earlier phases. London-type ware and other fine wares are almost completely absent: fabric Q412 is present in small quantities. London-type ware disappears in London, superceded by the Surrey wares, by the late 14th century (Vince 1985, 56).

The range of vessel types present is similarly restricted, and nearly half the rim types identified are characteristic late medieval forms in Coarse Border Ware: flat-rimmed cooking pots (CP Type 8; Fig. 22 No. 21) and deep bowls (D/B Type 3; Fig. 23 Nos 44, 45). Only two other cooking pot rims were recovered (Fig. 21 Nos 4, 11), one skillet (Fig. 23 No. 47), and one jug/pitcher. Some 42.6% of the pottery from this phase was glazed.

Post-medieval and modern phases

Post-medieval material does not in fact form an appreciable part of the assemblage until Phase 6d.

Table 11: pottery vessel forms by phase (based on rims only)

Phase	*CP1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*J/P*	*D/B1*	*2*	*3*
2b	2	1	-	-	6	2	1	-	-	-	-	-
2	-	-	-	-	1	-	-	-	2	-	-	-
3	1	1	2	-	-	2	3	-	2	-	-	-
4	9	12	18	29	46	39	12	-	13	9	1	1
5	-	1	3	-	1	2	-	1	3	-	-	-
6a	-	1	1	-	-	2	1	-	3	2	-	-
6b	2	2	2	1	6	-	1	1	3	3	-	2
6c	-	-	1	-	1	-	-	-	-	-	-	-
6d	2	-	2	1	2	2	-	1	3	-	-	1
Modern	-	-	-	-	-	1	-	-	1	-	-	-
Total	16	18	29	31	63	50	18	3	30	14	1	4

Red and white earthenwares are found from Phase 6a as are salt-glazed stonewares, though both occur in very small quantities.

Tin-glazed earthenwares appear for the first time at the end of Phase 6b, together with a single sherd of Beauvais sgraffito slipware, dated to the late 15th or 16th century.

From Phase 6d, red and white earthenwares are present in large quantities, and the Surrey white earthenwares show a marked peak in this phase. This would be consistent with the output of the Hampshire/Surrey border kilns, which were producing white earthenwares from the late 16th century until *c.* 1800; none of the rim types in this fabric can be dated earlier than the early 17th century (Holling 1971). A single sherd of Westerwald stoneware, of late 17th century date or later, also derives from this phase.

Creamware and later white earthenwares are not present until post-Phase 6, contexts, though never in large quantities.

Discussion

Although broad chronological trends are apparent in the ceramic sequence, it proved more difficult to discern any more detailed patterning. Accurate dating of the sequence of events on the site is confounded by the apparent homogeneity of the assemblage through time, and the suspected presence of residual material in later medieval phases. It appears that many fabric types and vessel forms had a wide date range; two of the most common fabric types (Q400, S401) appear in quantity throughout the medieval phases, with little or no apparent development in vessel form.

Dating is therefore largely dependent on the presence of datable pottery from known sources, eg London-type ware and Coarse Border Ware. A *terminus post quem* in the late 12th century for the construction of Building 4112 is provided by the building material employed; other independent dating evidence is limited to early post-medieval leather from the fills of ditch 0666.

The relative absence of London-type ware from contexts contemporary with the use of Building 4112 (Phase 3) would suggest that this structure was very short-lived. The robbing fills of the building (Phase 4) contain most of the London-type ware jugs from the site; even if some of this material is residual, it would place the demolition of the building no later than the mid 13th century, although a single sherd of Saintonge ware is ambiguous evidence of a slightly later date. Coarse Border Ware, which is unlikely to be earlier than mid-14th century, is absent from the robbing fills but occurs in small quantities in contexts associated with the collapse of the jetty and upper fills of the ditches 0666 and 0578. The majority of the Coarse Border Ware on the site derives from contexts contemporary with the demolition of the second structure on the site, Building 0943.

A consideration of the sources of the pottery found at Jennings Yard reveals that the site has more in common with the London area than with the rest of east Berkshire. Fundamental differences are apparent between the assemblages from Reading and Windsor. The former was supplied largely from south Oxfordshire and the west of the county, although Surrey wares and possible Camley Gardens material are also present (Underwood in Hawkes and Fasham forthcoming).

The absence at Windsor of the flint-and-chalk tempered fabrics found in the west of the county, with a postulated source to the north of the Savernake Forest (Vince in prep., group B fabrics), is not surprising, given the existence of other, nearer, kilns which were producing a similar range of coarse cooking wares at the same period.

Some possible examples of south Oxfordshire fabrics have been identified at Jennings Yard, but it appears that apart from the local supply from Camley Gardens, the main sources of pottery were to the east, in the London area, and to the south, on the Hampshire/Surrey border. Although not all the

Table 12: pottery decoration by fabric type (number of sherds, medieval fabrics only)

	Incised	*Stab*	*Comb*	*Groove*	*Impressed*	*Roulette*	*Applied*	*Slip*
E410	-	-	-	-	-	-	2	-
E450	1	4	1	1	4	-	-	2
E460	-	-	-	1	-	-	15	14
E461	-	-	-	-	-	-	-	1
E500	-	-	-	-	-	-	-	4
Q400	2	-	15	53	18	1	8	-
Q401	-	-	5	2	1	11	-	-
Q402	-	-	10	-	7	-	5	-
Q403	-	-	-	1	-	-	1	1
Q404	1	-	3	1	3	-	-	-
Q405	2	1	5	2	1	-	6	-
Q406	-	-	-	-	2	-	-	1
Q407	-	-	13	-	2	-	-	-
Q408	-	-	-	-	-	-	-	-
Q409	-	-	2	-	-	-	-	-
Q410	-	-	-	-	-	-	1	1
Q411	-	-	1	8	8	-	1	-
Q412	-	-	-	4	8	-	8	13
Q413	-	-	-	-	-	-	-	-
Q414	-	-	-	-	1	-	1	-
S400	-	-	1	-	-	-	9	-
S401	-	2	68	2	4	-	6	2
S402	-	-	2	-	1	-	-	-
S403	3	-	27	1	1	-	-	-
Total	9	7	153	76	61	12	63	39

Table 13: pottery decoration by vessel form (no. of occurrences, medieval vessel forms only)

	Incised	*Stab*	*Comb*	*Groove*	*Impressed*	*Roulette*	*Applied*	*Slip*
CP1	-	-	-	-	2	-	-	-
2	-	-	-	-	1	-	-	-
3	-	-	-	-	-	-	1	-
4	-	-	-	-	-	-	1	-
5	-	-	-	-	7	-	-	-
6	-	-	-	-	2	-	-	-
7	-	-	-	1	-	-	-	-
8	-	-	-	-	-	-	-	-
J/P	1	-	-	-	3	1	1	3
D/B1	-	-	-	-	4	-	-	-
2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-
Total	1	0	0	1	19	1	3	3

Table 14: Estimated vessel equivalents (EVE) by vessel form

Form	*No. of rims*	*EVE*
CP1	16	1.89
2	18	0.85
3	29	2.17
4	32	2.55
5	63	3.11
6	50	2.88
7	18	1.85
8	3	0.63
J/P	32	4.63
D/B1	14	0.11
2	1	0.86
3	2	0.11

pottery from London need necessarily have been travelling by river, the position of Windsor on the Thames must have had some influence on the supply of pottery. The trade in coarse shelly cooking pots up-river to Henley has been noted (Vince 1985, 77), and London-type ware outside the city has a noticeably riverine distribution (Pearce *et al.* 1985, figs 1–3).

The presence of imports, albeit in very small quantities, emphasises further the disparity between Windsor and the area to the west, and must have some implication for the interpretation of site status, since Rouen and Saintonge wares are rare outside London and major ports such as Southampton (Platt and Coleman-Smith 1975). On the other hand, despite the presence of the imports, the quantity of fine ware on the site is not large, and apart from the small group of London-type ware sherds, decorated jugs and/or pitchers are virtually absent. The majority of the assemblage appears to comprise a fairly standard, relatively plain, range of domestic cooking vessels.

List of Fabric Types

A type series of representative sherds has been retained by Wessex Archaeology.

Medieval fabrics

Group Q (sandy wares)

Q400 Moderately fine sandy fabric; common (25–30%), fairly well-sorted quartz grains mm; sparse (3–5%) iron oxide <0.5 mm. Generally unoxidised.

Q401. Moderately coarse sandy fabric; common, poorly-sorted quartz grains <1 mm; sparse iron oxide <1 mm. Oxidised or unoxidised.

Q402 Coarse, irregular sandy fabric; common, poorly-sorted quartz grains <1 mm; sparse iron oxide <1 mm; often slightly soapy feel. Generally unoxidised.

Q403 Moderately coarse sandy fabric; moderate (10–15%), poorly-sorted quartz grains <1 mm; rare (1–3%) flint fragments <1 mm. Generally oxidised.

Q404 Moderately coarse, sparsely sandy fabric; sparse quartz grains <0.5 mm; sparse black iron oxide <0.5 mm; often slightly soapy feel. Generally unoxidised.

Q405 Moderately coarse sandy fabric; common, fairly well-sorted quartz grains <0.5 mm in an iron-poor clay matrix, firing buff/pale grey. Generally unoxidised.

Q406 Moderately fine, sparsely sandy fabric; sparse, fairly well-sorted quartz grains <0.5 mm; sparse black and red iron oxides <0.5 mm. Generally oxidised; appearance similar to red earthenware.

Q407 Coarse, sandy fabric; moderate, poorly-sorted quartz grains <1 mm; sparse, poorly-sorted flint fragments <1.5 mm; moderate iron oxide <0.5 mm. Generally unoxidised.

Q408 Moderately fine sandy fabric; common, fairly well-sorted quartz grains <0.5 mm in an iron-poor clay matrix; sparse rounded grog/clay pellet <2 mm. Generally unoxidised.

Q409 Moderately fine sandy fabric; common, fairly well-sorted quartz grains <0.5 mm; sparse, subrounded flint fragments <3 mm; sparse iron oxide <0.5 mm. Generally unoxidised.

Q410 Fine sandy fabric; sparse, poorly-sorted quartz grains <1 mm; sparse, subrounded flint gravel <2 mm; sparse black iron oxide <0.5 mm. Unoxidised.

Q411 Coarse, sparsely sandy fabric with flint; sparse, poorly-sorted quartz grains <0.5 mm; sparse red iron oxide <1 mm; rare subangular flint fragments <1 mm. Unoxidised.

Q412 Fine sandy fabric, slightly micaceous; rare quartz grains <0.5 mm; rare black and red iron oxide <0.5 mm. Oxidised, often with unoxidised core.

Q413 Fine sandy fabric, slightly micaceous, very similar to Q412; rare carbonised ?organic fragments; often slightly soapy feel. Oxidised, generally with unoxidised core.

Q414 White sandy fabric; moderate, fairly well-sorted quartz grains <0.5 mm sparse black iron oxide <0.5 mm.

Table 15: proportions of glazed sherds by Phase

Phase	*No. glazed*	*Wt (g)*	*% of total*	*% Q400 glazed*	*% S401 glazed*
2b	8	94	2.7	0.8	–
2	4	231	38.4	–	–
3	7	286	9.1	3.5	0.9
4	346	6620	17.2	15.0	27.0
5	77	1015	41.2	11.9	16.3
Total	442	8246			

Group S (shelly wares)

S400 Coarse, shell-tempered fabric; common to abundant (20–40%), poorly-sorted, laminar shell fragments <5 mm; very rare quartz grains <0.5 mm; rare red iron oxide <0.5 mm. Fairly soft fabric with a slightly soapy feel; oxidised or unoxidised.

S401 Moderately coarse shell-tempered fabric; sparse to moderate, poorly-sorted laminar shell fragments <1 mm; sparse quartz grains <0.5 mm; moderate iron oxide <1 mm. Soft to hard fabric; sometimes slightly soapy feel; oxidised or unoxidised.

S402 Moderately coarse shell-tempered fabric; moderate, poorly-sorted shell fragments <1 mm; moderate, poorly-sorted quartz grains <1 mm; sparse iron oxide <0.5 mm. Oxidised or unoxidised.

S403 Fine, micaceous sandy fabric; sparse shell fragments <0.5 mm. Oxidised or unoxidised.

Group E ('established' wares)

E410 Saintonge white ware: very fine, soft, fabric, firing buff; no visible inclusions.

E450 Surrey white ware (Coarse Border Ware): hard, fine fabric, firing pink/buff; moderate pink/red/clear quartz grains <1 mm.

E460 London-type ware: fine, slightly micaceous fabric; rare quartz grains <0.5 mm; rare black and red iron oxide <0.5 mm. Oxidised, generally with unoxidised core.

E461 Mill Green ware: soft, very fine, micaceous fabric; sparse red iron oxide <0.5 mm. Oxidised.

E500 Rouen white ware: soft, fine fabric, firing pale pink; rare pink/red/clear quartz grains <1 mm; sparse black iron oxide.

Post-medieval fabrics

E600 Red earthenware: includes both glazed and unglazed wares, probably from a variety of sources.

E601 Pink earthenware: possibly part of E600.

E630 Surrey white earthenware: white to pinky-buff fabric, both glazed (green or yellow glaze) and unglazed. Late 16th century–*c.* 1800.

E670 Westerwald stoneware: pale grey fabric, salt-glazed; with characteristic blue glazed decoration. Early 17th century onwards.

E671 Frechen stoneware: grey or creamy-buff fabric, salt-glazed. Late 16th–17th century.

E672 Salt-glazed stoneware: includes all salt-glazed stonewares not otherwise identified. Grey to buff fabric, glaze generally brown or mottled grey-brown. 16th century onwards.

E673 Stoneware, not salt-glazed: includes all stoneware without salt-glaze, eg 19th–20th century ginger beer bottles.

E674 White salt-glazed stoneware: *c.* 1720–1800.

E675 Raeren/Aachen stoneware: light grey fabric, mottled grey-brown salt-glaze. Late 15th–16th century.

E680 Tin-glazed earthenware (Delft): relatively soft white to cream/buff fabric; tin glaze often abraded from surfaces. Late 16th–18th century.

E681 Creamware: fine cream-coloured glazed earthenware. *c.* 1750–19th century.

E685 Beauvais slipware: very hard creamy/buff earthenware, red-slipped. Late 15th–16th century.

E690 Modern white earthenware: includes all modern (19th–20th century) white glazed earthenwares, including 'blue & white transfer' wares.

E699 Porcelain.

Fig. 21

1. **Cooking pot**, Type 1, in moderately fine shelly fabric (S401), hand-made but probably wheel-finished. Sooting on exterior surface. Phase 3, context 4055, Featured Sherd No. 5352.
2. **Cooking pot rim**, Type 1, in coarse sandy fabric (Q402), hand-made, wiped exterior. Phase 4, context 0942, FSN 5254.
3. **Cooking pot rim**, Type 2, in moderately fine shelly fabric (S401); wheel-finished. Phase 4, context 0386, FSN 5065.
4. **Cooking pot rim**, Type 2, in coarse sandy fabric with flint (Q407); hand-made, ?wheel-finished. Phase 5, context 0987, FSN 5339.
5. **Cooking pot rim/shoulder**, Type 3, in coarse shelly fabric (S400); hand-made, wheel-finished rim, exterior surface wiped. Phase 4, context 0979, FSN 5288.
6. **Cooking pot rim**, Type 3, in moderately coarse shelly fabric (S401); wheel-finished. Applied, finger-impressed cordon around neck. Phase 4, context 0979, FSN 5294.
7. **Cooking pot rim**, Type 3, in coarse shelly fabric (S400); wheel-finished. Phase 4, context 0618, FSN 5143.
8. **Cooking pot rim**, Type 4, in coarse shelly fabric (S400); wheel-finished. Phase 4, context 0393, FSN 5083.
9. **Cooking pot rim/shoulder**, Type 4, in coarse shelly fabric (S400), hand-made with wheel-finished rim. Applied thumbed strip on body. Phase 4, context 0195, FSN 5027.
10. **Cooking pot rim/shoulder**, Type 5, in moderately fine sandy fabric (Q406); ?wheelthrown. Phase 6b, context 0400, FSN 5088.
11. **Cooking pot rim/shoulder**, Type 5, in moderately coarse sandy fabric (Q400); wheel-finished. Finger-impressed decoration on inside of rim. Phase 5, context 0903, FSN 5234.
12. **Cooking pot rim/shoulder**, Type 5, in moderately coase sandy fabric (Q405); hand-made with wheel-finished rim. Phase 4, context 0979, FSN 5324.
13. **Cooking pot rim**, Type 5, in moderately coarse sandy fabric (Q400); wheel-finished. Finger-impressed decoration on rim. Phase 4, context 0979, FSN 5319.
14. **Cooking pot rim**, Type 6, in moderately coarse sandy fabric (Q400); wheel-finished. Phase 4, context 0392, FSN 5078.
15. **Cooking pot rim/shoulder**, Type 6, in coarse shelly fabric (S400); hand-made with wheel-finished rim. Sooted exterior, up to rim; slightly spalled exterior surface. Phase 6a, context 0467, FSN 5098.
16. **Cooking pot rim/shoulder**, Type 6, in coarse sandy fabric with flint (Q407); hand-made with wheel-finished rim. Sooted exterior. Phase 4, context 0176, FSN 5020.
17. **Cooking pot**, Type 6, in moderately coarse sandy fabric (Q400); hand-made with wheel-finished rim.

Grooved decoration on body. Phase 4, context 0618, FSN 5140.

Fig. 22

18. **Cooking pot rim/shoulder**, Type 7, in moderately fine sandy fabric (Q406); ?wheelthrown. Phase 2, context 0387, FSN 5068.
19. **Cooking pot**, Type 7, in moderately coarse sandy fabric (Q405); hand-made with wheel-finished rim. Sooted exterior; one small glaze splash. Phase 6a, context 0467, FSN 5097.
20. **Cooking pot**, Type 7, in moderately coarse sandy fabric (Q400); hand-made with wheel-finished rim. Sooted exterior. Phase 3, 4053, FSN 5351.
21. **Cooking pot rim/shoulder**, Type 8, in Coarse Border Ware (E450); wheelthrown. Spots of glaze on exterior and interior. Phase 5, context 0833, FSN 5220.
22. **Cooking pot rim**, Type 8, in Coarse Border Ware (E450); wheelthrown. Phase 6d, context 195, FSN 5031.
23. **Jug/pitcher rim** in fine oxidised sandy fabric (Q412); wheelthrown. Pinched strap handle with thumbed decoration, mortised. Glazed exterior. Phase 6a, context 0467, FSN 5357.
24. **Jug/pitcher rim** in fine oxidised sandy fabric (Q412); ?wheelthrown. Rod handle, mortised. Traces of glaze on exterior. Phase 3, context 991, FSN 5342.
25. **Jug/pitcher rim** in moderately coarse sandy fabric (Q400); ?wheelthrown. Strap handle with incised decoration, mortised. Patchily glazed exterior. Phase 4, 4106, FSN 5355.
26. **Jug/pitcher rim** in moderately coarse sandy fabric (Q405); ?wheelthrown. Strap handle with applied thumbed strip, mortised. Glazed exterior. Modern, context 0890, FSN 5232.
27. **Jug/pitcher rim** with spout in coarse sandy ware (Q401); ?hand-made. Rouletted decoration externally, glazed externally and inside neck. Possibly from same vessel as No. 29. Phase 2, context 0371, FSN 5049.
28. **Jug/pitcher rim** in London-type ware (E460); wheelthrown. White slip coating inside neck; applied slip decoration on exterior, glazed. Phase 4, context 0392, FSN 5079.

Fig. 23

29. **Jug/pitcher base**, in coarse sandy fabric (Q401), ?hand-made. Thumbed base, rouletted decoration above. Glazed exterior. Possibly same vessel as No. 27. Phase 2, context 0371, FSN 5050.
30. **Jug/pitcher base** in fine oxidised sandy ware (Q412); ?wheelthrown. Thumbed base, glazed exterior. Phase 4, context 0393, FSN 5082.
31. Body sherd of **glazed jug** in Rouen ware (E500); wheelthrown. Red-slipped, with applied white slip decoration. Phase 4, context 0976, FSN 5370.
32. Body sherd of **glazed jug** in Saintonge white ware (E410); wheelthrown. Applied rouletted strips. Unstratified, FSN 5375.
33. **Jug** in London-type ware (E460); wheelthrown. White-slipped and glazed, with north French style applied slip decoration. Phase 6a, context 0467, FSN 5095.
34. Lower half of **baluster jug** in Coarse Border Ware (E450); wheelthrown. Roughly thumbed base. Upper part of exterior glazed. Phase 4, 4106, FSN 5354.
35. Body sherd of **glazed jug** in London-type ware (E460); wheelthrown. Rouen-style applied slip decoration. Phase 4, context 0979, FSN 5373a.
36. Body sherd of **glazed jug** in London-type ware (E460); wheelthrown. Rouen-style applied slip decoration. Phase 4, context 0979, FSN 5373b.
37. Body sherd of **glazed jug** in London-type ware (E460); wheelthrown. North French style applied decoration. Phase 4, context 0392, FSN 5364.
38. Body sherd of **glazed jug** in London-type ware (E460); wheelthrown. Rouen-style applied slip decoration. Phase 4, context 0617, FSN 5135.
39. **Shallow dish** (Type 1) in moderately coarse fabric (Q400); hand-made, wheel-finished. Phase 4, context 0939, FSN 5242.
40. **Shallow dish** (Type 1) in coarse sandy fabric (Q402); hand-made, knife- trimmed base. Finger-impressed decoration on rim. Phase 4, context 0487, FSN 5109.
41. **Shallow dish rim** (Type 1) in moderately fine sandy fabric (Q400); wheelthrown or wheel-finished. Finger-impressed decoration on rim. Phase 4, context 0390, FSN 5072.
42. **Convex-sided bowl** (Type 1) with internally bevelled rim, in moderately fine shelly fabric (S401); hand-made. Modern, context 0921, FSN 5237.
43. **Bowl** (Type 2) in moderately coarse sandy fabric (Q400); ?wheelthrown. Partially glazed internally. Phase 4, 4106, FSN 5353.
44. **Deep bowl** (Type 3) in Coarse Border Ware (E450); wheelthrown. Sooted exterior, up to rim. Phase 5, context 0833, FSN 5222.
45. **Deep bowl** (Type 3) in Coarse Border Ware (E450); wheelthrown. Partially glazed interior. Phase 5, context 0833, FSN 5223.
46. **Skillet rim/handle** in moderately coarse shelly fabric (S401); hand-made. Sooted exterior. Phase 4, context 0979, FSN 5296.
47. **Skillet rim/handle** in moderately coarse shelly fabric (S401); hand-made. Phase 5, context 0172, FSN 5015.
48. **Skillet rim/handle** in moderately coarse sandy fabric (Q400); ?hand-made. Partially glazed on interior and over handle. Phase 4, context 0979, FSN 5307.

6. Clay Pipe, *by J. M. Mills*

A total of 341 pieces of clay pipe (1854 g) was recovered from 51 contexts, one piece being unstratified. Of the 341 pieces, 52 were bowl fragments (642 g). Details of numbers and weights by context may be found in the archive along with details of their provenanced contexts.

The stem of the unstratified bowl was marked with a maker's mark, and one fragment, from context 0526 (post-Phase 6), was decorated with a spiral rouletted design at one end. No single context or stratigraphic unit contained sufficient stem fragments for statistical dating using stem bore diameter measurements to be considered.

Of the 52 bowl fragments, 39 from 15 contexts and the one unstratified bowl were complete enough to be dated by comparison to Oswald's general

simplified typology (1975, 37–41). Details of the Oswald type by context may be found in the archive. Date ranges on the basis of bowl type can be assigned to eight stratigraphic units (details in archive), spanning 1600–1820.

On this basis, no chronological difference can be seen between the various zones of the Phase 6 orchard soils, and a late 17th century date is suggested for the deposition or working of these layers. The range of dates for pipes included in the later (post-Phase 6) rubble spreads and drainage trenches is broadly comparable to the orchard soils but with some later items; much of the collection from modern contexts must be regarded as residual.

Makers' Marks

Three different marks were present, two occurring on pipe bowls from context 0526 (modern), and one on the unstratified bowl:

1. Base stamp with the initials **R S** in a small heart shaped stamp. Present on an Oswald type 8/9 bowl (*c.*1660–1680). Modern, context 0526.
   No makers with these initials are listed from Berkshire. None in Buckinghamshire are consistent with the date suggested by the bowl type. London is the only other alternative source for pipes in Windsor. A Richard Saunders of Blackfriars, died 1692, may have been the maker (Oswald 1975, appendix).
2. Two definite and two probable instances (one is very faint and badly impressed, the other is _ **B** of a relief, mould-imparted spur mark **W B**. Only one of the bowls was complete enough to assign to a type. It was an Oswald type 13 bowl (*c.* 1780–1820), and is likely to date to after 1800 as the mould line on the base of the spur has been removed. Modern, context 0526.
   No makers from Berkshire are known with these initials. Five makers from Buckinghamshire with the initials *W B* are known, but all have dates inconsistant with the date for the bowl, again a London source is possible. Four makers with *W B* initials are known from London for the period 1780–1820 (Oswald 1975, appendix), the mark may be that of any one of these makers.
   Unfortunately as not all clay pipe makers names are known and the author knows nothing of any research that may have been completed on clay pipes in the Windsor area it seems unlikely that these two marks can be accurately assigned to makers at this time.
3. Incuse **S V** on upper stem surface, the bowl was an Oswald type 4 (*c.*1600–1640) (unstratified).
   The *S V* maker is known from London *c.*1620–1660, from Lincolnshire, and elsewhere from the mid 17th century (Oswald 1975, 88 and fig.16). The date for this bowl is consistent with the known early distribution of the maker's work and is not out of place in Windsor.

7. Architectural Stonework,
by Michael J. Heaton

A total of 48 fragments of building and foreign stone weighing at least 307.164 kg was recovered, with 269 kg being accounted for by three particularly large objects. A further quantity was not removed from site, comprising *in situ* walling, predominantly of Chalk rock. The remainder, roughly half of which consisted of dressed or cut stone of definite structural or decorative function, was recovered from a wide range of contexts and stratigraphic units but predominantly from the northern half of the site about the area of the main medieval building, 4112. Only six pieces came from contexts not directly associated with the construction, use or demolition of these buildings. None of the ornamental pieces or voussoirs were *in situ*, although ashlars apparent within the surviving walls of Garderobe 4051 may have been fragments of voussoir, or may have carried mouldings on faces not visible.

The assemblage comprised Chalk rock (clunch), Upper Greensand, Oolitic Limestone and small quantities of quartz fossil and chert. The stone was identified by Dr B.W. Selwood and Dr Joy Rae of the Post-Graduate Research Institute of Sedimentology at Reading University. A full catalogue of dimensions, provenance and stratigraphic information is held in archive.

Raw Material

The stone originated from three main areas. Table 16 gives the relative proportions and distributions of each stone type.

The main source of Chalk rock is likely to have been the Reading area, the consistency of most of the items recovered being too hard to have been obtained from the local outcrop beneath Windsor Castle. Some exploitation of this latter source was indicated by the presence of two fragments of *Inocernamus*, the type-fossil for that outcrop.

Slightly glauconitic Upper Greensand originated from the Reigate area (Reigate Stone), some 35 km to the south east. Reigate Stone was introduced as a building material at Windsor Castle during the reign of Henry II (Yarwood 1961). Robert of Beverley, master mason at Windsor Castle, was ordered in 1261 to supply Reigate Stone for the Queens Lodgings (Harvey 1984). Five hundred blocks were taken from the Royal stores at Westminster indicating that a convenient route between the source and destination was not always of primary importance. A single piece of chert was Upper Greensand chert, presumably from the same source as the other Greensand.

The Chalk rock and Greensand displayed an overlap of properties, some of the former being off-white in colour with slight traces of mica visible to the eye, as if a mixture of Chalk and Greensand. This suggests that both stones were being quarried at the same source where the two overlapping beds were accessible together, the Chalk being recovered from a considerable depth.

Great Oolitic Limestone was likely to have been derived from two sources; the majority from the Cotswolds north of Oxford, possibly Taynton, *c.* 90 km north west of Windsor, with all but 30 km of that

Table 16: building stone types by Phase (weights in grams)

Phase	*Reigate Stone*	*Cotswold Oolite*	*Bath Oolite*	*Chalk rock*	*Chert*	*Quartz*	*Calcite*	*Total*
1	-	-	-	-	15	-	-	15
2a	-	216,000*	-	-	-	-	-	216,000
2b	120	-	-	-	-	-	-	120
3	-	16,400	687	8020	-	-	-	25,107
4	1860	380	-	590	-	-	23	2853
5	2165	-	-	-	-	-	-	2165
6a	-	-	-	230	-	-	-	230
6b	90	-	-	758	-	-	-	848
6c	-	-	-	-	-	-	-	-
6d	-	-	-	107	-	-	-	107
Modern	-	53,000	-	-	-	440	-	53,440
Unstrat.	292	3295	-	-	-	-	-	3587
Total	4527	289,075	687	9705	15	440	23	304,472

* = estimated weight only

distance accessible via the Thames. One piece (SF1153) almost certainly came from the Bath area.

Reuse
Two pieces of dressed or cut stone had mortar adhering to broken surfaces or best faces, or more than one type of mortar on other surfaces, suggesting secondary reuse. Fragments of other cut stones were recorded in the standing walls of Garderobe 4051, and may have been also have been reused from elsewhere.

Forms

The pieces are described and listed individually in the archive catalogue, the following discussion is by type.

Architectural fragments accounted for the majority of the pieces. Of the remaining 32 pieces, 16 showed dressing marks or cut faces, and one was probably a piece of moulded mortar.

Mouldings

Fig. 24

1. Fragment of **dressed Chalk rock** that may have been either a splayed stop or the outside corner piece of a string course, or an element of a composite piece such as early English dog-toothing (Yarwood 1961 No. 158). Phase 4 Context 0625 /SF 1331.
2. Fragment of **moulded Reigate Stone**, possibly a mullion, part of a composite, decorative shaft, or a moulded string course. Originally in one piece, the two deep-chiselled mortices in the back surface along which the piece has split could possibly have been for fixing ties. There is no regular rebate as would be expected on a mullion and the piece is therefore more likely to be a decorative shaft or string course, the flat rectangular back keying into the wall face to leave the moulding proud, Phase 5, context 0943, SF1076.
3. **Moulding of Chalk rock**, probably the end piece from an ornate string course or hood moulding. Typologically it could be a developed form of scroll moulding of 13th century type similar to examples from Little Wenham, Sussex (Wood 1965, 406 no. 4), composed of concentric chords of differing radii, although more ornate and open than that example. The design suggests a 14th century date. Phase 6d, context 0144, SF1070.

Columns and shafts

SF1153 (not illustrated) was a small column, or shaft with base, or abacus of Bath Stone. It was recovered from the gravel infill 4033 within Building 4112 associated with its construction, and may therefore have related to an earlier use of the site. Also pre-dating the use of the main Building 4112 was SF1095 (not illustrated), which was not removed from site. It was a large, roughly-hewn column of Oolitic Limestone with a roughly hexagonal section dimension, and comprised part of the Phase 2a wall 4028.

Voussoirs

SF1088 (not illustrated) was a voussoir of Great Oolitic, possibly Taynton, Limestone, giving a minimum span of 0.44 m although, in combination with less flared stones, a broader arch may have been constructed. It had been reused prior to having been discarded in Phase 3 context 4052. SF1090 (not illustrated, Phase 3 Context 4054) was a roughly wedge-shaped piece of Reigate Stone with dressed faces and edges, but with one large broken or undressed face, that might have been a voussoir. It, too, had been reused.

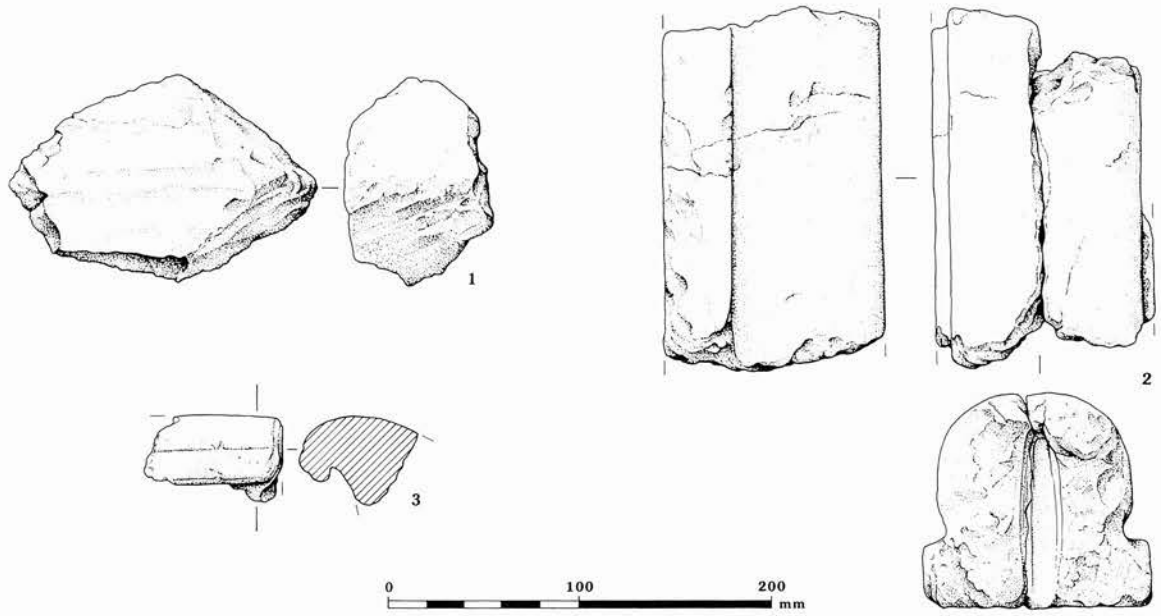

Figure 24 Building stone. Scale 1:4

Ashlars
SF1156 and SF1329 were possibly two diagonal halves of the same Chalk rock ashlar, giving an overall dimension of 215 x 310 x 150 mm. One end had a pair of scratched, parallel lines, possibly for keying plaster or mortar. A deep, pecked hole at the end of the diagonal broken surface was covered in mortar. Other fragments of Reigate Stone, Chalk rock and Oolitic Limestone had dressed faces, but none were large enough to allow detailed examination of tooling. The fragment of Greensand chert, SF1345, had mortar adhering to one surface, and possibly had been used as gallets. It was, however, recovered from a prehistoric layer 0728, and must be considered intrusive in that context.

Table 17: roof tile by Phase

Phase	*No.*	*Weight (g)*
2	41	2590
3	270	>34,669[1]
4	913	102,961
6a	122	>90[2]
6b	735	72,479
6c	24	3152
6d	259	17,818
Modern	329	20,613
Unstrat.	39	1609
Total	2732	>255,981

1 = One context with 42 pieces of tile NOT weighed
2 = One context with 120 pieces of tile NOT weighed

8. Ceramic Building Material,
by J.M. Mills

Roof Tile

A total of 2732 pieces of roof tile (>255981 g) was recovered from 187 contexts (Table 17). A range of fabrics was observed and samples of the variations were kept in addition to those tiles which had complete lengths/widths, peg-holes or were glazed. The tile from context 0767 is different to all the other material and, despite being very worn, small pieces, it is thought to be Romano-British in date.

Floor Tile

Ten fragments (2718 g) of ceramic floor tile were recovered from eight contexts (Table 18). Three of the pieces were glazed with plain yellow/green glaze (contexts 0281, 0672), the remainder were plain unglazed tiles. None had measurable lengths or widths, thickness varied between 25 mm and 40

Table 18: floor tile by Phase

Phase	*No.*	*Weight (g)*
2	1	330
4	5	1879 (1 glazed)
6b	1	346
6d	2	125 (2 glazed)
Modern	1	38
Total	10	2718

Table 19: brick by Phase

Phase	*No. of contexts*	*No.*	*Weight (g)*
2	1	1	320
3	2	3	857
4	6	9	4097
6b	4	28	3992
6d	3	4	213
Modern	2	8	295
Total	18	53	9774

mm. No features such as stab marks that might help either date the tiles or identify a production site were noted.

Brick

A total of 53 fragments (9774 g) was recovered from 18 contexts. Eleven fragments from three bricks were part glazed (Table 19). No complete bricks were recovered; eleven had measurable thicknesses, ten fell between 47 and 64 mm thick, the eleventh was noted as being of an unusual cross-sectional shape measuring 67 x 76 mm and was stratigraphically the earliest brick (Phase 2b, context 0363).

9. Worked Bone, *by J.M. Mills*

Four objects of worked bone or antler were recovered from the excavations, only one of which was from a medieval phase.

Fig. 25

1. **Antler beam fragment**, probably fallow deer, from which two tines have been cut. A hole has been drilled along the centre of the beam, and a second, at right angles to it, across the beam. Possibly a hammer head, similar in form to a 13th or 14th century example from Jarrow (MacGregor 1985, 171–2 and fig. 90), suggested as connected with sheet metal-working. Length 115 mm. Phase 5, context 0170.

Unillus. **A double-tapering strip of bone** formed into an oval ring or loop. Function unknown. Length of loop 12.5 mm. Phase 6b, context 0360, SF1054.

Unillus. **Turned bone or antler lid** with a screw thread. The top is decorated with four inscribed, concentric circles, the areas between each circle are domed giving an undulating cross-section. Similar in form to, but more ornate than, an example from Aldgate, London (Grew 1984, fig. 63, 114) from a layer dated to 1700–1720. Diameter 27 mm. Modern, context 0420, SF1028.

Unillus. **Incomplete bone handle scale**, pierced at one end by a rivet hole, D-shaped in cross-section. The front is polished, the back is roughly finished. Length 62 mm, width 17 mm (max.). Modern, context 0418, SF1014.

Unillus. **Large bovine femur**, neatly sawn proximal and distal ends with back neatly cut open. No dimension, item recorded during animal bone analysis. Phase 4, context 0938.

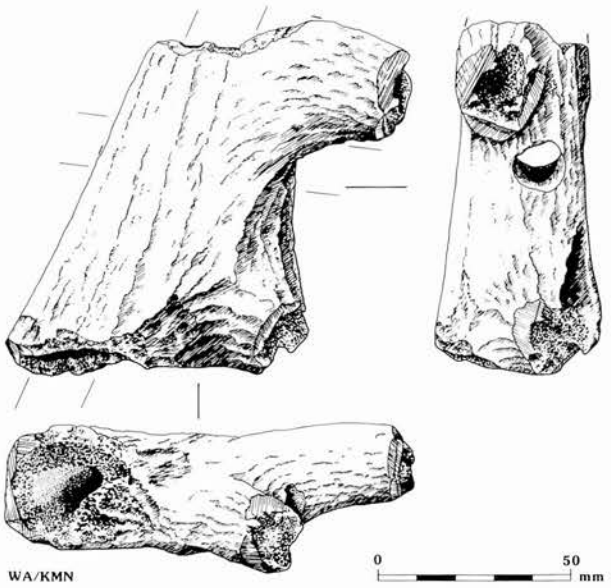

Figure 25 Worked antler Scale 2:3

10. Worked Wood

Structural Timbers, by J. Pidgeon

Preservation of timbers was largely confined to the waterlogged or semi-waterlogged levels of ditch 0666 or the backfill of trench W145 in the same area, although fragments and off-cuts of softwoods including pine occurred in non-waterlogged post-medieval to modern contexts. Full descriptions of all the wood excavated are held in archive.

The only *in situ* remains were those of revetment 0681 comprising fragmentary oak planks 3013 and 3014 (*above, Chapter 3*), and a single oak post, 3011, driven through the primary silts on the floor of the channel. The post was a quartered trunk of *c.* 90 mm radius from which the bark had been removed, and survived to a length of *c.* 0.85 m. A four-faceted axe trimmed point extended for 0.20 m of its length. The preparation is comparable to that employed in the construction of the medieval Abbey Wharf at Reading (Hawkes and Fasham forthcoming), although the rather simple technique involved precludes any conclusive comparison.

Three items probably related to timber-frame construction were also recovered (Fig. 26 Nos 2 and

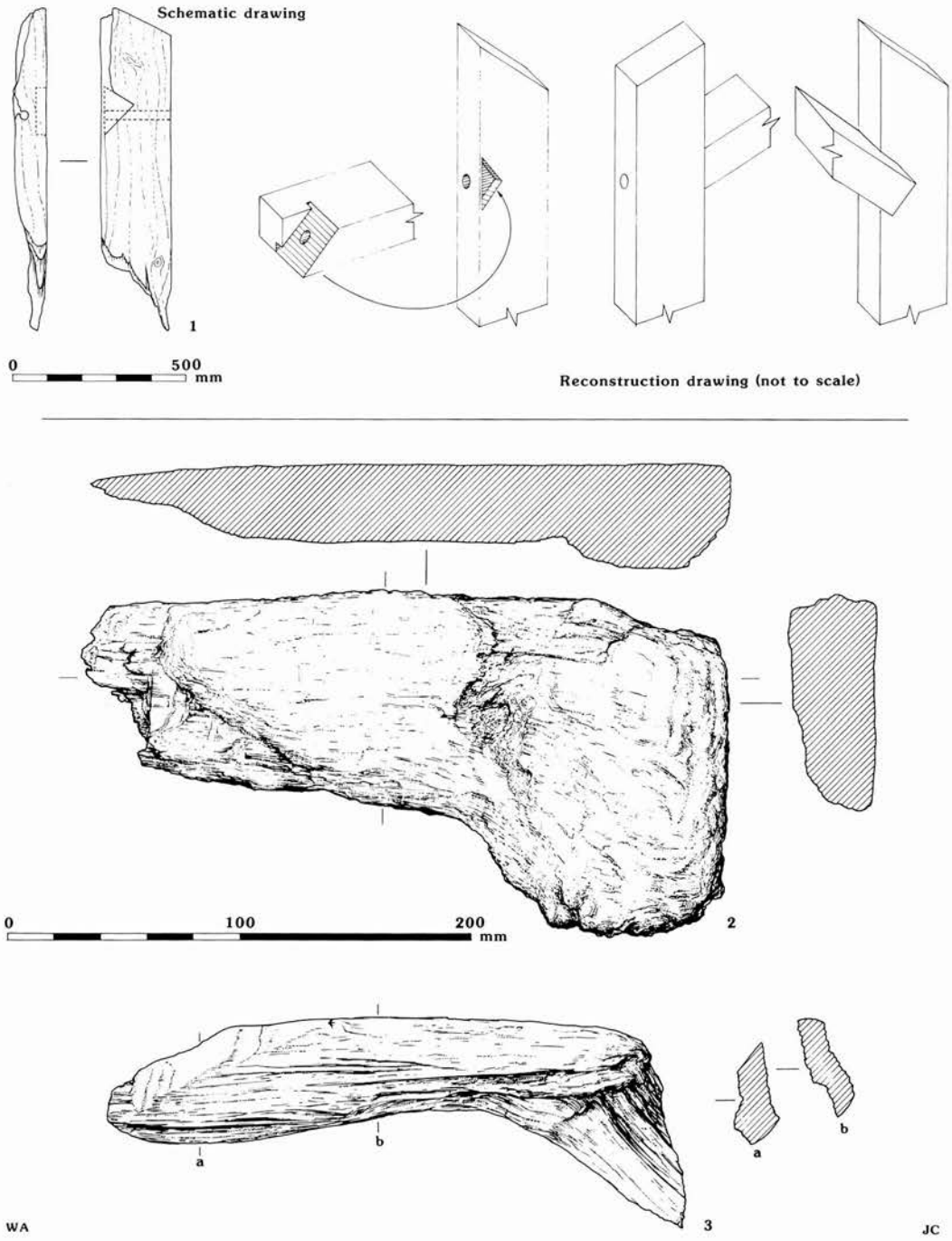

Figure 26 Worked wood, Nos 1–3. Scale 1:3

3 examined and described by Dr C.A. Morris, with species identification by Dr R. Gale):

Unillus *Quercus* sp., (oak). Framing peg, 135 mm long, 20 mm diameter, with a multi-faceted point 15 mm long. Not closely datable. Backfill of trial trench W145, SF3008.

Fig. 26

1. *Quercus* sp. Fragment of irregular, rectangular-sectioned beam, 0.20 m wide x 0.10 m thick (approx) x 0.95 m long, with circular peg-hole, diameter 12 mm, and triangular joint-hole, 30 mm deep. Reconstruction would suggest a squint, secret lap-joint, possibly a precursor to the mainly 13th

century secret notched lap-joints. Phase 3, context 0673, Timber 3010.

2. *Quercus* sp. Fragment, possibly part of corner brace, bracket or structural fitting made from a naturally curving L–shaped timber. The piece is worn and abraded making recognition of the conversion technique difficult — possibly a quarter section including a side branch. There are no obvious surviving toolmarks, joints or peg-holes. Dimensions 275 x 150 x 50 mm. W145, context 10, SF61002.
3. *Sambucus* sp. (elder). Length of timber with natural L–shaped curve at the junction of main stem and side branch; debarked and converted from roundwood by tangential splitting. The surviving board is the 'inner split' and its edges still retain their natural curve from the outside of the stem. One end is broken, but the other has a series of facets, probably cut with an axe. The timber has a slightly twisted grain and does not lie flat; it may therefore have been discarded as a reject or off-cut. Dimensions 255 x 65 x 20 mm. W145, context 12, SF61009.3.

Wooden Artefacts and Off-Cuts, by C.A. Morris and species identification by R. Gale.

All the wooden artefacts were recovered from the W145 machine excavations and therefore cannot be precisely provenanced or dated; those from contexts related to the fill of channel 4120 are almost certainly post-medieval. It is possible that some of the less diagnostic pieces included here are off-cuts from structural timbers. A detailed catalogue of the unillustrated off-cuts and unworked wood is in archive.

For wood identification, thin-sections were taken from samples using a double-sided razor blade. The samples were mounted in 50% glycerol on microscope slides and were examined at magnifications up to x400.

Fig. 27

4 and 5. *Fraxinus* sp. (ash); binding strips of *Populus* (poplar) or *Salix* (willow), most probably the latter. Radially split laths with wedge-shaped cross-section. Possibly from the same binding hoop of a stave-built vessel, such as a bucket, tub or (less likely) a cask. No. 5 has one intact end with a diagonally cut edge overlapping the other, broken end. It is fastened down by strands of split withies bound round the overlapped ends and by a small, squared wooden peg in a hole which perforated both ends of the lath.

Hoops such as this were made to bind stave-built vessels where either metal bands were inappropriate or too expensive. Wooden hoops with various bindings are known from Anglo-Saxon and medieval England, eg Exeter, Devon (Morris and Allan 1984, 309 and fig. 178) and York (Hall 1984, fig. 167). The manufacture of such hoops continued into the 20th century in the areas of Sussex, Kent and Furness (Edlin 1949, 75–6; Fitzrandolph and Hay 1926, 100–7). W145, context 12 (ditch 0666), SF61006.1; SF61022; SF61023.

6. *Quercus* sp. Fragment of radially split oak stave from a stave-built vessel, such as that represented by the binding hoop fragments Figure 27 Nos 4 and 5. There are no surviving straight side edges, rim, or bottom edge, but there is a very slight trace of the upper edge of a basal groove, below which the stave is broken. Inner and outer surfaces are smoothed. Dimensions 214 x 33 x 11 mm. W145, context 12 (ditch 0666), SF6011.1.
7. *Quercus* sp. Small, narrow oak bucket or tub stave from radially split board. The upper, rounded edge is probably intact, but the lower end is broken just above the basal groove. One long side is intact and has a smoothed surface, the other long side is broken. Dimensions 165 x 27 x 8 mm. A possible parallel for the Jennings Yard stave-built vessels was found in a late 17th century pit in Gloucester (Morris 1983, 208, fig. 119). W145, context 15 (channel 4120), SF61025.1.
8. *Quercus* sp. Large stave fragment from radially split board. Possibly the end of a cask stave. Dimensions 99 x 80 x 9 mm. The hollowing of the stave end is a cooper's technique to thin the stave where the caskhead must be fitted into the groove. W145, context 15 (channel 4120), SF61025.2.
9. *Quercus* sp. Fragment of stave-built vessel head or base made from radially-split board. A length of one smooth, straight edge survives with an adjacent fragment of outer curved edge, roughly chamfered on one side only. Dimensions 140 x 33 x 12 mm. W145, context 19 (channel 4120), SF61016.2.
10. *Fagus* sp. (beech). Possible narrow stave or off-cut lath fragment. One end is possibly a rounded rim edge, but the other end is broken with a rectangular notch cut into the side edge. Dimensions 112 x 27 x 7 mm. W145, context 19 (channel 4120), SF61016.3.
11. *Quercus* sp. Off-cut block from split-section timber. At least one edge has been sawn, although the others appear to have been faceted by an axe. Dimensions 118 x 60 x 25 mm. W145, context 19 (channel 4120), SF61016.4.
12. *Quercus* sp. Wedge from radially split section of timber. Rectangular head with a fragment now split away and missing; very prominent axe marks on the two faces, with a rounded point. Dimensions 139 x 33 x 27 mm. W145, context 19 (channel 4120), SF61016.5.
13. *Ulmus* sp. (elm). Off-cut block, sawn and abraded. One flat side is probably a sawn edge, and the ring pattern in the cross-section shows that the piece was tangentially sawn across the grain. One edge is deliberately rounded. Dimensions 78 x 38 x 20 mm. W145, context 12 (ditch 0666), SF6011.2.
14. *Populus* or *Salix* sp. Off-cut, split-section with flat end possibly showing tool marks. Dimensions 87 x 39 x 19 mm. W145, context 15 (channel 4120), SF61025.3.
15. *Quercus* sp. Off-cut or sliver, possibly a straight-sided peg. Made from a split-section billet, sub-square cross-section with straight,

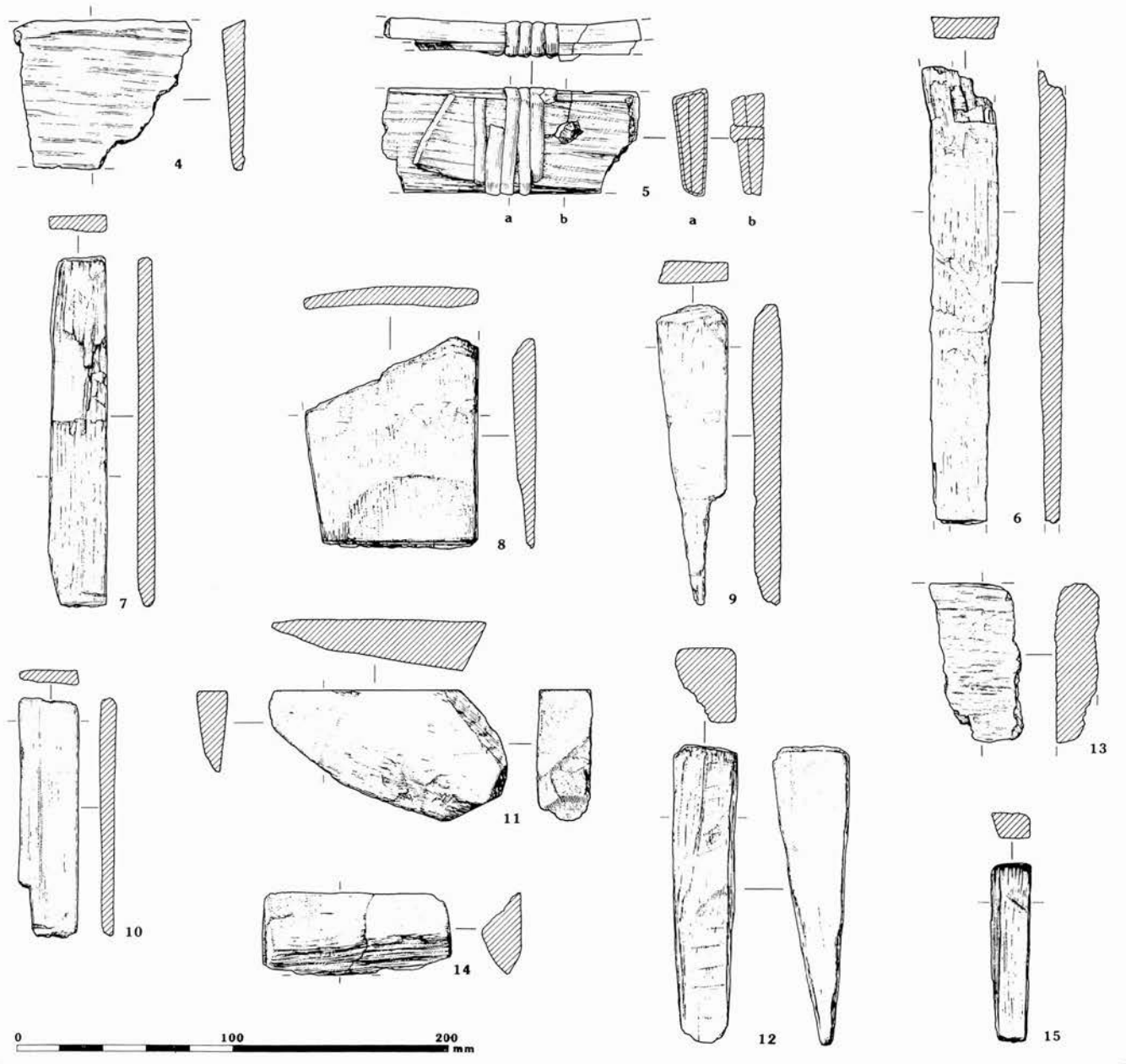

Figure 27 Worked wood, Nos 4–15. Scale 1:3

flat ends. Two sides are smoothed, the others are rough. Dimensions 84 x 17 x 13 mm. W145, context 19 (channel 4120), SF61016.

Fig. 28

16. *Sambucus* sp. Half-section roundwood split to form a parallel-sided half tube. One end is broken, the other has distinct cut marks, and possibly even a cut or a notch. Dimensions 170 x 25 mm.

Young branches of elder with the pith removed have been traditionally used as musical pipes, blow pipes and pop-guns (Edlin 1949, 117); it is possible that this is the remains of such an item or an off-cut from the manufacture of one. W145, context 19 (channel 4120), SF61016.1.

17. *Ulmus* sp. Large, lathe-turned bowl reconstructed from 23 fragments. Face-turned, ie the original rough-out was prepared from a length of half-section roundwood with the mouth of the bowl towards the centre of the tree. When mounted on the lathe, the wood grain would have been perpendicular to the lathe's main axis. There are no residual centre marks, although a slight triangular depression on the external base could be the remains of a

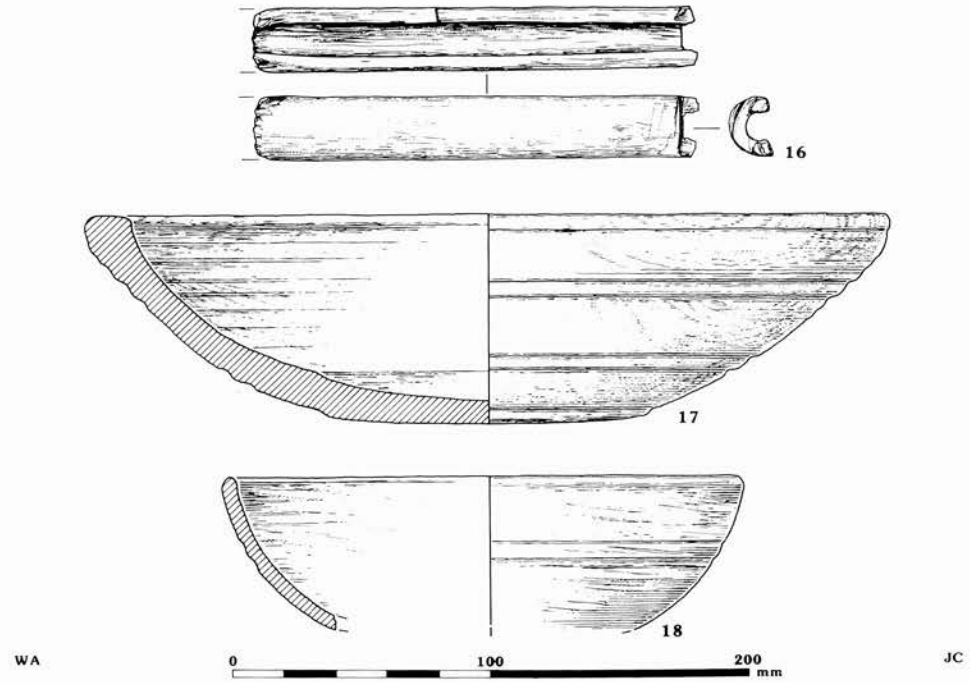

Figure 28 Worked wood, Nos 16–18. Scale 1:3

spur centre. If so, it was off-centred on the lathe. The turning technique is essentially medieval, although an identical form of manufacture continued well into later periods (Morris 1982; 1984; 1985; in prep.); the species (alder being more common in the medieval period) and the finished size would suggest a post-medieval date. Further notes on manufacture are in archive. Mouth diameter 308 mm, base diameter 125 mm, height 80 mm, thickness 16 mm at rim reducing to 10–12 mm on walls. W145, context 12 (ditch 0666), SF61018–20, SF61024.

18. *Alnus* sp. (alder). Ten fragments from a lathe-turned bowl. Mouth diameter *c.* 188 mm. W145, context 15 (channel 4120), SF61021.

11. Leather, *by Q. Mould*

Introduction

Some 60 individual items of leather were examined, 41 items coming from the evaluation (W145) and a further 19 from the full excavation (W199). As is usually the case, the majority of the leather found was shoe components. Possible garment fragments and panel pieces of uncertain function were also found, however. Where discernible, the shoe parts were all of welted construction (Fig. 29) and, therefore, of post-medieval date, with the larger diagnostic pieces coming from shoes of mid/later 16th century types.

For the most part the assemblage appears to represent casual discards rather than the deliberate large scale dumping of manufacturing waste; a single length of trimming (W145 backfill, SF 1086.2, not illustrated) being the only secondary waste leather recovered. Some 8% of the leather found had been deliberately cut up before being discarded suggesting a proportion of the finds to be cobbling debris.

1987 Excavation (W199)

Leather recovered from the main excavation W199 was confined to the lowest, waterlogged levels of ditch 0666 and disturbed levels comprising the re-excavated backfill of the assessment trenches W145.

A rectangular piece of sheep/goat leather (Fig. 30, No. 2) with a length of folded hem and a butted edge/flesh seam at right angles to it, apparently cut from a garment, occurred in a spit excavated through primary channel silts (Phase 3, context 0679) containing 13th and 14th century pottery. A rectangular lining of similar leather (Fig. 30, No. 3), probably belonging to it, was also found with grain/flesh stitching from a whipped seam around three sides and a line of apparently worn tunnel stitching along the bottom edge on the grain side.

A fragment of welted shoe sole (Phase 3, 0677, SF1152, not illustrated) and a nearly complete welted shoe (Fig. 30, No. 1) of later 16th century style occurred in a spit excavated through lower channel silts (Phase 3, context 0677), which also contained 13th and 14th century pottery. This latter, slip-on shoe for the left foot, consisted of a broad, round toed sole and insole (*for construction see Fig. 29A*) with a calf skin upper comprising a high throated vamp with straight side seams and

one-piece quarters internally lined with a counter. The straight top edge of the quarters extends at the top of the front seams into a small tab which was sewn to the inside of the vamp in order to reinforce the seams. The vamp throat has an edge/flesh seam with whipped stitching suggesting that either a crescentic tongue was originally present lying on the instep (Fig. 29B) or that the edge had a top band binding (Fig. 29C). In addition the throat has been cut at centre front; it is likely that the throat was slit by the wearer to allow easier movement of the foot and increase comfort across the instep.

The shoe is similar to Shoe A from a shipwreck in the Waddenzee, the shallows off the Frisian coast (Goubitz 1985, 224, fig. 2 upper and 226, photograph 3), although a few minor differences are apparent (namely the Waddenwrak shoe has higher quarters peaked at centre back, lifts at the seat, no internal quarters lining or tongue). The Waddenwrak shoe A was found with three others of a style which can be well dated by comparison with finds from the 1596–7 winter camp of William Barentsz on the Isle of Nova Zembla in the North Polar Sea and with engravings by Goltzius and de Ghein to the 1580s–1590s (*ibid.* 225–7 and fig. 5), so that the Jennings Yard shoe can be dated to the same period. The lack of any indication of separate lifts or thickening of the sole at the seat may suggest it belongs earlier rather than later in the period as the heel was an introduction quickly taken up in the 1590s in this country (Swann 1982, 7).

A small fragment of leather with no distinguishing features (W145 backfill, context 0603, not illustrated), the seat of a two-piece insole (W145 backfill, context 0701, SF1023, not illustrated), and other fragments of welted shoe bottom units (SF1032,1085,1086.1, none illustrated) were found in the unstratified backfill of a trial trench along with a fragment of secondary waste trimming (SF1086.2, not illustrated, also mentioned above).

1986 Evaluation (W145)

Leather was recovered from two areas: the lower, waterlogged deposits in Trenches E and F, recognised by the main excavation as the primary fills of ditch 0666; contexts in Segments H, I and J forming parts of channel 4120 not re-examined by the main excavation.

Ditch 0666

A square toed welted insole for the left foot (Fig. 30, No. 4) probably from an 'earred' or 'horn' toed shoe (as, for example, the shoe from Hall Place, St Neots, Huntingdonshire; Thornton in Addyman and Marjoram 1972, 95–6, fig. 43), an earlier 16th century style most popular in the 1530s (Swann in Doughty 1973, 22), and fragments of a broad toed welted shoe of calf skin (Fig. 31 No. 5) occurred in context 12.

This shoe, being welted (*for construction see Fig. 29A*), for the right foot, and with a broad round toe, is likely to be of mid–later 16th century date,

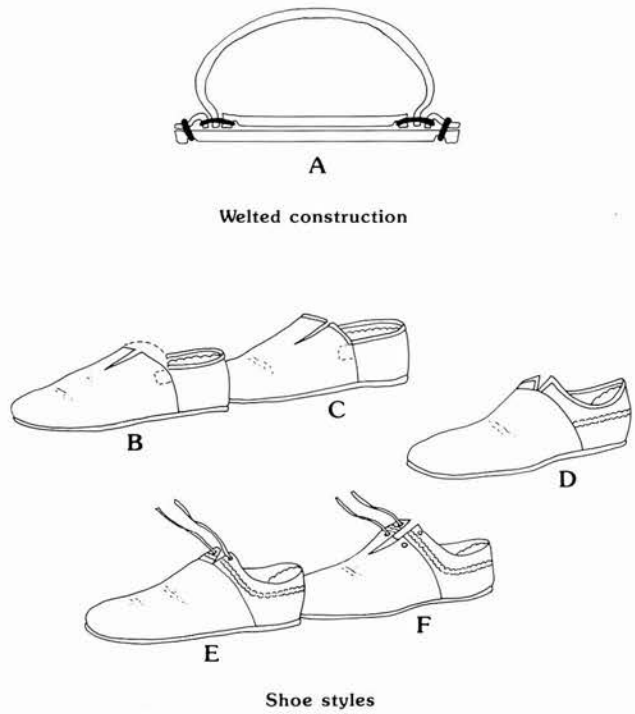

Figure 29 Leather: shoe construction and styles (see text)

unfortunately other diagnostic features such as the style of the vamp throat and quarters and the method of fastening are unknown so that more precise dating is impossible. Pottery from overlying deposits suggests a date pre *c.* 1250 for this context (12), the evidence from the leather finds, however, indicates the presence of 16th century intrusions not recognised from other artefact types.

Channel 4120

The majority of the leather from Jennings Yard derived from fills of channel 4120 associated with pottery dating 15th–17th centuries. The shoe parts found were all of welted construction, agreeing with the pottery evidence. Eleven soles and three insoles were found from these fills, the more complete examples being made for either the left or the right foot (ie not straights) and were relatively wide with broad, round toes, (eg Fig. 32, No. 10) again likely to date to the mid–later 16th century.

The majority of the soles had the grain/flesh seam lying within a distinct stitching channel on the grain side. One example (Fig. 31, No. 6) had the impression of bracing thread clearly visible at the forepart and seat indicating its method of construction and a series of holes whereby clump repairs to the forepart and seat had originally been attached using small wooden pegs. Three pegged clump repair pieces were also recovered (SF15.8, SF19.6, not illustrated). Three of the smaller sole fragments had been deliberately cut from the rest of the sole before being discarded (SF19.5, SF19.7, not illustrated) suggesting they may be cobbling waste.

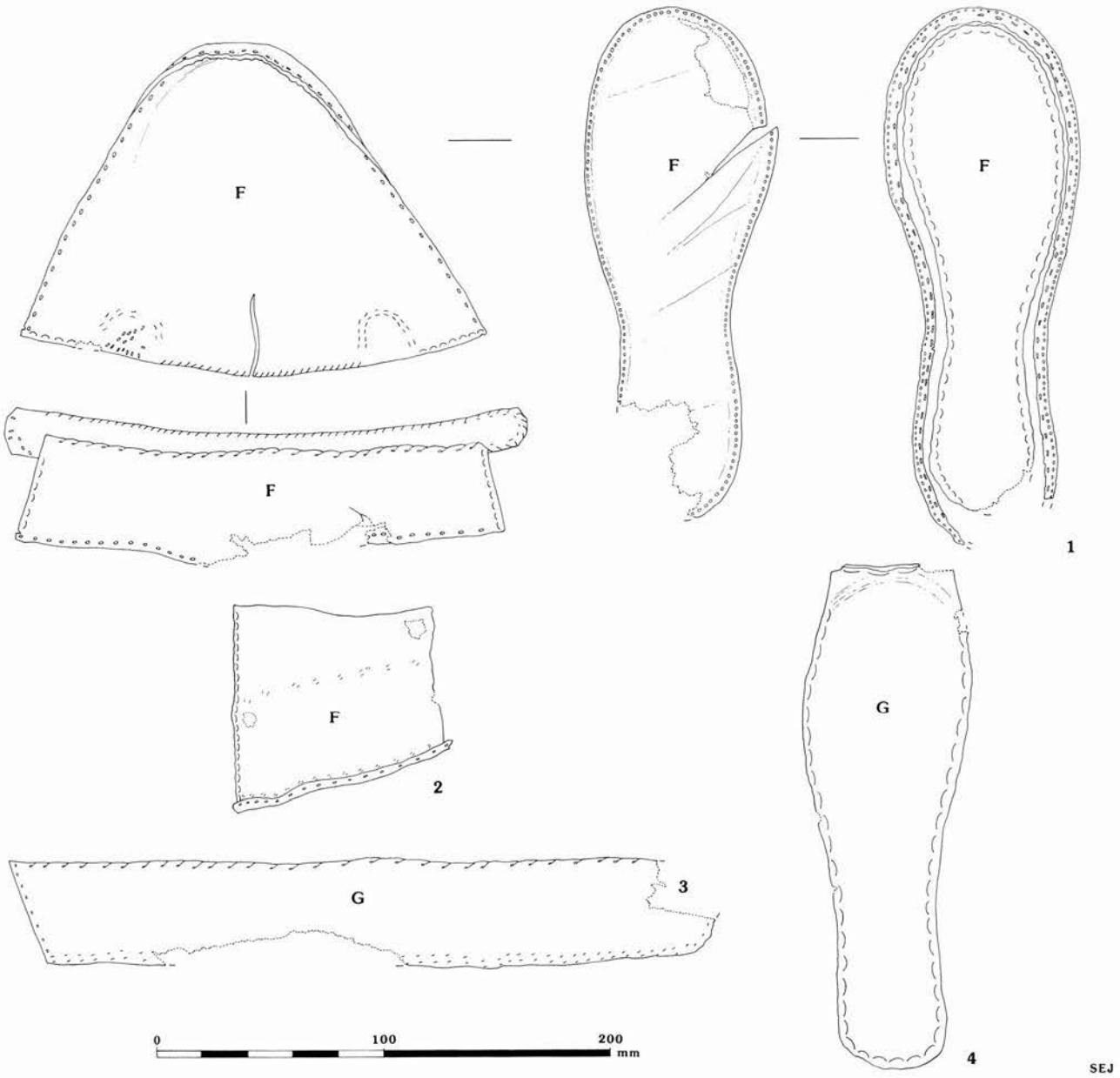

Figure 30 Leather, Nos 1–4. Scale 1:3

The upper components recovered are of similar date. The remains of a calf skin one-piece quarters (Fig. 31, No. 7) with a tab at the top of the front seam to attach to the inside of the vamp, similar to that on the slip-on shoe (Fig. 30, No. 1) from the excavation dated by comparison with continental examples to around the 1580s, were found. Other diagnostic components comprised two pairs of calf skin quarters, one pair (Fig. 31, No. 8) being accompanied by its broad toed insole for the left foot. The quarters, seamed at centre back, have low cut top edges which rise sharply to extended front seams which join to the vamp throat with a butted seam. One pair (Fig. 32, No. 9) had narrow front seam extensions which had originally been bound with a top band (Fig. 29D), the other (Fig. 31, No. 8) were wide with a simple knife cut top edge and a pair of lace holes in the extensions to tie the shoe over the instep (Fig. 29E or F).

Both pairs had heel stiffeners at centre back, one of which remained *in situ* (Fig. 32, No. 9), and a line of decorative stitching present on the external, grain side which also served to strengthen the top edge. On one of the two-piece quarters (Fig. 32, No. 9) the stitching runs in a straight line from the back to the front seam, on the other pair (Fig. 31, No. 8) it curves to continue up the front seam extension. Examples of such decorative stitching on 16th century shoes are known such as across the vamp of a man's shoe dated 1570s–1580s (Swann 1975, fig. 7 upper), however, it is more commonly seen on the quarters of 17th and 18th century shoes (for example, the man's buckle shoe of 1680s (Swann 1982, 19, no. 15) and two 17th century two-piece

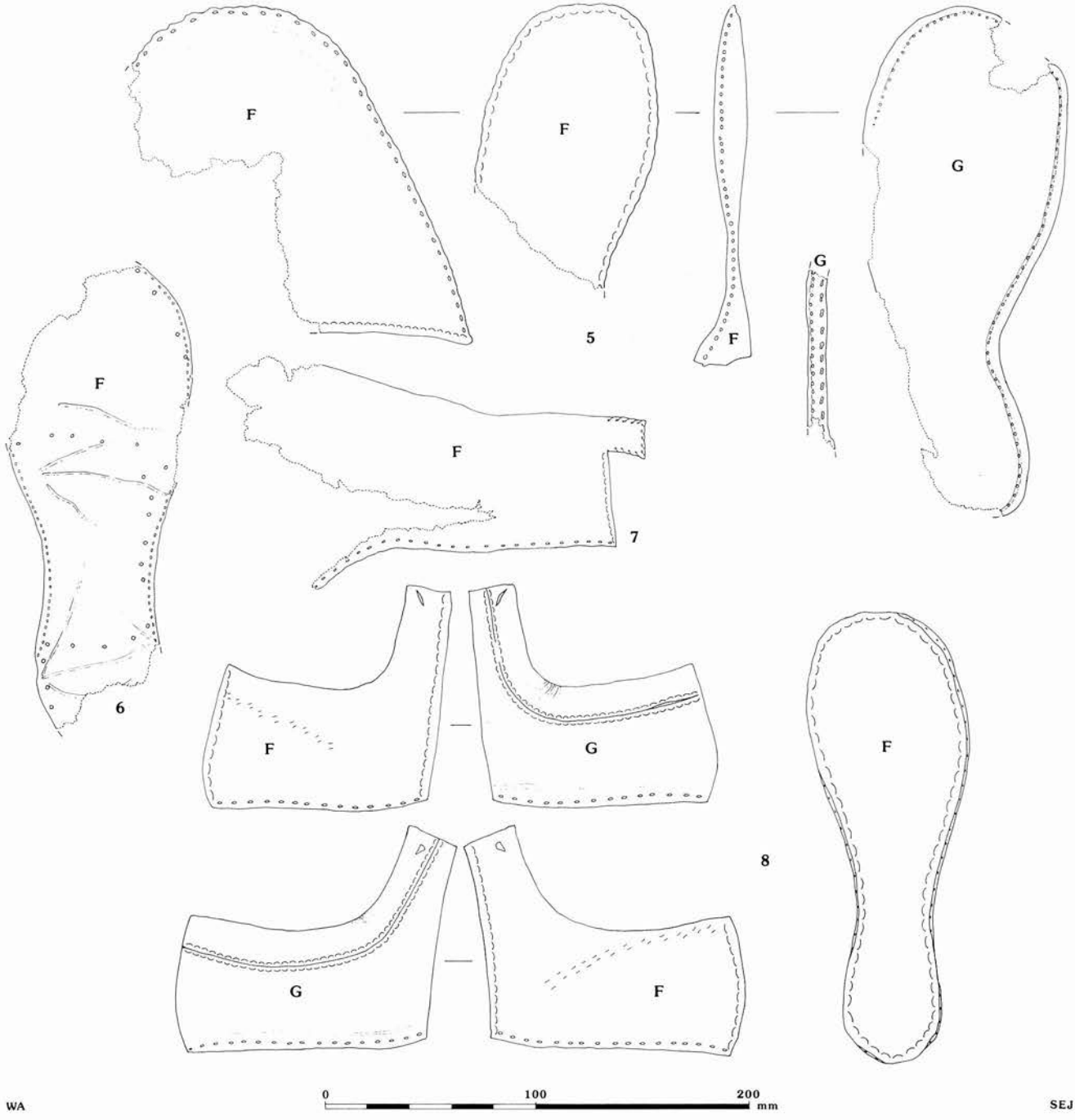

Figure 31 Leather, Nos 5–8

quarters from the Abbey Wharf site, Reading (Mould in Hawkes and Fasham forthcoming, W12C SF296 and 310)).

Shoes with quarters with front seam extensions are known from Delft, Groningen and Schagen in Holland and, in this country, from the wreck of the Mary Rose (Goubitz, pers. comm.). The quarters with the narrow front seam extension (Fig. 32, No. 9) comes from a high-throated slip-on shoe (Fig. 29D) comparable in style with a highly decorated shoe from Delft and a 'horned' or 'cow mouthed' shoe from Schagen. The Delft shoe (part of a private collection) has the vamp and quarters decorated with a pattern of stamped and cut out motifs with an additional line of oblique slashes at the throat and toe. It is believed that a similar shoe was found on the Mary Rose (sunk 1545), although the present author has been unable to gain confirmation. The 'cow mouthed' toe of the Schagen shoe is a style popular during the earlier 16th century as was the less exaggerated 'earred' or 'horned' toe style in this country (Fig. 30, No. 4).

The quarters with lace holes in the front seam extensions (Fig. 31, No. 8) are comparable with a shoe from Groningen (Goubitz 1988, 149, afb 1 S1c) found at Sledemennerstraat in 1982. The

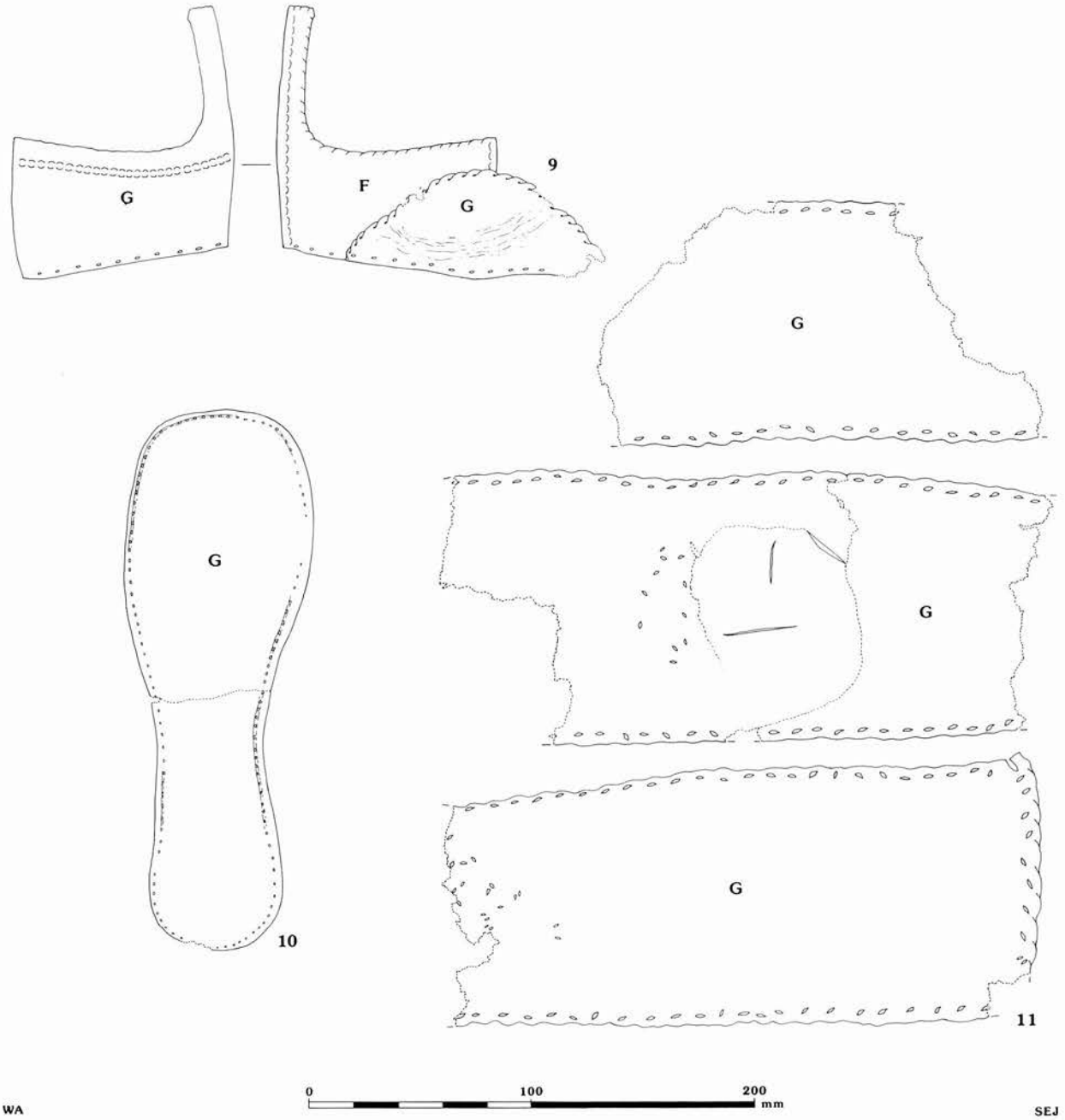

Figure 32 Leather, Nos 9–11. Scale 1:3

Groningen shoe fastens over the instep with two pairs of lace holes, an original feature on this shoe as evidenced by the provision of a small tongue. It is difficult to be sure, however, whether the lace holes present on the Jennings Yard example are an original feature or a secondary adaptation made by the wearer after first cutting a slit at centre front to provide for greater foot movement and comfort across the instep, as is likely to have been the case with the slip-on shoe (Fig. 30, No. 1, Fig. 29B and C) from the excavation. As the lace holes on each of the quarters front seam extension vary in shape it is more likely that they were a subsequent adaptation.

The quarters may come from a shoe with a single pair of lace holes (Fig. 29E) or with lace holes in both the quarters and vamp (Fig. 29F) as seen in the Groningen shoe.

The dating for these types of high throated shoes with front seam extensions to the quarters, whether of slip-on (Fig. 29D) or front lacing style (Fig. 29E and F) is again likely to be mid later 16th century when their construction (ie welted, two-piece quarters, association with a broad toed insole for the

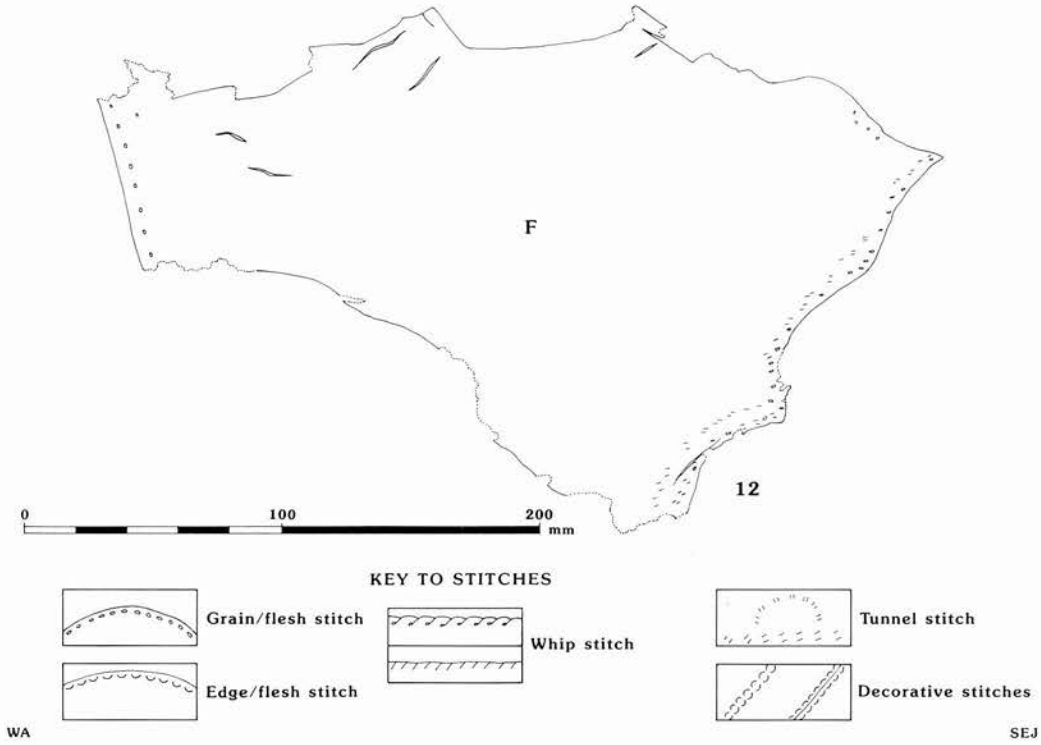

Figure 33 Leather, No. 12. Scale 1:3

left foot), decoration and parallels are taken into consideration.

The channel fill (context 15/19) also contained non-shoe leather including three fragments of a long, rectangular calf skin panel (Fig. 32, No. 11) with a whipped seam around the perimeter and two areas of crued stitching possibly for the attachment of straps. A fragment apparently cut from a garment (Fig. 32, No. 12) was also found, with remains of stitching from a lapped seam and an irregular seam, possibly from a hem, opposite. Three decorative slashes are present suggesting it to be from a garment of 16th or early 17th century date. A length of strap (SF15.6, not illustrated) and a fragment with a whipped seam (SF15.5, not illustrated) also occurred in these deposits.

A length of middle packing from a welted bottom unit was found from an unstratified context.

Fig. 30

1. **Welted shoe** (sole, insole, welt, vamp, one-piece quarters and quarters lining). W199, Phase 3, context 0677, SF1150.
2. **Garment fragment** (flesh view). W199, Phase 3, context 0679, SF1155.1.
3. **Lining** (grain view). W199, Phase 3, context 0679, SF1155.2.
4. **Insole** (grain view). W145, ditch 0666, context 12.

Fig. 31

5. **Welted shoe** (sole, insole, middle packing, welt, vamp). W145, ditch 0666, context 12.
6. **Welted sole** (flesh view). W145, channel 4120, context 15.
7. **One-piece quarters** (flesh view). W145, channel 4120, context 15.
8. **Insole** (flesh view) and two-piece quarters (grain and flesh views). W145, channel 4120, context 15.

Fig. 32

9. **Right two-piece quarters** (grain and flesh view) and heel stiffener (grain view). W145, channel 4120, context 19.
10. **Welted sole** (grain view). W145, channel 4120, context 19.
11. **Three conjoining fragments of panel** (grain view). W145, channel 4120, context 19.

Fig. 33

12. **Garment fragment** (flesh view). W145, channel 4120, context 19.

12. Animal Bone, *by J. Bourdillon*

Introduction

A small amount of animal bone was recovered in the W145 trial excavations in 1986 (12 fragments of chopped cattle skull and ribs, a radius of sheep and an ulna of pig). A far larger assemblage was excavated in 1987, and it is this material which forms the basis of the present report.

Only three eroded fragments of large mammal bone were recorded from the alluvial silts containing Mesolithic flintwork. From the upper layers, much of the post-medieval animal bone came from contexts which had been disturbed or which cannot be closely dated. This material has been scanned and all items of interest are listed, though not fully quantified, in the archive.

The main discussion here is therefore restricted to bone from medieval contexts. The small assemblages from Phase 2 have been treated separately in the archive and in Table 20 but their main interest lies as a broad comparison with the more abundant later deposition and in subsequent tables they are taken together.

Phase 3 produced only a moderate amount of animal bone from normal hand recovery, but samples of soil from several contexts produced useful assemblages from sieving.

Most animal bone came from the destruction of the buildings and the flooding of the site in Phase 4, contexts associated with the first stage of robbing and silting yielding much good animal bone. Tables in archive distinguish between the animal bone assemblages from three stages of Phase 4 activity: contexts associated with the robbing and primary inundation silts; those comprising the majority of the inundation silts (from which little bone was recovered); and contexts comprising the upper fills of robber Gullyes. Quantities for each of these episodes have been amalgamated within this report.

The assemblage of greatest interest came from the Phase 5gully, 0656 (Fig. 15, Plate 6), including articulated heads, trunks and limbs from at least eight adult horses which had been closely packed in a narrow Gully with a small amount of material from other domestic animals. Other Phase 5 contexts produced only limited quantities of animal bone, including groups which appeared more akin to post-medieval assemblages. Though a full archive has been made for Phase 5 and the bones are discussed briefly below, their results must be treated with caution and the data have not been included in the main tables of this report.

Table 20: animal bone, identified fragments by Phase

Phase	2a	2b	3	4	*5*	
					0655	*Others*
Cattle	8	36	50	416	63	54
Sheep	1	8	4	72	-	9
Sheep/ goat	-	17	22	217	5	31
Goat	-	3	5	70	13	3
Pig	-	20	12	108	3	11
Horse	-	-	1	8	1067	11
Cat	-	-	-	5	-	5
LAR	2	10	4	51	-	5
SAR	-	18	29	105	-	9
Fallow deer	-	2	-	13	-	2
Roe deer	-	1	-	1	-	-
Rabbit	-	-	-	1	-	-
Fowl	-	6	2	25	-	3
Goose	-	1	1	8	1	2
Pigeon	-	1	-	1	-	-
Duck	-	-	-	-	-	1
?Wild bird	-	-	-	-	1	-
Total	11	123	180	1111	1153	141

LAR = large ungulates
SAR = small ungulates

Methods of recovery

The horse bones from context 0655 within Gully 0656 were lifted under the direction of Mark Maltby of the Faunal Remains Unit (FRU). Articulated groups were bagged together, assigned SF numbers in the field, and were recorded with close stratigraphic detail. A further small assemblage from the same group was recovered during machine Gullying over Ditch 0578. These were not recorded in as much detail (*see Archive*). In addition, photographs were taken by the excavators at various stages in the recovery of this assemblage.

Bulk samples of soil were taken from four contexts in Phase 3 and were sieved under laboratory conditions. Of these contexts, 4052, 4053 and 4055 were occupation deposits or layers of cess-pit fill from Building 4112 or its garderobe 4051. Context 0693 was part of the waterlogged fill of the east channel before the collapse of the causeway. The rest of the material came from normal hand recovery.

Methods of study

The articulated horse bones from context 0655 were expected to throw light both on the animals themselves and on their strange burial. It was hoped that the other bone assemblages might give some idea of the nature of the main medieval occupation on the site, especially in its closing years, and that in this way they might provide a wider animal context for the unique assemblage of horse.

All material was identified and recorded at the FRU; the fish bones were identified by Sheila Hamilton-Dyer.

Ovicaprid material was identified with reference to the modern comparative collection at the FRU and to the discussion in Boessneck *et al.* (1964). This material appears as 'sheep', 'goat', or 'sheep/goat' in the archive and in Table 20, but almost all of the fragments which were certainly of goat represent specialised material from worked horncores and it is likely that the postcranial ovicaprid fragments were nearly all derived from sheep. In the later tables, therefore, they have been combined with sheep.

Measurements are those described by von den Driesch (1976). They were taken with vernier calipers to an accuracy of 0.1 mm, except for those of curves which were taken with a tape measure to an accuracy of 1 mm.

Special care was taken with the horse bones. There is a full measurement archive, and non-measureable bones such as vertebrae and minor fragments were compared for size against two modern specimens in the FRU collection — a 12-year old New Forest mare and a large 17-year old stallion, believed to have been a racehorse. In addition, all the smaller horse material has been compared against donkey.

Horse teeth were aged with reference to the two modern specimens and to the descriptions in Silver (1971); in addition, the crown and root conditions of the many loose horse teeth were compared with the development figures in Taylor (1955, 108–17) and with the discussion in Levine (1982).

Most of the material was recorded in the standard AML format (Jones *et al.* 1977) with extra detail recorded for the horses. The full archive is held at the FRU.

Condition

No rodent gnawing was observed but a fair proportion of the fragments in all phases had been chewed, almost certainly by dogs though no dog bones are recorded. The horse Gully (context 0655) was conspicuous for the high general incidence of chewed material (*see below*). In terms of erosion of bone the horse Gully was again distinctive in that the material showed very little sign of having been left lying around uncovered for long.

Species Identifications

Table 20 lists the identified fragments found by normal hand recovery from Phases 2–5. A meticulous watch was kept for possible horse bones and it is likely that any unassigned fragments recorded as 'large ungulate' will have come from cattle. The material recorded as 'small ungulate' is composed of tiny unidentifiable fragments which are likely to have come from sheep, goat or pig.

The large domestic mammals form the bulk of the assemblage. There was a small amount of cat but there no fragments of dog. For a site in the medieval period, when domestic poultry and wild birds were generally quite plentiful in food remains, bones of fowl and goose were not well represented and there were only two fragments of pigeon.

There was a single bone of possible mallard, and a fragment of broken coracoid which was probably also from a wild bird. The species represented suggest a rather impoverished diet but are complemented by a number of bones of deer, principally fallow. No fish was recovered by normal excavation.

Table 21: distribution of cattle body parts

Phase	*2a*	*2b*	*3*	*4*	*5*	
					0655	*Others*
Horncore	1	3	11	84	2	7
Skull frag.	-	2	8	63	37	4
Mandible	2	-	1	5	1	4
Hyoid	-	2	1	1	-	-
Loose teeth	-	-	1	2	-	-
vertebrae:						
Cervical	1	1	2	10	1	-
Thoracic	-	1	1	11	1	1
Lumbar	-	-	4	5	-	-
Sacral	-	-	-	1	-	-
Frags	-	-	-	1	-	-
Rib	-	15	10	114	19	24
Scapula	-	1	2	14	-	4
Humerus	-	1	-	4	-	-
Radius	-	-	1	14	1	-
Ulna	-	-	1	7	-	-
Metacarpus	-	-	1	9	-	4
Ilium	-	1	-	4	-	1
Ischium	-	-	-	4	-	-
Os coxae	1	1	2	7	1	-
Femur	-	3	3	15	1	1
Patella	-	-	-	1	-	-
Tibia	1	1	1	20	-	1
Astragalus	1	-	-	-	-	-
Calcaneum	-	1	-	4	-	-
Other t'sis	-	1	-	-	-	-
Metatarsus	1	-	-	10	-	1
Phalanx 1	-	-	-	4	-	1
Phalanx 3	-	-	-	2	-	1
Total	8	34	50	416	64	54

Summary (%)	*2*	*3*	*4*	*5*	
				0655	*Others*
Horncores	9.1	22.0	20.2	3.2	13.0
Other head frags	13.6	22.0	17.1	60.3	14.8
Feet/ ankles	9.3	2.0	7.0	-	13.0
Others	68.0	54.0	55.7	36.5	59.2
N	42	50	416	64	54

The bulk of the material comes from Phase 4. Of the other phases, Phase 2 produced a moderate amount of material. It is interesting that Phase 2b, the sealing layer of silt above early medieval occupation, already contained fallow deer and also roe deer; it produced slightly more bird than Phase 3 though this later phase is linked with the construction and occupation of the main medieval building on the site. These assemblages are small, and contrast with the general medieval pattern, which suggests increasing richness in food waste over time. Moreover, there is no indication of a richer or more varied assemblage associated with the building itself.

Within Phase 5, context 0655 is set apart from the rest by the great numbers of horse bones. It also contained some material from the main domestic mammals and from goose, and the probable wild bird fragment. The other contexts from this phase included fowl, goose, duck and two fragments of fallow deer.

Material from Sieving

Material from the soil samples consisted largely of fish; there were also fragments of the main domestic mammals and of large and small ungulate, not further identified. There were a very few fragments of bird, domestic and wild, and one fragment of hare. These results are discussed below.

Main Domestic Food Species

Cattle accounted for roughly half the fragments of the main food species, and sheep/goat were well represented. Pig bones were less common overall and only occurred in any number in Phase 4 (Table 20).

The distribution of body part fragments may provide clues as to the uses to which the bones had been put before they were thrown away. In cattle (Table 21), bones from the feet and ankles consistently represent less than 10% of cattle bones for each period and this seems to rule out the presence of deposits of prime butchers' waste or residue from tanning. Skull fragments, which also may represent prime butchers' waste, were far more numerous, especially in Phase 4, but these fragments were found with much horncore wastage and it is likely that the skull fragments represent waste associated with the working of horn. Mandible fragments were not common, but could have been detached from the skulls at an earlier state and not brought to the site with the horns.

In the Table 21 'other' bones are those neither of the head nor of the lower limbs, and most of these are likely to have come from basic food waste.

For sheep/goat, by contrast, fragments of horncore are rare (Table 22a and b). Foot and ankle bones are better represented, and since many of these are quite small and frequently missed in non-sieved excavation recovery, their relatively high numbers serve to emphasis the dearth of the

Table 22: distribution of sheep/goat and goat body parts

Phase	*2a*	*2b*	*3*	*4*	*5*	
					0655	*Others*
Horncore	-	1	1	2	-	1
Skull frag.	-	-	-	16	-	3
Mandible	1	3	1	22	-	2
Loose teeth	-	-	-	7	-	2
vertebrae:						
Cervical	-	1	-	3	-	-
Thoracic	-	-	2	3	1	-
Lumbar	-	-	-	5	-	-
Sacral	-	-	1	-	-	-
Rib	-	5	3	75	-	15
Scapula	-	-	2	23	-	3
Humerus	-	3	1	12	-	1
Radius	-	4	2	27	-	6
Ulna	-	-	1	4	-	-
Metacarpus	-	-	-	11	1	-
Os coxae	-	-	4	5	1	-
Femur	-	1	-	11	1	3
Tibia	-	2	5	24	-	1
Astragalus	-	-	-	-	-	1
Calcaneum	-	-	-	1	-	-
Metatarsus	-	5	3	38	-	1
Phalanx 1	-	-	-	-	1	1
Total	1	25	26	289	5	40

Summary (%)	*2*	*3*	*4*	*5*	
				0655	*Others*
Horncores	3.8	3.8	0.7		2.5
Other head frags	15.4	3.8	15.6		17.5
Feet/ ankles	19.2	11.5	17.3	20.0	5.0
Others	61.6	81.9	66.4	80.0	75.0
N	26	26	289	5	40

Goat	*2a*	*2b*	*3*	*4*	*5*	
					0655	*Others*
Horncore	-	3	5	74	13	3
Humerus	-	-	-	1	-	-
Metacarpus	-	-	-	3	-	-
Metatarsus	-	-	-	2	-	-
Total	-	3	5	80	13	3

Table 23: distribution of pig body parts

Phase	*2a*	*2b*	*3*	*4*	*5*	
					0655	*Others*
Skull frag.	-	1	2	12	-	2
Mandible	-	2	7	14	-	1
Loose teeth	-	3	1	15	3	3
vertebrae:	-		-	1	-	-
Cervical		1				
Thoracic	-	3	-	3	-	-
Rib	-	2	-	4	-	-
Scapula	-	1	1	4	-	-
Humerus	-	-	-	10	-	-
Radius	-	3	-	4	-	-
Ulna	-	-	-	7	-	-
Metacarpus	-	-	-	2	-	1
ilium	-	2	-	1	-	1
Os coxae	-	-	-	1	-	-
Femur	-	2	-	11	-	-
Tibia	-	-	-	9	-	1
Fibula	-	-	-	3	-	-
Calcaneum	-	-	-	3	-	1
Metatarsus	-	-	-	4	-	1
Phalanx 1	-	-	1	-	-	1
Total	-	20	12	108	3	12

Summary (%)	*2*	*3*	*4*	*5*	
				0655	*Others*
Head frags	30.0	83.4	38.0	100	50.0
Feet/ ankles	-	8.3	53.7	-	33.3
Others	70.0	8.3	8.3	-	16.7
N	20	12	108	3	12

much more robust foot bones of cattle. Skull fragments of sheep are quite well represented and their mandibles are relatively plentiful. There are also good numbers of 'other' bones. The representation of the various body parts seems to suggest either unspecialised use, if the sheep were generally hornless (in the females), or to have been biased by the removal of a great many horns if the sheep had been horned in both sexes.

Pig is a food mammal with few other uses for its carcass. The present sample of bones is quite small, but it includes a fair amount of head waste and some foot waste (Table 23). There may have been some selection for the best food bones in the assemblage from Phase 2b, but in Phase 3 a single scapula represents the only prime pig food bone recovered.

Table 24: ageing of main domestic species by mandibles

Phase	*Stage*	*Cattle*	*Sheep/ goat*	Pig
2b:	3	-	1	-
3:	2	-	-	2
	3	-	-	3
4	1	-	-	-
	2	-	-	1
	3	-	1	2
	3/4	-	1	3
	4	1	1	-
	4/5	1	1	-
	5	2	10	-
5 (0655)	3	-	-	1
	4	-	-	1
	5	1	-	-
5 (others)	4	-	1	1
Total		5	16	14

Stage 1 = 1st molar not yet in wear
Stage 2 = 2nd molar not yet in wear
Stage 3 = 3rd molar not yet in wear
Stage 4 = 3rd molar coming into wear
Stage 5 = 3rd molar in full wear

Ageing

The best assessments of ageing are likely to be those that were based on mandibles, but in the present assemblage these were not abundant overall. Indeed, if the mandibles of horse are excluded there was a total of only 35 ageable mandibles from the site (Table 24). Only one context, Phase 4 0618, produced as many as three (two sheep/goat, one pig).

The five ageable cattle jaws were all from adults. Three or even four of these were from stage 5 where the last molar is fully in wear and the meat is likely therefore to be tough. For sheep/goat too, nearly all of the jaws were old. The pigs were much younger and were presumably better eating.

Other evidence of ageing may come from material which is porous. There were a few fragments which were both porous and small which

Table 25: incidence of young animal bone material (fragments as % of total)

Phase	*2*	*3*	*4*	*5*	
				0655	*Others*
Small porous	1.9	2.7	2.0	-	0.8
Foetal/neonatal	-	2.1	1.0	0.1	2.4
Total	104	97	955	1153	127

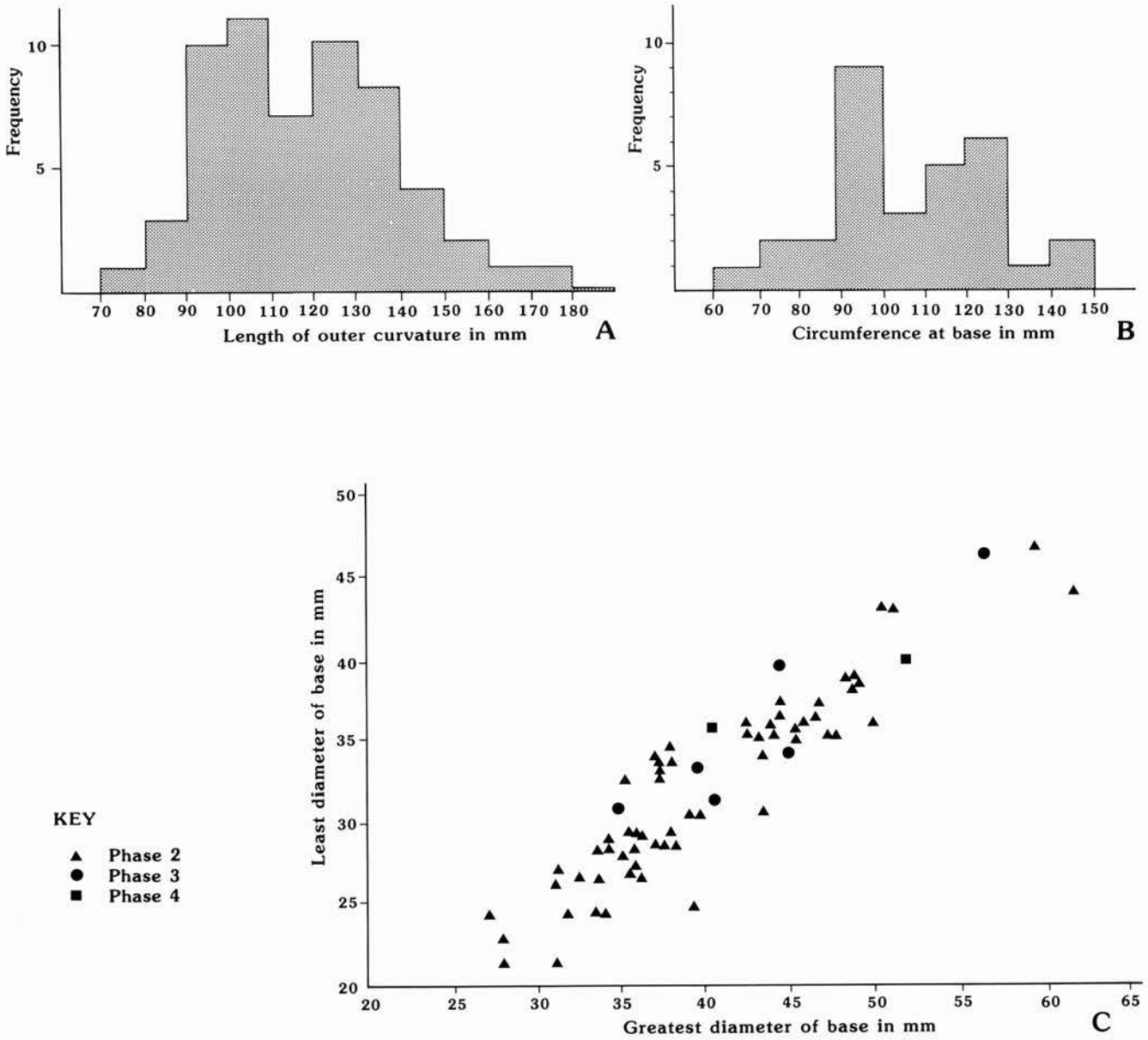

Figure 34 Cattle horncore dimensions

would have come from quite young animals (Table 25); these came from cattle, sheep/goat and pig, but, whereas for sheep/goat and pig this material came from the main bones of the body, for cattle it was nearly all of horncore. In addition, there were some foetal or neonatal fragments. None of these was from cattle, with roughly equivalent numbers of sheep/goat and pig. These might represent breeding nearby, or just possibly the occasional animal that had been pregnant when driven in for slaughter.

Industrial Deposits

Horncores were found widely across the site, including several from Phase 2b, before the construction of the Building 4112, and Phase 3, the period of its occupation. The majority, however, came from Phase 4 contexts.

Table 26 shows that the horncores were rarely found in concentrations. The major groups came from contexts 0618 and 0979, two robber Gullyes of Building 4112, and there were several in association with the horse deposit in context 0655. Overall, cattle and goat cores were quite evenly represented (108:98), and it would seem that the horn-working was not specialised.

All the cattle cores were of short-horned, or even small-horned animals: Armitage and Clutton-Brock (1976, 331) cite an outer curvature of 150 mm as the dividing point between short and medium horns in the medieval period, and 96 mm for small horns. In the present assemblage the longest such measurement was 142 mm and the mean only 105

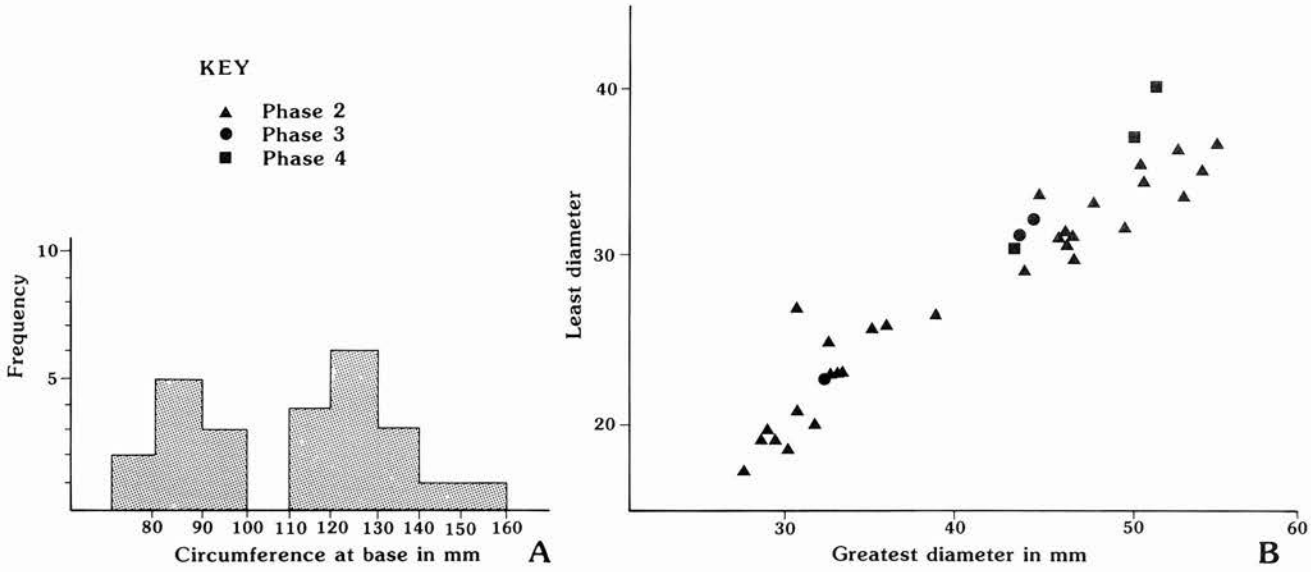

Figure 35 Goat horncore dimensions

mm with several below 96 mm. Some of these tiny cores were still porous.

Where the base of the core was still joined to a fragment of skull, the brow profile was always a marked double arch with a low point at mid-brow. Within this basic uniformity, however, there was a great variety of cattle cores in which it was difficult to determine any pattern of selection: whatever material came to hand seems to have been put to use.

The cores were certainly the residue from working. Cuts on the cores themselves were rare, but there were some hard, clean cuts, oblique or saggital, through the surviving fragments of skull, and also a great deal of evidence of scraping at the back of the core, at the base, on the main body, or at the tip, though the purpose of this is unclear.

Histograms of the measurements of basal circumference and the length of outer curvature (Fig. 34) are bimodal but neither diagram suggests a policy of careful selection of material. The scatter diagram (Fig. 34C) is more homogeneous with just three cores of notably greater overall dimensions. These three cores were 'puffy' in shape and quite grooved on the surface, and they may have come from castrate males. Two others were also grooved and 'puffy', but not so large.

Grouping the material on appearance, one may suggest that the cores of the bulls were stronger and rounder and that those of cows were more oval and gently curving. For the castrates and bulls, such a grouping would fit with Armitage and Clutton-Brock (*ibid.*, 339) for medium-horned cattle of the medieval period. The cores of the presumed cows from the present assemblage, on the other hand, are generally smaller and more twisted than is the example they illustrate.

Such cores would not be the easiest to work, nor would they carry the most horn, yet these are the most common: a rough visual estimate of sex made on this basis gives 37 cows, 9 possible bulls, and 5 probable castrates.

Further evidence of a readiness to make the best use of unpromising material comes from the size of the smallest specimens: basal measurements of 28.2 x 21.5 mm, 27.3 x 24.4 mm, 27.8 x 23.6 mm would have supported meagre areas of workable horn. Other cores were noted as 'stunted', 'very stunted', 'small and drooping', or as 'small but well formed'. There is an abundance of cattle cores in relation to their other body parts suggesting the importation of much material for working. Armitage (1982, 52), writing for post-medieval times, considers it self-evident that porous material would have no place in horn-working residues, but the many porous cores in the present assemblage show that there was a readiness to utilise material which would be difficult to work during all Phases of activity on the site.

The contrasting dearth of sheep horncores suggests that many of the sheep were hornless. O'Connor (1982, 30) identified significant numbers of polled sheep from 14th century assemblages in Flaxengate, Lincoln, and notes variation amongst medieval assemblages. In the present assemblage no female cores were identified, yet these would have carried as much horn as some of the smaller cattle cores. All the sheep cores were from rams, and all had been worked. One from Phase 2, context 0717, had deep lateral scraping, damage presumably made during the extraction from the horn; and from Phase 4 contexts there were heavy male cores that had clean and powerful cuts around the base. One of these also had scraping at the tip.

Cores of goat, on the other hand, are plentiful and clearly separate into two groups (Fig. 35). These groups surely represent males and females. In the group of presumed males the larger cores will have come from castrates. Noddle (1974; 1977, 396) has drawn attention to the particular value and good

Table 26: distribution of horncores

Phase	*2a*	*2b*	*3*	*4*	*5*	
					0655	*Others*
Cattle	1	3	11	84	2	7
Sheep	-	1	1	2	-	1
Goat	-	3	5	74	13	3
Total	1	7	17	160	15	11

Main deposits of horncore (<5 specimens)

Phase	*Context*	*Cattle*	*Sheep*	*Goat*
2b	0717	3	1	3
3	0712	5	-	2
4	0386	2	-	4
	0393	2	-	4
	0618	13	-	4
	0625	6	-	2
	0640	7	-	1
	0757	4	-	2
	0965	1	-	5
	0976	4	-	2
	0979	11	-	14
	0980	1	1	5
5	0655	2	-	13

firm size of the horn of the castrate male goat. The male goat cores were large, robust and gently curving; some, but not all, were rounded in section at the midcore; the female cores were rather thinner and straighter.

A visual separation (including fragmentary material) suggests 46 male cores to 21 female; on the basis of measurements the ratio is 15:10 (basal) and 20:15 (diameter), but the male material had been cut or sawn from the skull and, in the process, these cores had often been damaged at the base. Whatever the precise ratio, however, it seems clear that more than half of the cores were from males. With so few post-cranial bones that could surely be identified to goat, virtually all the goat horncores must have been brought in specially to be worked. It would seem, then, that there was some element of selection in what was brought in, but that there was not rigid discrimination.

One interesting deposit of goat core came from the same context as the multiple horse burials, where there were six good male specimens and two female; in addition, there were some smaller fragments from heavy cores, almost certainly from males. The same feature contained only two cores from cattle.

Many of the goat cores had been removed from the skull by cutting obliquely on the frontal bones, but sometimes they had been cut (or sawn) across the base of the core itself. One large core from context 0996 was attached to a roughly-cut fragment of skull, but the core itself was sawn carefully and obliquely near the tip. In contrast to the scraping of the cattle cores, only three cores of goat appeared to have been scraped, probably the cleaner lines of the goat cores would make it easier for them to be slipped from the horn without too much damage. Many, though, were broken just below the tip, and only four goat cores provided measurements for the full length of the outer curvature — two from males (210 mm and 178 mm), and two from females (120 mm and 121 mm).

As with the cattle cores, there was a change over time in the abundance of the deposition, but not in any pattern of selection or of use.

Other Possible Industrial Uses

There was only one possible offcut from boneworking, a large femur shaft from cattle which had been neatly sawed both proximally and distally. The back had been neatly cut away, and the specimen might have been intended for some use although there were no signs of any wear.

Deer

Of the small number of fallow and roe deer bones recovered (Table 20), humeri and tibiae were represented by four and three fragments respectively; both bones are fromgood meat areas.

Fish

Fish remains were recovered only from sieved samples. The four contexts which were sampled all came from Phase 3, three from cess layers within Garderobe 4051 (contexts 4052, 4053, 4055), and were very similar in their assemblages. Fish bones were predominantly herring (bones of the head as well as vertebrae) and eel (vertebrae only). The eels could have been trapped locally; the herrings must have been imported to the site, probably after salting. Both these species were a common part of the diet for the time.

Context 4053 also contained sea fish, with a vertebra of a large gadoid, probably cod, and several vertebrae of whiting. Contexts 4052 and 4055 included cyprinids, freshwater species. In 4052 there were two vertebrae from a cyprinid of moderate size, probably dace or chubb, and this would most likely have been food waste; in 4055 there was a vertebra of a good-sized cyprinid which could not be further identified, and five inter-pharangeal bones from another cyprinid, most likely roach. These, however, were from a very small specimen, which might perhaps have swum in from the Thames at a time of flooding, or arrived in the gut of one of the larger fish.

Context 0673 from the area of the causeway, had much smaller quantities of herring and eel, and no other species of fish.

The Horses from Context 0655

A rather bizarre collection of horse skeletons was revealed squeezed into the narrow confines of Gully 0656 (Fig. 15 and Plate 6). Only 20 horse bones were recovered from other contexts on the site.

Body part representations of the horse bones from context 0655 are given in Table 27. Many ribs and much of the skull material had fragmented quite badly in places, but the other bones were whole or near whole, and were found in articulated groups: some complete limbs and several lengths of vertebral column were very distinctive in the ground. Some vertebral columns, or parts of them, lay east to west; others lay west to east. Two or more heads had been buried quite high in the Gully and a little to one side.

The first hope of the present study had been to identify skeletal parts from whole or near-whole individuals, but it was soon clear that most if not all of the horses had been far from complete at burial; indeed, it would have been difficult to pack many large, partly decayed, animal carcases into a deep and narrow Gully, if each had still been fully intact. The revised first objective, therefore, was to try to quantify the loss.

Minimum numbers

An estimate was made of minimum numbers of individuals in relation to both body parts and to size, age, pathology and sex (summarised in Table 28) and it was found that at least eight horses were represented.

The heads

All but one of the heads (1135) were much fragmented, but an examination of toothwear accounted for eight individuals, listed in Table 28 in ascending order of age. There were also several loose teeth, but these could all have been lost from the listed jaws and need not indicate any further individuals.

No deciduous teeth were identified, but in the incisive (1144) recovered during machine sondaging the third upper adult incisors had not been long in wear, and in the accompanying mandible the third incisors were unworn. This was the youngest individual, perhaps at just under 5 years (Silver 1971, 257). Three animals were most likely 5–10 years at death; two others seem to have been approaching 10 years; and two may have been a little older.

It must be stressed that these ages can only be very approximate: toothwear may be greatly affected by diet, and also by oral pathology, which was very much in evidence here — several of the mouths were far from healthy.

On the other hand, there were no teeth which approach the root stage of Taylor's (1955, 116) diagrams for 16–20 years, nor of Levine's (1982, 234–9) tooth-by-tooth measurements for that age, and it seems clear from the state of the toothwear that, as a group, these horses were nowhere near the end of their working lives, that many of them

Table 27: horse fragments from context 0655

Skull fragments	263
Maxilla	10
Mandible	6
Hyoid	3
loose teeth:	
Lower incisors	15
Lower premolars	5
Lower molars	3
Upper incisors	17
Upper canines	2
Upper premolars	3
Upper molars/premolars	6
Upper molars	7
Atlas	8
Axis	8
Other cervical vertebrae	38
Thoracic vertebrae	104
Lumbar vertebrae	39
Sacrum	4
Rib fragments	368
Scapula	1
Humerus	4
Radius	5
Ulna	4
Carpals	18
Metacarpus 2	2
Metacarpus 3	4
Metacarpus 4	2
Front 1st phalanx	4
Front 2nd phalanx	4
Front 3rd phalanx	4
Os coxae	14
Femur	13
Patella	2
Tibia	7
Fibula	1
Astragalus	7
Calcaneum	5
Other tarsals	20
Metatarsus 2	6
Metatarsus 3	6
Metatarsus 4	6
Rear 1st phalanx	4
Rear 2nd phalanx	3
Rear 3rd phalanx	6
Sesamoid	6
Total	1067

Table 28: details of the horse skeletons

Skulls and teeth

Incisive 1144 third incisors coming into wear
Mandible 1144 third incisors unworn
? under 5 years

Mandible 1105 5–10 yrs on Taylor root diagrams
= 5–10 yrs

Skull 1134
Incisive *Pathology:* twisted roots, strange wear
L + R maxillae 5–10 years on Taylor roots
L + R mandibles *Pathology:* spongy gumlines (also on maxillae)
Four canines present
Upper wolf teeth present
? Male
= 5–10 years

Skull 1135
Incisive infundibulum still open
L + R maxillae *Pathology:* execrescences on nasal+ palatine surfaces
Canines present
Wolf teeth present
?Male
= ?5–10 years

Skull 1123
Incisive slight labial grooving, some infundibulum.
L + R maxillae trivial right canine, no left canine
Left wolf tooth present
? Castrate or female
= ? rising 10 years

Skull 1124
Incisive more grooving; still some infundibulum
L + R maxillae flat canines
? Male
= ? c.10 years

Skull 1108
Incisive infundibulum concave
L maxilla
L + R mandibles 10–12 yrs on Taylor root diagrams
= 10–12 years

Skull 1126
Incisive labial grooves; no infundibulum on 3rd incisors
L + R maxillae *Pathology:* left pre-molar 2 twisted labially
Canines present
?Male
= 10–12+ yrs

Vertebral columns

vc=cervical vertebra, vt=thoracic vertebra, vl=lumbar vertebra

Neck 1112/thoracics 1112/lumbars 1112/sacrum 1112
Articulates: backleg 1112
Fusion: some caudal ends unfused or just fused unfused pubis
Pathology: art processes thickening VT13–VL3, worst at VT18, VL1 with exostosis on femur 1112 + pathological tarsals
Size: cf FRU New Forest pony
Sex: ? male — heavy structure pelvis

Neck 1105/thoracics 1105/lumbars 1140/sacrum 1140
Articulates: head 1105, 5–10 yrs os coxae 1140
Fusion: many caudal epiphyses unfused
Pathology: articular processes thickened, VT17 and 18
Size: medium

Neck 1108/thoracic 1 + 2 1108, 3 – 18 1101/lumbars 1101/sacrum 1101
Articulates: head 1108, 5–10 yrs; and os coxa 1101
Fusion: all fused save one thoracic just fused caudally
Pathology: rigid pairs of vertebrae, VT11 + 12, 13 + 14, 15 + 16, plus lumbar execrescences also exostosis on ribhead 1108
Size: smaller than FRU New Forest Pony

Neck atlas 1135 + cervicals 2–5 1141 + 6–7 1144/ thoracics 1–13 1144.
Articulates: head 1135, 5–10 yrs
Fusion: all fused
Pathology: minor exostosis on processes of 2 vertebrae
Size: large, but smaller than FRU's modern stallion

Neck 1133/thoracics 1133+1117/lumbars 1117/ cervicals 1117
Fusion: caudal epiphyses loose on VC7 and VT1
Pathology: 5 x VLs with exostosis and deformatiion of body crest also one ribhead with exostosis
Size: medium

Neck 1126/thoracic 1 1126
Articulates: head 1126, *c.* 10 yrs
Fusion: all fused
Pathology: none
Size: slightly smaller than FRU New Forest Pony

Neck 1134 + 1142/thoracic 1 1142
Fusion: all fused
Pathology: none (but see skull 1134)
Size: slightly larger than FRU New Forest Pony

Neck 1103 + 1128
Articulates: scapula 1103
Fusion: all fused
Pathology: none
Size: cf FRU New Forest Pony

Rump lumbars 1104/sacrum 1104
Articulates: backleg 1104
Fusion: some lumbar vertebrae just fused caudally

Size: smaller than FRU New Forest Pony

Frontlegs

WRH = withers height estimate (in cm) by Kiesewalter's factors; Size: estimates from Vitt's groups

Frontleg 1110
Pathology: 1st, 2nd phalanges with light exostosis
Size: average to larger than average— WRH on radius 142.5, on metacarpus 144.2

Frontleg 1111 (includes metacarpus + feet from baulk)
Pathology: humerus trochlea and prox radius rubbed porous at joint + exostosis on distal radius shaft
Size: average to larger than average — WRH on radius 144.0

Frontleg 1114
Pathology: mild exostosis on proximal metacarpus shaft
Size: smallish — WRH on radius 130.0 on metacarpus 126.9

Frontleg 1118
humerus missing
Pathology: metacarpus 3 + 4 fused with damage
Size: average — WRH on radius 143.7 on metacarpus 141.6

Radius 1144
Pathology: grievous proximal exostosis and joint wear
Size: smallish — WRH 134.1

Scapula 1103

Backlegs

Left backleg 1102: os coxae + femur
Right backleg 1104: femur to 1st phalanx, no patella
Articulates: rump 1104
Size: smallish — WRH on metatarsus 134.3

Right backleg 1109: femur + tibia
Size: larger than average — WRH on tibia 145.2

Right backleg 1112: os coxae, femur, tibia, central tarsals, plus metatarsus 1139 (from baulk)
Articulates: whole trunk 1112
Pathology: femur mild medial exostosis; T3 + T central with pitted joint surface; T4 fused to T central
Size: average — WRH 142.8 on metatarsus

Left backleg 1113: complete from os coxae
Pathology: 1st phalanx small lesion px joint
Size: smallish — WRH on tibia 191.2, on metatarsus 133.3

Right backleg 1115: complete from os coxae to 2nd phalanx
Size: smallish – WRH on tibia 130.8, on metatarsus 133.8

Left backleg 1116: os coxae and femur

Right backleg 1129: femur to metatarsus 2, 3, and 4
Size: larger than average — WRH on tibia 145.2, on metatarsus 145.5

Right backleg 1138: femur to metatarsus 2, 3, and 4
Size: average – WRH on metatarsus 142.8

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were quite young adults, and that even the oldest of them should still have had a fair span of useful life ahead.

Four individuals had strong canine teeth and are likely to have been male. A further indivivdual had one canine only, a very small one, and was perhaps a gelding. Two individuals had no canine teeth and may have been female. The remaining jaw was broken and gave no information.

For a minimum of eight individuals at death, some material loss may be established. This loss was greater from the lower jaws than from the upper. The lower cheek teeth of horse are somewhat smaller than are those of the upper jaw, but even so they are hard and substantial, liable neither to decay in the ground nor to be lost at excavation. From the different recovery, it seems likely that some of the lower jaws had become detached before the horses were buried in the Gully.

The trunks

A minimum of eight horses were again represented by bones of the neck. The other vertebrae were less well represented. Table 28 suggests a possible form of composition for eight trunks; where different finds numbers appear for a single individual these vertebrae articulate well together, and there are no biological reasons against such reconstruction, but some of these groups were separated in the Gully, and the recognition of possible individuals cannot be taken as conclusive. The exercise was none the less useful in locating the areas of loss.

An estimate of ageing was made from the state of fusion of the vertebrae. The epiphyses on the cranial ends of all vertebral bodies were fused, but on the non-cranial ends there were several unfused epiphyses, particularly for the lumbar vertebrae and for a few of the lower thoracic ones. In other individuals, all fusion was complete and enduring, but the fusion line could still be seen. Two trunks (1101 and 1112) which had unfused or just fused epiphyses are directly linked with other body parts which seem much older, but both these vertebral columns have signs of serious pathology which may have distorted or delayed the normal processes of fusion. All in all, the indication is of several quite young adults, perhaps of 5 or 5-plus years,

corresponding well with the ageing results from the toothwear.

In terms of size, neck 1135 and the accompanying lower vertebrae were of large size, as was head 1135. These were the only large vertebrae in the whole assemblage. Several other spinal groups were of smaller vertebrae than those of the FRU's New Forest mare.

Serious pathological conditions were evident on many of the vertebrae and there were several large ventral excresences which had formed rigid joins between adjacent vertebral bodies. One individual (1101) was badly affected in this way, with joins on pairs of thoracic vertebrae and with rough irregularities on several of the lumbars. In others, the articular processes were thick and mis-shapen. These conditions occurred at different locations in different individuals, and their location may be evidence of hard usage in different parts of the spine — the thoracic troubles may have come from the strains imposed by traction, the lumbar from heavy riding, perhaps on hard or uneven ground (Baker and Brothwell 1980). But wherever the seat of the trouble, it is likely that the affected animals had been worked hard and long, and since the group as a whole was not very old they show the signs of being put to work too soon.

Many rib heads were found articulated with their vertebrae. Though much fragmented, a total of 126 articulated rib heads was counted; since horses have 18 (or, rarely, 19) pairs of ribs, these would account for just under four individuals. A few ribs had signs of pathological conditions: one in group 1117 had a heavy bony outgrowth all round its head, one on 1108 showed bad exostosis on the tubercle and also by the head, and one in 1112 had rough lumps on the caudal border.

Again, there is a loss of material, and again this loss is differential: from the vertebral column it is greater to the rear of the animals. Assuming a figure of eight individuals there was virtually a full complement of necks; but there were only five main thoracic groups, five rumps and four sacra. There were no tail vertebrae.

The forelegs

Only four right front legs were represented (Table 28). These legs were all articulated and, except for three missing carpals from leg 1114, they were complete from the distal humerus downwards. There was one additional radius, also from a right foreleg. These legs are likely to have been buried as separate limbs; in the whole assemblage there was only one scapula (also from a right leg). Nor was there a proximal humerus — all were from the shaft and distal joint. This represents a loss of twelve legs and 15 out of 16 possible scapulae.

All the front limb material was fully fused. There was much evidence of exostosis — indeed, not one of these limbs was undamaged. The elbow joint on leg 1111 was very badly rubbed and must surely have been painful for the animal, and the radius recovered during machine sondaging was also in very poor condition. So high an incidence of trouble would seem to confirm the suggestion of hard work, of rough treatment, or both.

Size estimates were made as recommended by von den Dreisch and Boessneck (1974, 131–3). Withers heights are calculated by Kiesewalter's factors, which use measurements of lateral length of the main long-bones and metapodials to provide a general guide. Vitt's groups are based on measurements of the greatest length of the long-bones and the metapodia, and they span nine sizes of horse from giant to dwarf. The front legs from the present assemblage fall into Vitt's 'average' (1.36–1.44 m, 13.1–14.2 hands; three examples) and 'smallish' (1.28–1.36 m, 12.2–13.1 hands; one example) groups, all four coming from pony-sized animals therefore. The additional radius also came from a smallish animal. This is not precise enough to link any of these legs with particular heads or trunks, but they are readily acceptable as coming from the same group of individuals.

The back legs

The rear of vertebral columns was less well represented than the neck, but the back legs proved to be rather better represented than were the front. Bones of the pelvic girdle were well represented, with six left and six right legs, plus one fragment; this is probably because the pelvic girdle is anchored far more closely to the spine. The surviving back legs, though, were not as complete in themselves as were the front legs, and only leg 1113 was fully articulated from the pelvis to the foot. Details are provided in Table 28: it may be seen that leg 1113 (left) and leg 1115 (right) were a pair.

The material from the back leg was in a generally healthier state than was that of the front. The femur of leg 1112 showed mild exostosis on the medial shaft, and the tarsals of this leg were pathological; it was noted above that many of the thoracic and lumbar vertebrae from this same individual showed a thickening of the articular processes and that there was mild ventral exostosis on the 13th–16th thoracics. The first phalanx of 1113 had a small lesion on the surface of the proximal joint.

Estimates of withers heights are given for those legs where length measurements are available. Three legs were 'smallish', but since 1113 and 1115 formed a good pair these three legs represented only two individuals. Two legs were from medium-sized individuals, and two from somewhat larger ones; but although leg 1109 and leg 1129 both come into Vitt's group of 'larger-than-average' horses (withers height 1.44–1.52 m, 14.2–15.0 hands), they are like the material from the front legs discussed above in that they come very low in this range. There is nothing to compare, for example, with the larger material in Prummel's (1986, 201) assemblage of 19 horses from 15th century Utrecht, where by Kiesewalter's factors several bones gave withers heights of over 1.50 m and one individual over 1.60 m (15.3 hands). Nor is there anything to compare

with a single large horse (1.60 m withers height) from a 14th century deposit in Southampton Castle (Bourdillon 1986, 75).

Discussion

Of the horses, many were quite young adults and none was really past its prime, yet there was much evidence of oral pathology, of spinal rigidity and arthritic conditions on the vertebrae, and of exostosis and joint disorders on the limbs. It is suggested that these animals worked too hard too soon. Yet such conditions are not lethal, and, even if as a group the horses had been treated poorly, they must have lived with their troubles for some time, and it seems unlikely that they would all suddenly have been killed, to end in a single, quite fresh burial, simply because they were under par.

The loss of material is perplexing. With the bones from the whole body parts preserved intact the loss by total decay in other bone groups would seem unlikely, and serious disturbance after burial would have been very difficult in so deep and narrow a pit. The horses were probably incomplete at burial, but if so, how and why?

During the present study few cutmarks were observed. There had been no chopping or breaking of the bones either for the eating of the flesh or the extraction of marrow. Trunks 1101 and 1117 showed damage, perhaps by cutting, to the transverse processes of several lumbar vertebrae and to the spines of some of the thoracics, but this damage might have resulted from post-depositional heavy pressure on the spines and processes from the sides of the Gully. There were marks, too, on the lateral surfaces of ribs, but these were superficial scratches rather than positive cuts.

Some evidence, though, was more conclusive. The four sacra were all chewed at their ends and no blade marks could be seen, but all four had been cleanly cut or broken, and these cuts or breaks were not along any lines of weakness but obliquely across the caudal end. So regular a pattern suggested clean cutting. Convincingly, fragments from three of the skulls showed clear cutmarks. Skull 1124 had a clean, sharp mark on the ventral surface of the basiphenoid; skull 1123 had been cut through the forehead; skull 1135 had a great many light cuts all around the orbit, mostly oblique and crossing each other. This was unmistakeable evidence that a knife or other implement had been used.

Such evidence may point to the removal of the hide. It seems that a skilled worker is able to skin an animal without leaving any marks on the bones save in two places only — on the skull above the eyes, and at the base of the spine in the removal of the tail. The marks on the whole skull (1135) would fit exactly with skinning, and the multiple fragmentation of the other skulls may mean that further evidence has been lost. The total absence of tail bones, plus the pattern of destruction on the sacra, is what would be expected from the removal of the hide.

One may suggest, then, that at some point before burial some or all of the horses had been skinned. This would leave the flesh directly open to damage from dogs, and there was ample evidence of chewing. The chewing was found in a consistent pattern over the body and it seems likely that much or all of the chewing had taken place before the material was brought to the Gully: there is chewing on the bones at the bottom of the Gully as well as on the more accessible material at the top.

It is possible that some of the missing material may have been incorporated in other contexts but the small groups of other horse waste from the site are not complementary.

The lack of erosion on material from this single stratigraphic unit is a striong indication that the horses were all buried in one operation. Their killing does not seem to have been a matter of controlled exploitation since they showed a range of ages from young adult to prime adult, and the prospect of much future horsepower would have been lost in one short episode. There are no signs of serious epidemic (although such signs might not be present in the bones) from which they may all have suddenly died, and they were clearly not killed for meat — there are cutmarks which indicate skinning but the bones were not butchered. They appear to have been left exposed, perhaps lying on their right sides, long enough for the carcases to have been considerably chewed by dogs; dismemberment by chewing was soon underway, with some front limbs either devoured entirely or else dragged whole from the site, but with the chewed back limbs torn less often from the trunk.

The presence of at least eight rotting and partly dismembered horses, with their attendant scavengers, cannot have been pleasant and the carcases were at some point deposited into a narrow Gully and covered over. This cannot have occurred too long after death since the rotting corpses would probably have bloated and even exploded as a natural consequence of decay, scattering debris, though some loss of body parts could have resulted from detachment as the corpses were dragged to the Gully for disposal.

13. **Mollusca**, *by Michael J. Allen and R. Davidge*

Twelve bulk soil samples were analysed for terrestrial Mollusca in order to determine the nature of the local environs and water courses in the high medieval and post-medieval periods. The samples were processed following the methodology outlined by Evans (1972). One kilogram of air-dried soil was disaggregated in water and hydrogen peroxide. The floating molluscs were decanted onto a 500 μm sieve and the residues passed through a nest of sieves of 5.6 mm, 2 mm, 1 mm and 500 μm mesh aperature. Molluscs were extracted (RD) and identified and quantified (MJA) using a 10 x 30 stereobinocular microscope. The results are shown in Table 29. The residues were weighed and the 5.6

Table 29: Mollusca (weight of each sample = 1kg)

Phase	*2b*	*3*	*3*	*5*	*6c*	*6c*	*6d*	*6d*	*6d*	*Mod*
Sample	*2034*	*2054*	*2053*	*2027*	*2021*	*2038*	*2032*	*2037*	*2036*	*2031*
Feature	*362*	-	-	-	-	*375*	*362*	*375*	*375*	*362*
Terrestrial Mollusca										
Pomatius elegans	+	-	-	1	-	-	-	-	-	-
Carychium minimum	-	-	2	-	-	-	-	-	-	-
C. tridentatum	1	1	1	4	-	-	-	-	-	-
Carychium spp.	-	-	-	-	-	+	-	-	-	-
Succinea putris	-	-	1	-	-	-	-	-	-	-
Oxyloma pfeifferi	-	-	1	-	-	-	-	-	-	-
Cochlicopa lubrica	-	-	-	1	-	-	-	-	-	-
Cochlicopa spp.	-	1	1	1	-	1	-	-	-	-
Vertigo cf *substriata*	-	-	-	2	-	-	-	-	-	-
Pupilla muscorum	1	1	-	3	-	+	-	-	-	3
Vallonia costata	-	-	-	36	-	-	5	-	-	12
Vallonia pulchella	-	5	12	14	-	6	1	3	-	4
Punctum pygmaeum	1	-	-	-	-	-	-	-	-	-
Discus rotundatus	-	2	-	1	-	-	-	-	1	-
Vitrea contracta	-	-	-	1	-	-	-	-	-	-
Nesovitrea hammonis	-	-	-	-	-	-	-	-	-	2
Aegopinella pura	-	-	-	1	-	-	-	-	-	-
Aegopinella nitidula	1	-	1	4	-	-	-	-	-	-
Oxychilus cellarius	-	-	1	-	-	1	-	-	-	-
Zonitoides nitidus	-	-	1	-	-	-	-	-	-	-
Cecilioides acicula	1	3	-	60	-	1	1	-	+	3
Cochlodina laminata	-	2	-	-	-	1	-	-	-	-
Clausilia bidentata	+	1	-	-	-	4	-	-	-	-
Helicella itala	-	-	-	-	-	3	-	-	-	-
Trichia striolata	-	-	1	-	-	-	-	1	-	-
Trichia hispida	3	3	13	23	-	3	-	-	1	-
Arianta arbustorum	-	-	-	-	-	+	-	-	-	-
Cepaea/Arianta spp.	+	1	1	-	-	1	-	1	-	-
Helix aspersa	+	+	-	-	-	-	-	-	+	-
Aquatic Mollusca										
Valvata cristata	-	2	20	-	-	1	-	-	-	-
Valvata macrostoma	-	-	1	-	-	-	-	-	-	-
Bithynia tentaculata	-	-	2	1	-	2	-	-	-	-
Bithynia leachii	-	-	7	-	-	-	-	-	-	-
Lymnaea truncatula	-	1	23	-	-	-	-	-	-	-
Lymnaea peregra	-	-	4	-	-	-	-	-	-	-
Planorbis planorbis	-	-	9	-	-	-	-	-	-	-
Planorbis carinatus	-	-	2	-	-	-	-	-	-	-
Anisus leucostoma	-	-	8	-	-	-	-	-	-	-
Bathyomphalus contortus	-	-	5	-	-	-	-	-	-	-
Hippeutis complanatus	-	-	3	-	-	-	-	-	-	-
Planorburius corneus	-	-	1	-	-	-	-	-	-	-
Total (excluding *Ceciliodes acicula*)	7	20	121	93	0	23	6	5	2	19
Taxa (" " ")	9	12	23	13	0	13	2	3	3	4
% terrestrial (" " ")	100	85	30	99	0	87	100	100	100	100
% freshwater (" " ")	0	15	70	1	0	13	0	0	0	0

mm fraction discarded. Terrestrial mollusc nomenclature follows Waldén (1976), and fresh and brackish-water species follow Kerney (1976).

Phase 3

Building 4112
Sample 2034 came from the fill (0363) of Gully 0362, part of the possible external staircase base attached to Building 4112. A single sample from the grey clay loam produced only seven apices, however four other species were represented by fragments only. So few shells makes any palaeoenvironmental interpretation difficult, although the indications are of a terrestrial assemblage, predominantly shade-loving and associated with dank vegetation.

Ditch 0578
Two samples from sondages and machine-dug Gullyes through ditch 0578 immediately west of the excavated area were examined (2054 and 2053), that from the lowest layer (light grey sandy clay 0621) producing only 20 shells. The assemblage was predominantly shade-loving, but moist open country was indicated by the presence of *Vallonia pulchella*. Two fresh–brackish water species were recovered; *Lymnaea truncatula* and *Valata cristata*. These are both common in small bodies of slowly moving soft water. The overlying clayey silt (0620) contained a much larger and diverse assemblage of 121 individuals of which 70% could be categorised as fresh or brackish-water species.

The amphibious group (Robinson 1988) or Sparks' group 1 (Sparks and West 1959) was represented by both *Lymnaea tentaculata* and *Anisus leucostoma*; the latter of which is typical of poor, intermittently dry, stagnant habitats (O'Connor 1988). Most of the species present can be classified as marsh or freshwater slum species (Evans 1972; 199–200).

After *L. tentaculata*, the most common species was *Valvata cristata* which belongs to Sparks group 3; ditch aquatic species. Most of the generally aquatic molluscs prefer well vegetated or weedy habitats especially *Planorbis corneus*, *Valvata macrostoma* and *Bithynia leachii*. These, together with the obligatory marsh species (*Succinea putris*, *Oxyloma pfeifferi* and *Zonitoides nitidus*) and those characteristic of marsh malacofaunas (*Carychium minimum* and *Vallonia pulchella*), indicate dank marsh vegetation. Of the obligatory marsh species, it is notable that those that favouring wetter places were more common here. No suggestion of significant shady habitats was provided by the assemblage; indeed, positive indications of an open environment were provided by the presence of *Succinea putris*, which is decidedly phototrophic (Boyatt 1934).

Thus the assemblages from this channel suggest that it had been excavated in open moist conditions and the channel was prone to puddles and seasonal wetness. Later the channel became a refuge for marsh and rich dank vegetation as it held stagnant water and was probably very muddy. Some of the diverse assemblage may have migrated from nearby riverside habitats or been transported into this micro-refuge by occasional flooding (Kew 1893; 138–45).

Phase 5

Floor of Building 0943
Sample 2027 came from the chalk floor (0925) of Building 0943. The problems of taphonomy and interpretation of a mollusc assemblage from an active occupation surface are rife, but it is assumed that the shells within the floor were incorporated at the time of construction from the immediate environs. Survival of shells of molluscs living on the surface of the floor would not be expected to have survived trampling in any significant quantities.

The assemblage was predominantly open (*Vallonia pulchella* and *Vallonia costata*) with a number of shade-loving species occurring in low frequencies. This probably indicates some shade was provided by either vegetation or more probably garden and anthropogenic contexts; building rubble, gardens, long grass etc. The presence of *V. pulchella* indicates moist habitats and has been identified in earlier (Phase 3) marsh environs.

A single freshwater specimen of *Bithynia tentaculata* reinforces the proximity of suitable aquatic locations.

Post-Medieval

A number of samples throughout the post-medieval sequence were taken to broadly assess the environment of the site during its later phases.

Phase 6c
Two samples were taken from the fill of saw pit 0375. The lowest, sample 2021 from layer 0358 contained no mollusca, but a spot sample (2038) from the upper fill contained a diverse but numerically deficient assemblage. The assemblage was essentially one of open dry conditions, and, although the aquatic species *Bithynia tentaculata* and *Valvata cristata* were recorded, these had probably originated from the known surrounding wetter environments.

Phase 6d
Three samples were taken from the supposed orchard soils 0321; these produced extremely depauperate assemblages and only five species were recorded.

Modern

Two samples from context 0335 immediately overlying the orchard soils were analysed. One was

devoid of shells the other produced an assemblage of open country with the synanthrope *Trichia striolata present.*

14. Carbonised, Mineralised and Waterlogged Plant Remains,
by W.J. Carruthers

Soil samples were taken during the excavation for the recovery of environmental remains. The samples were treated in one of two ways depending on whether the deposit was wet or dry:

i) Fifteen-litre samples were taken from selected dry deposits and processed on site in a modified Siraf tank using flotation techniques (Allen and Heaton in prep.). The flots were recovered in a 500 µm meshed sieve. After being air-dried and bagged the flots were passed on to the author unsorted.

ii) Where the soil was sufficiently wet for it to be possible that waterlogged remains might be preserved, samples were taken but left unprocessed. The large samples of soil (about 20 litres) were double-bagged and well-sealed. They were stored in a cool, dark place prior to being passed on to the author.

The author first examined 500 ml subsamples in order to establish the state of preservation of the plant remains. The subsamples were processed by disaggregating the soil gently in warm water, and pouring the suspension through a stack of sieves of minimum mesh 250 µm. The residues were sorted under a dissecting microscope. On the basis of the results from this examination, further 10 litre subsamples of soil (bulk samples) were either soaked in warm water and washed through a 500 µm meshed sieve, or subjected to flotation as in i). The purpose of examining the bulk samples was in order to recover the larger, less abundant remains such as fruit stones, carbonised grain and fish bones. The coarse residues were sorted by eye and the fine residues and flots sorted under a binocular microscope.

Results

The analyses revealed that three types of preservation of plant remains were present in deposits from this site:

a) Carbonised grain and weed seeds were found in small numbers in most of the samples, both wet and dry. These are summarised in Table 30.

b) Mineralised plant remains were recovered primarily from a medieval garderobe deposit. The seeds possessed the amber colouring typical of calcium phosphate replaced remains as described by Green (1979a). Such material is frequently found in deposits containing faeces or other highly organic matter.

c) A few deposits contained anaerobically preserved plant remains. This material was principally recovered from channel silts, but also from a medieval cess-pit fill. Table 30 gives details of the mineralised and waterlogged remains, presenting the results for each taxon in terms of relative abundancy rather than absolute numbers. The full species list is retained in the archive.

It was not possible to undertake any detailed statistical analyses of the data, since the quantity of material recovered was not sufficient from any one period sampled. In addition, the variety of methods of preservation made comparisons between samples and periods difficult, since each method imposes a certain degree of bias on the range of taxa preserved. However, a wide range of taxa was recovered from the samples, and valuable records of food plants were obtained from two of the phases examined.

Discussion

Phase 2a
The sample from the primary fill of cess-pit 0718 contained substantial numbers of waterlogged seeds but no mineralised remains. Compressed organic matter rich in cereal bran (spermoderm) fragments was present, and this was similar in nature to mineralised concretions present in the Phase 4 garderobe. Clearly, the conditions neccessary for mineralisation to take place had not been present in the case of this deposit. Since the material was obviously sufficiently organic, total waterlogging of the deposit appears to have prevented the remains from becoming mineralised. This sample is discussed further at the end of this report.

Phase 2b
The single sample from an early medieval inundation silt (4031) produced just a few carbonised weed seeds. The presence of a seed from the arable weed thorow-wax (*Bupleurum rotundifolium* L.) indicted the cultivation of calcareous soils which are predominant in the surrounding area.

Phase3
Samples were examined from the lowest fills of the presumed garderobe, 4051, cess-pit 0711, and the primary channel silts of ditch 0666.

Garderobe 4051
The two samples from different areas of the garderobe deposit (contexts 4053 and 4055) were found to contain a number of carbonised cereal caryopses and a wide range of mineralised remains. The presence of large quantities of mineralised

Table 30: waterlogged, carbonised and mineralised plant remains

Taxa	*Phase* / *Habitat*	*2a* *0718*	*2b* *4031*	*3* *4051*	*3* *0666*	*3* *0711*	*5* *pits etc*	*6a* *various*	*6d* *orchard soils*
Cereals									
Triticum sp. free-threshing (wheat caryopses)		-	-	<15>[1]	<5>	-	<1>	<4>	-
Hordeum sp. (barley caryopses)		-	-	<13>[2]	<1>	<1>	-	-	<3>
Hordeum sp. (barley rachis frags)		5	-	-	-	-	-	-	-
Avena sp. (oat caryopses)		-	-	<2>[1]	<3>	-	<4>	<1>	-
Secale cereale L. (rye caryopses)		-	-	<5>[4]	<1>	<1>	-	<1>	-
Secale cereale L. (rachis frags)		9	-	-	-	-	-	-	-
Indet. cereals		-	-	<27>[3]	<3>	<3>	<3>	<8>	<2>
Cereal spermoderm frags		+++	-	[++]	-	[++]	[+]	[++]	-
Cereal/grass culm frags		+	-	-	-	[+++]	[++]	[+]	-
Cereal/grass culm nodes		+	-	[+]	-	-	-	-	-
Boraginaceae									
Lithospermum arvense L. (corn gromwell)	AD	-	-	[++]	-	-	-	-	-
Myosotis sp. (forget-me-not)	CGMS	-	-	[++]	-	-	-	-	-
Cannabiaceae									
Cannabis sativa L. (hemp)	*D	-	-	-	+	-	-	-	-
Humulus lupulus L. (hop)	H*	-	-	-	+	-	-	-	-
Caprifoliaceae									
Sambucus nigra L. (elder)	DHSn	+	-	[+]	++++	-	-	[+]	-
Caryophyllaceae									
Agrostemma githago L. (corn cockle)	A	++++f	-	[+++]	+f<+>	-	-	-	-
Cerastium sp. (chickweed)	ABDG	-	-	[+]	-	-	-	-	-
Lychnis flos-cuculi L. (ragged-robin)	wGMS	-	-	-	+	-	-	-	-
Stellaria graminea L. (lesser stitchwort)	EGSI	+	-	-	+	-	-	-	-
S. media (L.) Vill. (chickweed)	AD	+	-	-	+	-	-	-	-
Silene cf. *alba* (Mill.) Krause (white campion)	CDH	+	-	-	+	-	-	-	-
Silene sp. (campion)		-	-	[+]	+	-	-	-	-
Indet.		-	-	[+]	-	-	<+>	-	-
Chenopodiaceae									
Atriplex hastata/patula L. (orache)	CD	+	-	-	-	-	-	-	-
Chenopodium album L. (fat hen)	CDn	+	<+>	-	+	-	-	-	-
C. rubrum L. (red goosefoot)	CDn	-	-	-	++++	-	-	-	-
Chenopodium sp.			-	-	-	-	-	-	-
Atriplex sp./*Chenopodium* sp. (no seed coat)		-	-	[++]	-	-	-	-	-
Compositae									
Achillea millefolium L. (yarrow)	GH	+	-	-	-	-	-	-	-
Anthemis cotula L. (stinking mayweed)	ADh	+++	-	-	+	-	-	-	-
Arctium lappa L. (great burdock)	DW	+++f	-	-	+	-	-	-	-
Centaurea cyanus L. (cornflower)	AD	-	-	-	-	-	-	-	-
Centaurea sp. (no seed coat)		+	-	[+++]	-	-	-	-	-
Chrysanthemum segetum L. (corn marigold)	Aa			-	+	-	-	-	-

Taxa	*Phase* / *Habitat*	*2a* / *0718*	*2b* / *4031*	*3* / *4051*	*3* / *0666*	*3* / *0711*	*5* / *pits etc*	*6a* / *various*	*6d* / *orchard soils*
C. vulgare (L.) Bernh. (tansy)	DHO	-	-	-	+	-	-	-	-
Cirsium sp./*Carduus* sp. (thistle)	ABDGMW	-	-	[+]	+	-	-	-	-
Lapsana communis L. (nipplewort)	DHR	+++	-	-	+	-	-	-	-
Sonchus asper (L.) Hill (spiny sow-thistle)	CD	+	-	-	-	-	-	-	-
S. oleraceus L. (sow-thistle)	CDW	-	-	-	+	-	-	-	-
Tripleurospermum maritimum (L.) Koch (scentless mayweed)	AD	-	-	-	-	-	-	<+>	-
Indet.		-	-	[+++]	-	<+>	-	-	-
Corylaceae									
Corylus avellana L. (hazelnut shell frags)	HS	+f	-	-	+f	<+>f	<+>f	-	-
Cruciferae									
Alliaria petiolata (Bieb.) Cavara & Grande (garlic mustard)	HW	-	-	[++]	-	-	-	-	-
Barbarea vulgaris R.Br. (yellow rocket)	BwHW	-	-	-	+	-	-	-	-
Brassica sp./*Sinapis* sp.	ACD	+	-	[++]	+	-	-	-	-
Capsella bursa-pastoris (L.) Medicus (shepherd's purse)	CDW	-	-	-	+++	-	-	-	-
Rorippa islandica (Oeder) Borbás (marsh yellow-cress)	M	-	-	[+]	+	-	-	-	-
Raphanus raphanistrum L. (wild radish capsule)	Aa	-	-	[+]	-	-	-	-	-
Indet.		-	-	[+]	+	-	-	-	-
Cyperaceae									
Carex sp. (sedge)	GM	+	-	[+]	+	<+>	-	-	-
Eleocharis subg. *Palustres* (spike-rush)	MPw	+	-	-	+	-	-	-	-
Euphorbiceae									
Euphorbia helioscopia L. (sun-spurge)	C	-	-	-	+	-	-	-	-
Fumariceae									
Fumaria sp. (fumitory)	CD	-	-	-	+	-	-	-	-
Gramineae									
Bromus sect. *Bromus* (chess)	ADG	-	-	[++]	-	<+>	<+>	-	-
Gen. et sp. indet. (grasses)	CG	+	-	[++]	+	-	-	-	-
Juncaceae									
Juncus sp. (rush)	wGMR	-	-	-	+	-	-	-	-
Labiatae									
Lamium sp. (dead-nettle)	CDHW	+	-	-	+	-	-	-	-
cf. *Marrubium vulgare* L. (white horehound)	DW	-	-	-	+++	-	-	-	-
Nepeta cataria (cat-mint)	HWc	-	-	-	+++	-	-	-	-
Prunella vulgaris L. (self-heal)	DG	-	-	-	+	-	-	-	-
Rosmarinus officinalis (rosemary)	*	-	-	-	+	-	-	-	-
Leguminosae									
Medicago lupulina L. (black medick)	GW	-	<+>	-	-	-	-	-	-
Vicia cf. *sepium* L. (bush vetch)	GH	-	-	[+]	-	-	-	-	-

Taxa	*Phase* / *Habitat*	*2a* *0718*	*2b* *4031*	*3* *4051*	*3* *0666*	*3* *0711*	*5* *pits etc*	*6a* *various*	*6d* *orchard soil*
Vicia sp./ *Lathyrus* sp. (vetch/tare)		<+>	-	-	<+>	<+>	-	-	-
Indet.		-	-	[+]	-	-	-	-	-
Lemnaceae									
Lemna sp. (duckweed)	P	-	-	-	+	-	-	-	-
Linaceae									
Linum usitatissimum L. (cultivated flax seed)	*	+	-	[+]	-	-	-	-	-
Malvaceae									
Malva sylvestris L. (mallow)	DW	-	-	-	+	-	-	-	-
Menyanthaceae									
Menyanthes trifoliata L. (bogbean)	BP	-	-	-	+	-	-	-	-
Moraceae									
Ficus carica L. (fig)	*	-	-	-	+	-	-	-	-
Papaveraceae									
Papaver rhoeas / hybridum L. (field/round prickly-headed poppy)	CD	-	-	-	+	-	-	-	-
Papaver sp. (poppy)	CD	-	-	[+]	+	-	-	-	-
Plantaginaceae									
Plantago major L. (great plantain)	CDGfo	+	-	-	-	-	-	-	-
Polygonaceae									
Bilderdykia convolvulus (L.) Dumort. (black bindweed)	AD	-	-	[+]	+	-	-	-	-
Polygonum aviculare agg. (knotgrass)	AD	+	-	-	+	-	-	-	-
P. hydropiper L. (water-pepper)	P	-	-	-	+	-	-	-	-
P. lapathifolium / nodosum (pale persicaria)	BD	-	-	[+]	-	-	-	-	-
P. persicaria L. (red shank)	BCD	-	-	-	+	-	-	-	-
Rumex acetosella agg. (sheep's sorrel)	CEGa	+	-	-	-	-	-	-	-
R. maritimus L. (golden dock)	oBwG	-	-	-	+	-	-	-	-
Rumex sp. (dock)		+	<+>	<+>[++]	+	-	<+>	-	-
Portulacaceae									
Montia fontana susp. *chondrosperma* (blinks)	BwGas	-	-	-	+	-	-	-	-
Ranunculaceae									
Caltha palustris L. (marsh marigold)	MP	-	-	[+]	-	-	-	-	-
Ranunculus sceleratus L. (celery-leaved crowfoot)	BPR	-	-	-	+++	-	-	-	-
R. acris / bulbosus / repens (buttercup)	GD	+	-	[++]	+	-	-	-	-
Rosaceae									
Aphanes arvensis (L.) Scop. (parsley piert)	CGd	+	-	-	-	-	-	-	-
Crataegus monogyna Jacq. (hawthorn)	HSW	-	-	[+]	+	-	-	-	-
Fragaria vesca L. (strawberry)	GS*	+	-	[+]	+	-	-	-	-
Malus sylvestris L. (apple seeds)	HS*	-	-	[++]	-	-	-	-	-
" " (apple endocarp frags)		+	-	-	-	-	-	-	-

Taxa	*Phase* / *Habitat*	*2a* *0718*	*2b* *4031*	*3* *4051*	*3* *0666*	*3* *0711*	*5* *pits etc*	*6a* *various*	*6d* *orchard soil*
Malus sp./*Pyrus* sp. (apple/pear, no seed coat)		-	-	[+++]	-	-	-	-	-
Potentilla sp. (cinquefoil)	DG	+	-	-	-	-	-	-	-
Prunus persica (L.) Batsch (peach)	*	-	-	-	+	-	-	-	-
P. spinosa L. (sloe)	HS	-	-	-	+	-	-	-	-
Prunus sp.		-	-	[++]	-	-	-	-	-
Rubus fruticosus agg. (blackberry)	DHS	+	-	++++	+	-	-	-	-
R. idaeus L. (raspberry)	ES*	+	-	+	+	-	-	-	-
Rubus sp.		-	-	+++[++]	-	-	-	-	-
cf. *Sorbus* (B)		-	-	[+]	-	-	-	-	-
Rubiceae									
Galium aparine L. (cleavers)	DH	-	-	-	-	-	-	-	-
G. cf *palustre* L. (marsh bedstraw)	BMw	-	-	-	-	<+>	-	-	-
Galium sp.		-	<+>	-	-	-	<+>	-	-
Salicaceae									
Salix sp. (catkins scales)	BSW	+	-	-	-	-	-	-	-
Scrophulariaceae									
Euphrasia sp./*Odontites verna* (eyebright/red bartsia)	CD	<+>	-	[++]	-	-	-	-	-
Rhinanthus minor L. (yellow rattle)	G	-	-	[+]	-	-	-	-	-
Solanaceae									
Hyoscymus niger L. (henbane)	Dn	-	-	-	+	-	-	-	-
Solanum dulcrama L. (woody nightshade)	DHS	-	-	-	+	-	-	-	-
S. nigrum L. (black nightshade)	D	+	-	-	+	-	-	-	-
Umbelliferae									
Aethusa cynapium L. (fool's parsley)	C	-	-	-	+	-	-	-	-
Anethum graveolens L. (dill)	*	-	-	-	+	-	-	-	-
Bupleurum rotundifolium L. (thorow-wax)	Ac	-	<+>	-	-	-	-	-	-
Conium maculatum L. (hemlock)	Bw	+	-	-	+++	-	-	-	-
cf. *Daucus carota* L. (carrot)	Gc	-	-	[+]	-	-	-	-	-
Scandix pecten-veneris L (shepherd's needle)	A	-	-	[+]	-	-	-	-	-
Torilis cf. japonica (Houtt.) DC (upright hedge parsley)	GH	-	-	[++]	-	-	-	-	-
Torilis sp. (hedge parsley)	AGH	+	-	[+]	-	-	-	-	-
Indet.		+	-	[+]	+	-	-	-	-
Urticaceae									
Urtica dioica L. (stinging nettle)	DGHWp	+++	-	-	++++	-	-	-	-
U. urens L. (small nettle)	CDl	+	-	-	-	-	-	-	-
Verbenaceae									
Verbena officinalis L. (vervain)	DW	-	-	-	+++	-	-	-	-
Violaceae									
Viola sp. (violet)		-	-	-	+	-	-	-	-
Vitaceae									
Vitis vinifera L. (grape)	*	-	-	[++]	+	-	-	-	-
Worm cocoons		-	-	[+++]	-	-	-	-	-
Ergot sclerotia		-	-	[+]	-	-	-	-	-

		Phase	*2a*	*2b*	*3*	*3*	*3*	*5*	*6a*	*6d*
			0718	*4031*	*4051*	*0666*	*0711*	*pits etc*	*various*	*orchard soil*
Flotation:	Total no. seeds in flot		-	<7>	[1]	-	<87>	<16>	<25>[1]	<5>
	Total volume of soil processed (litres)		-	15	20	-	60	105	60	45
	No. contexts sampled		-	1	1	-	4	5	4	3
Wet-sieving	Average no. seeds per 500 ml soil		670<1>-		[191]<2>	501	-	-	-	-
	Volume soil processed to 250μ (litres)		0.2	-	0.6	2	-	-	-	-
	Volume bulk sieved (litres)		-	-	40	80	-	-	-	-
	No. contexts sampled		1	-	2	4	-	-	-	-

Key to Table 30

No brackets = waterlogged; < > = carbonised; [ ] = mineralised; + = occasional; ++ = several; +++ = frequent; ++++ = numerous; f = fragments

Habitat preferences:

A = arable
B = river banks
C = cultivated land
D = disturbed/wasteland
E = heath
G = grassland
H = hedgerows
M = marsh
P = ponds, ditches, slow moving/stagnant water
R = rivers, streams
S = woodlands, scrub
W = waysides

a = acid soils/calcifuge
c = calcareous/basic soils
d = dry soils
h = heavy soils
l = light soils
n = nitrogen-rich soils
o = open habitats
p = phosphate-rich soils
s = sandy soils
w = wet/damp soils
* = plants of possible economic importance

concretions containing cereal bran, and the occurance of mineralised fruit seeds, such as apple (*Malus sylvestris* L.), grape (*Vitis vinifera* L.) and strawberry (*Fragaria vesca* L.) confirmed that this material was of faecal origin.

Also present in the mineralised assemblage were a number of arable weed seeds, such as corn gromwell (*Lithospermum arvense* L.), corn cockle (*Agrostemma githago* L.) and shepherd's needle (*Scandix pecten-veneris* L.). These may have been consumed as contaminants of grain, or disposed of in the garderobe as crop processing waste. The former explanation seems more likely in this situation.

The absence of waterlogged plant remains indicated that the deposit had not been continuously waterlogged since it was laid down. A large number of blackberry (*Rubus fruticosus* agg.) seeds which were recovered from the eastern area of the deposit (4055) could indicate partial waterlogging, since the woody nature of the seed coat might have ensured its survival where other seeds decayed. However, the seeds may have been partialy mineralised, or they could have been a rodent's food store of more recent origin.

The presence of mineralised grape pips suggests that the diet of at least some of the users of the garderobe had been of a reasonably high status, as

is also indicated by the high quality of Building 4112. Cultivated flax (*Linum usitatissimum* L.) seeds were recovered. These could represent a food source, or waste from the cultivation of flax for fibre. The presence of several yellow rattle (*Rhinanthus minor* L.) seeds and numerous grass/cereal stem impressions in the mineralised concretions indicate that waste hay may also have been present. The seeds of a few marsh plants were recovered, such as marsh marigold (*Caltha palustris* L.) and marsh yellow cress (*Rorippa islandica* (Oeder)Borbás), and these may have been introduced in hay from wet meadows or could have grown locally in the damp soils of the river bank.

Hay meadow taxa including wet grassland species were recovered from a medieval barrel latrine at Worcester (Greig 1981) and it was suggested that hay might have either been used as a floor cover, placed on top of the faecal material to reduce odours, or used as a precursor of lavatory paper. A 13th century latrine deposit in Bergen, Norway (Krzywinski *et al.* 1983) contained large quantities of moss which it was suggested had been used as toilet 'paper', but no clear evidence was recovered from the Jennings Yard deposit to indicate what had served this function.

Both mineralised cereal caryopses and a comparatively large number of carbonised cereal grains were present. Free-threshing wheat, barley, oats and rye were found, wheat and barley being the more numerous in the carbonised state. These cereals were probably discarded amongst domestic waste, although some may have been consumed, both burnt ('overcooked') and unburnt, and deposited in faeces.

The third sample (4052) from a deposit sealing the faecal material contained very few remains. Traces of mineralised material and a number of mineralised worm cocoons were recovered, but no waterlogged or carbonised remains were present. The absence of botanical evidence from this context rules out the possibility of suggesting its derivation.

Cess-pit 0711 and inundation fill 4006

Samples from dry contexts of this phase contained a small number of carbonised cereal caryopses amongst which barley and rye were identified. A few common arable weed seeds such as chess (*Bromus* sect. *Bromus*) were also present as carbonised remains.

Mineralised grass/cereal culm fragments and fragments of cereal bran were recovered from cess-pit 0711 providing confirmation of its use. The paucity of mineralised plant remains in this feature may be due to the pit having been cleaned out prior to its abandonment, but is probably because the contents were insufficiently waterlogged for mineralisation to have taken place to any great extent.

Ditch 0666

A column of soil samples were taken at 0.2 m intervals through the lower channel silts of ditch 0666. Waterlogged seeds were recovered from all four samples, but the numbers decreased towards the top, indicating that some drying out of the deposit may have occurred. Small quantities of carbonised grain (wheat, barley, oats and rye) were found at all levels, but no chaff and very few carbonised or waterlogged arable weed seeds were present. Because of the scarcity of carbonised chaff and weed seeds it is more likely that the carbonised cereals originated from household waste rather than burnt crop processing debris.

Small numbers of waterlogged fruit seeds were present throughout the silt deposits. In addition to the grape, strawberry, raspberry and blackberry recovered from other medieval faecal deposits on the site, fig (*Ficus carica* L.) and peach (*Prunus persica* (L.) Batsch) seeds were recovered, the peach stone being in the uppermost level. These probably represent fruits imported from the continent although, with care, both species can be grown to produce fruit in Britain. The presence of these 'luxury' fruits is indicative of a high status diet, the range of taxa being typical of medieval assemblages recovered from the larger towns such as Winchester and Southampton (Green 1979b). Since remains from edible plants were present in fairly low numbers in these silts they may have come from the occasional deposition of faecal waste in the channel, or more likely from discarded domestic waste. Fruits, herbs and cereals might also have numbered among the cargoes being transported along the Thames and possibly being temporarily stored in the Building 4112.

The herbs dill (*Anethum graveolens* L.) and rosemary (*Rosmarinus officinalis*) were also recovered from the channel silts, the latter of which has not previously been recovered from a medieval site in Britain. This is perhaps surprising considering the extent to which it appears to have been valued for its many medicinal and culinary properties, according to documentary records.

Documentary sources show that rosemary was grown in monastery herb gardens in its native mediterranean region from the 9th century (Harvey 1972, note 2). It is recorded as having been introduced into Britain by Queen Philippa, wife of Edward III, around 1340. Harvey (*ibid.*) suggests that it was probably first grown in the gardens of the Palace of Westminster and from there may have been passed on to other royal gardens, such as that at Windsor.

Experimental work and the translation of the *Treatise on the Virtues of Rosemary* by the Dominican friar Henry Daniel in the late 14th century may well have helped to spread the popularity of the herb, as documentary sources suggest that it was quite widely cultivated in the later medival period. Daniel's translation demonstrates the extent to which this herb was valued, describing it as a holy herb which will not grow above the height of Jesus Christ. He lists its medicinal properties in 65 sections and gives instructions for the cultivation and propagation of the plant.

Although Daniel mentions that rosemary flowers twice a year but seeds once, it appears that

most of the propagation of the plant in this country would have been by cuttings, as is true today. Indeed, Harvey (ibid) quotes a 14th century French book: 'Gardeners say that the seed of rosemary groweth never in French soil'. This could help to explain the absence of rosemary seeds from the archaeobotanical record until now, as the seeds were not important for medicinal, culinary or propagation purposes.

Rosemary produces a valuable essential oil which can be used medicinally as well as for culinary purposes or in perfumery. However, if taken in excess it can be fatal (Harrison *et al.* 1985). Some of the virtues attributed to the plant include the stimulation of liver function, improving of the circulation, aiding digestion and antispasmodic properties (Lust 1974). It was used as a standard remedy for plague (Baker 1969) which was rife in the mid 14th century. It is also associated with the Virgin Mary and is said to protect against spirits and lightning and act as a love charm. It is a symbol of rememberence and constancy and so has been used at funerals and placed in graves in the past. The recovery of rosemary seeds from a late medieval grave in Germany (Willerding 1984) may be associated with these beliefs.

An attractive explaination for the presence of rosemary seeds in the silts at Windsor would be to link them with the proximity of the Royal gardens. Unfortunately these deposits cannot be closely dated, and it is very possible that the channel had been dredged at some time in its history. The rosemary seeds were concentrated in the middle of the deposit (context 0676, 15 seeds) with only a single seed occuring in the lowest layer, two and five seeds in the uppermost two silts. It is possible that the single seed in the lowest deposit represents contamination from the layer above, as some mixing of channel sediments is quite likely to have occurred as a result of human activity in the area. The dating of this find, therefore, is questionable, but even a 16th century date (based on the occurrences of diagnostic leatherwork within the waterlogged levels of ditch 0666) would be the first record from a British site.

A number of catmint (*Nepeta cataria* L.) seeds were present in the channel silts, primarily the upper levels. Although this is not an uncommon plant on calcareous soils in the south of England, the relatively high frequency of the seeds in these deposits in addition to the other herbs suggests that it may have been collected for medicinal use, as it is an antispasmodic which is valued for chronic bronchitis and diarrhoea. Catmint is said to grow in 'watery places by the Thames' according to Spencer's *Complete British Traveller of 1771* (Druce 1897).

Hop (*Humulus lupulus* L.) and hemp (*Cannabis sativa* L.) seeds were present in the upper two silt levels, possibly due to the former plants use in brewing and the latter as a fibre crop. They can also both be used as medicinal herbs.

The majority of the seeds in the channel silt assemblages were from weeds of disturbed, often nitrogenous or phosphate-rich habitats, such as henbane (*Hyoscyamus niger* L.), red goosefoot (*Chenopodium rubrum* L.) and stinging nettle (*Urtica dioica* L.). These were probably growing in the vicinity along the river bank in addition to the plants of damp soils, such as hemlock (*Conium maculatum* L.). The only notable difference between the four samples was shown by a slight increase in plants of marshy soils towards the middle of the silt deposit, such as spike-rush (*Eleocharis* subg. *Palustres*) and celery-leaved crowfoot (*Ranunculus sceleratus* L.), the latter being indicative of muddy, mineral-rich waters. This increase could be due to the silting up of the channel producing more marshy conditions locally. Seasonal waterlogging of some areas was indicated by the presence of blinks (*Montia fontana* subsp. *chondrosperma*). The water within the channel is likely to have been still and muddy, since water-pepper (*Polygonum hydropiper* L.) and duckweed (*Lemna* sp.) seeds were present.

Other differences between the four channel silt samples are less obvious, although the uppermost sample (context 0679) contained particularly large numbers of stinging nettle, sow-thistle (*Sonchus oleraceus* L.) and hemlock seeds perhaps indicating site abandonment. As outlined above, some additional fruits and herbs were found in the later silts, particularly the upper silt which contained hop, raspberry, peach and dill. However, these remains are of little assistance in dating the silts beyond the range *c.* 1200–1550 determined by the artefacts. The former two taxa are native and, although it is not possible to be sure of when they were first cultivated, they can occur in large numbers on early medieval sites. The latter two introduced taxa were first imported in Roman times and reappear on British sites in the medieval period (eg, dill, 13th century, Bristol (Jones and Watson 1987); peach, 13th–14th century, Winchester (Green 1979b) and 13th century, Bristol (Jones and Watson *ibid.*)).

Other introduced taxa fig, grape and rosemary were present throughout the deposit, as were most of the weed species. Thus there appears to have been no major change in the vegetation growing along the river bank or the waste and cargo deposited over the period of silting up of the channel. The plant remains fit in with the proposed time scale but do not assist in defining it beyond the suggestion that the second lowest silt sample (0676) is unlikely to be earlier than *c.* 1340 due to the presence of rosemary.

Later phases

The flots from dry deposits of Phases 5, 6a and 6d contained a few carbonised cereal caryopses (wheat, barley, oats and rye), some carbonised weed seeds and mineralised bran and grass/cereal culm fragments. The presence of this small amount of mineralised material in dry deposits suggests that some redeposition of faecal material from earlier levels may have occured. If so, the origin of the

carbonised remains within these samples must also be questionable. In any case, the amount of material recovered from each of these levels was too small for any interpretation to be attempted.

Comparison with Other Sites

Although only a small number of samples were examined from Jennings Yard, the presence of mineralised and waterlogged deposits provided some useful evidence of food and probable medicinal plants. Grape, fig, strawberry and apple are all typical of medieval urban waterlogged deposits, such as those found in Winchester, Southampton (Green 1979b), Norwich (Ayers and Murphy 1983), Bristol (Jones and Watson 1987) and Reading Abbey (Carruthers in Hawkes and Fasham forthcoming). Finds of peach stones are less frequent, but they have been recorded from Winchester and Bristol. The most notable occurrence was that of rosemary which has not previously been recorded from a medieval or post-medieval site in Britain.

A Comparison between the Mineralised and Waterlogged Faecal Material from Phases 2a and 3

This revealed a number of differences between the assemblages. Some of the differences, such as the absence of grain from the waterlogged sample but the presence of a small amount of chaff fragments, and the presence of mineralised grain in the garderobe deposit but no chaff fragments, are likely to be due to the differences in the methods of preservation, since they are commonly encountered on other sites containing these types of deposits. Similarly, apple endocarp fragments (from the apple core) are often present in large numbers in waterlogged faecal material, but in the authors experience are not found in the mineralised state. On the other hand, the pips can be preserved both anaerobically and by mineralisation. Other differences may be due to the inability to identify mineralised seeds to species level or even to the level of genus in many cases, as the seed coats are often lost on mineralisation. Thus, the mineralised embryos listed as *Centaurea* sp. are probably from the arable weed, cornflower, (*C. cyanus* L.) which was present as a large number of small fragments of seed in the waterlogged deposit. The fragmentary nature of the seeds in this case, as in the case of the corn cockle seeds, suggests that they were present as a contaminant of grain which had been ground into flour before being consumed.

The only significant differences between the assemblages which are unlikely to be due to the different methods of preservation are the presence of a large number of waterlogged stinging nettle seeds in the Phase 2a cess-pit, and the absence of grape pips and large numbers of blackberry seeds from this deposit. All three taxa can occur as mineralised or waterlogged remains. The nettle seeds are likely to have originated from the local vegetation growing around the pit, since nettles often colonise soils which are high in phosphates. The absence of nettle seeds from the garderobe was probably due to the deposit being more securely closed off from the elements. The absence of grape pips and much lower occurance of blackberry seeds in the cess-pit when compared with the garderobe could indicate differences in diet, but this is difficult to determine from so few samples. Apple, strawberry and cultivated flax remains were present in both the garderobe and cess-pit.

5 Discussion

Discussion focuses, in the main, on the function and status of the main medieval Building 4112, its immediate setting, and its place within the late 12th–13th century settlement. In order to elucidate the later development of the site a brief survey of documentary and cartographic evidence was undertaken; these enquiries were problem-specific and have not attempted to produce a comprehensive synthesis such as that which might be achieved by the fuller exploitation of this range of evidence.

1. Pre-Building 4112 Activity

The earlier prehistoric material and setting has been discussed above (*Healy, Chapter 3.3*). The isolated later prehistoric and Romano-British materials in the brickearth 'natural' need not relate to activity on site but do provide a *terminus ante quem* for the final deposition of that alluvial type at this point within the Thames Valley.

Recent finds of Romano-British material within the precincts of Windsor Castle (Kerr, pers. comm.), however, provide an additional episode in the archaeological background of Windsor against which the uncomfortably early features and deposits (such as wells 4027 and 4028 and pit 4057) can be viewed. The castle promontory would, of course, seem to be an ideal location for an Iron Age hillfort and, in such an instance, would have been likely to have received some Roman attention.

2. Building 4112 and its Setting

Some reconstruction of the form of principal medieval Building 4112 has already been attempted in the preceding sections. Despite the limited survival of evidence for architectural form, general parallels can be made with later 12th–13th century stone-built, first-floor hall merchant houses, although, if the arguments for the reconstructed ground plan are accepted, Jennings Yard is a notably large example in comparison with many other near-contemporary buildings (cf Wood 1965, 32–3). King John's Palace in Southampton (Faulkner in Platt and Coleman-Smith 1975, 83–5) may be a particularly appropriate parallel. A late 12th century building on a quayside location, it comprised first-floor domestic accommodation over ground-floor warehousing, with the suggestion of an open arcade giving access to the wharf. The location of the Jennings Yard building invites the obvious conclusion that it, too, was essentially a waterfront structure, but the impossibility of conducting excavations to the north of the building imposes limitations to any assessment of its status, function and form; a different perspective may have been obtained by excavation of the Thames frontage.

The Garderobe

Assuming that Structure 4051 was a garderobe — its shape and content give no reason to doubt that it was — then Building 4112 emerges as one of the earliest (if not *the* earliest) known example of an integral garderobe in this country, on the basis of the ceramic dating evidence (AD 1150–1250).

Wood (1965, 378) cites documentary references for the construction of a garderobe at Winchester Castle in 1238 but the earliest surviving example is probably Old Soar, Plaxtol, Kent (*c.* 1290; ibid, 380). Shaft and pit garderobes, similar to the Jennings Yard example, were an hygenic development of the earlier medieval open chutes which had come to be viewed as insanitary by the end of the 12th century. The earliest shafts emptied into open pits or watercourses but were also discovered to be dangerous in times of siege; in 1204 Chateau Gaillard was taken by assailants climbing up through the privy chutes (ibid, 379).

At Old Soar (ibid, pl. lixb) and Fountains Abbey, Yorkshire, structures very similar to 4051 were cleaned out by *gong fermers* via a door opening into the basement/undercroft, there being no external opening. This would conveniently explain the similar lack of an external opening at Jennings Yard. Examples at No. 3 Vicars Court, Lincoln (ibid) also display the same bipartite plan with a central supporting spine-wall as 4051.

The integral, adjoining garderobe is an exclusively medieval feature, such arrangments being viewed as insanitary during the later medieval and post-medieval periods until the water closet, invented by Sir John Harrington for Elizabeth I, became more widely available.

Status of the building

Such an architectural extravagence as a closed-shaft garderobe in close proximity to a major flowing watercourse is surely an indication of either considerable wealth and, *inter alia*, status of the building, or of strategic considerations during a time of civil unrest such as pertained during the first quarter of the 13th century, particularly at Windsor.

The excavated assemblages from Jennings Yard are not entirely consistent in their indications of status, although the absence or scarcity of 'quality' items need not necessarily imply any lack of

prestige. The restricted range of types of deposit examined and an essentially commercial function for the main building are likely to have limited both the quantity and quality of certain materials, and for some items (eg the medieval imported pottery) any occurrence must be considered significant when viewed from a local or sub-regional perspective.

The availability of the Thames as an alternative means of rubbish disposal would have further limited the amount of material being discarded into recoverable contexts on site, and may therefore have introduced a bias into the assemblages as excavated. Selective disposal may partly explain the comparative scarcity of prime meat-yielding bones from the range of faunal remains, although it is also true that the majority of this material came from disturbed, demolition contexts.

The presence of deer, unsurprising so close to Windsor Forest, provides at least a hint of the accessibility of better quality meat than is reflected by the bulk of the excavated animal bone assemblage. A more certain and direct indication of dietary sophistication comes from cess-pits and the organic fills of the garderobe, 4051, with evidence for both salt- and freshwater fish, and a wide range of fruits.

An assessment of status is in any case prejudiced by the structural evidence; the building itself was obviously of some importance. It was at least partially stone-built at an early date in an area where stone was never a dominant vernacular tradition, and incorporated a range of non-local stone types, some imported from a considerable distance in a structure of some architectural complexity.

The impression of high status is heightened by the setting of the building (Fig. 36). Integration of the results of the excavation with Astill's (1978) reconstruction of the extent of New Windsor places Jennings Yard on the fringes of the urban/suburban area, this peripheral location allowing space on a scale which could not normally be afforded to town buildings. The orientation of the causeway suggests some link with either the castle or the manor house of *Underore*, which may have occupied the same site in Thames Street as its 17th century successor (Hunter 1977, 19).

It cannot be proven that the excavated features 0578 and 0666 formed the terminals of a discontinuous enclosure ditch or moat, and the difficulties in conclusively demonstrating the contemporaneity of a moat with the activities on the platform have been broached in an earlier section (*above, pp28–31*). Nevertheless, a reconstruction placing Building 4112 in the centre of a moated island (Fig. 36) would seem to be a not unreasonable interpretation of the available evidence. This arrangement would then conform to Wilson's (1985) classification of a simple D–shaped or subsquare valley moat with level platform. If it is assumed that the extension to 0666 had its confluence with the Thames above Windsor Bridge, and that the ditch terminating in 0578 enclosed an area not significantly larger than that necessary to accommodate the suggested extent of Building 4112, then this would define a moated platform at least 0.2 ha (half an acre) in size.

A survey of moats in east Berkshire (Kupferman 1986) has identified at least six other sites within a 3 km radius of Windsor Castle, five of which were Royal manors on the fringes of the forest. Within the survey area, moated sites on the Thames terraces were found to be generally situated in proximity to the boundary of the gravels with either London Clay or Reading Beds deposits, and not directly associated with the river channel. Sites with an internal area greater than one acre were confined to the area of Windsor Forest.

The likely width of the moat (up to 12 m) is at the upper limit of Wilson's range (Wilson 1985, 7), and more than adequate as a defensive barrier. The use of a causeway rather than a (retractable) bridge can be seen as a potential weakness in this respect, whatever provisions may have been included within the causeway superstructure for a gate, so defence may not have been the primary concern. The disproportionate size of the moat when compared with the modest size of the platform may have resulted from a need to allow access to small river-craft along its length.

The incorporation of a timber revetment such as that found at terminal 0666 cannot be automatically taken to imply the presence of some wharf or landing-stage, however, as protection for the sides of the moat would have been necessary to prevent erosion of the brickearth. It is possible that sluices could have been provided at the confluence/divergence of the moat and the Thames to lessen the extreme effects of scouring during periods of fast river-flow, and also to reduce the incidence of flooding evidenced by the deposition of transgressional river silts in the pre-Building 4112 phase, 2b. The use of punt-poles might help to explain the apparent mixing of medieval pottery amd post-medieval leatherwork.

3. The 12th–13th Century Settlement

The reasons for the apparently short life of Building 4112 remain unknown, although parallels for short-lived 12th century stone buildings are to be found elsewhere. At Tower Lane, Bristol (Boore 1984) a large first-floor hall house of early 12th century date was demolished within 75 years, and was not replaced directly. The overall development of the Jennings Yard site, however, is perhaps best viewed in the context of major topographic change in the immediate area in the late 12th–13th century.

The apparent chronology of these changes largely reflects the availability of documentary evidence; little of relevance survives for the period before the reign of Henry III (1216–1272), but it is likely that the character of the riverside settlement was undergoing some transformation prior to this time. The first mention of Windsor Bridge occurs in 1236 (*Calendar of Close Rolls*), although this is a

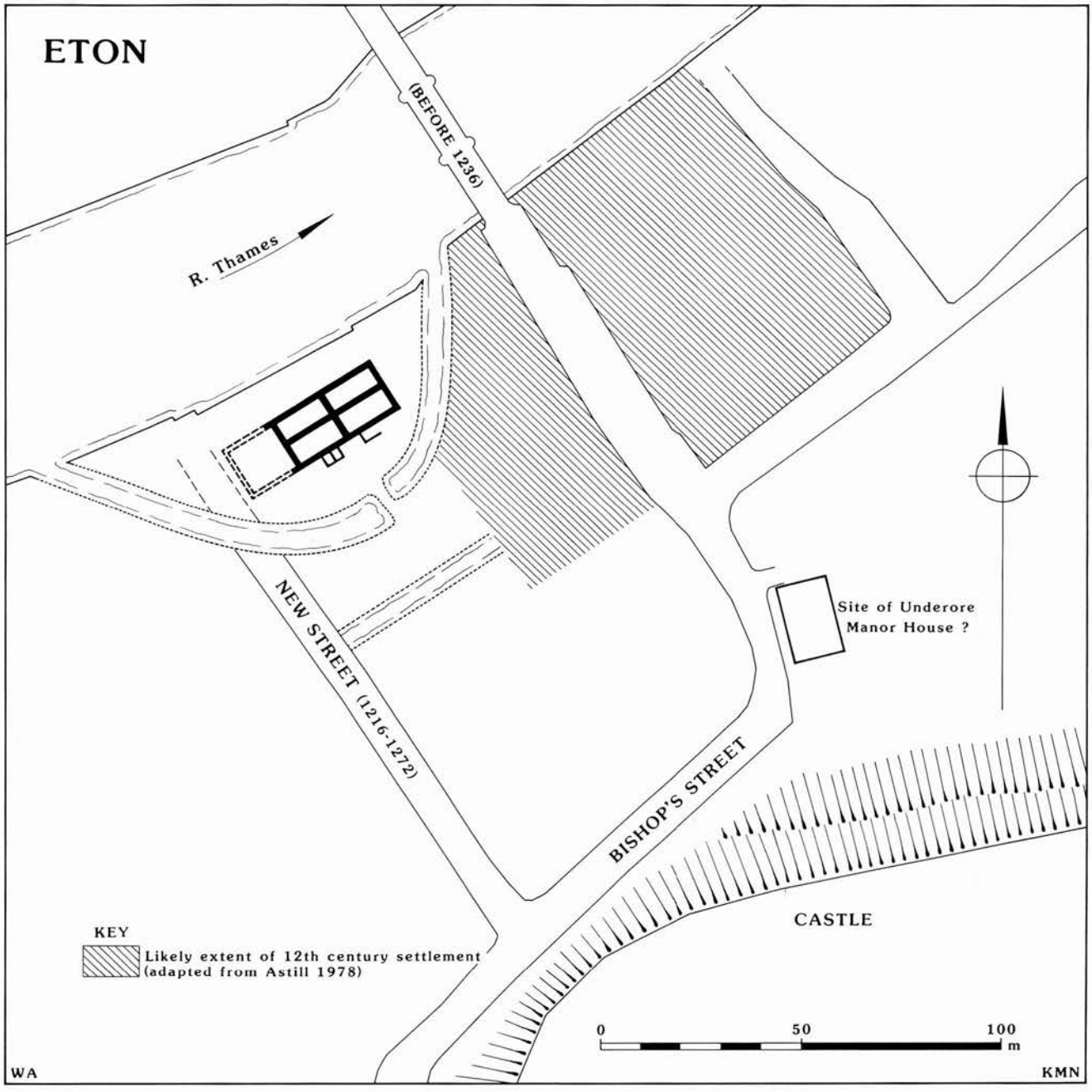

Figure 36 New Windsor: overview of medieval topography in the Jennings Yard area

reference to repair and not original construction; references to the collection of tolls extend back into the 12th century (*Victoria County History of Berkshire,* vol. 3, 57).

The course of the western arm of the moat was traced to the boundary of the present site, and the construction of New Street, later Bere and now River Street, would certainly have involved its partial infilling. The first mention of *Neuestrate* occurs during the reign of Henry III in a document not more precisely dated (*Eton College Records* w2), suggesting an extension and perhaps also an intensification of occupation in the area at this time. The new road alignment need not necessarily have involved the demolition of Building 4112 (cf Fig. 36), nor, within the area of Jennings Yard, the complete backfilling of the moat; the complex could not have survived these topographical developments unaltered, however. The truncation of the causeway and the upper fills of the 'moat' ditch 0578 by ditch 656/494 (Fig. 15) and the range of pits apparently respecting it, suggest the development of new property divisions fronting onto New Street at this time. Although it is still highly likely that those structures survived as topographical features.

There is, too, the possibility that the building was never actually completed, hence also explaining the near absence of domestic assemblages of any meaningful size. The foundation

trenches would not have survived freshly defined had they been left open for even a short period of time, as our own experiences of working on the site demonstrated, but only the construction of the lower courses of footings and walls would have been necessary to preserve their clean, regular lines.

A more general disruption of the urban settlement may have resulted from the civil strife and sieges endured by the town at the end of the 12th and beginning of the 13th century, and in particular the devastating siege of 1216 which caused extensive damage, although the worst effects were likely to have been felt in the area of the town immediately adjacent to the castle (Bond 1984, 22).

4. Later Medieval Settlement

Bond (1971) has suggested that the St George's Chapel and Eton College Records (*ECR*) series of deeds offer the best sources for topographical investigation, although a brief assessment would indicate that results would not rival the level of detail achieved for Oxford, Hull or Canterbury (cited in Aston and Bond 1976, 99), where it has been possible to draft tenurial plans for parts of the medieval period.

The occupation of the areas immediately adjacent to Jennings Yard is likely to have resulted from an expansion of the suburb of *Underore* beyond its original centre immediately adjacent to the site of Windsor Bridge in the later 13th century. Some intensification of settlement in the area of Thames and New Street during the first half of the 14th century may be discerned. A plot size of 23 x 70 ft is recorded for a Thames Street property in 1307 (*ECR* w91) and a width of 24 ft for a property fronting New Street in 1317 (*ECR* w409), with a reduced width of 14 ft to the rear where it adjoined another plot. The *ECR* w409 property maintains its dimensions through successive deeds dated 1330 (*ECR* w443) and 1339 (*ECR* w470), although other properties were being transferred as subdivided plots, no dimensions given.

These documents make clear that, despite the construction of Building 0943 within the area of Jennings Yard, the emphasis of late medieval settlement had moved to the street frontage. Indeed, the generally low density of features and lack of stratigraphic build-up suggest that the site has never experienced the density and continuity of occupation witnessed in other contemporary urban areas

Also mentioned in the deed of 1307, *ECR* w91, is the *Flotgang*, the channel for the Abbot of Reading's mill at *Underore*. The course of this stream is unknown, although other 14th and 15th century deeds cite the *Flotgang* as a boundary to properties fronting Thames Street, suggesting an east–west alignment not incompatible with the course of channel 4120 (Fig. 8). This channel was located in the excavation but not examined in detail; the date of its first appearance cannot be established, but the leatherwork recovered from channel 4120 contexts during the evaluation suggests infilling during the latter part of the 16th century. The feature is not shown as an open watercourse on Norden's plan of 1607 (Fig. 37).

The skinned, partially disarticulated and probably putrifying remains of eight horses, which were crammed into the narrow gully, 0656, seems a rather bizarre find and it is diffiuclt to imagine how such an unpleasant deposit could be tolerated in an urban locale. In all probability the medieval inhabitants of Windsor/ *Underore* were accustomed to rather more stench and filth than can probably be even imagined by the present-day citizens of our city suburbs, but even they must have had a bottom line! Also, the apparently simultaneous death of eight sound draught animals cannot be put down to disease or bad luck.

In a more fanciful mood we might suggest that the corpses had been used as *trebuchet* ammunition — as intimated in a similar (12th century) incident at Odiham Castle, Hampshire (Allen 1982) during a desperate siege — were it not for the almost certainly more dramatic disarticulation that the resultant impact would have had on a large, skinless ungulate cadaver after a flight of nearly one hundred metres. Such a scenario, though admittedly undocumented for later medieval Windsor, would provide a context for this unusual burial — the death of eight horses in the close confines of urban warfare would require rapid prophylactic action once the immediate economic potential of the animals had been realised. The eating of horse meat is not commonly attributed in the archaeological record of medieval England but this might have been one literal incidence of looking a gift horse in the mouth!

5. Early Post-Medieval Settlement

Norden's survey of 1607 (Fig. 37) shows a pattern of settlement likely to have been little changed from the late medieval period, confirming the presumption from the earlier documents that occupation in the riverside area was concentrated on the frontages of New Street and, particularly, Thames Street. There are inconsistencies in the orientation of parts of the map, particularly in the area of *Underore*, even if some allowance is made for a possible realignment of Thames Street. Bond (1984, 36), however, believes that at least 28 individual standing buildings within New Windsor can be identified from the 140 shown on this map, and that therefore some elements are accurately portrayed.

Within the area of the Jennings Yard site there are indications from the plan of the survival of earlier, medieval features. The small building nearest the river at the end of New Street (Fig. 37, A) occupies the approximate position of Phase 5

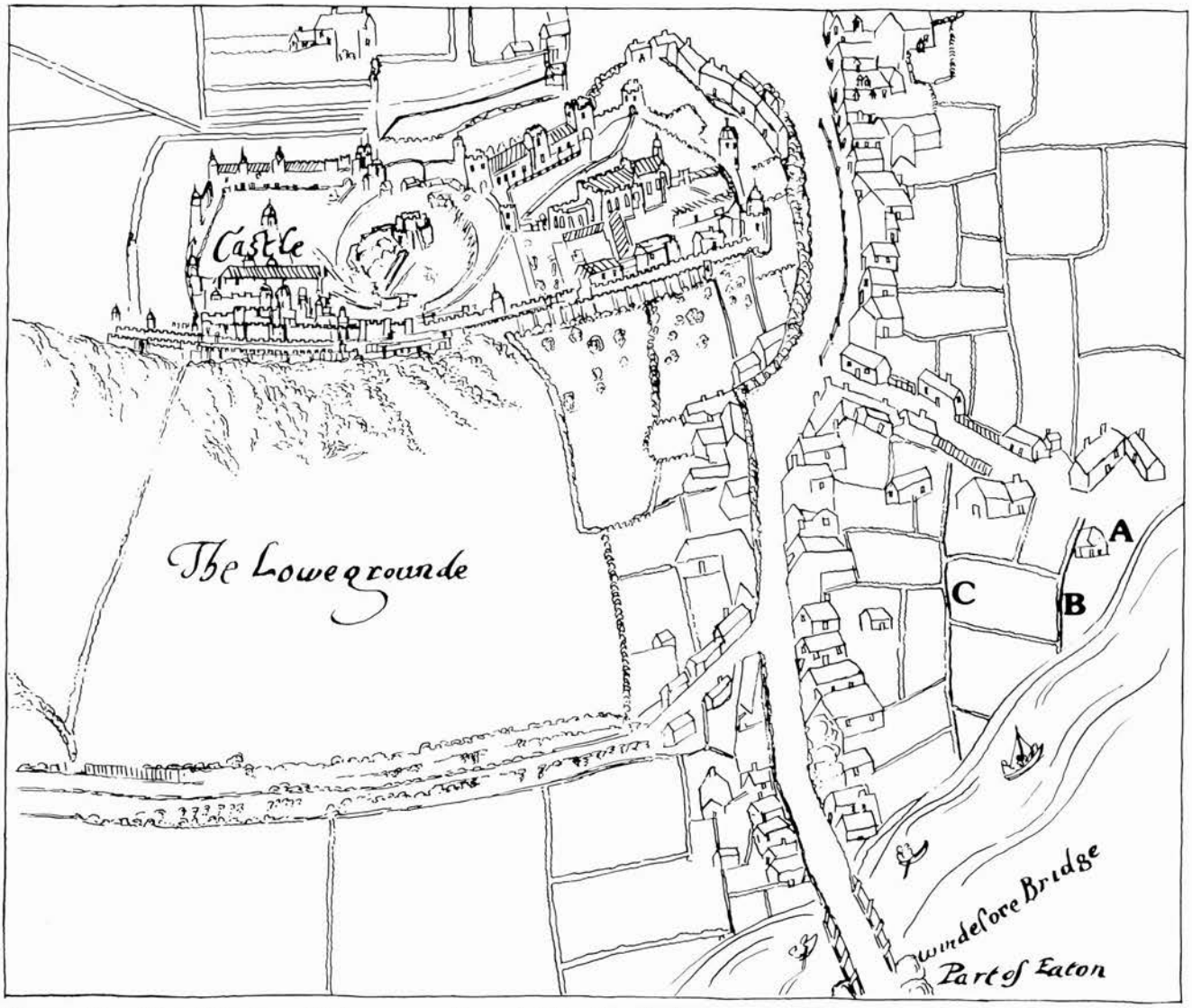

Figure 37 New Windsor: Redrawn portion of John Norden's map of 1607

Building 0943 and, in the absence of any excavated evidence for a later structure, would suggest the continuation of this building into the post-medieval period. A 17th century date for its demolition would not contradict the (limited) artefactual evidence.

Immediately south and west of this structure, Norden's plan shows a boundary running from New Street to the river (Fig. 37, B). The alignment of this boundary is not incompatible with the projected course of the western arm of the moat associated with Building 4112, which, on the evidence of the associated, excavated leatherwork, must have remained partly open until at least the late 16th century.

Some of the Phase 5 activity, in particular the excavation of feature 0656 containing the horse burials, might be interpreted as maintaining and extending this boundary. A second, parallel boundary (Fig. 37, C) may conceivably be the remains of the alignment of channel 4120.

6. Comment on the Efficacy of Trench Evaluations

The large-scale excavation at Jennings Yard offers *inter alia* an opportunity to examine the efficacy of the evaluation exercise. The evaluation had made a case for further investigation of the site before destructive development, and had highlighted some of the potential priority areas. The principal contents of the site were reasonably well predicted:

1. The presence of two former east–west watercourses, one almost certainly artificial and of likely medieval origin, the other largely or wholly post-medieval.
2. The presence of associated stone-built buildings of probable medieval date.
3. The general emphasis of activity on the site being 12th–13th century, with comparatively little later medieval occupation.

4. The presence of limited evidence of prehistoric activity.

Where the results of the evaluation were less helpful was in providing information to assess the nature, scale and complexity of the features revealed. Almost any other 2 m-wide north–south trench alignment would have failed to produce convincing evidence for the presence of the northern, artificial channel, but would have been likely to have provided a better understanding of the associated buildings.

Had the causeway and its associated deposits been uncovered, a very different interpretation of the function and the content of the site might have resulted. Given that Jennings Yard was subsequently shown to comprise a number of disparate elements each occupying a relatively small area, it was inevitable that a sample of only some 1.75% of the development area would not be adequate to resolve the potential of the site in any great detail.

Higher levels of interpretation based on this assessment, predictably proved to be incorrect, and tentative models to explain the topographical setting of the site (Hawkes and Heaton unpubl., copy with archive) as an aid to formulating a project design for further work are no longer tenable.

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Bold denotes major entries.

Excavations at Jennings Yard, Windsor primarily revealed evidence of substantial medieval buildings within the former suburb of *Underore*. Remains of three successive masonry buildings—one incorporating an en suite garderobe—spanning the years AD 1150–1600 were recorded, associated with structures and features including a possible moat' and revetted causeway.

Substantial pottery, metalwork, waterlogged leather and woodwork assemblages were recovered. Extensive environmental sampling was undertaken. An unusually early find was made of a rosemary seed (13th/14th century). A group of eight partially disarticulated horse skeletons was recovered from a narrow ditch.

Following abandonment of the medieval buildings the site was used as an orchard during much of the post-medieval period prior to the development of small-scale 19th century industries.

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