



THE SOUTHERN LANES, CARLISLE,

**Publication of
Existing
Unpublished
Fascicules:
Fascicule 1**



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CONTENTS

ACKNOWLEDGEMENTS	2
SUMMARY	3
1. INTRODUCTION	4
1.1 Background	4
1.2 Scope of the Project	4
1.3 Methodology.....	5
2. FASCICULE 1 ERRATA LIST.....	7
2.1 Introduction	7
2.2 Fascicule 1 Errata List.....	7
2.3 Additional Bibliographic References For The Fascicule	10
3. CONCORDANCE OF CROSS-REFERENCES FROM THE SOUTH LANES MONOGRAPH TO FASCICULE 1	11
3.1 Introduction	11
3.2 Cross-References from the Monograph to Fascicule 1	11
BIBLIOGRAPHY	13
FASCICULE 1	

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The following specialists are thanked for taking the time to respond to enquiries about their work on the south Lanes project and, where appropriate, providing advice and information: Kay Hartley, Jacqui Huntley, English Heritage Science Advisor for North East England, Harry Kenward, Tim Padley, Keeper of Archaeology at Tullie House Museum and Art Gallery, Jennifer Price, David Shotter, Sue Stallibrass, English Heritage Science Advisor for North West England, and Cathy Tyers of the University of Sheffield.

For OA North, the south Lanes fascicules project was managed by Murray Cook. The report was written by John Zant and edited by Rachel Newman, who also acted as Project Executive. Other OA North personnel who provided important contributions include Jo Cook, for providing IT advice, Marie Rowland, who digitised the existing manuscript copies of the fascicules and typeset the digital version of Fascicule 3, and Michelle Watson and Joanne Povall, who retyped Fascicule 3 from the manuscript.

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SUMMARY

During the late 1970s and early 1980s, Carlisle Archaeological Unit (CAU) carried out a programme of archaeological excavation prior to the redevelopment of the Lanes, a densely built-up area situated within the north-east angle of Carlisle's medieval city defences (NY 4015 5606). The work confirmed that deeply stratified archaeological deposits relating to the Roman town and the medieval and post-medieval city survived over large parts of the site. For post-excavation purposes, the project was divided into two areas: the north and south Lanes.

Following a period of several years in which the project remained largely static, English Heritage provided funding in the mid-1990s for CAU to undertake a programme of analysis leading to publication. For the south Lanes, it was envisaged that three fascicules, presenting the detailed data for the stratigraphic sequence and environmental remains (Fascicule 1), the artefacts (Fascicule 2), and the pottery (Fascicule 3), would accompany a synthetic monograph. A similar publication strategy was also planned for the northern Lanes.

The south Lanes monograph was published in 2000, by which time CAU had become Carlisle Archaeology Limited (CAL), but the accompanying fascicules were never published, nor were the monograph and fascicules for the north Lanes, and CAL ceased trading in 2001. However, manuscript copies of all three of the south Lanes fascicules were available in the former CAL archive in Carlisle.

In 2009, English Heritage commissioned Oxford Archaeology North (OA North) to make the south Lanes fascicules available on-line through the Archaeology Data Service (ADS). The work was restricted to minor copy-editing and the creation of PDF versions of the existing documents; no new work was undertaken. However, during the course of this work, any obvious mistakes or omissions were noted, and errata lists were compiled. It was found that the published monograph held a fascicule Contents List, and also contained numerous cross-references to the fascicules, many of which were not consistent with the chapter numbering and pagination in the existing manuscript versions of these documents. Consequently, it proved necessary to compile a concordance between the monograph and the fascicules, as well as between the fascicules themselves.

All three fascicules were placed on the ADS as separate documents; appended to each was a short report, prepared by OA North, detailing the background to the project and the methodologies employed to produce digital versions of the fascicules from the existing manuscript copies. Each report also contained, as appropriate, an errata list and a monograph concordance.

1. INTRODUCTION

1.1 BACKGROUND

- 1.1.1 From 1978 to 1982, Carlisle Archaeological Unit (CAU) carried out a programme of archaeological excavation and standing building recording, funded in part by the then Department of the Environment, prior to the redevelopment of the Lanes, a densely built-up area of approximately 2.8ha (6.9 acres) situated within the north-east angle of Carlisle's medieval city defences (NY 4015 5606). In total, some 26 excavation trenches were opened over the site as a whole, and a further 20 areas were subjected to watching brief. The work confirmed that deeply stratified archaeological deposits relating to the Roman town and the medieval and post-medieval city survived over large parts of the site. For post-excavation purposes, the project was divided into two areas: the north and south Lanes.
- 1.1.2 Following completion of the fieldwork and basic post-excavation processing, the project remained static for several years. During the 1990s, however, English Heritage provided funding for CAU to undertake a programme of analysis leading to publication. For the south Lanes, it was envisaged that three fascicules, presenting the detailed data for the stratigraphic sequence and environmental remains (Fascicule 1), the artefacts (Fascicule 2), and the pottery (Fascicule 3), would accompany a synthetic monograph. A similar publication strategy was also planned for the northern Lanes.
- 1.1.3 The south Lanes monograph was published in 2000 (McCarthy 2000a), by which time CAU had transferred from Carlisle City Council to the University of Bradford, to become Carlisle Archaeology Limited (CAL). The accompanying fascicules (the contents of which are tabulated in the monograph) were never published, nor were the monograph and fascicules for the north Lanes, and CAL ceased trading in August 2001. However, manuscript copies of all three of the south Lanes fascicules (Fascicule 1: McCarthy 2000b; Fascicule 2: Padley 2000; Fascicule 3 (two versions, *Section 1.3.2*): Hird and Brooks 1993; 2000) were found to exist in the archive of CAU/CAL, which is curated by Tullie House Museum and Art Gallery.

1.2 SCOPE OF THE PROJECT

- 1.2.1 In 2009, as part of a wider initiative to disseminate the results of the Lanes project, English Heritage commissioned Oxford Archaeology North (OA North) to make the mock-ups of the south Lanes fascicules available on-line through the Archaeology Data Service (ADS). The work was restricted to minor copy-editing and the creation of PDF versions of the existing documents; no new work was undertaken.
- 1.2.2 It is important to note that the specialist reports within each fascicule, most of which were prepared during the mid-1990s or before (the glass report, for

example, which appears in Fascicule 2, was written in 1992), have not been revised or updated, but are presented as being ‘of their time’. Work on the north Lanes is subject to a different proposal.

1.3 METHODOLOGY

- 1.3.1 **Contacting authors:** in the first instance, all specialists who had contributed reports for inclusion in the south Lanes fascicules were contacted, in order to make them aware of the project and to discuss any relevant issues. In total, 18 specialists were contacted, and replies were received from eight (see *Acknowledgements*), most of whom provided valuable help and information.
- 1.3.2 **Digitisation of manuscripts:** for Fascicules 1 and 2, clean, typeset manuscript mock-ups (McCarthy 2000b; Padley 2000) were available in the former CAU/CAL archive; these were simply scanned to create PDF files of the documents. In the case of Fascicule 3, which was available in two parts - an early, heavily annotated copy (Hird and Brooks 1993) and an incomplete photocopy of a later version (Hird and Brooks 2000), the latter obtained from the papers of the late Vivien Swan (see *Acknowledgements*), the entire text was retyped to create the digital document. The accompanying figures and tables were then scanned, except where the tables were illegible, in which case they were retyped. The whole fascicule was then typeset to match Fascicules 1 and 2.
- 1.3.3 **Errata:** during the course of this work, any obvious mistakes or omissions, such as missing/incorrect page numbers or incomplete bibliographic references, were noted. In the case of Fascicules 1 and 2, it was not possible to correct the documents themselves, since the digital versions comprised PDFs scanned from the original manuscripts (*Section 1.3.2*). For this reason, all mistakes and corrections are presented in errata lists; that pertaining to Fascicule 1 is presented in *Section 2*, below. Since Fascicule 3 was retyped from scratch (*Section 1.3.2*), any mistakes or omissions present in the extant manuscripts were corrected during retyping, obviating the need for an accompanying errata sheet.
- 1.3.4 **Concordance between fascicules:** as part of this process, all cross-references between the different fascicules were checked. Any that proved to be incorrect were added, with amendments, to the relevant errata list.
- 1.3.5 **Concordance with monograph:** the published south Lanes monograph (McCarthy 2000a) contains a Contents List for all three fascicules, although these documents had not been published at the time. In this, each fascicule is paginated separately, and contains its own list of Chapters, Illustrations and Tables. Thus, Fascicule 1 comprises Chapters 1 through 13 and runs from page 1 to page 166; Fascicule 2 comprises Chapters 1 through 13 and runs from page 1 to page 165; and Fascicule 3 comprises Chapters 1 through 6 and runs from page 1 to page 110. All cross-references to the fascicules that appear in the monograph text also follow this system.

- 1.3.6 However, the extant manuscripts of the fascicules did not follow this system. Instead, pagination, chapter numbering, and numbering of illustrations and tables were continuous across all three volumes. The reason for this is not clear, but it seems likely that the Contents List published in the monograph reflects an intended change that was never realised (at least in the available versions of the fascicules) before CAL ceased trading in 2001. Thus, whilst the numbering of Fascicule 1 is largely consistent with that given in the published Contents List (with the exception of Chapter 13, The Human Bone, which is given in the monograph Contents List but does not actually exist), the pagination, chapter numbering and numbering of Illustrations and Tables for Fascicules 2 and 3 were wholly incompatible with those published in the monograph.
- 1.3.7 In the case of Fascicule 3 this problem could be resolved, since retyping of the document from scratch (see above) allowed for the adoption of the system of pagination and numbering given in the monograph. For Fascicule 2, however, which was simply scanned and converted to a PDF file from manuscript version (*Section 1.3.2*), this was not possible, and the original pagination and numbering had to be retained. Consequently, a concordance was required between the pagination and numbering published in the monograph and that which appears in the digital fascicules hosted on the ADS. The concordance for Fascicule 1 is presented in *Section 3*, below.
- 1.3.8 For Fascicule 3, it was found that neither of the extant manuscript copies (Hird and Brooks 1993; 2000) contained an Introduction chapter, though this was included in the Contents List for Fascicule 3 that appears in the published monograph (Fascicule 3, Chapter 1; McCarthy 2000a, x). Consequently, during the retyping of this document, the introductory chapter for Fascicule 2 was copied and, with minor changes of wording to render it ‘fit for purpose’, was inserted into Fascicule 3 to serve as Chapter 1.

2. FASCICULE 1 ERRATA LIST

2.1 INTRODUCTION

- 2.1.1 The manuscript copy of the south Lanes Fascicule 1 (McCarthy 2000b) was scanned to create a PDF file for hosting on the ADS (*Section 1.3.2*). Consequently, it was not possible physically to correct any mistakes, omissions or out-of-date bibliographic references that were noted during the course of the project. For this reason, an errata list was compiled, in which all errata are noted and corrections/amendments are given (*Section 2.2*). The errata are organised in the sequence that they appear within the manuscript.

2.2 FASCICULE 1 ERRATA LIST

Title Page: the title of south Lanes Fascicule 1 (McCarthy 2000b) as it appears on the cover of the manuscript is

Roman and medieval Carlisle: the southern Lanes. Excavations 1981-2.

Fascicule 1

Stratigraphy and environmental remains

Cumberland and Westmorland Antiquarian and Archaeological Society

Research Series Number N

However, in order to be consistent with the title of the south Lanes monograph report (McCarthy 2000a), the title page should read as follows:

Roman and medieval Carlisle: the southern Lanes. Excavations 1981-2.

Fascicule 1

Stratigraphy and environmental remains

Department of Archaeological Sciences, University of Bradford Research

Report Number 1

List of Contents: for ‘Chapter 6 Minor Sites’ read ‘Chapter 6 Minor Sites with a contribution by P A Flynn’;

The reference in the published monograph (McCarthy 2000a, x) to a Chapter 13 (The Human Bones) is an error, since this does not actually exist.

Acknowledgements: this section was never completed.

Page 8 (column 2, line 17): for ‘Fasc 2, No G13’ read ‘Fasc 2, pp224-5, No G13’.

Page 14 (column 1, line 30 and column 2, line 1): for 'Fasc 2, No F15' read 'Fasc 2, p221, No F15'.

Page 14 (column 2, line 3): for 'Fasc 2, No C12' read 'Fasc 2, p197, No C12'.

Page 19 (column 1, line 5): for 'Fasc 2, No F15' read 'Fasc 2, p221, No F15'.

Page 37 (column 1, line 17): for 'Fasc 2, No L1' read 'Fasc 2, p278, No L1'.

Page 54 (column 1, line 10): for 'Fasc 3, pp416-7' read 'Fasc 3, pp92-5, Fig 63'.

Page 57 (column 1, line 14): for 'McCarthy forthcoming' read 'Zant and Howard-Davis in prep'.

Page 78 (column 1, line 17): for 'Fasc 3, p373' read 'Fasc 3, pp48-51'.

Page 85 (column 1, lines 46-7): or 'Fasc 2, No K28' read 'Fasc 2, p273, No K28'.

Page 94 (column 1, line 16): For 'Fasc 3, p000' read 'Fasc 3, pp105-6'.

Page 101 (column 1, lines 14-15): The bibliographic reference for the watching brief at 46-52 Lowther Street should be 'Flynn 1995'.

Page 101 (column 2, line 18): for 'McCarthy forthcoming' read 'Zant and Howard-Davis in prep'.

Page 103 (column 1, line 12 and column 2, line 15): for 'Groves 19XX' and 'Groves 199X' read 'Groves 1993'.

Page 108 (column 2, line 42): for 'McCarthy 1993, Chapter 00' read 'Huntley 2000, 78-9'.

Page 117 (column 1, line 28): for 'p 000' read 'p126'.

Page 131 (column 1, line 9): for 'McCarthy 1994, Chapter 9' read 'Kenward *et al* 2000, 81-3'.

Page 131 (column 2, lines 9-10): for ‘Hill forthcoming’ read ‘Hill 1994’.

Page 132 (column 1, line 1): for ‘Kenward and Hall forthcoming’ read ‘Kenward and Hall 1995’.

Page 138 (column 1, lines 58-9): for ‘Allison and Kenward forthcoming’ (twice) [this is Allison and Kenward forthcoming b in the biobiography] read ‘Kenward and Allison 1994’.

Page 138 (column 1, line 69 and column 2, line 1): for ‘Allison and Kenward forthcoming c’ read ‘Kenward and Allison 1994’.

Page 138 (column 2, line 19): for ‘Kenward and Hall forthcoming’ read ‘Kenward and Hall 1995’.

Page 143 (column 1, line 17): for ‘McCarthy 1993, Chapter 10’ read ‘Stallibrass 2000, 85-9’.

Page 164 (column 1, lines 2-3): for ‘Nicholson forthcoming’ read ‘Nicholson 1993’.

Page 164 (column 1, line 23): for ‘Nicholson and Scott in prep’ read ‘Nicholson 2004’ and ‘Scott 2004’.

Bibliography: the bibliography within the Fascicule contains references to unpublished work that has subsequently been published.

For ‘Allison, E P, and Kenward H K, forthcoming a’ (etc) read ‘Kenward, H K, 2009 *Invertebrates in archaeology in the north of England*, English Heritage Res Dep Rep Ser **12/2009**, London’

For ‘Allison, E P, and Kenward, H K, forthcoming b’ (etc) read ‘Kenward, H K, and Allison, E P, 1994 A preliminary view of insect assemblages from the early Christian site at Deer Park Farm, Northern Ireland, in J Rackham (ed), *Environment and economy in Anglo-Saxon England*, CBA Res Rep, **89**, York, 89-107’

For ‘Groves, C, 199X’ (etc) read ‘Groves, C, 1993’; also, for ‘Ancient Monuments Lab Report XX/XX’ read ‘Ancient Monuments Lab Report 21/1993’

For ‘Groves, C, and Hillam, J, forthcoming’ (etc) read ‘Groves, C, and Hillam, J, 1997 Tree-ring analysis and dating of timbers, in J D Hurst (ed), *A multi-period saltmaking site at Droitwich: excavations 1983-4*, CBA Res Rep, **107**, York, 121-6’

For 'Hill, M, forthcoming' (etc) read 'Hill, M, 1994 Insect assemblages as evidence of past woodlands around York, in A R Hall and H K Kenward (eds), *Urban-rural connections: perspectives from environmental archaeology*, Assoc Environmental Archaeol Symposia, **12**, Oxford, 45-54'

For 'Huntley, J P, forthcoming' (etc) read 'Huntley, J P, 1995 Pollen analytical investigations and carbonised plant remains, in C D Morris, C E Batey, and D J Rackham (eds), *Freswick Links, Caithness: excavation and survey of a Norse settlement in Caithness*, Inverness and New York, 8-16, 220-4'

For 'Kenward, H K, and Hall, A R, forthcoming' (etc) read 'Kenward, H K, and Hall, A R, 1995 *Biological evidence from Anglo-Scandinavian deposits at 16-22 Coppergate*, Archaeol York, **14/7**, York'

For 'McCarthy, M R, 1993' (etc) read 'McCarthy, M R, 2000 *Roman and medieval Carlisle: the southern Lanes, excavations 1981-2*, Univ Bradford Res Rep, **1**, Carlisle'

For 'McCarthy, M R, forthcoming' read 'Zant, J, and Howard-Davis, C, in prep *Roman and medieval Carlisle: the northern Lanes. Excavations 1978-82, Volume 1: the Roman period*'

For 'Nicholson, R A, forthcoming' (etc) read 'Nicholson, R A, 1993 An investigation into the effects on fish bone of passage through the human gut: some experiments and comparisons with archaeological material, *Circaea*, **10(1)**, 38-50'

For 'Nicholson, R A, and Scott, S A, in prep' (etc) read 'Nicholson, R A, 2004 Animal husbandry and exploitation', and 'Scott, S A, 2004 Animal remains', in H Dalwood and R Edwards, *The excavations at Deansway, Worcester, 1988-89. Romano-British small town to late medieval city*, CBA Res Rep, **139**, York, 94-6, 506-35'

2.3 ADDITIONAL BIBLIOGRAPHIC REFERENCES FOR THE FASCICULE

Flynn, P A, 1995 A watching brief at 46-52 Lowther Street, Carlisle, *Trans Cumberland Westmorland Antiq Archaeol Soc*, n ser, **95**, 278-82

Huntley, J P, 2000 The plant and wood remains, in McCarthy 2000a, 71-9

Kenward, H K, Allison, E P, Dainton, M, Kemenés, I K, and Carrott, J B, 2000 The insect and parasite remains, in McCarthy 2000a, 81-3

Stallibrass, S M, 2000 The animal bone, in McCarthy 2000a, 85-9

3. CONCORDANCE OF CROSS-REFERENCES FROM THE SOUTH LANES MONOGRAPH TO FASCICULE 1

3.1 INTRODUCTION

3.1.1 The published south Lanes monograph (McCarthy 2000a) includes a Contents List for the three accompanying specialist fascicules (*op cit*, x), although these documents were not published at the time. For each fascicule, a list of chapters is provided, which includes the chapter title, the author(s), and page numbers. Additionally, the monograph text also contains numerous cross-references to the fascicules; these were checked against the manuscript copies of the fascicules present in the former CAU/CAL archive, and any divergences were noted.

3.2 CROSS-REFERENCES FROM THE MONOGRAPH TO FASCICULE 1

3.2.1 **Chapter concordance:** the list of chapters given in the monograph is almost entirely consistent with that present in the manuscript version of the fascicule itself. The only significant divergence relates to Chapter 13, The Human Bones, which is included in the monograph Contents List but is not present in the fascicule manuscript (Table 1).

Monograph Contents List (McCarthy 2000a)	Page nos	Actual contents of Fascicule 1	Page nos
Chapter 1: Introduction	1	Chapter 1: Introduction	1
Chapter 2: Crown and Anchor Lane (CAL)	15	Chapter 2: Crown and Anchor Lane (CAL)	15
Chapter 3: Old Grapes Lane (OGL) Trenches A and B	25	Chapter 3: Old Grapes Lane (OGL) Trenches A and B	25
Chapter 4: Old Grapes Lane (OGL) Trenches C and J	67	Chapter 4: Old Grapes Lane (OGL) Trenches C and J	67
Chapter 5: Lewthwaite's Lane (LEL) Trench A and Old Bush Lane (OBL) Trench B	73	Chapter 5: Lewthwaite's Lane (LEL) Trench A and Old Bush Lane (OBL) Trench B	73
Chapter 6: Minor sites	99	Chapter 6: Minor sites	99
Chapter 7: The Dendrochronology	103	Chapter 7: The Dendrochronology	103
Chapter 8: The Plant and Wood Remains	107	Chapter 8: The Plant and Wood Remains	107
Chapter 9: The Insects and Parasite Remains	131	Chapter 9: The Insects and Parasite Remains	131
Chapter 10: The Animal Bones	143	Chapter 10: The Animal Bones	143
Chapter 11: The Bird Bones	161	Chapter 11: The Bird Bones	161
Chapter 12: The Fish Bones	163	Chapter 12: The Fish Bones	163
Chapter 13: The Human Bones	165	Does not exist	-

Table 1: Chapter concordance between south Lanes monograph (McCarthy 2000a) and Fascicule 1

3.2.2 **Concordance of page cross-references:** there are 33 cross-references to Fascicule 1 in the published south Lanes monograph (McCarthy 2000a). These can be found on pages 21, 26, 27, 30, 35(2), 41, 43(3), 47, 48, 50(2), 69, 71,

75, 76, 77(2), 81(2), 82, 83, 85(4), 89, 90, 91(2), and 106. Are all correct, with the exception of a single reference (McCarthy 2000a, 91); this refers to the detailed report on the human bone (Fascicule 1, Chapter 13), which was never completed (*Section 3.2.1*).

BIBLIOGRAPHY

Hird, M L, and Brooks, C, 1993 *Roman and medieval Carlisle, the Lanes Volume 1: excavations at Old Grapes, Crown and Anchor and Lewthwaite's Lanes 1981-2. Fascicule 3: the Roman and medieval pottery*, unpubl manuscript (early draft), Tullie House Museum and Art Gallery archive, Carlisle

Hird, M L, and Brooks, C, 2000 *Roman and medieval Carlisle, the Lanes Volume 1: excavations at Old Grapes, Crown and Anchor and Lewthwaite's Lanes 1981-2. Fascicule 3: the Roman and medieval pottery*, unpubl manuscript (later draft), Tullie House Museum and Art Gallery archive, Carlisle

McCarthy, M R, 2000a *Roman and medieval Carlisle: the southern Lanes. Excavations 1981-2*, Dept Archaeol Sci, Univ Bradford Res Rep, 1, Carlisle

McCarthy, M R, 2000b *Roman and medieval Carlisle, the Lanes Volume 1: excavations at Old Grapes, Crown and Anchor and Lewthwaite's Lanes 1981-2. Fascicule 1: the stratigraphic sequence, absolute dating and the environmental remains*, unpubl manuscript, Tullie House Museum and Art Gallery archive, Carlisle

Padley, T G, 2000 *Roman and medieval Carlisle, the Lanes Volume 1: excavations at Old Grapes, Crown and Anchor and Lewthwaite's Lanes 1981-2. Fascicule 2: the Roman and medieval finds*, unpubl manuscript, Tullie House Museum and Art Gallery archive, Carlisle

ROMAN AND MEDIEVAL CARLISLE,
THE LANES VOLUME 1:
Excavations at Old Grapes, Crown and Anchor,
and Lewthwaite's Lanes 1981-2

Fascicule 1
The Stratigraphic Sequence, Absolute Dating
and the Environmental Remains

By
M R McCarthy

With contributions by
E P Allison, J B Carrott, M Dainton, P A Flynn,
C Groves, J P Huntley, I K Kemenés, H K Kenward,
R A Nicholson and S M Stallibrass

Volume Editor
C M Brooks

LIST OF CONTENTS

	<i>Page no</i>
List of illustrations	
List of tables	
Abbreviations	
Acknowledgements	
Chapter 1 Introduction	1
Chapter 2 Crown and Anchor Lane (CAL)	15
Chapter 3 Old Grapes Lane (OGL) Trenches A and B	25
Chapter 4 Old Grapes Lane (OGL) Trenches C and J	67
Chapter 5 Lewthwaite's Lane (LEL) Trench A and Old Bush Lane (OBL) Trench B	73
Chapter 6 Minor Sites	99
Chapter 7 The Dendrochronology <i>by C Groves</i>	103
Chapter 8 The Plant and Wood Remains <i>by J P Huntley</i>	107
Chapter 9 The Insect and Parasite Remains <i>by H K Kenward, E P Allison, M Dainton, I K Kemenés and J B Carrott</i>	131
Chapter 10 The Animal Bones <i>by S M Stallibrass</i>	143
Chapter 11 The Bird Bones <i>by E P Allison</i>	161
Chapter 12 The Fish Bones <i>by R A Nicholson</i>	163
Bibliography	165

LIST OF ILLUSTRATIONS

<i>Fig no</i>		<i>Page no</i>
1	Location plan	2
2	Street plan of The Lanes	4
3	Location of excavations in The Lanes	5
4	Location of major excavations in the southern Lanes area	6
5	Location of excavations in The Lanes, on present-day street plan	7
6	Schematic plan: the late first to mid second century	10
7	Schematic plan: the late second century	11
8	Schematic plan: the late second or early third century	12
9	Key to plan conventions	13
10	Plan of CAL A Periods 2B to 2E and CAL B Periods 2A and 2B	16
11	Plan of CAL A Periods 3B and 3B-4, and CAL B Period 3A	17
12	Plan of CAL A Periods 4A, 4B and 5, and CAL B Period Post-3B	19
13	Plan of CAL A Post-Roman and CAL B Period Post-3B	20
14	CAL A, the western section	21
15	CAL B, the eastern section	22
16	CAL B, the northern section	23
17	Plan of OGL A Period 1C and OGL B Period 1B	26
18	Plan of OGL A Period 2 and OGL B Period 1C	27
19	Plan of OGL A Period 3 and OGL B Period 2A	29
20	Plan of OGL A Period 4 and OGL B Period 2B	30
21	Plan of OGL A Period 5 and OGL B Period 3	31
22	Plan of OGL A Period 6, before construction of Building 674	32
23	Plan of Building 674 in OGL A Period 6 and OGL B Period 4	33
24	Plan of OGL A Period 6 and OGL B Periods 4A and 4B	34
25	Plan of OGL A Period 6 and OGL B Periods 4C and 4D	35
26	Plan of OGL A Period 7A and OGL B Period 4E	36
27	Collapsed wall or fence 659, OGL A Period 7A	37
28	Plan of OGL A Period 7B and OGL B Period 4F	38
29	Plan of OGL A Periods 7-8 and 8A, and OGL B Period 5A	39
30	Plan of OGL A Period 8B and OGL B Period 5B	40
31	Plan of OGL A Period 8C and OGL B Period 5C	41
32	Plan of OGL A Period 9C and OGL B Period 6B	42
33	Plan of Building 362 in OGL B Period 6B	43
34	Plan of OGL A Period 9D and OGL B Period 6C	44
35	Plan of OGL A Period 9E and OGL B Period 6D	45
36	Plan of OGL A Period 9F and OGL B Period 6E	46
37	Plan of OGL A Period 9H	47
38	Plan of OGL A Period 10A and OGL B Period 6F	48
39	Plan of OGL A Period 10B	49
40	Plan of OGL A Period 10C	49
41	Plan of OGL A Period 10D	50
42	Plan of OGL A Period 10E and OGL B Periods 6F-7 and 7A	51
43	Plan of OGL B Periods 8A and 8B	52
44	Plan of OGL A Periods 12A, 12B and 13	53
45	Timbers in well 1237, OGL A Period 13	54
46	Plan of OGL A Periods West 1, West 3 and 4, and West 5 and 6	56
47	Plan of Clack Trenches 1 and 2	57
48	Plan of OGL B Period 9	65
49	Plan of OGL C and OGL J	68
50	OGL C, the northern and southern sections	69
51	OGL J, the southern section	71
52	Plan of LEL A Periods 1 and 2A	73
53	Plan of LEL A Periods 2B and 2C	74
54	Plan of LEL A Period 3	74
55	Plan of LEL A Period 4	75

<i>Fig no</i>		<i>Page no</i>
56	Plan of LEL A Period 5	76
57	Plan of LEL A Period 6A	77
58	Plan of LEL A Period 6B	77
59	Plan of LEL A Period 6C	78
60	Plan of LEL A Period 7A	79
61	Plan of LEL A Periods 7B to 8A	79
62	Plan of LEL A Periods 8C and 8D	81
63	Plan of LEL A Periods 8D and 8E	81
64	Plan of LEL A Periods 9 and 10	82
65	Plan of LEL A Period 10	82
66	Plan of LEL A Period 11	83
67	Plan of LEL A Period 12B	84
68	Plan of LEL A Periods 12B and 12C	84
69	Plan of LEL A Period 13	86
70	Plan of LEL A Period 14	86
71	Plan of LEL A Period 15	88
72	Plan of LEL A Period 16	88
73	Plan of LEL A Period 17	89
74	Plan of LEL A Periods 18 and 19A	90
75	Plan of LEL A Period 19B	90
76	LEL A, the northern section	91
77	Plan of LEL A Periods 21A and 21B	92
78	Plan of LEL A Period 21B	92
79	Plan of Building 669, LEL A Period 21B	93
80	Plans of no 65 Scotch Street	94
81	Elevation of no 65 Scotch Street	95
82	Plan of OBL B	96
83	Plan of KAL F, G, H and J	100
84	Schematic drawing of timbers	105
85	Age frequency plot for <i>Alnus</i> , <i>Corylus</i> and <i>Quercus</i> from fence 581	125
86	Diameter frequency plot for <i>Alnus</i> , <i>Corylus</i> and <i>Quercus</i> from fence 581	125
87	Age-diameter plot for ash and alder from ditch 111	129
88	Roman cattle MWSs	149
89	Percentage survival curves for cattle, sheep and pigs	151
90	Roman sheep MWSs	153
91	Roman pig MWSs	156

LIST OF TABLES

<i>Table no</i>		<i>Page no</i>
1	Concordance of sites and periods	9
2	Samples submitted for dating	103
3	Summary of tree-ring dates	104
4	CAL A: percentage occurrence of ecological categories	109
5	CAL A and B: summary of wood data	110
6	OGL A: percentage occurrence of ecological categories	113
7	OGL B: percentage occurrence of ecological categories	113
8	OGL A, B, C and J: summary of wood data	114
9	LEL A: percentage occurrence of ecological categories	123
10	LEL A: summary of wood data	124
11	OBL B: percentage occurrence of ecological categories	128
12	OBL B: summary of wood data	129
13	Weights of animal bone, by site and recovery method	143
14	Weights of animal bone, by site and period	144
15	Numbers of bone fragments	145
16	Relative proportions of cattle, sheep and pigs	146
17	Relative proportions of cattle, sheep and pigs in the late 1st/early 2nd century	146
18	Cattle withers heights	147
19	Mean basal measurements of cattle horncores	148
20	Cattle epiphyseal fusion data	150
21	Sheep withers heights	152
22	Sheep tibia distal breadth and depth measurements	152
23	Sheep epiphyseal fusion data	154
24	Pig epiphyseal fusion data	156
25	Estimates of meat weights	159
26	Numbers of bird bone fragments	161
27	Bird bone fragments	162
28	Fish bone fragments	163

ABBREVIATIONS

CAL	Crown and Anchor Lane
ETS	East Tower Street
GLL	Globe Lane
KAL	King's Arms Lane
KLA	Keay's Lane
LAL	Law's Lane
LEL	Lewthwaite's Lane
LOL	Longcake's Lane
OBL	Old Bush Lane
OGL	Old Grapes Lane
PHL	Pack Horse Lane
PLA	Peascod's Lane
SEL	Sewell's Lane
UCT	Union Court

ACKNOWLEDGEMENTS

CHAPTER 1 INTRODUCTION

Location

Carlisle lies on the south bank of the River Eden, nine miles south of the present-day border with Scotland (Fig 1). On the north side of the Eden lies the suburb of Stanwix; Hadrian's Wall runs through Stanwix, crossing the Eden close to its confluence with the River Caldew immediately north of the Castle. The excavation site lies in the city centre within an area defined by Scotch Street, Lowther Street, Bank Street and the former Old Bush Lane (Figs 1-2). The Lanes derived its name from the large number of narrow lanes or vennels running between Scotch Street and Lowther Street.

History of The Lanes project

Carlisle City Council had been considering development proposals for The Lanes area for many years. A number of proposals were advanced and in 1977 the Council appointed consultants, Building Design Partnership (Preston) and Donaldsons, to reappraise the Scotch Street Central Development Area in the light of changed economic circumstances.

The first report produced by the consultants recognized the resemblance of The Lanes to medieval burgrave patterns, but concluded that 'it seems likely that they originated in Elizabethan times', developing 'along pre-Norman field boundaries' (Building Design Partnership and Donaldsons 1977, 3).

The second report (Building Design Partnership and Donaldsons 1978) incorporated a section on the archaeology of The Lanes prepared by the present writer. This drew attention to the importance and depth of the archaeological deposits and identified the need for three types of survey. These were:

- a: 'an architectural survey - to comprise measured plans, elevations and some detail of all buildings standing prior to the requirement to deposit plans with the Local Authority (late 1800s);
- b: an historical survey - to include a general synthesis of the city's development by the County Archivist, and an examination of the documentary potential for The Lanes by an historian;
- c: an archaeological investigation - to examine sample areas of both modern street frontages and the interior of the area in view of the possibility that there may be an underlying street pattern bearing no relationship to that apparent today'.

This three-pronged brief was successfully implemented using funds provided by the Department of the Environment (now English Heritage), Carlisle City Council, the Manpower Services Commission, the Marc Fitch Fund and the Society of Antiquaries of London. The archaeological excavations commenced in 1978, and in 1980 the architectural survey was put in hand. Dr Henry Summerson was appointed in 1979,

firstly to undertake a pilot study of the documentary potential, and then to produce a detailed account of the city of Carlisle, using written sources, from the eleventh to the sixteenth centuries.

The scale of the project

The Lanes occupies an area over 6 acres (2.43ha) in extent. The development option implemented by the City Council entailed the wholesale removal of all archaeological deposits over some areas but less in others. The greatest threats were at the northern end of the site, between East Tower Street and Globe Lane, where below-ground vehicular access and parking was required. Elsewhere the threats were variable, depending on the location and spacing of foundations and services. In the end some 57 separate excavations and watching briefs took place across the whole of The Lanes area.

There were two other threats. Firstly, the proposed development would effectively destroy a townscape pattern of lanes and properties which almost certainly originated in the medieval period. In 1977 some 19 lanes existed between East Tower Street and Bank Street. The proposals put forward by the consultants entailed the retention of five short lanes, together with part of King's Arms Lane and Globe Lane. The two former Grapes Lanes were to be reconstituted as one.

Secondly, a large number of buildings were threatened with demolition. A building survey report carried out in 1977 revealed that almost all the buildings between Old Grapes Lane and East Tower Street were in either a poor, very poor or bad condition (Building Design Partnership and Donaldsons 1977, 16), and that many had a very limited future lifespan. The bad condition of the buildings was most dramatically illustrated in 1978 when the adjacent properties of numbers 79 Scotch Street and 1 English Street collapsed overnight after trading the day before. Demolition orders were later implemented on other properties considered to be in a dangerous condition.

The City Council accepted the report of the consultants, and by 1980 over 170 properties were identified as being under threat. Eventually most of these buildings were recorded in one way or another before a wholesale programme of demolition was put in hand in 1982. By autumn 1982 about 80% of the Lanes (5.47 acres) had been demolished.

Previous work

Previous archaeological work in the Lanes had been very limited in scope. In 1953 excavations took place at 67 Scotch Street by Robert Hogg, formerly Curator of Tullie House Museum and Art Gallery (Hogg 1955). In a trench 0.75m wide Hogg established that archaeological deposits were over 2m deep on the Scotch Street frontage. He concluded that in Roman times 'the site apparently lies outside the main built-up

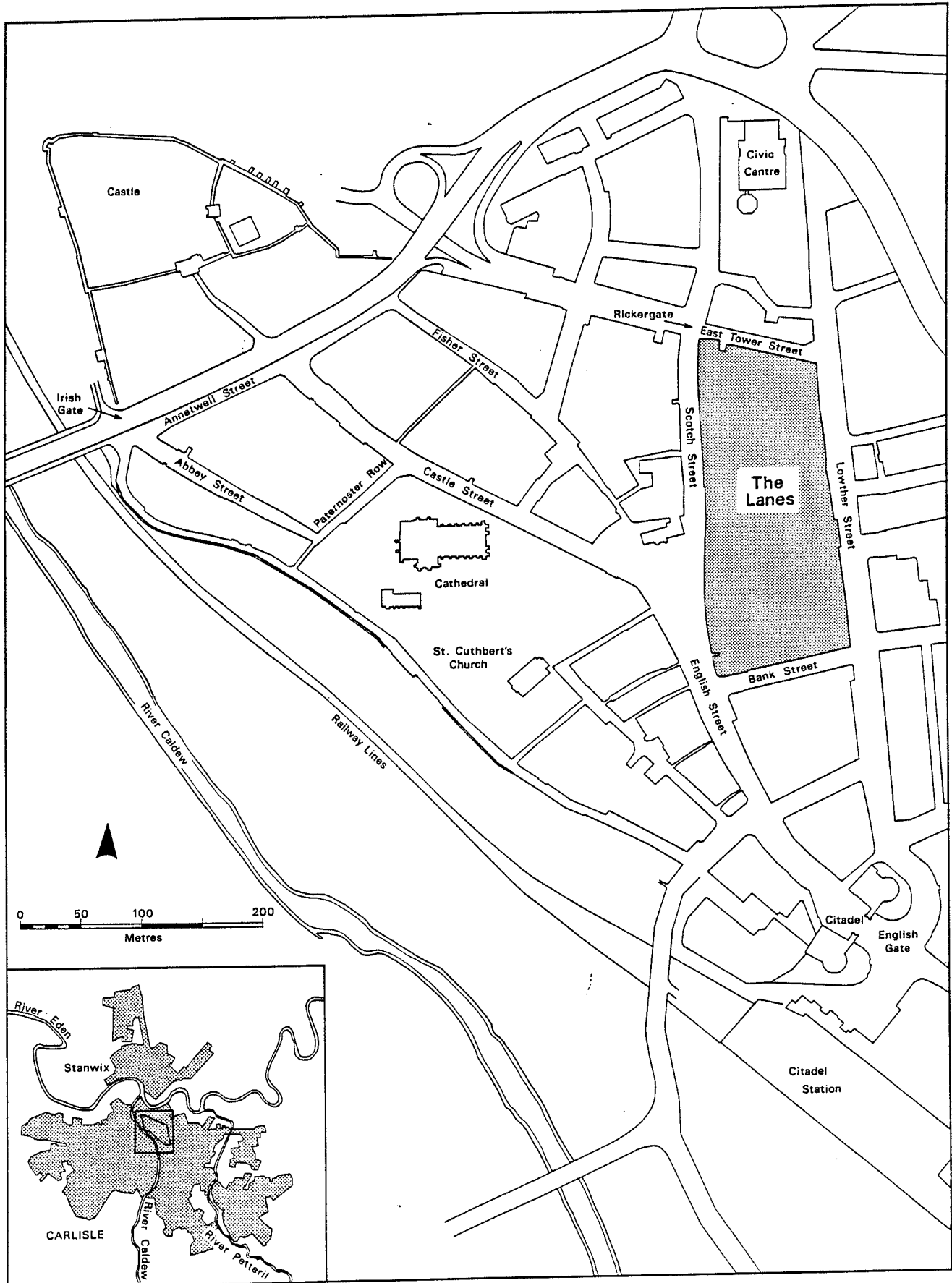


Fig 1 Location plan of The Lanes

area of the town, in a marshy tract which had been used as a midden', and furthermore, 'the site was never heavily occupied' (*ibid*, 65).

In 1975 two small trenches were excavated in Grapes Lane by Peter Clack, working for the University of Durham and the Department of the Environment. This work also established a substantial depth to the archaeological remains, as well as revealing traces of medieval structures. At the same time Paul Gosling, also working for the University of Durham and the Department of the Environment, excavated a trench between Keay's Lane and Hodgson's Court behind the Howard Arms. This too revealed archaeological deposits of around 2m in depth.

Casual finds from The Lanes area in general appeared to indicate the presence of extensive Roman remains (Charlesworth 1978, 124-33), and this was Charlesworth's conclusion when she noted that the burials at the Bowling Green, Spring Gardens Lane, 'must mark the limit of *Luguvalium* in that direction' (*ibid*, 119).

For the later periods the only information available was based on ancient maps and written sources. These show *inter alia* that The Lanes was not only enclosed within the medieval town walls (eg Jones 1976; Perriam 1976), but they clearly identify Scotch Street (the former *vicus Ricardi*) as a major thoroughfare from medieval times onwards.

Sampling strategy and excavation methods

With such a large area of historic townscape under threat, and in the knowledge that only a part of the area could be examined, consideration was given at the outset to the nature of the sampling strategy. In particular Carver's work at Shrewsbury (1978) and later at Worcester (1980) was considered, together with other contributions on sampling in urban contexts. None of the models then available fitted the circumstances in Carlisle.

Sampling in The Lanes was determined very largely in the first instance by the availability of open areas. Some demolition took place ahead of schedule in order to facilitate the archaeological work, but the continued occupancy of many properties until 1981-2 restricted work, especially at the southern end of The Lanes.

Two strategies were adopted. The first was to obtain a sample of the ancient townscape through the use of area excavation. This was achieved in the Keay's/Law's Lane area, and was the first stage of the project. The second was to use smaller units of investigation widely distributed across the site, some of these being conventional excavations, and some exploited the presence of cellars.

The most important and extensive investigations were controlled excavations by hand from the modern ground surface to the undisturbed natural subsoil. In some instances machinery was used to remove modern features, and occasionally the decision was taken to remove medieval deposits mechanically in order to provide more time for the examination of the Roman levels. Some smaller excavations took place below the floors and behind the walls of cellars, a relatively inexpensive exercise capable, in the right circumstances, of providing useful information quickly. In a small number of cases machinery was used to excavate trenches in order to

provide a 'view' of the archaeology or else to provide an answer to a specific question. Later, watching briefs were undertaken during the initial stages of the building programme.

In the end the archaeological programme lasted three and a half years, and resulted in approximately 1.3 acres (0.53ha) of the Roman settlement being exposed. A substantial area of medieval townscape, including several lanes with their buildings, yards, pits, wells and other features, was investigated at the northern end of the site (Keay's and Law's Lanes).

Method of publication

The archaeological and architectural remains

The size of this project and the amount of data recovered necessitate the division of this publication into three volumes. Volume 1 deals with the results of work in a group of trenches at the southern end of the development area, and covers all periods from prehistoric to the twentieth century. Volume 2 will be confined to Roman deposits at the northern end of The Lanes area, and Volume 3 will deal with features of medieval and later date in that area, including a summary of the architectural data.

The results of the architectural survey are treated as an extension to the archaeological data. Where excavated sites had been occupied by buildings of particular interest, as at number 65 Scotch Street, the buildings are described at the end of the stratigraphic sequence.

Following the precedent established with the publication of Castle Street, Carlisle, the archaeological detail is published as a series of fascicules with separately produced volumes of synthesis. The rationale behind this approach has been described elsewhere (McCarthy 1991a; McCarthy *et al* 1992).

The documentary research

After the initial pilot study was completed, the scope of the documentary research was expanded to include the whole of the city, rather than confining it to properties in The Lanes. It was felt that, valuable though the documentation of individual properties would be, the significance of the data could only be appreciated against the background of the city as a whole.

This wider perspective is of crucial importance in a number of ways. Firstly, it has the potential for shedding light on the physical development of the city in a way which is much more difficult to achieve through property- or area-specific research. Secondly, it may provide social data. Inferences about tenants, types of tenancies and rentals, the population mix and demographic fluctuations which may arise from war or pestilence depend upon taking the broad view. Thirdly, the economic background may be elucidated. The relative importance of local and regional trade patterns can sometimes be distinguished, as well as information on specific trades, their organization and location in the city. Fourthly, non-domestic buildings for which there is now no physical evidence, such as churches, chantry chapels and hospitals, may be documented. Locating these and other buildings is frequently only possible by combining data from a variety of sources.

Summerson's *Medieval Carlisle: The City and the Border*

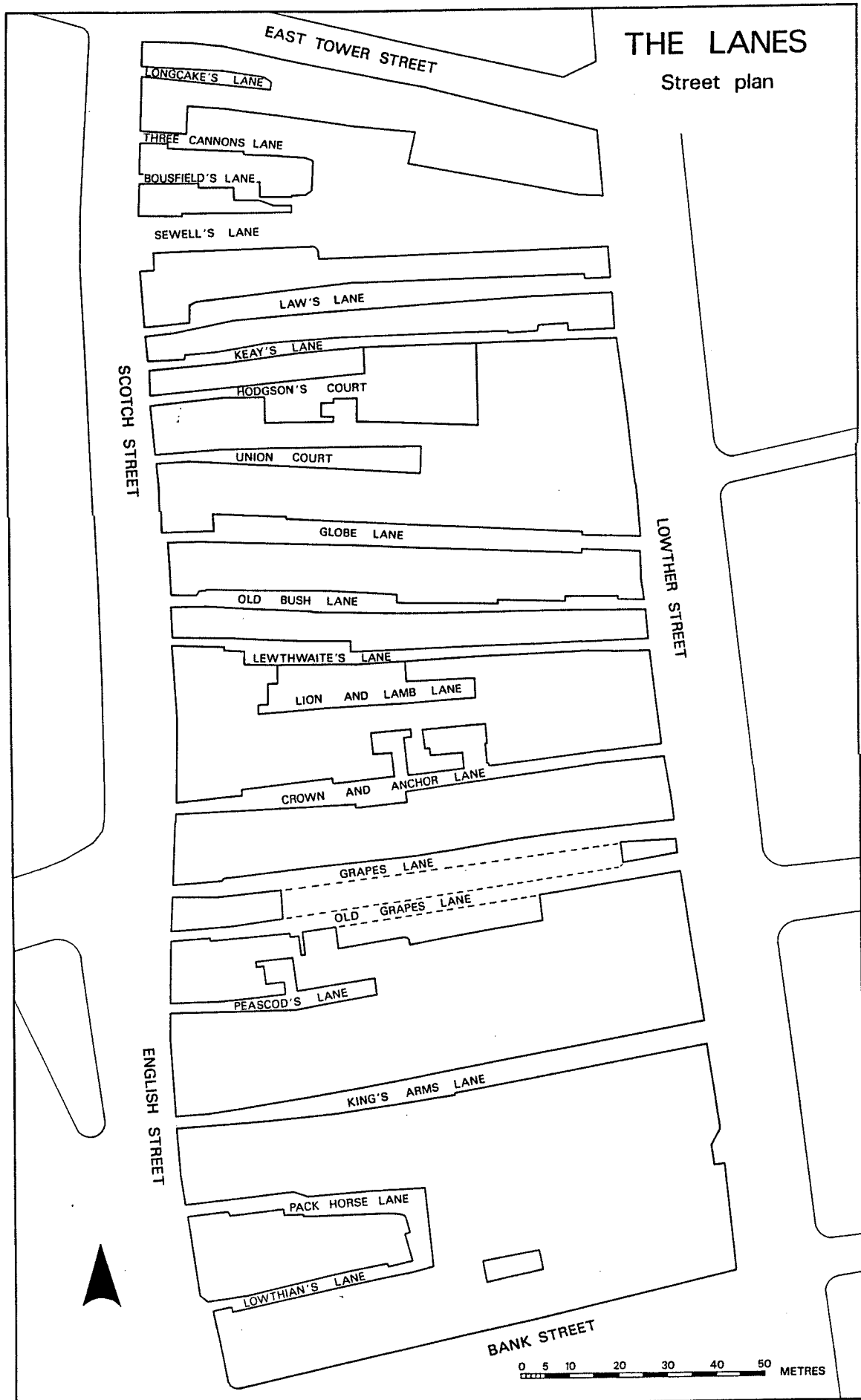


Fig 2 Street plan of The Lanes prior to redevelopment

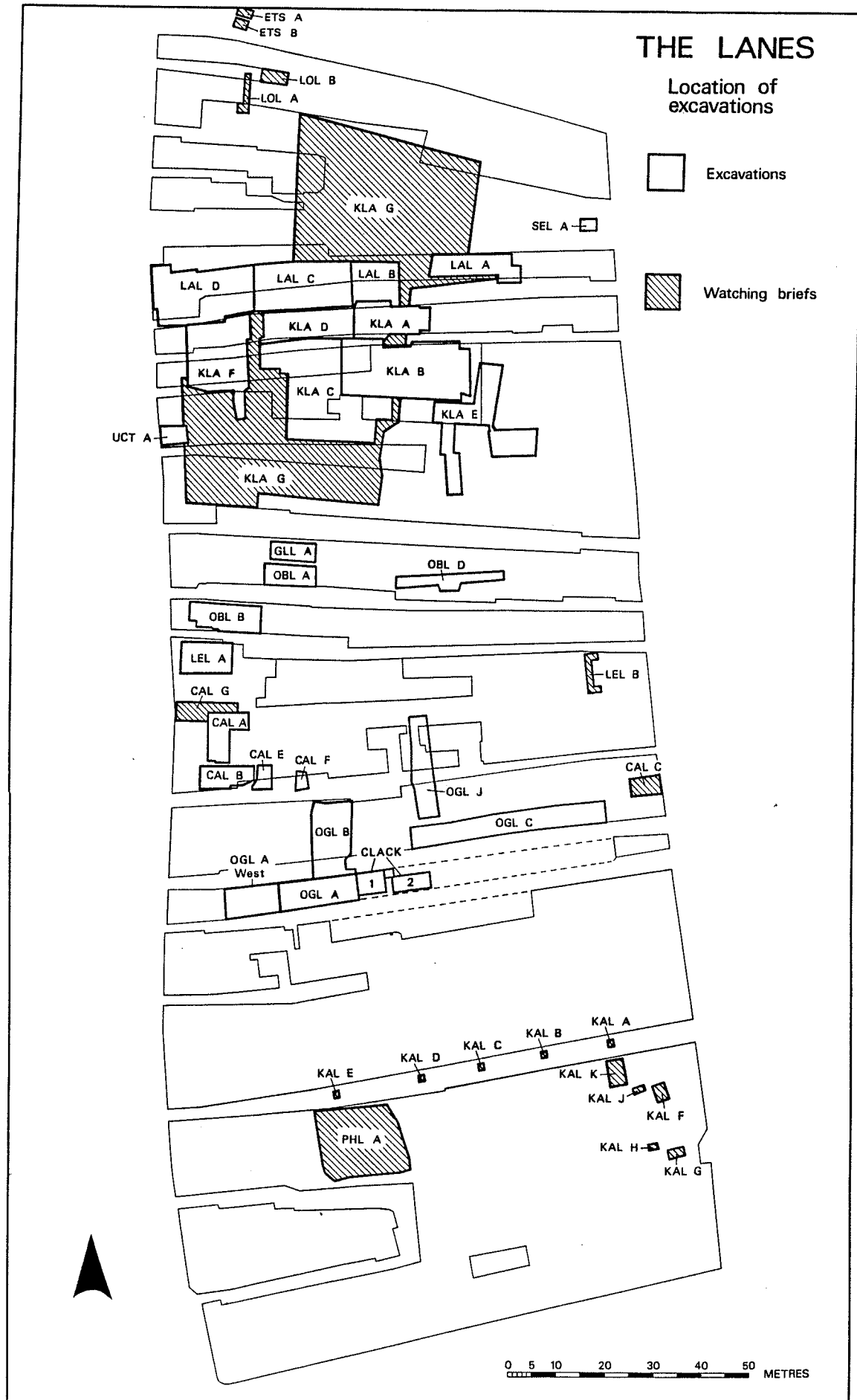


Fig 3 Location of excavations in The Lanes



Fig 4 Location of major excavations in the southern Lanes area

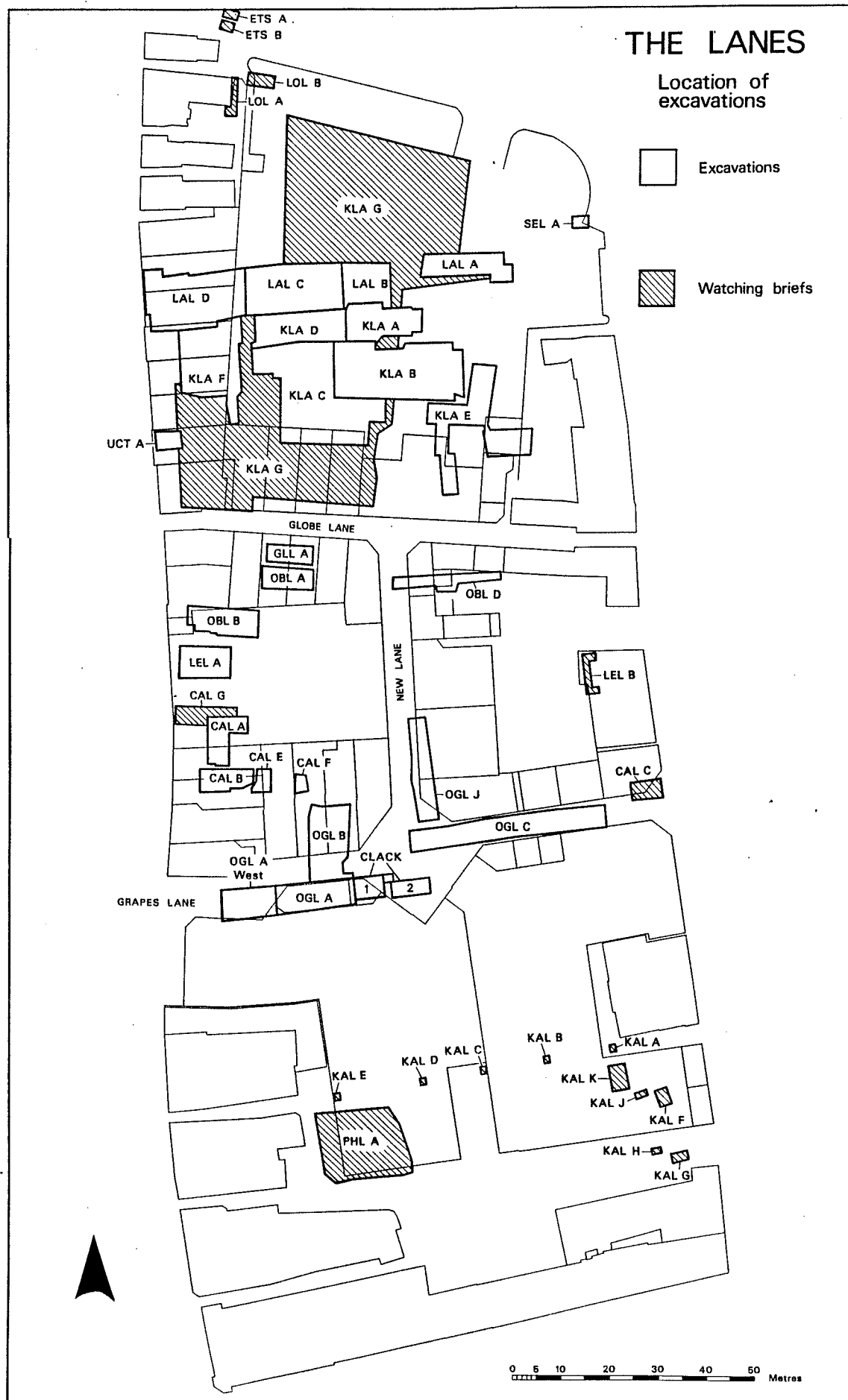


Fig 5 Location of excavations in The Lanes, superimposed on the present-day street plan

from the Late Eleventh to the Mid-Sixteenth Centuries (1993) is one of the most detailed accounts drawn from primary sources written for any English medieval town. Although many individuals and their properties are referred to, the documentary history of specific tenements or burgages does not feature in this volume; some of this data, where it survives, is included here, however.

Phasing

Each trench reported on was investigated as a self-contained unit with its own numbering sequence of contexts and finds, and the data were examined independently of the other trenches, irrespective of whether they were contiguous or not. Within each trench the sequence was divided into periods, which are numbered. Some periods were then sub-divided, the divisions being identified by letter. Within this report, not all contexts are referred to by number on the published illustrations, and not all the contexts on the plans are mentioned in the text. The key to plan conventions can be found in Figure 9. The full draft report, incorporating more references to context numbers, is housed with the site archive, along with a complete list of all contexts with context-type and phasing details. It will be apparent from this list that some contexts are attributed to more than one period (eg LEL A 614, Period 2C-4). This not only indicates a range of uncertainty in the phasing, but it also affects the degree to which the biota and the artefacts can be regarded as firmly stratified.

On completion of the phasing, an attempt was made to correlate the details of contiguous trenches at Old Grapes Lane. In some cases the correlation is secure but in others there is an element of doubt. An attempt was also made to correlate sequences between all trenches, and here there is a considerable element of doubt. Where the physical evidence was absent, pottery has been used as a guide to contemporaneity. Table 1 is a very tentative stab at linking the phasing against a chronological framework.

Dating the sequence

The site chronologies have been based very largely on pottery, especially samian ware, as very few coins were discovered in useful positions. Furthermore, although absolute dates for many of the timbers were obtained (pp 103-6), many of the felling dates are too early, being first century BC or early first century AD, and are of no use in dating individual structures, with the exceptions of OGL A Periods 6 and 13 and OGL B Period 2B. It is very difficult, therefore, to establish the dating with any degree of precision.

The problems are compounded by the difficulty in deciding how to interpret some deposits. Period 4 in OGL B appeared to be remarkably clean compared with its equivalent in OGL A (Period 6). This could be explained if the assumption is made that Period 4 in OGL B was deliberately kept clear of rubbish for a specific purpose. However, Periods 5A and 5B in OGL B yielded over 1,000 sherds of pottery, including about 300 sherds of samian ware, and over 40,000g of animal bone. In this case it is possible to suggest that the deposits of Periods 5A and 5B derived from Period 4 and were

midden material which was later spread across the site. The samian spectrum appears to bear this out in that it compares fairly well with OGL A Period 6, which ended about AD 160.

Summary of the excavations

The earliest features

The old ground surface was recorded at several sites but, unlike excavations on the western side of the city, at Blackfriars Street (McCarthy 1990, 13-14) and Annetwell Street (Caruana forthcoming), no traces of plough marks were found. The nearest possible example was observed at 46-52 Lowther Street in 1991 (p 101).

The only potential prehistoric feature was part of a round-house, which cut the old ground surface in OGL A. The round-house cannot be dated with any certainty, and could theoretically belong almost anywhere from the Early Bronze Age to the Roman period. Apart from a barbed and tanged arrowhead from the same site (Fasc 2, No G13), the lithic assemblage is undiagnostic. Two factors may give a pointer to the approximate date of the round-house, however. Firstly, there were no associated features such as other gulleys or an enclosure ditch. The OGL A and B excavations combined were sufficiently large as to suggest that the absence of an enclosure ditch was significant. Recent research on 'native' sites in the north (Bewley 1984; Higham 1986) suggests that unenclosed settlements are Iron Age or early Roman in date. Secondly, the building was directly underneath the earliest definite Roman features, with no intervening deposits. This may imply that the time gap between the round-house and the Roman period was short, lending support to the argument that the house was either late Iron Age or early Roman in date.

A small number of Neronian to early Flavian samian ware sherds, together with the occasional example of Lyon ware and Terra Nigra, may indicate Flavian period activity in the vicinity. There is no corroborative artefactual evidence from the sites excavated to indicate occupation that early, and it seems likely that this material is rubbish emanating from somewhere else.

The earliest Roman activities are represented by pits, soil spreads and postholes. Period 2B at OGL B includes a timber with a dendrochronology-derived *terminus post quem* for felling of AD 83 (p 104 and Table 3 below). It is thought that the early periods in OGL A and B belong to the late 80s or early 90s AD. Periods 2 to 5 in LEL A, thought to be contemporary, include a sequence of patchy surfaces associated with gulleys, slots and some postholes.

The late first to the mid second century

In the winter of AD 93-4 a timber and wattle building, Building 674, was erected within a fenced or hedged enclosure in OGL A Period 6 (Period 4 in OGL B) (Fig 6). Although the date was established by dendrochronology (pp 103-4), the caveat must be expressed that the timbers from which the dates were obtained could have been re-used. Nevertheless, the date of AD 93-4 is regarded as being the probable start date on the grounds that it is not inconsistent with other lines of evidence. The building probably had a life of 50-60 years, extending to

around AD 160, on the evidence of associated samian ware.

The function of Building 674, which contained at least two rooms and a possible outshut, cannot be determined with certainty, but the insect and botanical remains suggest that the building might have been, in part at least, a stable or byre. Around the building were metalled open areas which were probably yards, perhaps for stock. The stockyards were bounded by a damp gulley and a hedge to the west, whilst a mixed hedge and fence alongside a road defined the property to the north.

This road ran from the heart of the Roman settlement eastwards towards the crossing of the River Petteril; its alignment was secured through work at CAL B-C and OGL J, and more recently at 46-52 Lowther Street. The date at which this

road was first laid down could not be established, but because it was bedded directly on the old ground surface, it is assumed to have been at least as early as Building 674 in OGL A. Further east, along the south side of this road in OGL C, a complex of slots, posts and surfaces recorded in section suggest that the settlement extended at least as far as this.

On the north side of the road successive timber buildings (125 and 97) were erected in CAL A (Period 2), the property being screened from the road by a fence (Fig 6). Its northern boundary is thought to have been in LEL A, where in Period 6 there was an east-west gulley bounded by a stake fence; this also formed the southern limit of another property to the north. The CAL A Building (97) probably stood within a plot containing yards and working areas, seen both in CAL A and LEL

Table 1
Concordance of sites and periods

<i>Horizon</i>	<i>OGL A</i>		<i>OGL B</i>		<i>CAL B</i>		<i>CAL A</i>		<i>LEL A</i>		<i>OGL C</i>		<i>OGL J</i>
Natural	0	=	0	=	0	=	0	=	0				
	1A	=	1A										
	1B												
Old ground surface	1C	=	1B	=	1B	=	1	=	1	=	1		
Round-house	2												
Late 1 st century	3-5	=/=	2A-3		2A-B	=	2A-B	=/=	2A-B				
AD 90s	6	=	4A				2C	=/=	3		2		
			4B-D				2D	=/=	4				
					3A-B	=	2E	=/=	5-6C				
							3A	=/=	7A				
							3B-C	=/=	7B-C				
							4		8				
									9				
Late 2 nd century	7A-8C	=/=	4E-5C				5		10				
	9A	=/=	5D										
2 nd -3 rd century	9B	=/=	6A								3	=	2
	9C-E	=/=	6B-D						11				
	9F-H	=/=	6E										
	10A-D	=/=	6F						12				
	10E-F	=/=	7A-B										
3 rd -12 th century	11-12A		8A-B						13				
							OGL A West 1-3		14				
									15				
									16-19A				
Medieval	13	=	9	=			OGL A West 4-7	=	19B-22				
Post-medieval							OGL A West 8	=	23				

Periods linked by = are probably or certainly the same; periods linked by =/= may be the same but there is an element of doubt

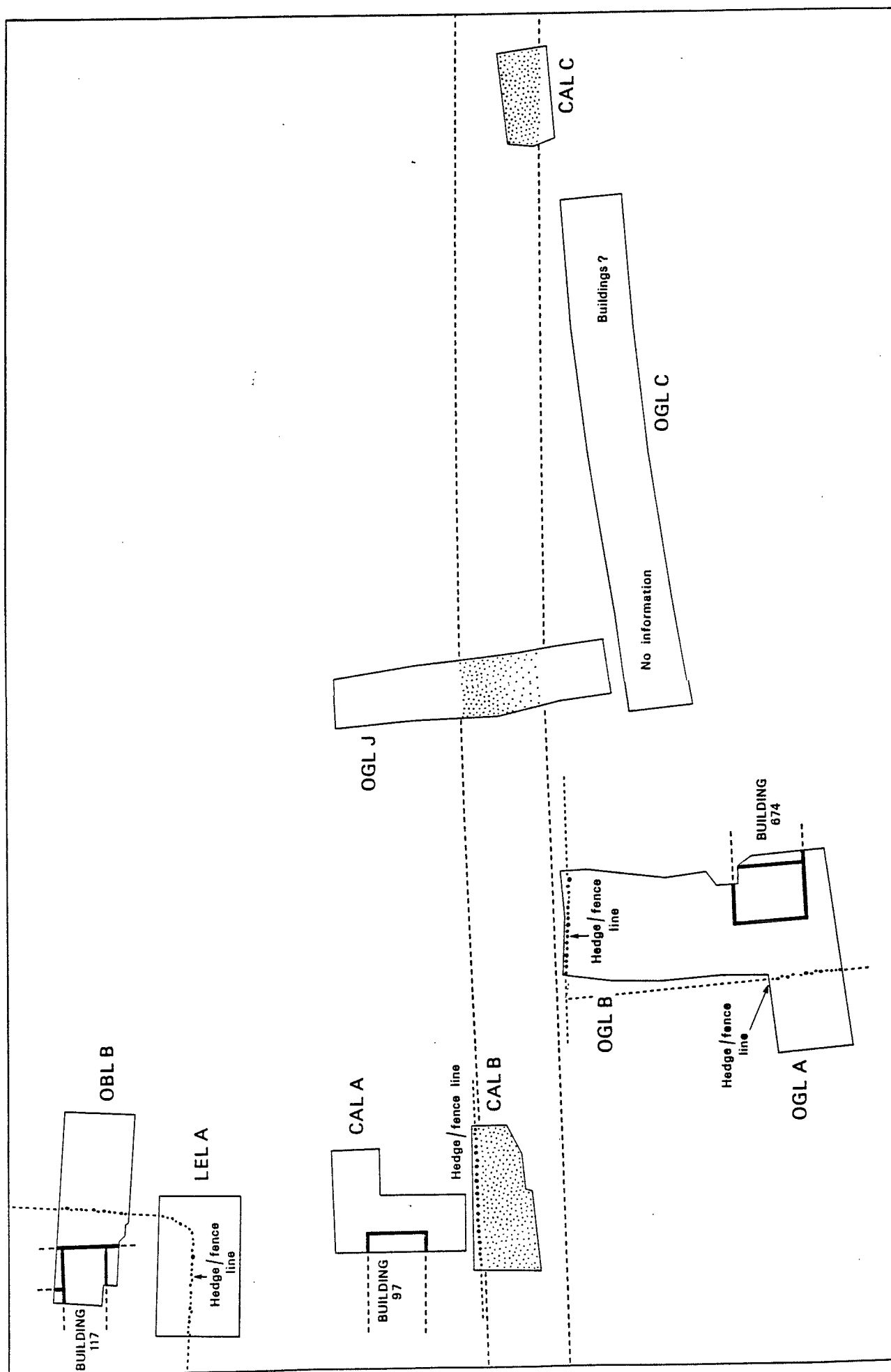


Fig 6 Schematic plan of major features thought to be broadly contemporary: the late first to mid second century (CAL A Period 2E, OGL A Period 6, OGL B Period 4, OGL C Period 2, LEL A Period 4, OBL B Period 2-7)

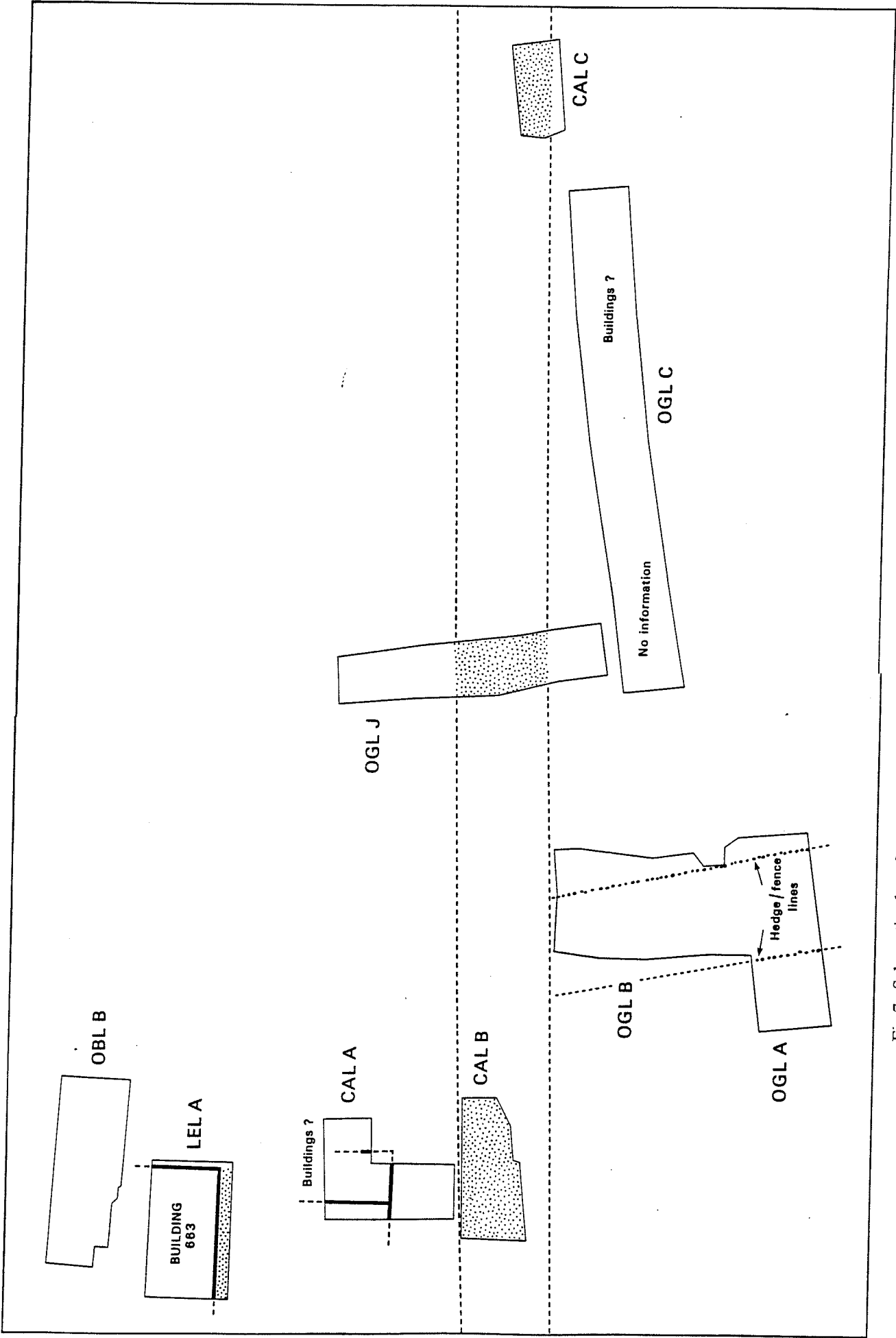


Fig 7 Schematic plan of some major features thought to be broadly contemporary: the late second century (CAL A Period 5, OGL A Period 8-9, OGL B Period 5, LEL A Period 10)

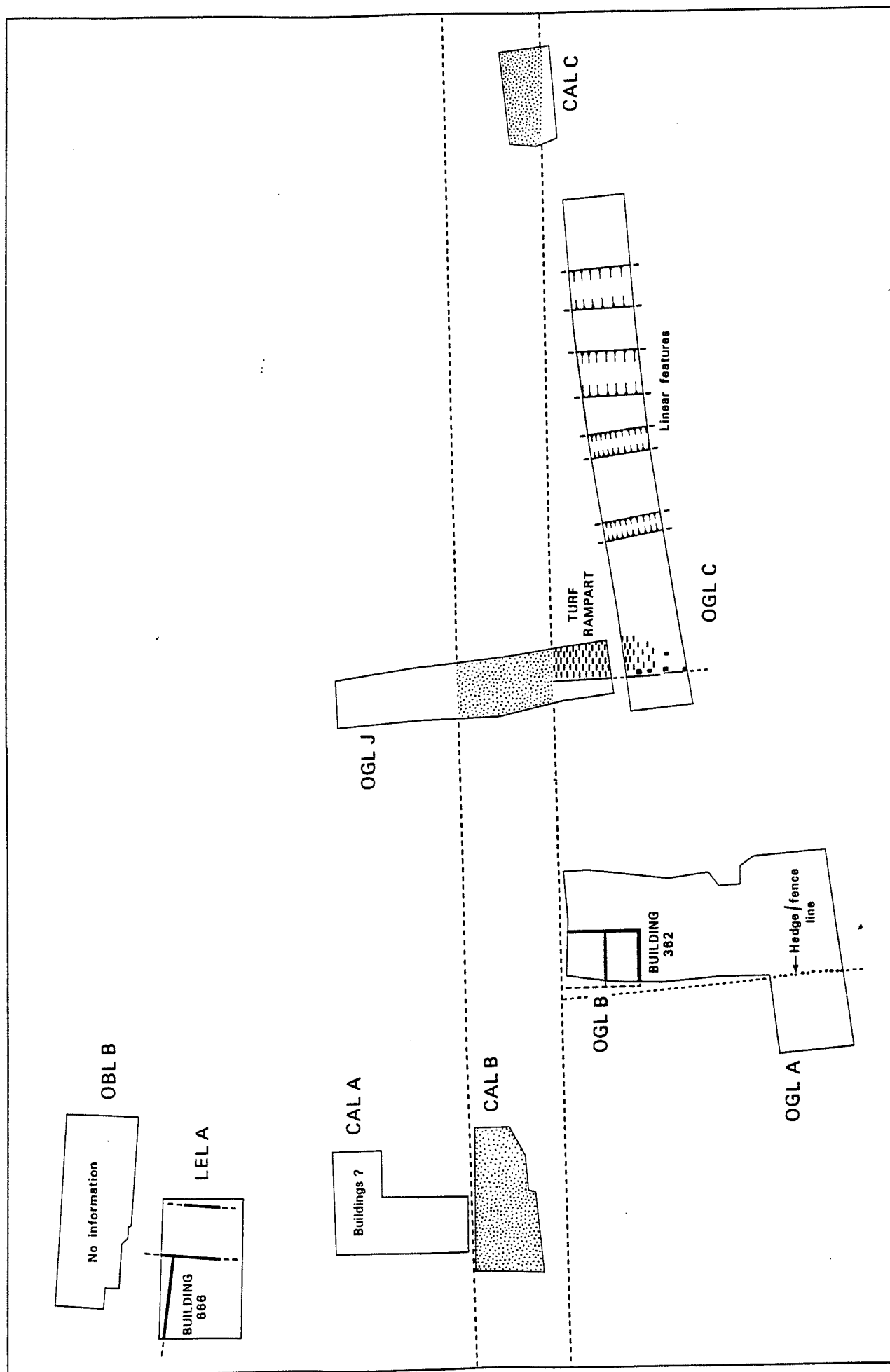


Fig 8 Schematic plan of major features thought to be broadly contemporary: the late second or early third century (OGL A Periods 9D-F, OGL B Periods 6B-E, OGL C Period 3, OGL J Period 2, LEL A Period 12B)

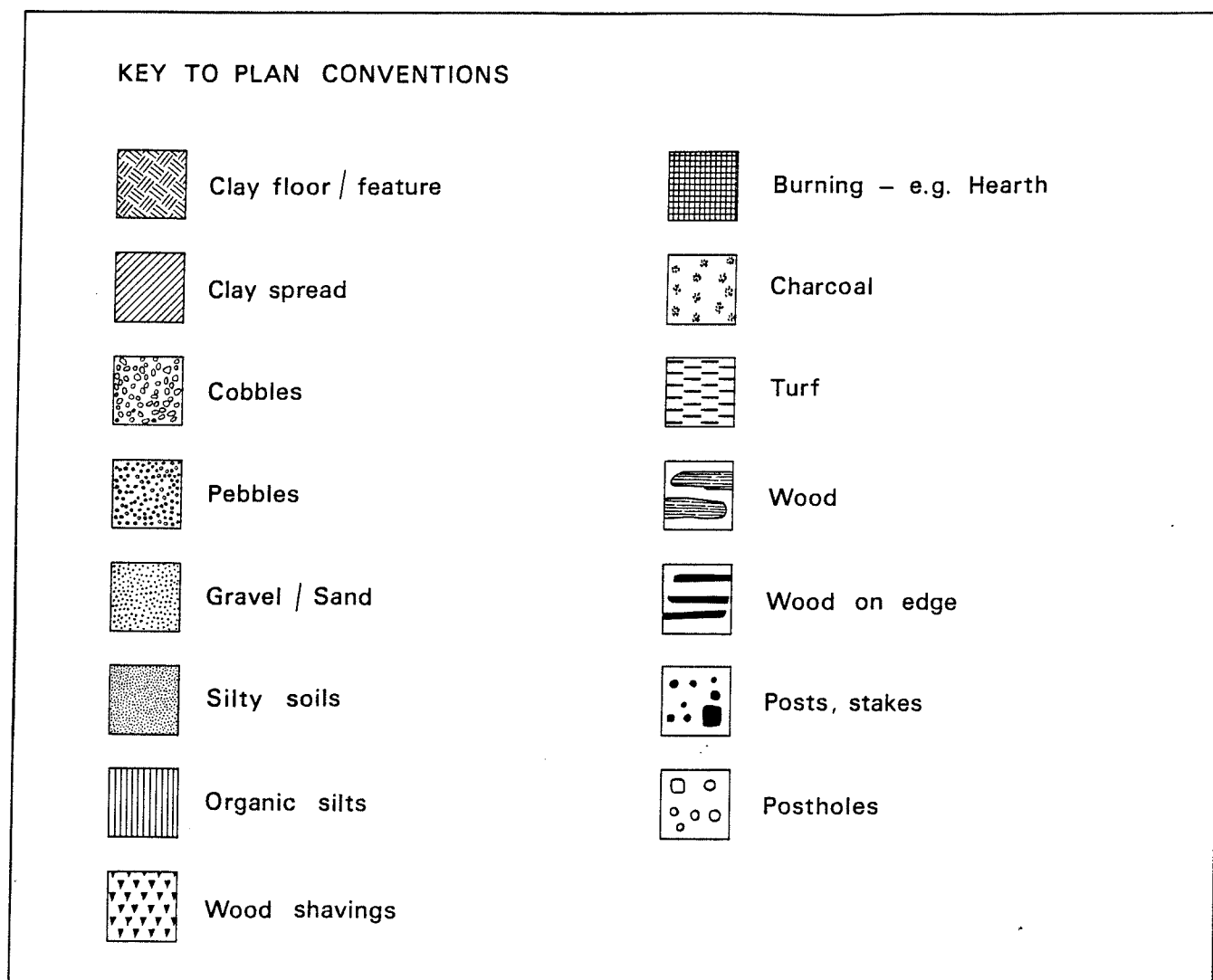


Fig 9 Key to plan conventions

A. The building was similar to that in OGL A-B in terms of width and construction techniques, but unlike the latter, the CAL A building was reconstructed on at least two occasions. In OBL B, Building 117 is also tentatively associated with this phase (Fig 6).

Correlating periods between trenches and the search for patterning in the evidence are clearly difficult in the absence of absolute dates, and there are several possible interpretations of the evidence for the building history. These buildings and boundaries could be seen either as piecemeal development along the street frontages, or as a layout of plots and buildings that owed their origin to a deliberate act of planning, the latter being the interpretation preferred by the present writer. It is suggested that a series of enclosed plots were established in the mid 90s AD along both the east-west road leading out of the city and the present Scotch Street frontage leading towards the crossing of the River Eden. After the initial layout had been established, however, piecemeal rather than uniform development may be expected.

The mid second to the fourth century

In the mid second century, from around AD 160, deposits at OGL A-B and LEL A seem to represent combinations of dumping, soil accumulating *in situ*, cobbled surfaces and other miscellaneous features including fence lines and pits. Precisely what was going on is not clear, except that much activity was taking place. Period 6B in OGL B and Period 10 in LEL A, both attributed to the late second century, witnessed the erection of major buildings. Building 663 in LEL A may have been on the frontage of the Roman predecessor of Scotch Street (Fig 7), and Building 362 in OGL B occupied a position on the frontage of the CAL B-C road (Fig 8). The function of neither building is certain as too little of the plans was recovered. Both structures may be domestic, but the LEL A building could to be relatively large. Attention is also drawn to a probable building in CAL A Period 5 (Fig 7), and it may have been at this time that the surfaces and ovens represented in the cellar sections at CAL A (Periods 4B and 5) were in use.

Building 377 was erected, set back some distance from the known road at the junction of the two trenches, in the late

second or third century, after which the OGL A-B sequence seems to peter out. Although the absence of pottery and finds of third- and fourth-century date seems decisive, the OGL A West excavation included a small amount of late Roman material associated with buildings and surfaces (Periods West 1 to West 3). This may imply that some late Roman deposits had been removed in antiquity or by machining.

In LEL A the Roman sequence was not affected by machine excavations or cellaring, and continued through multiple phases. Although traces of buildings were recognized in most periods, it is rarely possible to attempt any functional interpretation because of the size of the excavation.

Within this period it seems likely that a programme of defence building commenced, as shown by work at OGL C and J (Fig 8), although there is little associated pottery and dendrochronology cannot refine the dating of this important development. It is clear, however, that the turf rampart was not finished. No evidence for it was found on the northern side of the road in OGL J, and none was present either in OBL D further north.

The post-Roman to Anglo-Scandinavian periods

There is no reason to doubt that at LEL A and in the vicinity activity continued into the fourth century. What is not clear from any of these Lanes sites is the nature and dating of deposits at the interface between the Roman and post-Roman periods, which at LEL A must occur somewhere between Periods 11 and 20. There are no 'dark earth' deposits, and features ostensibly of twelfth-century or later date are in direct contact with those of the Roman period. Yet some Anglian or Anglo-Scandinavian period activity would not be surprising. The Trewiddle-style strap-end mould from CAL A (Fasc 2,

No F15), the late eighth- to early ninth-century dendrochronology dates for CAL A (p 103), and a late tenth- to eleventh-century brooch from OGL A West (Fasc 2, No C12), together with features on the St Alban's church site on the opposite side of the road to LEL A (Keevill in prep), provide some pointers. It may be supposed that the junction of the CAL B-C Roman road and Scotch Street was a focus of settlement within this period. It is possible that a wattle building (668) in LEL A Period 15 belongs here.

The medieval and post-medieval periods

Medieval features are not well preserved. A large timber hall-like building (Building 669), perhaps dating to the later twelfth/thirteenth century, is present at LEL A (Period 21). A series of pits in OGL B (Period 9), tentatively regarded as having an industrial function, perhaps for tanning, probably date to the early thirteenth century, as does the infill of a timber-lined well (1237, Period 13) at OGL A. The road identified in CAL probably continued in use into the medieval period, when a number of pits containing twelfth-century pottery were dug into the surface (CAL E-F).

At none of the sites does the sequence continue unbroken into the post-medieval period. Given the history of the medieval town (Jones 1976; Summerson 1993), it is inconceivable that an area such as this, so close to the heart of the city, should have been unoccupied. Here is a case where the relative lack of archaeological information can be confidently ascribed to the removal of deposits in later times.

This process probably took place in the late seventeenth or early eighteenth centuries, when the Scotch Street frontage was gradually rebuilt in brick. An example of this can be seen at LEL A, the site of no 65 Scotch Street.

CHAPTER 2 CROWN AND ANCHOR LANE (CAL)

Crown and Anchor Lane Trench A (CAL A)

This was an L-shaped trench, 10m in length north-south, with a short east-west arm up to 3.8m long extending from the northern end (Figs 3-4). The long arm lay parallel with, and included, numbers 69-73 Scotch Street; the trench was 6.5m east of the Scotch Street frontage. The short arm was approximately 1m south of the boundary between 67 and 69 Scotch Street.

Excavation revealed small cellars with brick- and stone-lined pits and drains in the bottom. Several phases of archaeological deposits survived beneath the cellars. The cellar walls were removed and the sections behind recorded. The early part of the archaeological sequence is relatively clear, but the later part is not fully understood as it was observed only in section.

Period 0

This was the natural subsoil (141-2, not illustrated).

Period 1

The old ground surface (124, seen in section in Fig 14), was a dark brown silty clay with no evidence of ploughing.

Period 2

Five sub-phases were distinguished; not all are likely to be of equal significance, and there are a number of features that cannot be attributed with certainty to any one sub-phase.

Period 2A

A layer of wood shavings (122, not illustrated) on the northern side of the site probably represents a construction phase for timber buildings.

Periods 2A-B and 2B

Clay surfaces (118-20, Period 2B, Fig 10) were cut by Building 125 (Period 2C). The clay surfaces looked like floor remnants although they could not be associated with a building. Surface 119 sealed a small pit (138-9, Period 2A-B, not illustrated).

Periods 2B-C and 2B-E

Miscellaneous surfaces (Period 2B-C), a probable road (90, Period 2B-E), postholes or stakeholes, and other features (eg depression 126, Period 2B-E) (Fig 10) were sealed only by layer 80 (Period 3A). They are attributed to 2B-C and 2B-E because their precise stratigraphic relationships could not be determined with certainty.

Some surfaces (eg 82, 89, Period 2B-C) looked very like 118-120 (Period 2B), with which they should probably be associated. Other surfaces of pink gravel and sand (eg 114, Period 2B-E; 115-6, Period 2B-C) may belong to the same features.

Period 2B-E probably represents a phase of activity distinct from and earlier than Period 2C-E, but it cannot be defined in terms of walls or other boundaries.

Period 2C

Building 125

Period 2C comprises Building 125, a rectangular building aligned

north-south, represented by slots 83/4 and 112/3 (Fig 10) which cut Period 2B surfaces. Slot 85/6 is regarded as belonging to the same building. Slots 83/4 and 112/3 varied in section from squared to U-shaped, being 0.2-0.4m wide by 0.05-0.15m deep. The gravel fill was probably the material out of which they were cut. No posts or stakes were present.

Slot 85/6 lay 4.20m to the east (centre to centre) of slot 83/4. It contained squared and rounded posts or stakes (104-9 and 111), at least one of which was oak. The roundwood identified consisted of alder, hazel and gear, and oak offcuts were present (p 00 below). The intervals of the posts from north to south were 0.39m, 0.40m, 0.21m, 0.66m and 0.67m.

Building 125 may be summarized as being 4.2m wide (east-west) by at least 6.5m long (north-south). The east wall incorporated posts, but the south and west walls must have been based on sill beams as there were no postholes or stakeholes. No floors or other surfaces, internal or external, were present.

Period 2D

East-west slot (or gully) 87/8 (Fig 10), which cut across Building 125, is the only feature attributed to this period. The slot profile varied from shallow with vertical sides to U-shaped with gently sloping sides. The maximum width was 0.6m, but for much of its length it was only 0.3m wide by 0.15m deep.

Period 2E

Building 97

Building 97, which cut slot 87/8, is the only feature attributed to Period 2E (Fig 10). It was delimited by three lengths of slot (91/2, seen also in section in Fig 14, 93/4 and 95/6) forming the northern, eastern and southern sides. The slots were all square in profile, 0.35-0.40m wide by 0.30-0.35m deep. They all contained a soil fill which resembled redeposited old ground surface.

The building was 4.2m wide (slot centre to centre), but only 1m of its east-west dimension lay within the trench. The walls were probably based on sill beams, with post 98, 0.09m in diameter by 0.10m deep, performing a special function at the south-east corner.

It is possible that a post (130, Fig 10) adjacent to slot 93/4 was part of Building 97. The post was 0.65m north of post 98. It could be a door jamb, but the aperture seems rather narrow and its diameter, 0.04m, rather small for such a function.

Period 3

The general appearance of Period 3 is of soils introduced to the site from different locations. The soils indicate phases of activity which may have had different functions. Period 3A, for example, was relatively clean, whilst 3B was of mixed origin. Apart from two small oak stakes in Period 3B-4 no structural features were present.

Period 3A

Layer 80 (not illustrated in plan, but seen in section in Fig 14) covered the entire site, sealing Period 2. It consisted of a brown clay loam with many pebbles and organic material, including fragments of wood. The deposit averaged 0.15-0.20m deep but was occasionally deeper, depending on the underlying contours. The botanical remains, which were dominated by chickweeds, sedges, *Chenopodium* species and annual nettles, suggested that the deposit was a garden soil in which coriander may have been grown (pp 110-1). As cultivated soils normally take some time to develop, it could be that layer 80 was an imported deposit of relatively clean soil which was spread over the site of the Period 2 buildings. The upper surface was generally level.

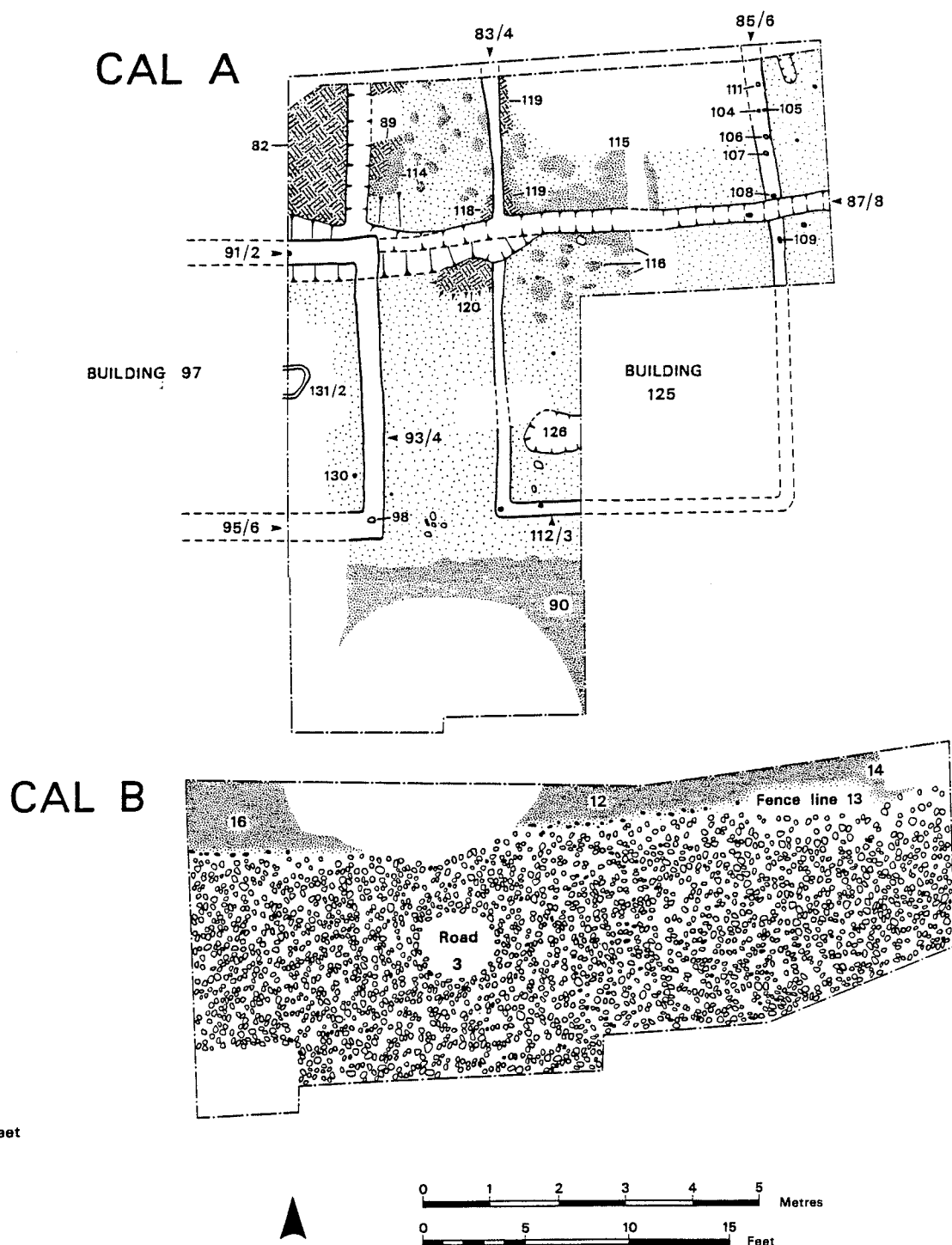


Fig 10 Plan of CAL A Periods 2B to 2E and CAL B Periods 2A and 2B (for plan conventions, see Fig 9)

Periods 3B and 3B-4

Much of Period 3A was covered with deposits interpreted during excavation as turf (75, Period 3B, Fig 11), and many individual sods could be recognized. In places the deposit was up to 0.20m in depth and two turves deep. The sods were relatively large, being 0.4-0.5m in length and 0.10m thick. At the southern end of the site a strati-

graphically isolated deposit of turf (65) is almost certainly the same as 75. Context 75 extended over an area of at least 9m by 5m. Amongst the turves were a number of fragments of wood, some of which were worked pieces.

The problem with the interpretation of the deposits as turf is that the samples taken for botanical analysis yielded relatively few seeds,

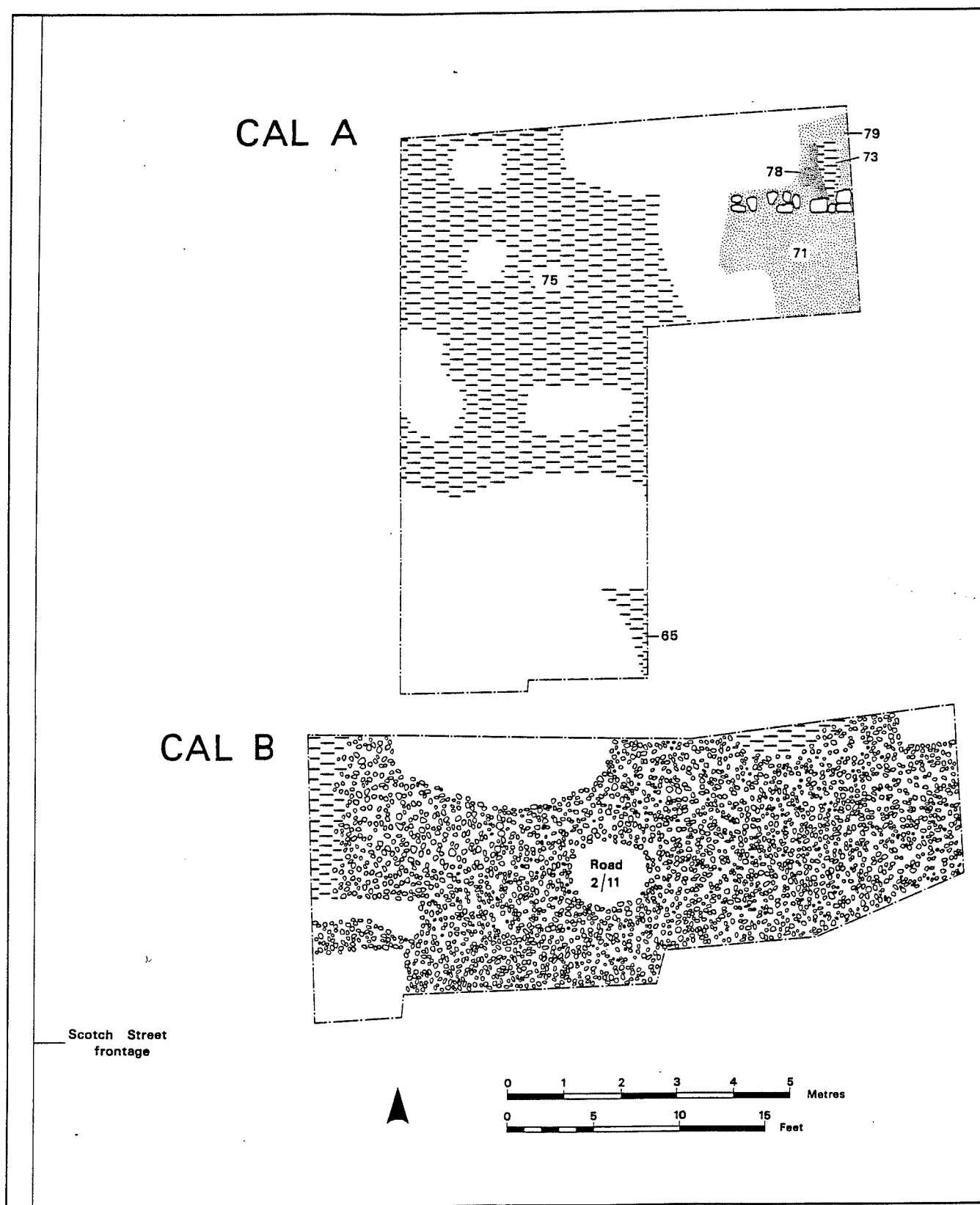


Fig 11 Plan of CAL A Periods 3B and 3B-4, and CAL B Period 3A

and the soil matrix proved to be almost entirely minerogenic (p 111). This does not mean that no sods were present but the lack of a seed bank may suggest that the turf had been stripped off.

In the north-east corner contexts 71, 73 (Period 3B) and 78-9 (Period 3B-4) were stratigraphically isolated by later disturbances from context 75. Turf deposit 73, of which only a very small area

was exposed, appears to be equivalent to 75. These turves seemed to form an east-west linear arrangement and they were constructionally part of a brown soil layer (71). The latter was very similar in appearance to the underlying layer 80 (Period 3A), with which it merged. Botanical analysis of soil 71 yielded a wide variety of taxa from a range of ecological categories, indicating a very mixed origin

for the deposit (p 111). Carbonized barley grains were sufficiently well preserved to suggest rapid covering over of the deposit with no post-depositional working.

Two small oak stakes in 78-9 (not illustrated; Period 3B-4) were the only structural features present.

Period 3C

Overlying much of the turf (75) and soil (71) was a thin laminated organic deposit (57, not illustrated). Where 57 overlay soil 71 it contained much discarded wattle and many roots, and where it overlay turf deposit 75 there were no wattles but a mat of compacted straw or grass laminae was present. Seeds found in deposit 57 are largely indicative of grassland and/or longer-term waste ground, with little evidence of cultivation; the botanical evidence suggests the disposal of hay in this layer (p 111).

Period 4

Period 4 and subsequent phases were truncated by cellar construction, and so their interpretation is problematical. Although some deposits and features survived in plan, some were seen only in section. The western cellar wall, over 10m in length, was removed and the section was cut back and drawn; part is shown in Figure 11. This section demonstrates the intensive nature of Roman activity after the deposition of layer 52, Period 4A. Three features can be identified with confidence, layer 75 (Period 3B), layer 52 (Period 4A) and post-pit 26 (Period 5A), which allows a tentative broad sequence to be established.

Period 4A

Overlying Period 3C was deposit 52 (Fig 12), seen also in section (Fig 14), a brown clay loam containing a great many pebbles. The layer, which was generally 0.3-0.4m deep, extends over the entire site. As it masks distinctions which appeared in Periods 3B and 3C, it is regarded as representing a separate event.

The function of this deposit is unclear. It contained no structural characteristics and may have been a dump of soil imported from elsewhere, perhaps for levelling purposes. The botanical suite includes a wide range of species, wet ground taxa being particularly common. There were relatively large amounts of carbonized cereal remains, suggesting that cereal processing debris was deposited. Other food species were present in small quantities, but there was little evidence for faecal material (p 111).

Period 4B

Deposits immediately post-dating Period 4A were for the most part seen in section only, and it is presumed that these deposits, which were shown to be stratigraphically earlier than the pits of Period 5, were largely destroyed by the cellars. At the south-east corner a short sequence of deposits survived, however. Overlying layer 52 were gravel layers (48, Fig 12) and a hearth. The gravels may be road surfacing related to CAL B, and they were cut by large shallow pit 39 (Period 5, possibly 5A), providing further evidence for an interval of time between Period 4A and the construction of the Period 5 pits.

At the northern end of the western section (not illustrated) was a short sequence of clay, silt and cobble surfaces, which may be contemporary with a sequence of deposits (including CAL A 147, CAL B 31-3, 38, 41, 49) at the southern end of the trench where it joins CAL B.

From the centre to the southern end of the section was a large clay oven (not illustrated), probably containing two flues with multiple phases of lining and use. It was cut by another round-based feature to the north, also with multiple phases of use. The function of the latter is not certain although its shape and fill are not inconsistent with an oven or related use.

It is not certain whether any of these features were inside a building. All features, however, seem consistent with an area given over to industrial activity. The surfaces at the north end could be yards or open areas associated with the ovens.

Periods 5, 5A and 5B

Deposit 52 (Period 4A) was cut by a number of deep features which survived in plan (Fig 12), including post-pits 5, 14, 16, 18, 26 and pits 41, 67 (fill 66) and 77 (fill 76), as well as shallow features 29 and 30. Post-pit 26 was also seen in section, where it clearly cut the Period 4A deposits (Fig 14). Although it is possible that these features are related, their stratigraphic relationships were largely destroyed by later cellars. There is a sequence for some of the features, however.

Pits 5, 14 and 26 were of similar size, had identical fills, and were about the same distance apart, centre to centre, although they did not form a straight line. They are tentatively ascribed to Period 5A.

Two other features may also be part of this phase: shallow depression 29, and large shallow pit 39 which lines up with shallow pit 30 (stratigraphically earlier than pit 16).

Pits 16 and 18 had identical fills and contained large posts of similar dimensions. Pit 18 is stratigraphically later than Period 5A and the same is probably true of pit 16 through its relationship with pit 30. Pits 16 and 18 are attributed to Period 5B. Pits 67 and 77 are stratigraphically unrelated to the other features.

At the northern end of the western section (not shown in Fig 14) was a sequence of surfaces, basically silty clays interleaved with silts. There was also an *opus signinum* floor. Although the surfaces were constructionally later than post-pit 26, they were essentially contemporary and were in use at the same time as the building represented by 26. A slot which cut the southern side of 26 and appeared to cut the *opus signinum* and earlier floors could be a foundation plate or sill beam for a wall line associated with 26 or post-pits 16 and 18 (Period 5B).

Overlying the Period 4B ovens, and at the same physical depth as the *opus signinum* floor, was a deposit of grey silt about 0.1m deep extending most of the way along the section. This may have been contemporary with the building represented by 26.

At both the northern and southern ends of the section were many surfaces of clay and pebbles and deposits of silt overlying the features associated with pit 26. No slots or other features positively indicating a wall were present and many of the deposits at the southern end could be external, perhaps associated with the roads in CAL B.

Many of the features attributed to Period 5 are almost identical to others recorded in LEL A Period 10 (Figs 64-5). The post-pits also compare with features recorded in the northern section of CAL B, Period Post-3B (Fig 16). At LEL A it was noted that a number of variations appeared in the methods employed in the construction of the south and east walls, although the walls are contemporary. It is possible that the CAL A, and possibly CAL B, post-pits belong with the LEL A building, in which case the variations in construction, and the stratigraphic sequence observed in CAL A, relate to the construction of the building instead of representing a completely new phase of activity.

The sections in CAL A demonstrate the former existence of good quality floors, including one of *opus signinum*, a relatively uncommon flooring material in Roman Carlisle. These floors contrast with the scarcity of recognizable floors associated with the LEL A building (see p 83).

Post-Roman

There is a single feature which is certainly post-Roman, a timber-lined pit. Pit 64 (Fig 13), which cut the Period 5 pit 67, was a large irregularly-shaped pit measuring at least 3.5m by 1.7m. The timber lining comprised oak beams which abutted. No functioning joints were seen and there were no vertical members. Several of the timbers have mortises which were not functional, and are probably re-used sill beams. The lining was more or less trapezoidal in shape, measuring 1.7m by 0.75-1m internally. The pit was relatively shallow and

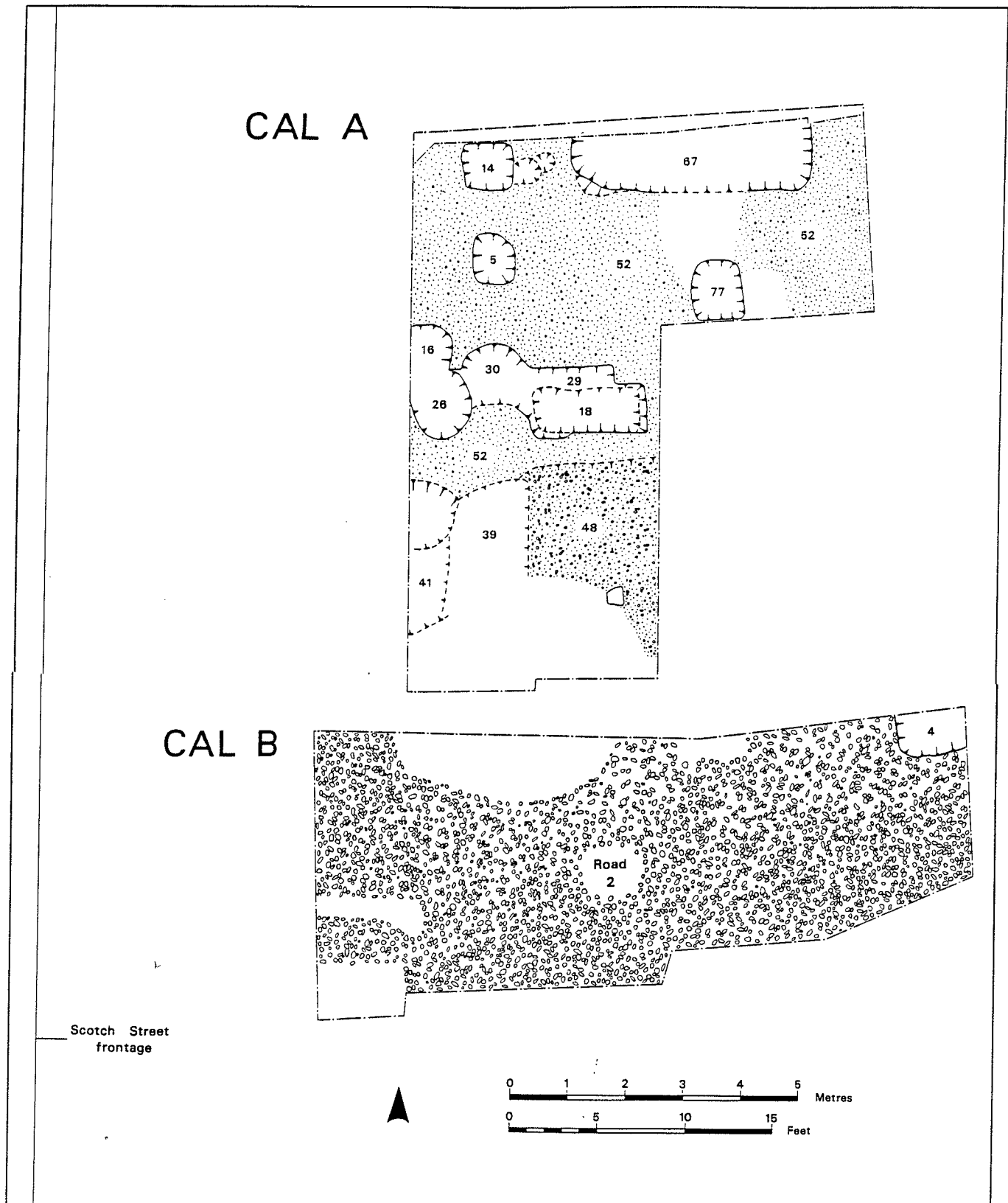


Fig 12 Plan of CAL A Periods 4A, 4B and 5, and CAL B Period Post-3B

only one course of lining beams survived; it was truncated by a cellar.

One of the timbers was dated by dendrochronology; its felling date range is estimated as AD 771-816 (p 79 and Table 3 below); it does show signs of re-use, and so this is not necessarily the date of the pit, although a ninth-century strap-end mould (Fasc 2, No F15)

was recovered from the pit fill.

The fill (60) includes quantities of fruit seeds, particularly *Prunus* stones, as well as burnt fucoid seaweed fragments. Faecal material was present, including a large number of *Trichuris* eggs, but the pit was also in receipt of non-faecal food debris, including

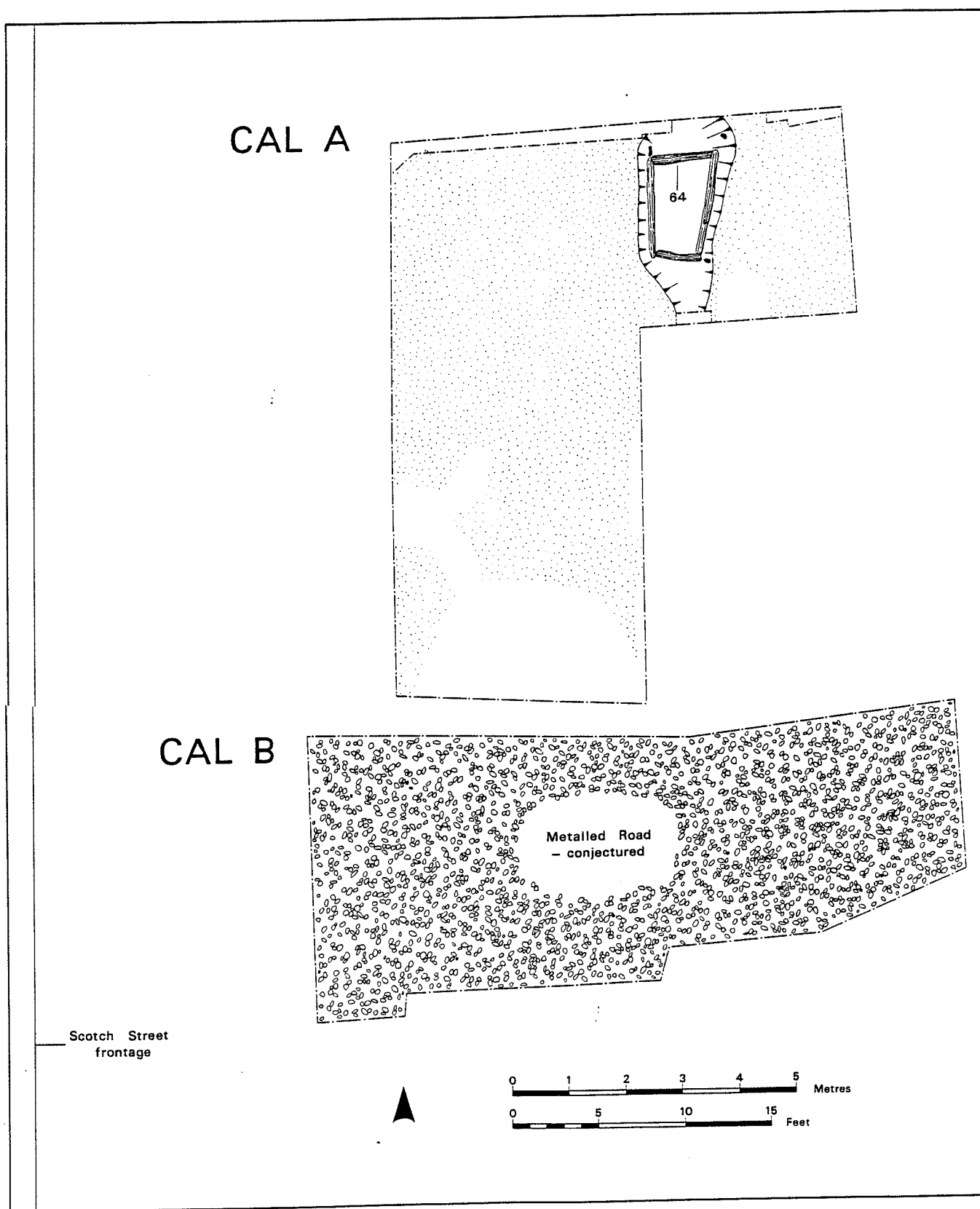


Fig 13 Plan of CAL A Post-Roman and CAL B Period Post-3B

quantities of eel bones (pp 112 and 164 below).

Medieval, post-medieval and modern

The upper portion of the western section comprised thicker deposits

of soil and pits, about which little can be said except that they are likely to be post-Roman, medieval or later in date.

The cellar walls are regarded as post-medieval as they could be as early as the later seventeenth century. All remaining features, including those on the base of the cellars, are potentially later post-medieval to modern.

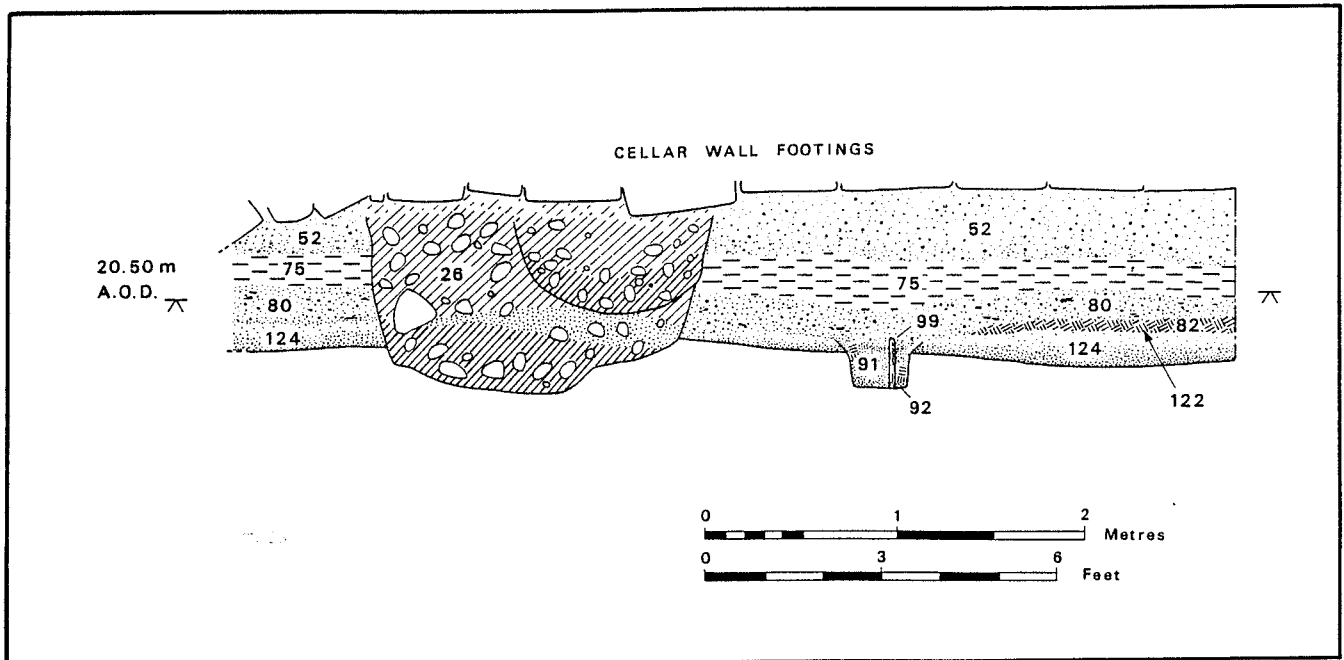


Fig 14 CAL A, part of the western section

Crown and Anchor Lane Trench B (CAL B)

This was a roughly rectangular trench, 11.5m in length by 3.1m wide at the eastern end and 5.1m at the western end (Figs 3-4). The western side was located approximately 5.5m east of the frontage of 75 Scotch Street, and the southern side almost abutted the northern frontage of Crown and Anchor Lane. Trench B was about 1m south of CAL A, and immediately beyond the eastern end was CAL E, with a large disturbance, originally a well (5), at the junction of the two.

CAL B was formerly a cellar. A short sequence of deposits beneath the cellar floor was excavated, and a long complex sequence behind the walls was recorded in section.

Period 0

The natural subsoil was only recorded in section.

Period 1

Period 1 comprises the buried ground surface (6, Figs 15-6) and associated features. These are divided into three sub-phases.

Period 1A

Contexts 57-9 (not illustrated) represent three features sealed below the old ground surface (6). Context 57 was an irregular depression which was probably a tree-hole. Root holes were identified and there was some staining of the natural. Context 58 was a possible gully on the edge of the excavation, measuring at least 4m in length by at least 1.4m wide and containing a dark grey clay loam. The feature may be man-made rather than natural in origin. Context 59 was a depression on the northern edge of the excavation.

Period 1B

The old ground surface (6) was recognized beneath the cellar and in all sections. It averaged 0.10m thick but the eastern section (Fig 15) shows that it was uneven in depth, and that there are differences within it. A monolith was taken for analysis and delivered to Dr

Keeley at Fortress House, where it was forgotten and allowed to dry out, and no recoverable information survived. This is especially unfortunate given the presence of pre-Roman features in nearby Trench A at Old Grapes Lane.

Period 1C

Animal burrows (56, not illustrated), 0.1m across, cut the top of the old ground surface.

Period 2

Period 2A

Four lengths of slot (not illustrated) were identified on the northern edge of the site. Slots 53-4 formed a right angle and slots 15 and 55 represent the eastern continuation of 54. The slots were 0.3-0.4m wide but of uncertain depth. Slot 53 contained a post, 0.10m by 0.6m wide, *in situ*, and slot 55 contained a stake 0.4m by 0.3m wide.

A road surface (3, Figs 10 and 15) overlay the old ground surface (6) and probably belongs with the earliest phase of buildings. At one point the large cobbles which formed the road surface abutted slot 54, but the road survived more extensively on the southern side of the trench.

Period 2B

The Period 2A slots were sealed by surfaces 12, 14 and 16 (Figs 10 and 15), composed largely of pebbles with grey silts and patches of clay. The surfaces were bounded to the south by a line of square and round stakes (13) set at 0.13-0.18m intervals. The stakes were 0.04-0.05m across. The function of the stake-line is uncertain, but the spacing suggests that it may have been a fence rather than a load-bearing wall. The relationship of the stakes with the earliest road is ambiguous.

Period 2-3B

A possible road gully (10, not illustrated), containing silt and pebbles, was identified in the north-eastern part of the trench. There was also a stake on the north side of the gully, but no other stakes or evidence for a gully lining was found.

Period 3

Features of Period 3B and later were observed in section only as the cellar and a well had cut away all other features.

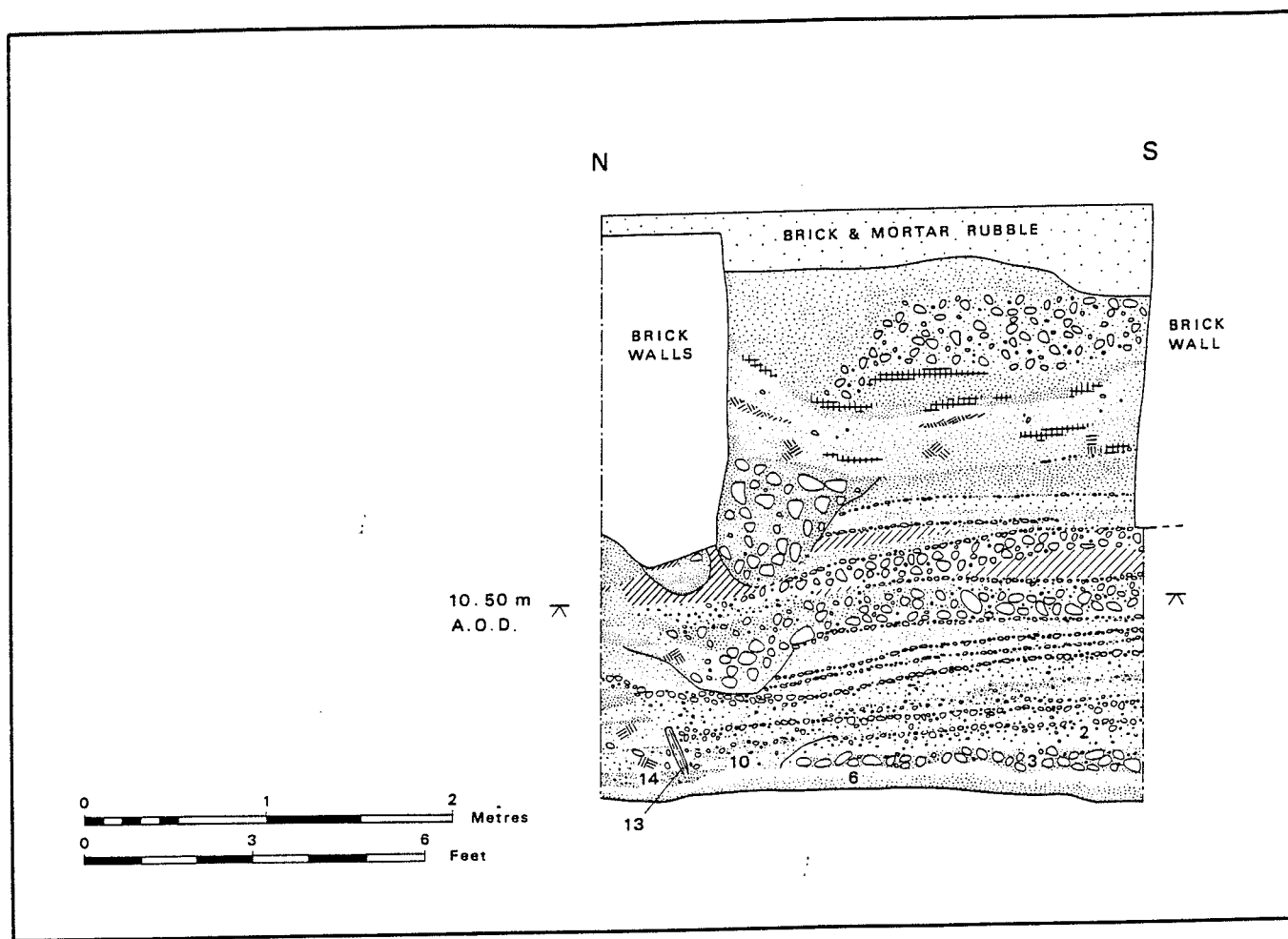


Fig 15 CAL B, the eastern section

Period 3A

The earliest road (3) was re-surfaced with a second layer of metallings (2, 11, Fig 11), and surface 16 (Period 2B) was sealed by layer 52 (not illustrated), a brown clay loam with pebbles and occasional wood fragments, 0.2-0.25m thick. This deposit is the same as layer 80 in CAL A (Period 3A).

Period 3B

Layer 52 was overlaid in the northern sections by a turf layer 0.05-0.1m thick (not illustrated), equivalent to layer 65/75 in CAL A (Period 3B). Road metallings 2 and 11 may have continued in use, but if not they were replaced by other road surfaces. The hiatus which is represented to the north of the road and in CAL A (Periods 3A-C) is not matched by a similar deposit in the road sequence.

Period Post-3B

The road continued in use for a considerable period of time. Metallings of pebbles, interleaved with lenses of silts and some clay, formed a continuous sequence to about 1m below the modern ground surface (Figs 12-13). The later deposits included deeper deposits of black silts but with sufficient cobbles to suggest that the road continued to function into the period at which it became Crown and Anchor Lane. The lane was finally obliterated by the new Lanes development in 1982.

The northern section (Fig 16) revealed a long sequence of deposits clearly associated with buildings, including several possible walls. At least three and possibly other clay and cobble foundations were clearly present. The earliest wall, which cut a succession of pebble, silt, charcoal and gravel lenses and surfaces, was at least 0.8m wide by 0.4m deep.

This wall was overlaid by silts and gravels, which were them-

selves cut by a post-pit (4, Figs 12 and 16), 0.85-1.3m wide by at least 0.85m deep. The pit contained a post approximately 0.22m across. The post-packing incorporated grey soils on the base, large cobbles 0.1-0.15m across, fragments of sandstone with pebbles and bands of clay. Post-pit 4 may be contemporary with another clay and cobble foundation recorded approximately 3m further west. It also resembles the post-pits recorded in CAL A Period 5 and LEL A Period 10.

The later deposits, where they were not completely destroyed by cellar construction, showed a range of pit- and slot-like features, and further possible clay and cobble walls or floors.

The north-western sections (not illustrated) revealed a long sequence of pebble surfaces interspersed with silts, some clay surfaces and other features.

Crown and Anchor Lane Trenches A and B

The old ground surface as recorded appears to be more complex in CAL B than in CAL A. The complexities revealed in CAL B may be significant in the context of pre-Roman activities noted in Old Grapes Lane Trench A.

The Roman sequence in both trenches can be broadly correlated. It consists of a long series of buildings, interrupted at an early stage by a hiatus represented by soil and turf accumulations, fronting on to a metallated road which probably continued in use throughout the Roman period.

In CAL A Period 2 had five sub-phases, probably not all of equal importance. These cannot be precisely correlated with Periods 2A-B in CAL B, but this is not in itself signifi-

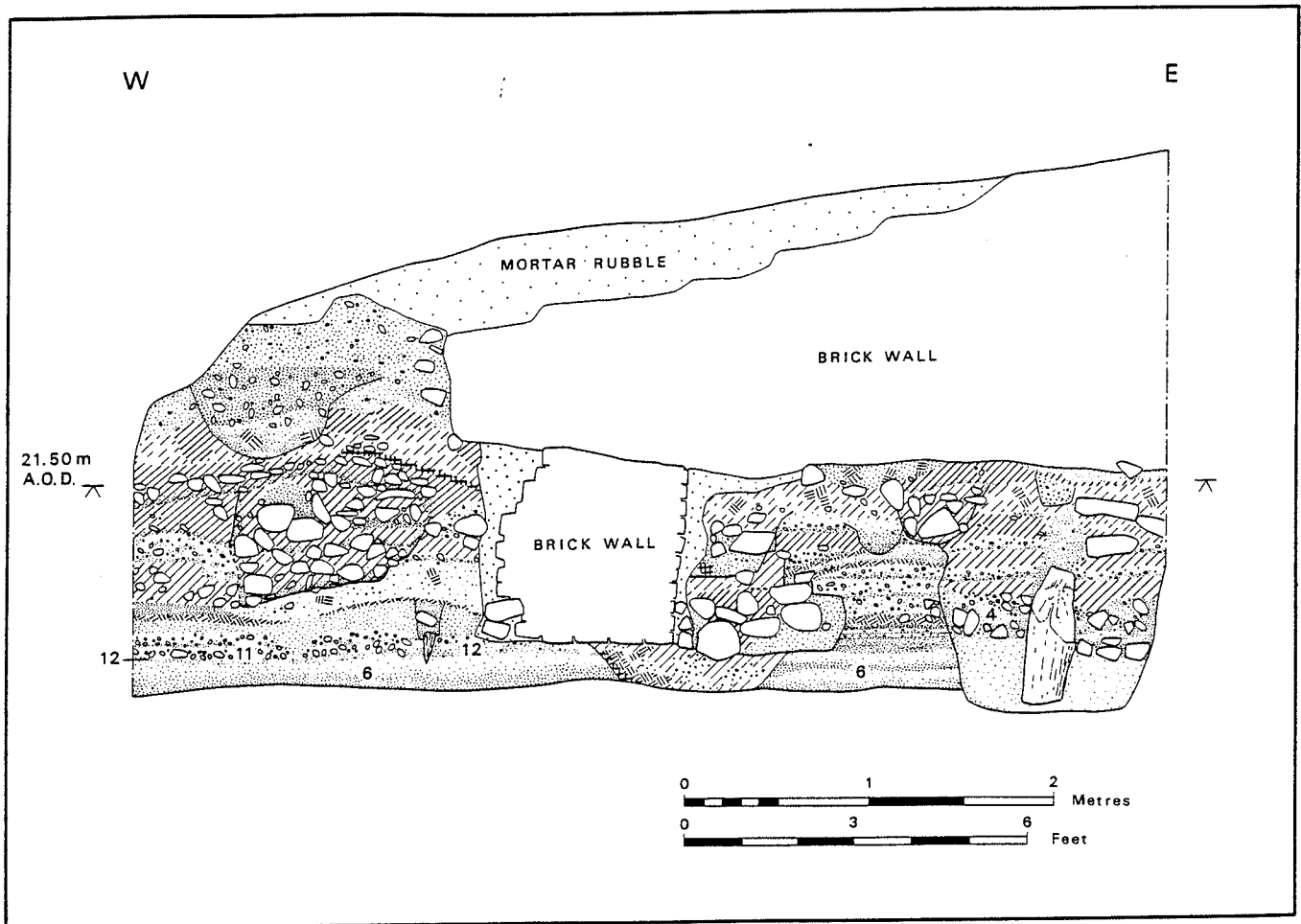


Fig 16 CAL B, the eastern end of the northern section

cant; the essential point is that before Period 3 there were at least three reorganizations of space (CAL A, Periods 2C-2E) close to a major east-west metalled road. It seems that a fence may have separated the road from the CAL A property behind. Changes of land-use are not implied but the rapidly altering disposition of buildings is of interest. The road was probably contemporary with the earliest buildings.

These buildings, but not the road, were succeeded by a hiatus (CAL A Periods 3A-3C; CAL B Periods 3A-3B). The extensive turf deposit clearly has structural implications and may be a bedding or levelling deposit.

The sections in both CAL A and B seem to show a similar sequence overlying the Period 3 hiatus. Activities include both the ovens and surfaces in CAL A and surfaces in CAL B. These are succeeded by at least two phases of buildings (CAL A Period 5, CAL B Period Post-3B), the earliest represented by clay and cobble foundations and the second by large posts in post-pits. One of these buildings had an *opus signinum* floor. These features are tentatively equated with LEL A Period 10.

The sequence is completed by a succession of surfaces, silts and soil deposits cut by later pits.

Crown and Anchor Lane Trench C

The section behind the western cellar wall at 77, Lowther

Street was recorded (Figs 3-4); it was 8.5m west of the Lowther Street frontage. The section (not illustrated) revealed a buried ground surface about 0.2m thick, the bottom of which lay 2.4m below the modern ground surface.

Overlying this was a succession of road metallings, the top of the uppermost being at 1.5m below the present ground surface. The roads were formed of cobbles or pebbles, often mixed with grey silts and sometimes compacted; no road edges were present. The roads are believed to be the same as those recorded in CAL B, E and F and OGL B and J. The road was also been recorded in Lowther Street during a watching brief in 1991 (p 101).

Crown and Anchor Lane Trench E

An area 8m by 6.5m east of CAL B was selected for excavation (Figs 3-4). It included an area of Crown and Anchor Lane together with the unnumbered property (effectively part of 75 Scotch Street in 1981-2) on the north side of the lane. The aims of the excavation were to provide some data on the medieval lane frontage and to extend the road sequence identified in CAL B into modern times. As the roads revealed in CAL B were only observed in section, it was hoped that the excavation of surfaces in CAL E might provide some dating material.

The presence of modern disturbances reduced the area to a small trench roughly 5.1m north-south by 4.2m east-west,

immediately adjacent to CAL B. The trench was excavated by hand to a depth of 1m. No features are illustrated here.

The road sequence found in CAL B was identified here as a succession of surfaces beginning with 24 (also tentatively identified in CAL B but seen in section only), through 23, 21, 18, 3, 8 and 2. A stone kerb (19) was present at a low level; this may have defined the north side of the road.

A number of pits, of which two sequences were recognized, cut the road surfaces (4-6, 11-12, 9, and 7, 13-14, 10).

Although the metallings identified in CAL E and B could be yard surfaces, they are assumed to be roads because they form a continuous sequence with the underlying Roman roads. If this assumption is correct, the excavations show that the alignment of Crown and Anchor Lane present at demolition in 1982, and which had existed since the late seventeenth century, was not the same as that of the Roman road. This is also clear from the alignment of the road present in CAL B and C.

It is also clear that the pits were dug through lane surfaces, suggesting that either the lane had fallen from use, or, more

likely, that it had moved south towards its modern position.

Crown and Anchor Lane Trench F

This was a roughly trapezoidal trench, 3.5m north-south by approximately 2.3m east-west, 5m east of CAL E (Figs 3-4). It was located astride the lane and northern property, and was excavated at the same time as CAL E. Its objective was to determine whether the modern property line along the northern side of Crown and Anchor Lane had medieval antecedents.

The excavation was terminated before a satisfactory result was obtained, and the site records are incomplete. The main finding was that metalled surfaces extended across the whole of the excavation (not illustrated here); the metallings were composed of cobbles and large fragments of red sandstone, and resembled lane or yard surfaces. No convincing evidence of a building line was identified, and no firm conclusions can be reached.

CHAPTER 3 OLD GRAPES LANE (OGL) TRENCHES A AND B

There were formerly two lanes, Grapes Lane and Old Grapes Lane (Fig 2), separated by a single range of buildings. In 1963 most of the buildings between the two lanes were demolished, leaving a long narrow vacant plot which was turned into a car park.

In 1975 Peter Clack, then of the Department of Archaeology, University of Durham, excavated two trenches in the space between the two lanes, and in so doing he established some details of the archaeological sequence.

In 1981 Carlisle Archaeological Unit excavated a trench 38m long and up to 6m wide (Old Grapes Lane Trench A; Figs 3-4). Machinery was employed in the first instance to remove the modern hardcore and to locate major disturbances. Clack's Trench 1 was found to lie within, and at the eastern end of, this trench. Apart from a timber-lined well (Clack 1 69/OGL A 1237) Clack's trench was not re-excavated, and the western end of Clack Trench 1 formed the eastern end of OGL A.

Within the area of OGL A time constraints determined that excavation had to be divided into two parts, an inherently unsatisfactory approach. First, the excavation proceeded by hand down to the undisturbed natural subsoil in the centre. The period numbers in this 'main area' run from 1 to 13. Second, the sequence at the western end (Old Grapes Lane Trench A West), investigated separately, has period numbers running from 1 to 8.

In 1982 a second trench was excavated to the north of OGL A. Old Grapes Lane Trench B (OGL B) measured 14.5m north-south by 8m east-west, and was positioned so that its southern side abutted OGL A and its northern edge just encroached on Crown and Anchor Lane (Figs 3-4). One of the specific aims of this excavation was to attempt to provide a link between features excavated in OGL A during 1981 and the Roman road discovered in Crown and Anchor Lane Trench B (CAL B) early in 1982.

The excavation of two almost contiguous trenches by different people at different times inevitably leads to variations in the stratigraphic record. In general the correspondence between the two trenches is very close, but the reader should be aware that discrepancies may be apparent. An attempt at reconciling the two sets of data suggests that the interface between the two trenches did coincide with real changes in deposit type, such as in the case of OGL A Period 9 and OGL B Period 6.

Two other trenches were located to the east of OGL A and B. Old Grapes Lane Trench C (OGL C), measuring 39m east-west by 4m north-south, entailed the removal of cellar walls and floors below numbers 2-5 Grapes Lane (Figs 3-4). Amongst the remains revealed in section, and in the underlying natural subsoil, were traces of a rampart. The recognition of this potentially important feature resulted in the excavation of another trench, Old Grapes Lane Trench J (OGL J), measuring 21m north-south by 4m east-west (Figs 3-4). Constraints of time and manpower required that the trench had to be excavated mechanically. The primary objective here was to

shed more light on the putative rampart, whilst a secondary aim was to locate the Roman road identified earlier in Crown and Anchor Lane Trench B (CAL B). These aims were realized.

The excavations are described in the following order: OGL A, OGL A West, Clack's Trenches 1 and 2, and OGL B. Although the correlation of results between these investigations has proved problematic at times, they nevertheless form a coherent group of contiguous and overlapping investigations. OGL C and J are dealt with in Chapter 4.

Old Grapes Lane Trench A (OGL A)

Period 0 (= OGL B Period 0)

This was natural subsoil (not illustrated).

Period 1

Period 1A (= OGL B Period 1A)

A depression (1191, not illustrated), approximately 3m long by 2.5m broad and 0.2m deep, was noted in the natural subsoil. The sides were gently sloping and the base was irregular. It was filled with dark brown silty clay with some yellow mottles; it contained some pebbles and cobbles. This depression was thought to have been a tree hollow.

Period 1B (= OGL B Period 1A)

A number of stakeholes (1162-6, 1168-72, 1179-81, not illustrated) cut the natural subsoil but were sealed by the old ground surface (Period 1C). The stakes were 0.03-0.07m in diameter and varied in depth between 0.01 and 0.08m. All the stakeholes were circular and were filled with brown sandy silts. A large number of other stakes (eg 983-9, 1069-73, not illustrated) may be associated but they were sealed only by layer 965 (Period 6).

Period 1C (= OGL B Period 1B)

An old ground surface (1050, 1150, 1154, 1159, 1173, 1223, Fig 17) survived in many places. It consisted of a dark brown silty loam containing black flecks with traces of mottles. It also contained some pebbles, charcoal, wood and fine organic fragments. There was no evidence, either archaeologically or from the botanical remains, for cultivation marks. What evidence there was suggests the presence of a rather wet grassland (p 114).

Period 2 (= OGL B Period 1C)

The earliest feature cutting the old ground surface consisted of four lengths of a slot forming an arc. When drawn out the arc would have had a diameter of about 8m and is identified as pertaining to a round-house (Fig 18).

The slot had sloping sides and a base varying from flat to rounded. It was approximately 0.23m wide and up to 0.1m deep. It contained many large cobbles between 0.1m and 0.15m across, and a number of stakes (eg 1084-6), some of which were of oak and alder roundwood. They were generally 0.02-0.05m in diameter, and varied in cross-section from circular to rectangular and wedge-shaped. In so far as intervals between the stakes could be determined, they were 0.15-0.35m apart.

The arc was interrupted in a number of places by later disturbances but on the western side it terminated at a point where there

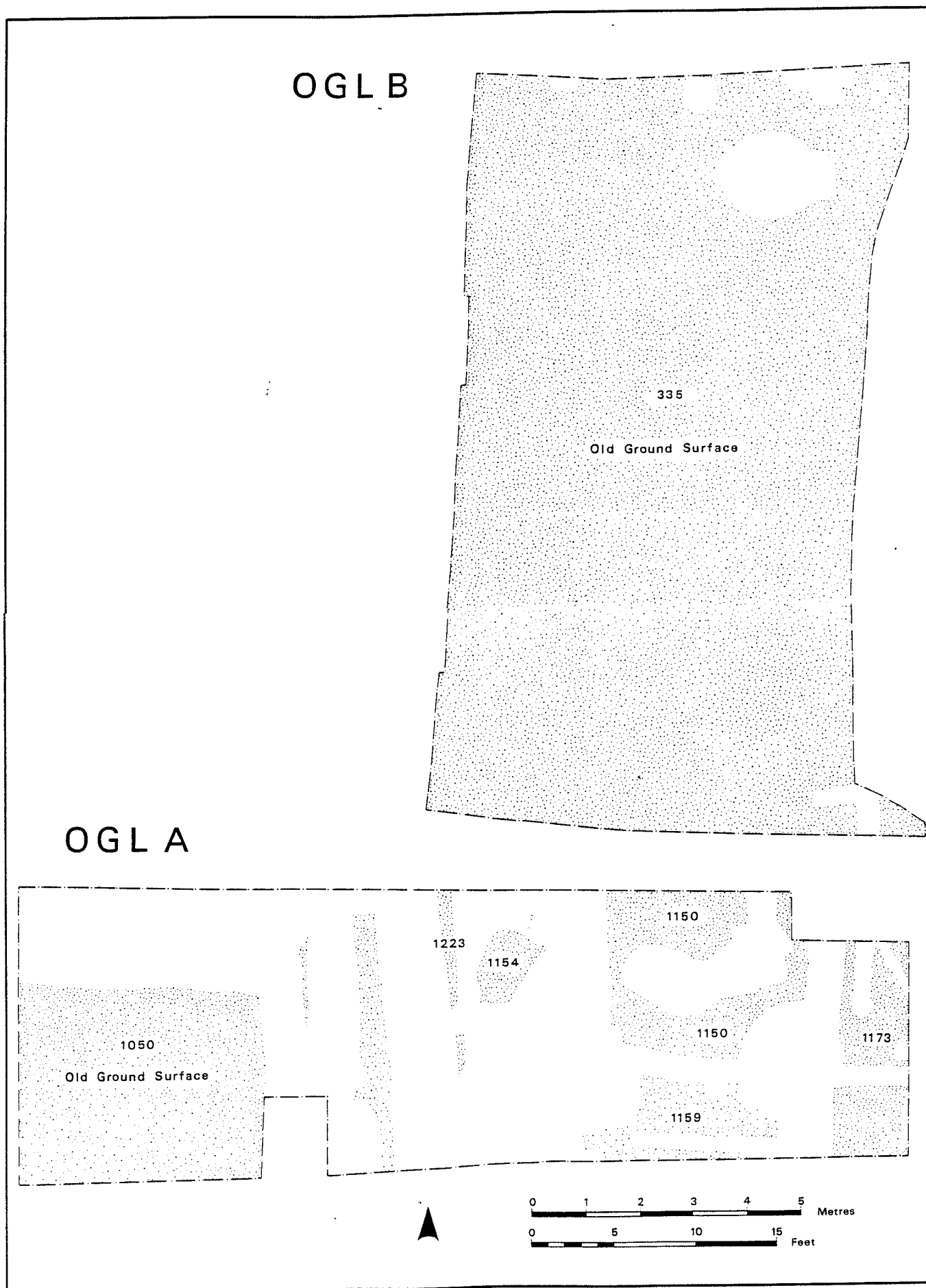


Fig 17 Plan of OGL A Period 1C and OGL B Period 1B (for plan conventions, see Fig 9)

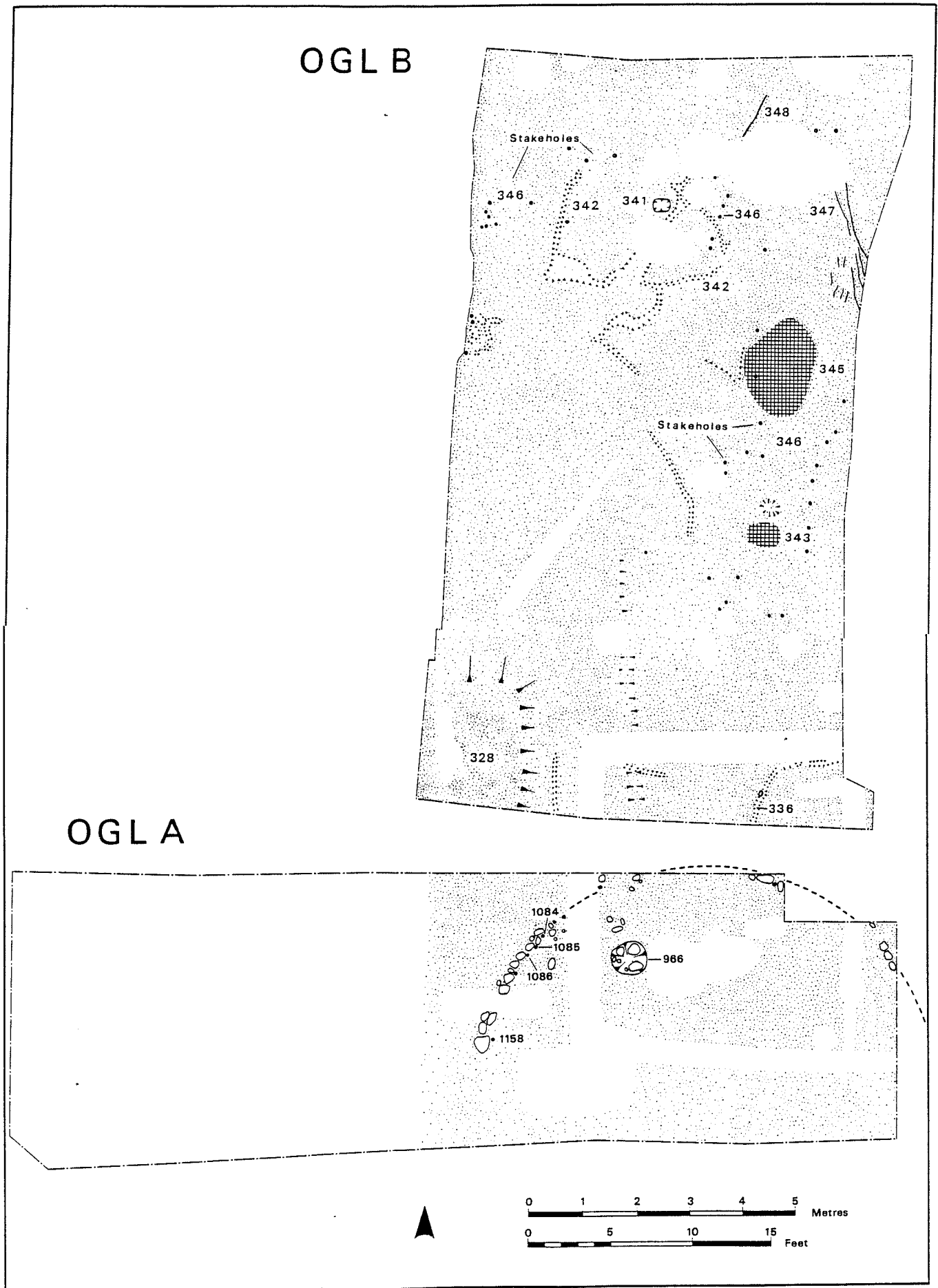


Fig 18 Plan of OGL A Period 2 and OGL B Period 1C

was no evidence of a later intrusion. The termination was marked by a large stone up to 0.3m across; none of the other stones in the slot approached this stone in size. Stake 1158, which had a rectangular section 0.04m by 0.02m, was next to the stone on the inner face of the arc. If the arc is correctly interpreted as a round-house, it is possible that the termination on the west marks an entrance.

One internal posthole (966, Fig 18) was recognized. It was 0.4m in diameter and 0.45m deep and had a flat base. The fill consisted of a number of cobbles and sandstone fragments which spilled out on to the surface around the posthole.

No features which could be positively linked with the structure of the round-house were identified elsewhere in OGL A or in OGL B, although a few features there such as root systems and animal burrows may be contemporary.

Period 3 (= OGL B Period 2A)

Two pits (1141, 1142, Fig 19) were identified at the eastern end of the trench. The pits cut the old ground surface and were themselves cut or overlaid by features of Periods 4 and 5. It is thought that this period can be equated with OGL B Period 2A.

Pit 1141 was sub-rectangular in shape, 2.3m in diameter and 0.4m deep. The sides sloped at about 45° and the base was flat. It contained homogeneous fills of mixed brown and white clay loam and sandy clay flecks, including much charcoal but very few seeds (p 115). Pit 1142 was roughly circular in shape, measuring 1.9m by approximately 1.7m and 0.5m deep. The fill (1146) was a dark brown silty loam which yielded no evidence for its function. Patchy deposits of mixed soil and clay (982, 991-3) were located near the pits.

At the western end of the site a number of features cut the old ground surface. There were traces of a gully, 1100 (fill 1101), which seemed to be aligned east-west. It was at least 0.41m wide and 0.21m deep, and was filled with a silty clay loam incorporating flecks of clay and organic material. Two flat stones up to 0.24m long were also found in the fill. In addition there was a pit (1118), and three postholes (1120, 1129, 1137), which varied from 0.25 to 0.5m diameter. Posthole 1129 was 0.5m deep. Pit 1118 (fills 1116, 1117 and 1126), 1m in diameter and 1.5m in depth with vertical sides, was a cess pit containing a substantial oak post and the remains of food including blackberries, grapes, figs, olives, apples or pears, sloes and cherries (p 115).

In the centre of the site, gully 1230 can be assigned to this period. The gully was V-shaped and was 0.35-0.6m across; it was filled with a silty loam.

At the eastern end of the trench were deposits 876 and 961 (Period 3-6), which probably continued in use into Period 4 and possibly later.

Period 4 (= OGL B Period 2B)

At the eastern end of the site, gully or slot 1140 (Fig 20) cut pit 1141 (Period 3). The gully was 0.84m wide and between 0.48-0.55m deep, and was filled with a sandy clay. Some 6.5m to the west a new feature (1222) was cut. It was identified as a gully although it could equally be described as a shallow ditch. It was between 1.2 and 1.45m broad, V-shaped and up to 0.75m deep. It was filled with clay and silty loams and occasional cobbles (1220, 1221), and contained a few seeds of wet ground taxa as well as large numbers of wireworm larvae, perhaps introduced with peat (pp 115 and 133). On the western side of feature 1222 there was an accumulation of black soil and upcast (1227), presumably derived from the ditch digging.

A hearth or bowl furnace (1174) may belong with this period. It comprised a roughly circular depression approximately 1.1m in diameter and 0.55-0.65m deep, lined with burnt clay. It was filled with lenses of ash, charcoal and silt. On the northern side there appeared to be a wide channel or flue (1149) of similar depth, filled with silt, charcoal, wood and twig fragments. These included round-wood of local species as well as offcuts of oak and silver fir (p 115). The seeds from 1149 and hearth 1174 probably indicate the presence of both bedding and food debris, the latter being represented by a small number of carbonized wheat and barley grains and a large number of lentils (p 115). The possibility that some of the material may have originated indoors is supported by the insect remains,

which included distinctive house fauna taxa and some which suggest stable manure as well as a possible human flea (p 133).

The Period 3 gully, pit and postholes at the western end of the site (1100, 1118, 1120, 1129, 1137) and patchy deposits (982, 991) in the centre may have continued in use, together with deposits 876 and 961 at the eastern end.

Periods 5 and 5-6 (= OGL B Period 3)

Two phases (not separately labelled) of soil accumulation blanketing earlier periods can be identified across the entire trench in Period 5. In the earlier phase, a shallow and irregular slot (1217) terminated in a steep-sided circular posthole 0.3m deep (1216). On the northern edge of the trench pit 1226 may belong with this phase, but insufficient was exposed to enable its characteristics to be determined. Also belonging to this phase are soil spreads (1052, 1123, Fig 21; 1006, not illustrated), which were generally of a fine silty loam with some stones and wood fragments and large numbers of earthworm egg cases (1006, p 115-6). At the western end spread 1006 appeared to be a homogeneous deposit, but at the eastern end context 1145, for example, resembled a gravelled surface in use at the time the soil was present (Fig 21).

The later phase was recognized at the western end of the trench, where lenses of clay loams (1026, 1044, not illustrated) overlaid soil 1006. The insect remains from 1026 and 1044 suggest that these represent a surface in grazing land with puddles or very close to open water. The degree of organic preservation in a presumed open ground deposit may imply waterlogging or sudden sealing (pp 133-4).

Period 5 is represented by deposits which were up to 0.2m thick. Although the amount and condition of the pottery and animal bone are inadequate as a basis for assessing the nature of this deposit, the presence of two sub-phases, together with the variety of faunal and floral taxa, supports the suggestion that this was not a naturally accumulating build-up. This deposit seems to have accumulated gradually as a result of different activities taking place in the vicinity giving rise to the deposition of soils and other refuse. Presumably the earthworm egg cases were imported with the soils.

Included in the later sub-phase are other spreads (770, 1046, not illustrated; 1103, Fig 21; Period 5-6) which may extend into the early part of Period 6.

Period 6 (= OGL B Period 4)

The site was divided into a number of 'stratigraphic islands' by drains or gulleys and the foundation trench of the timber building. A great many minor episodes can be identified in each 'island' but it is not always possible to be certain about how they should be correlated.

The western end and the property boundaries

At the western end of the trench (not to be confused with OGL A West), a ditch-like feature (1029, Fig 22), aligned roughly east-west, was cut. Its dimensions are uncertain as only its southern side lay within the excavation; its minimum measurements were recorded as at least 1.2m deep and 1.2m wide. The eastern end must have terminated within the area of excavation, although the exact point is obscure because it was cut by drains. It is possible that the eastern end formed not so much a terminal as the south-east corner of an enclosure. The fills of the ditch (785, 787) comprised many lenses of mixed clays, silts, pebbles, sandy layers and organic deposits comprising straw and other cereal debris and hay. Insect remains were present in relatively large quantities, including mites, parasites, larvae, spiders and flies, many of which would have been at home in a damp, but not wet, ditch (pp 136-7).

The surfaces to the south of the ditch included a pale red and white plastic clay containing some pebbles and sand (788). This was up to 0.08m in depth and resembled upcast from the ditch digging mixed with other materials. The upcast was overlaid by a deposit of very mixed clay loam which appeared to form a broad shallow slot or base (1005, Fig 22), no more than 0.05m deep but up to 1.2m wide. Its purpose was quite uncertain but the botanical remains from the fills (1002 and 1004) suggest the presence of spent animal bedding

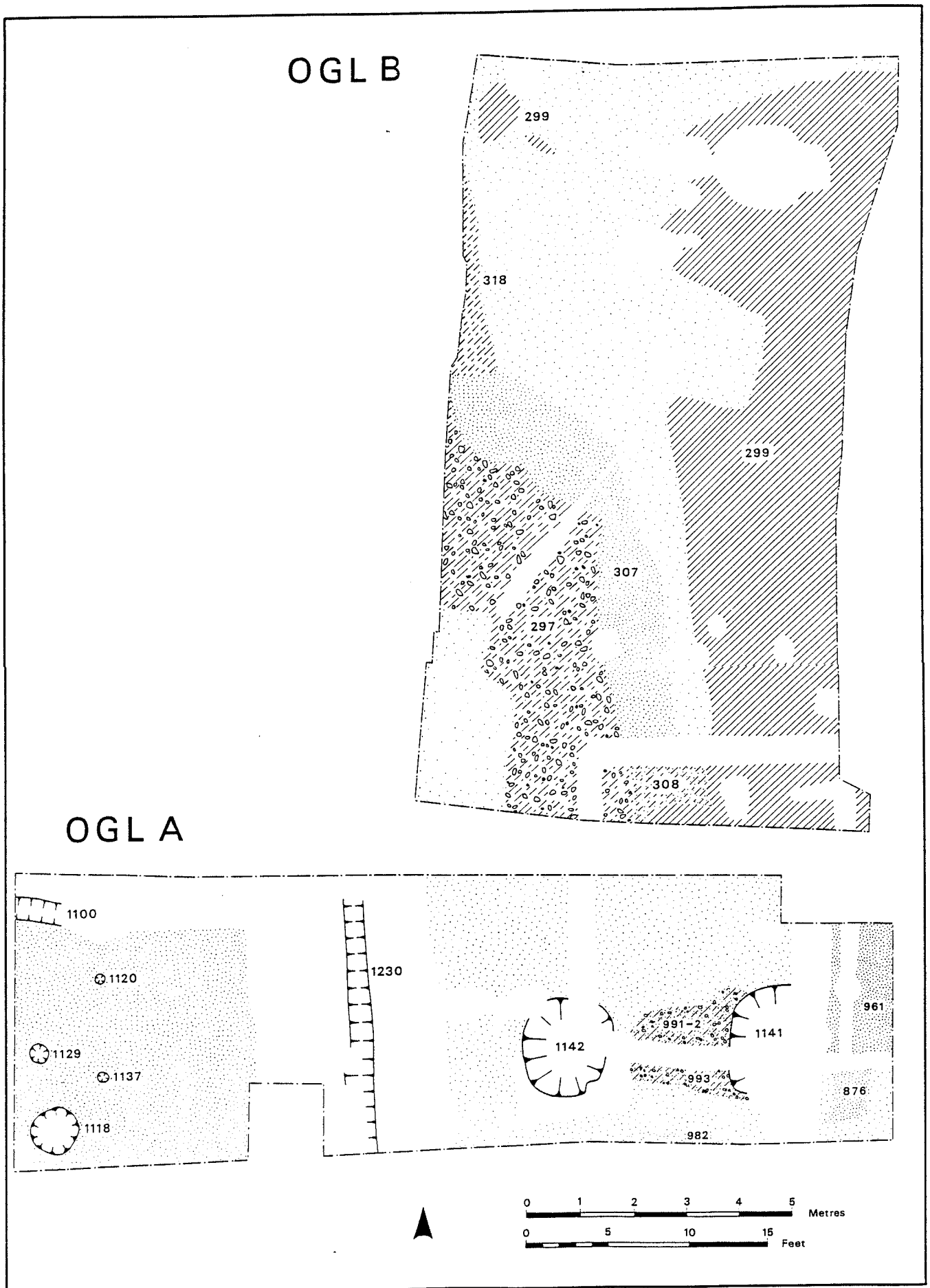


Fig 19 Plan of OGL A Period 3 and OGL B Period 2A

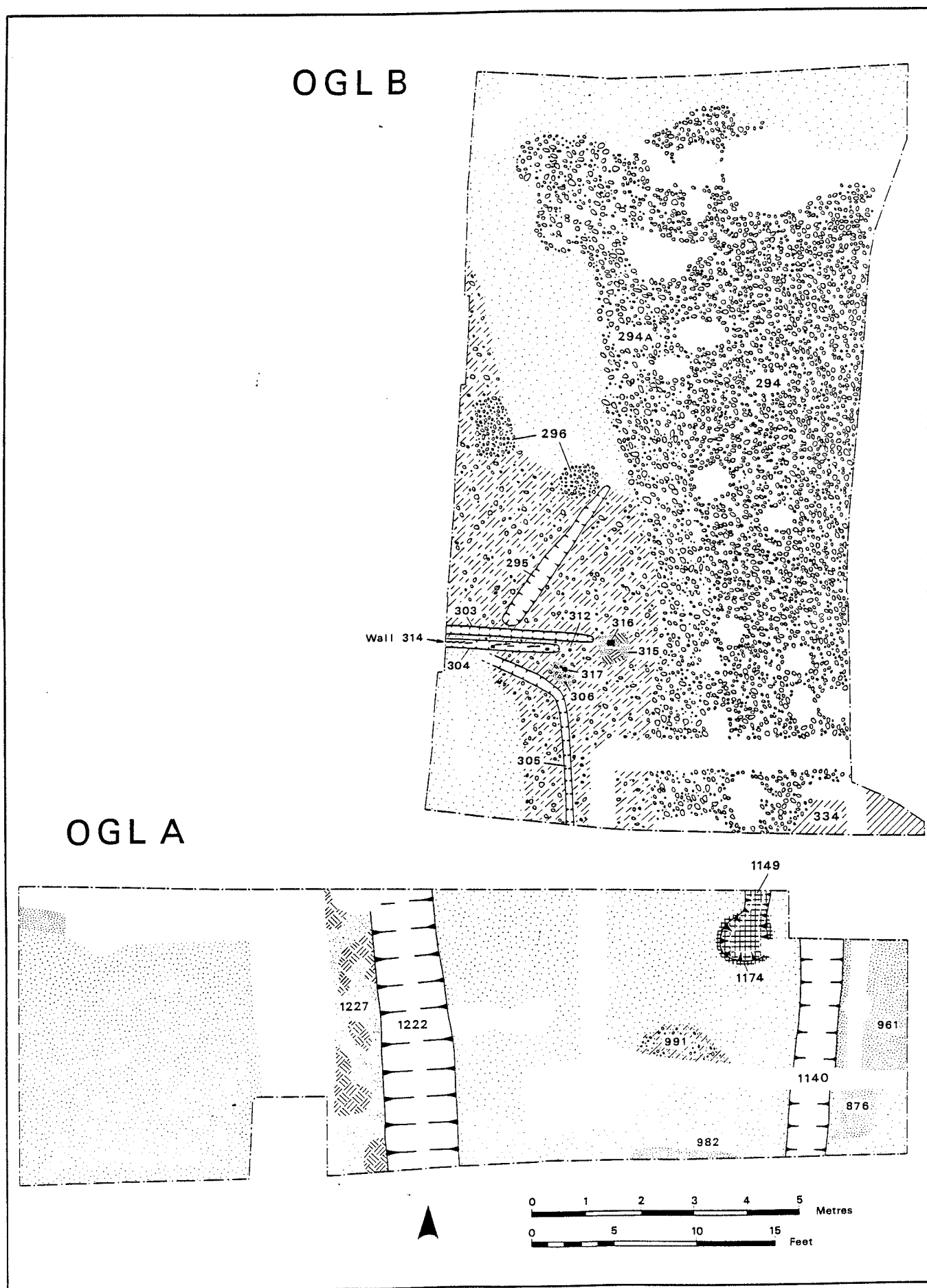


Fig 20 Plan of OGL A Period 4 and OGL B Period 2B

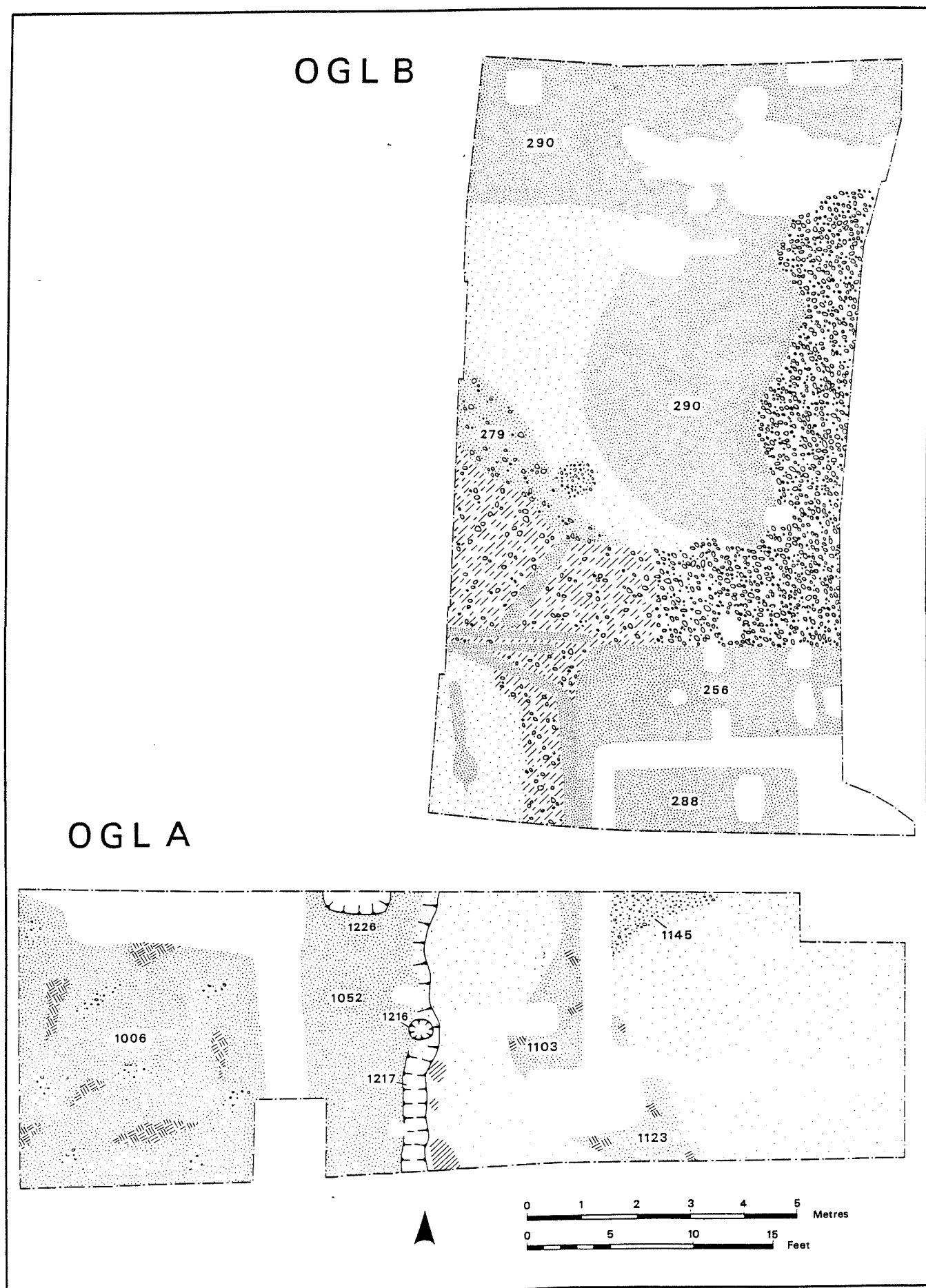


Fig 21 Plan of OGL A Period 5 and OGL B Period 3

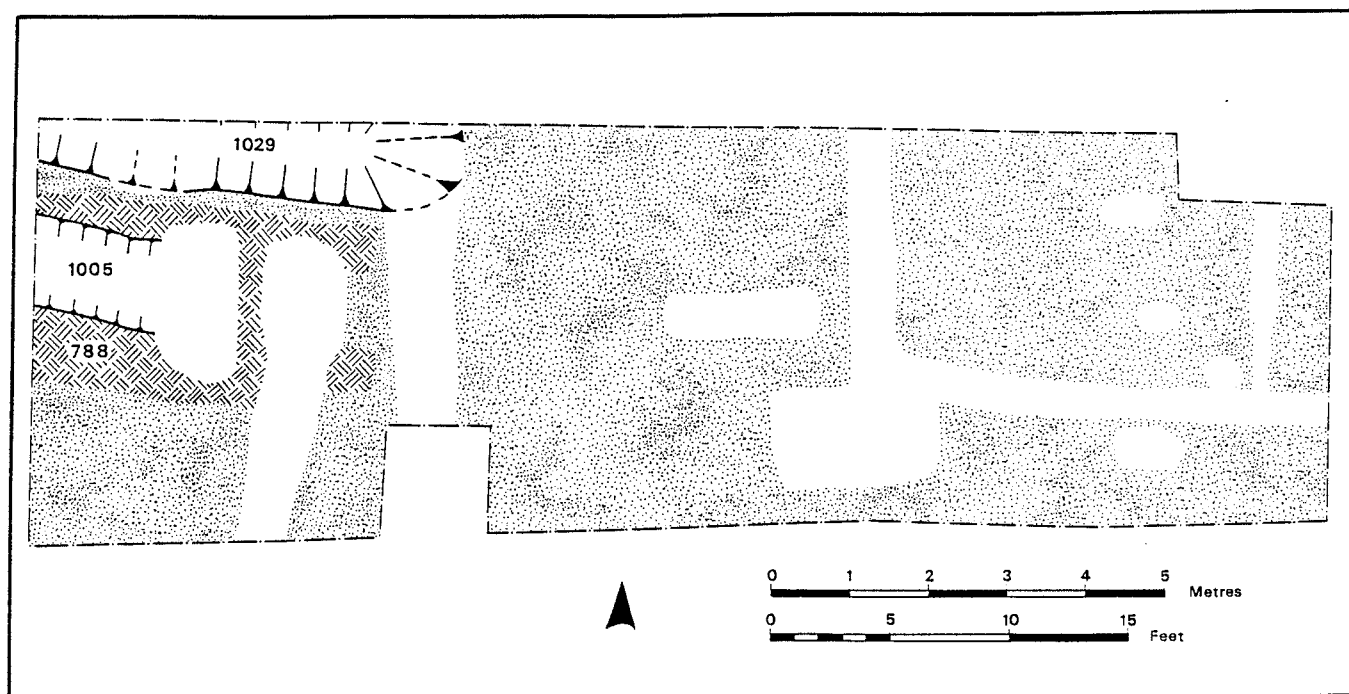


Fig 22 Plan of OGL A Period 6, before the construction of Building 674

(p 119).

Overlying all earlier deposits on the southern side of the ditch was a sandy deposit (755, Fig 24). This was itself overlaid by patches of gravel and a cobbled surface (758) abutting a revetment comprising an oak plank (782), 0.75m long and 0.08m wide, set on its edge and creating a division between 758 to the south and miscellaneous lenses (785) to the north. These deposits later subsided into the ditch as the fill consolidated. Overlying them was a further deposit of laminated organic material (737, Fig 25) containing patches of clay and cobbles extending over the whole of the western end.

The western end was separated from the eastern end, which contained a timber building, by drains or gulleys which were replaced on numerous occasions, and fence or hedge lines. These are clearly boundaries.

East of, and slightly later than, the surfaces at the western end, a drain or gully (1023, Fig 24) was inserted on a north-south alignment. The drain was 0.85m wide at its maximum extent and was U-shaped in section. It was filled with silty loams and pebbles, cobbles and small patches of sand which may have derived from surfaces 755, 758 and others to the west.

It was probably at this time that fence/hedge 1024 (Fig 24) was erected to the east of the drain. It consists of a post and stakes, two of which were oak, set at 0.5-0.7m intervals. The gaps between the posts were occupied by vertically-set oak planks 0.1-0.13m wide by 0.01m thick. The planks were carefully arranged so that the edges overlapped rather than abutted.

Shortly after drain 1023 had filled, a new drain (793, not illustrated) was dug. It contained mixed soils and lumps of clay (fills 783, 792, 806) with organic matter derived from hay, perhaps flooring or bedding material, together with very large numbers of grain beetles which are almost certainly the product of a dump of spoiling grain (pp 118 and 135-6).

Another drain and a new fence were constructed shortly after 793 had fallen from use. The drain (751, Fig 25) was cut slightly to the east of 793. It had vertical sides and an almost flat base. It was 0.45m deep and relatively wide, being between 0.85m and 1.1m across. There was no evidence of a timber lining. The sandy and gravel fills (750, 754, 803) included weeds of cultivation, amongst which were stinging nettles, corncockle and chickweed, as well as waterlogged and carbonized cereals (barley, bread wheat, rye). Abundant food remains were also present in the form of a range of fruit stones (grapes, figs, apples or pears, cherry, almond and many *Prunus*, including sloes and bullaces/damsons (p 118). Many of the fruit stones had been nibbled by small mammals. The insect fauna

in the drain, which include taxa typical of dung and grain, but not hay, indicates an origin for this deposit in a stock enclosure near to buildings (p 135).

Close to the line of the former fence, there was a new fence/hedge-like boundary (723, Fig 25) set in a low bank of brown silty loams (718), incorporating a botanical suite similar to that recovered from drain 751. The bank included a number of very irregularly-shaped pieces of wood with branch or root projections, as well as the aerial roots of a tree or bush (440). The hedge incorporated at least three varieties of *Prunus*, to judge from the large quantities of stones found. As *Prunus spinosa*, or quickthorn, forms a spiny thicket, it is possible that it may have been deliberately planted in order to restrict the movement of animals (718, p 117). Other elements of the boundary included wood that resembled conventional stakes, being round in section and up to 0.12m across. It is possible, therefore, that this boundary was a mixture of a scrub-like hedge with stakes inserted in the gaps.

Bank 718 may be upcast from shallow scoops or depressions (732, Fig 25) which are adjacent on the eastern side. The fill of the scoops differed from the bank material. Huntley notes, for example, the numerous remains of parching spelt wheat spikelets to release the grain (p 117). The botanical suite from this deposit is strongly indicative of activity related to people rather than animals; perhaps it was rubbish derived from living areas. The suite of insect remains differs from the plant flora in that, whilst hints of human activity may be discerned, the taxa are more reminiscent of material derived from grazing land or stockyard deposits, whilst the presence of aquatics suggests the presence of open water nearby (p 135). Clearly this was a relatively busy area in which the presence of both people and stock can be discerned.

Building 674 and the eastern end of the trench

Part of a rectilinear timber building (674) lay within the excavated area at its eastern end. The walls of this building could be correlated with walls in OGL B Period 4 (Figs 23-5). It was not possible, however, to correlate the floors between the two trenches. Within OGL A, parts of the west and south walls were located, as well as one internal wall which divided an eastern from a western room. Within OGL B, the western and northern rooms, together with the internal wall, were located.

Building 674 was erected in slots or wall trenches (956, 963, Fig 23), 0.45m wide by 0.5-0.65m deep. The upcast from digging the slots was spread across much of the western end, both inside and outside the building. To the south of the building, one early deposit

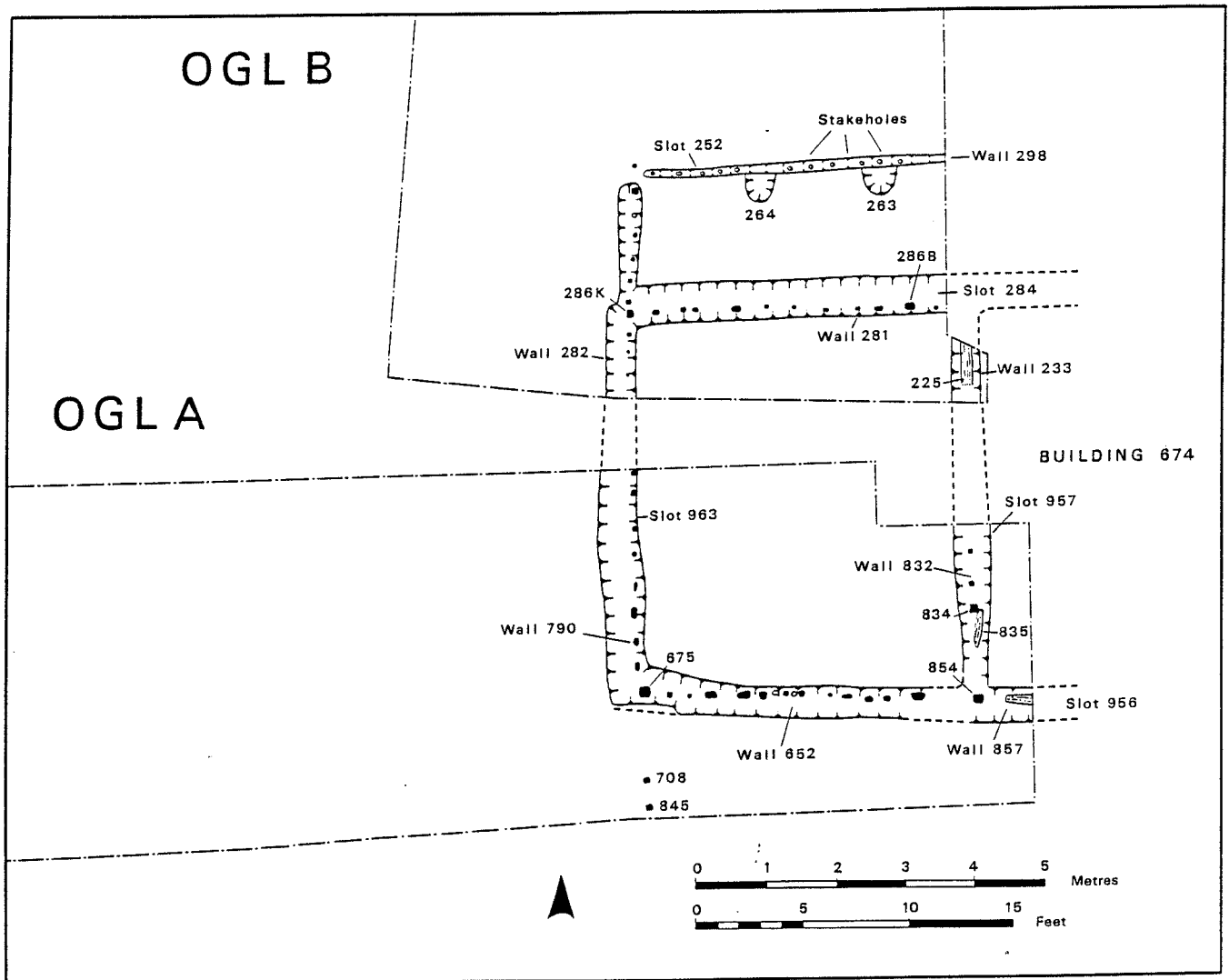


Fig 23 Plan of the post-trenches of Building 674 in OGL A Period 6 and OGL B Period 4

(878, not illustrated) included numerous wood shavings which may be regarded as construction debris. It formed a very useful stratigraphic boundary between Period 5 and subsequent deposits.

The walls were formed of oak posts set in the slots (Figs 23-5). The posts in the western wall, 790, were generally more widely spaced (0.25-0.4m intervals) than those in the southern wall, 652 (0.1-0.25m intervals), although the significance of this is not clear. The posts were generally roughly square or roughly rectangular in shape, 0.05-0.16m by 0.03-0.13m across. Many of the posts had flat bases and showed evidence of axe and adze marks, and in the southern wall, most had been pressed down into the subsoil below the bottom of the construction slot. All the posts in this wall survived above floor level to a maximum height of 0.2m.

Two corner posts were amongst the most substantial recorded. They were the post at the south-west corner (675), which measured 0.14m by 0.13m in section, and the post at the junction of the south wall with the internal wall (854), which measured 0.15m by 0.10m. One post contained an iron nail below floor level. At the eastern end of wall 652 there was a plank (913), 0.05m by 0.03m thick, which, if correctly interpreted as a sill beam, indicates the point of access between the exterior and the eastern room. The door jambs could not be identified as they lay beyond the limit of the excavation.

The internal wall (832, Figs 23-4) was based in a slot, 957 (fill 958), which was 0.4m wide. At one point the slot had a marked depression at the point where post 834 was positioned. The posts were similar in their characteristics to those in the external walls. A probable threshold (835), formed out of two horizontal planks 0.68m long, was identified. One of the planks was recessed to accommodate post 834 with which both were associated, and which was almost

certainly a door jamb. This post measured 0.17m by 0.10m across and had two rectangular vertically-oriented mortises on opposite sides of the post. As the mortises, which measured 0.09m long by 0.03m wide by 0.03m deep, were buried in the slot, they are evidence that the post had been re-used.

The wall infills comprised roundwood. The only sampled wall was 652, which was entirely made of oak between five and eight years of age (Huntley 1992, app OGL-2).

Inside the western room of the building there was a succession of at least 27 layers and two hearths. Many of the deposits were lenses and patches whilst others were more widespread. The surfaces were usually formed of sandy clays (800, Fig 25) or sand (654, 656, 795, 809, 867, 883, not illustrated) and, rarely, pebbles (811, 820, Figs 24-5). They were interspersed with silts or laminated organic deposits (798, Fig 25). The sequence suggests that when floors became fouled a deposit of fine red sand, often recorded as being clean, was laid. Throughout the life of the room most, though not all, of the floor deposits survived against the eastern and western walls, whilst the area in between was heavily worn. At a late point in the sequence, an oak plank (668, not illustrated), at least 2m in length by 0.09m by 0.04m, was laid at a distance of 0.7m east of wall 790. There were no joints or other indicators of use, and the plank was regarded when excavated as being part of an internal fixture, perhaps for a bench placed against the west wall. One of the internal surfaces (658, not illustrated) contained small assemblages of beetles which provide a hint that Building 674 was a stable or a store which was kept fairly clean (p 134).

The earliest hearth (855, Fig 24) was located towards the centre of the room as it was excavated. The later hearth (not illustrated),

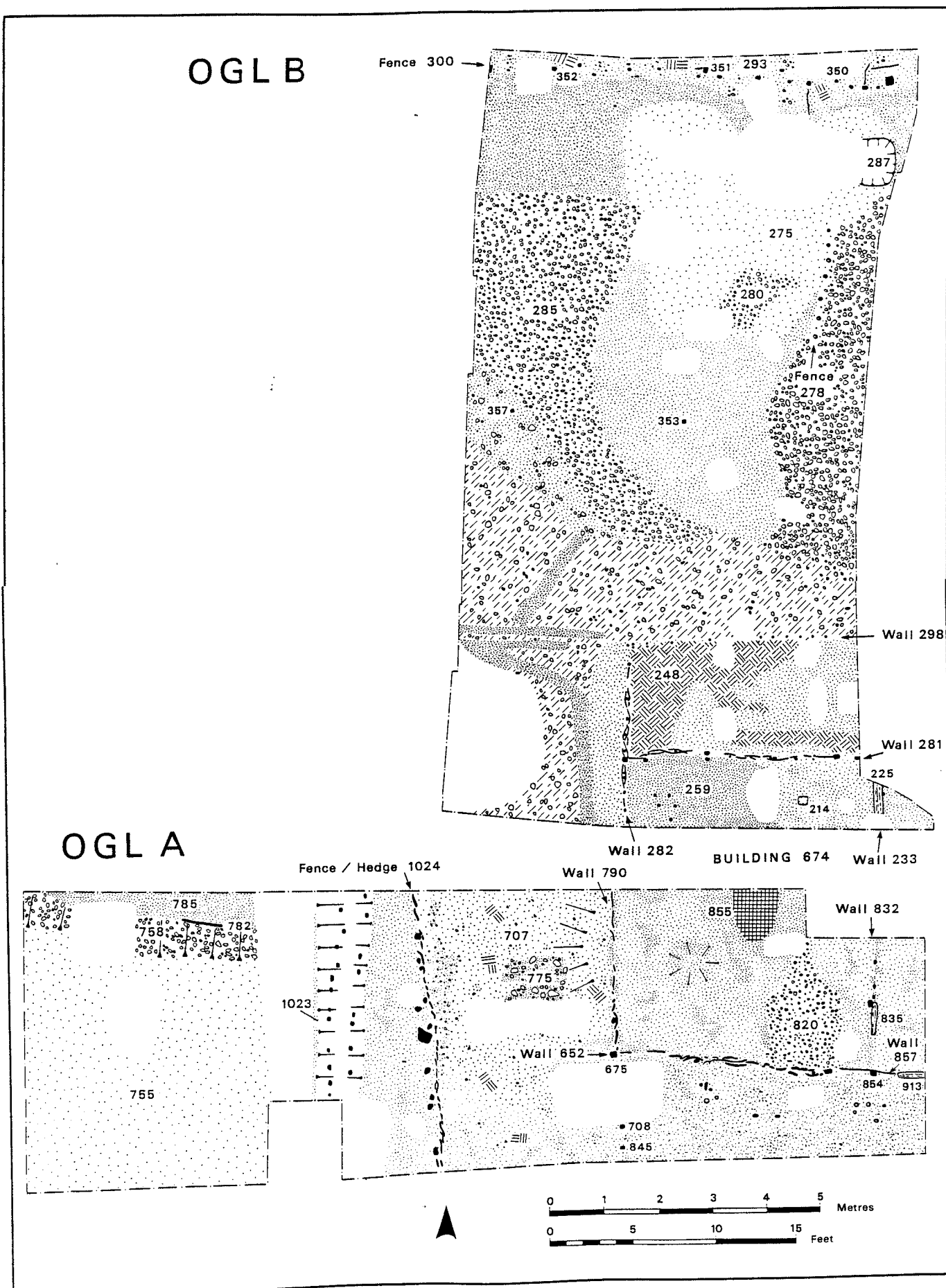


Fig 24 Plan of OGL A Period 6 and OGL B Periods 4A and 4B

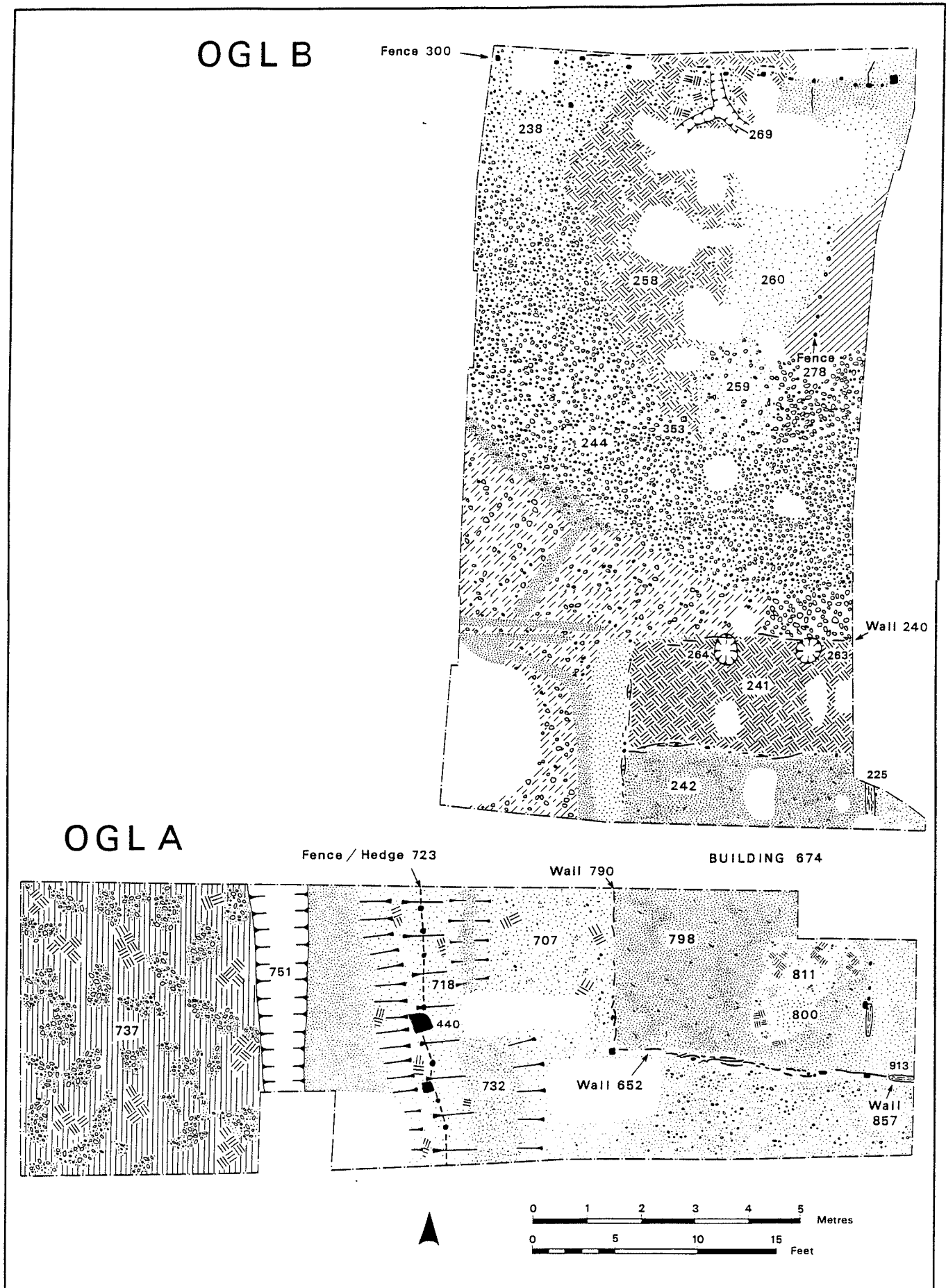


Fig 25 Plan of OGL A Period 6 and OGL B Periods 4C and 4D

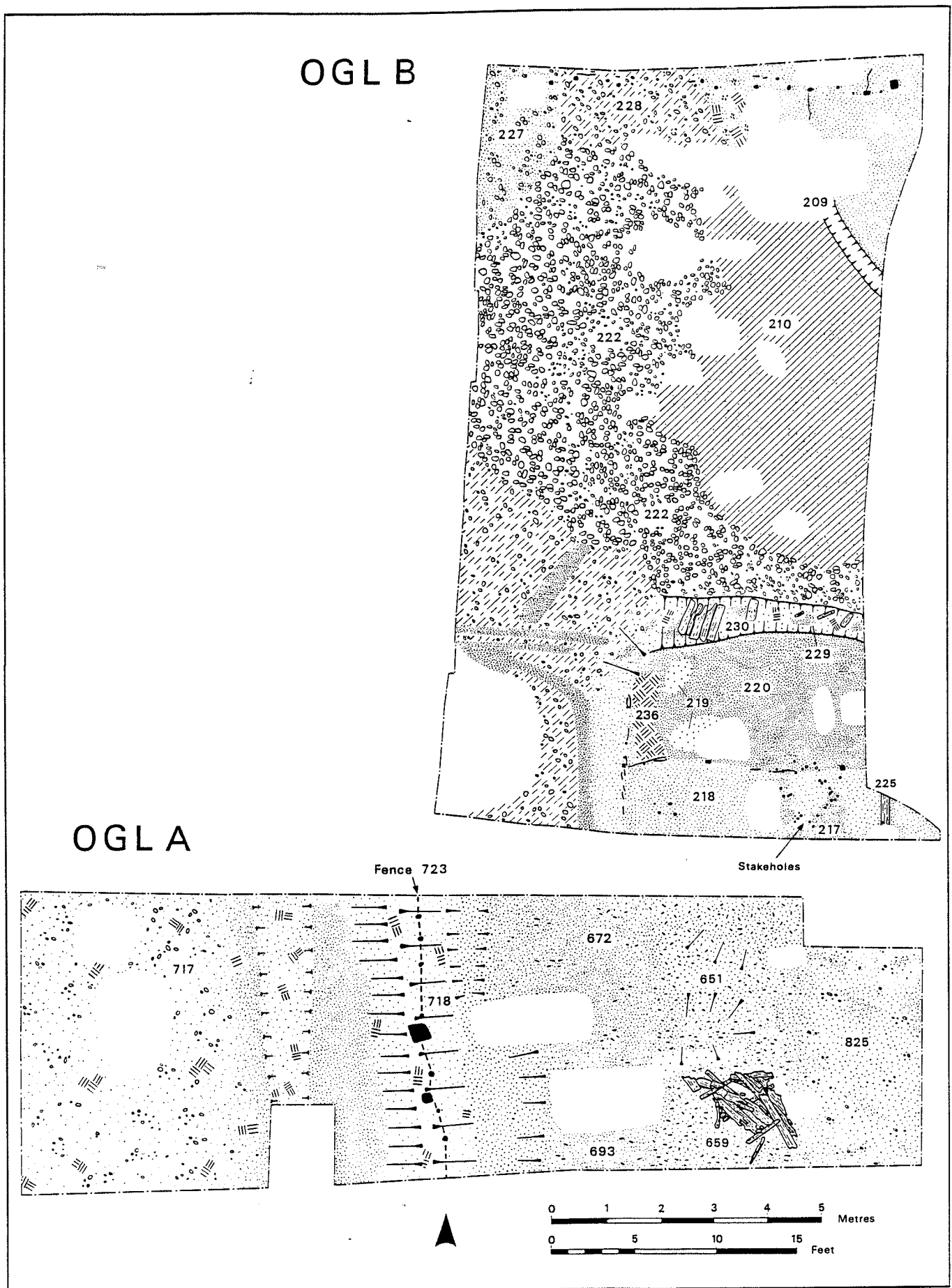


Fig 26 Plan of OGL A Period 7A and OGL B Period 4E

which showed evidence of much greater use and was associated with spreads of ash and silt, was placed against the west wall.

A number of samples from internal deposits were examined for botanical remains. In all cases where results were obtained, the seeds suggested the presence of hay or animal bedding, but not human occupation (658, 810, pp 116-7, 119). Within the building, inserted into the floor, was a small timber-lined pit (698, not illustrated), 0.4m by 0.35m by 0.4m deep. The sides were formed of planks held in place by pegs in the corners. Resting on the floor next to the western side of the pit was a thick oak plank 0.55m long by 0.25m wide by 0.14m thick, with two neatly-cut rectangular mortises. Where the planks and stakes lining the pit could be identified, they were of oak. The fills contained a variety of grassland seeds (822), including, near the top of the deposit, a more or less pure fen grassland flora (722) (p 117). Both deposits contained puparia of the sheep ked (p 134). It is possible that this pit was used as an animal feed trough. The upper fill also produced a woven object (Fasc 2, No L1).

Very little of the eastern room lay within the excavated area. The floors appeared to be of similar composition to those in the western room, but no details were recovered.

The status of the area south of the building is uncertain. To the south of wall 652 two oak stakes (708, 845, Fig 24) continued the line of wall 790 as far as the southern limit of excavation. The stakes were isolated, not contained in a slot, and their exact relationship with the building is in doubt, a factor partly due to a later disturbance. It is possible to argue on spatial grounds that the stakes represent a southern adjunct to the building reflecting the northern adjunct identified in OGL B. The botanical suite lends support to this view in that an early deposit (878, not illustrated) may be flooring material comprising grasses laid as flooring over construction deposits (p 119). Another later layer (817, not illustrated) seems to have been a pure hay deposit (p 119).

East of these two stakes was a complex accumulation of soil, clay and pebble surfaces. Laminated organic accumulations were also present, whilst the earliest deposit, overlying the upcast from the construction trench of wall 652, incorporated wood shavings, doubtless from the construction of the building.

Between the building and the boundary fence/hedge the deposits were much less complex. A pebble and cobbled surface was laid on top of the upcast from the construction trench of wall 790. Above this, a clayey silty loam (707, Figs 24-5), with sand, gravel and fragments of roundwood, mainly oak, developed. There is some indication from the plant remains that this may have been near the edge of cultivated ground (p 117).

Periods 7 and 7-8

Period 7A (= OGL B Period 4E-5B)

Extensive deposits (651, 672, 693, 825, Fig 26) of dark-coloured silts and loams, with some twigs, pieces of wattle and occasional wood shavings, were spread over the central and eastern parts of the site. The deposits appear to have been delimited to the west by the fence and hedge line (723) and the slight bank (718) continuing in use from Period 6.

Deposits 651 and 672 are regarded as being exactly contemporary in stratigraphic terms, but the botanical suites recovered are not the same. Deposit 651 includes wood fragments together with bedding and/or roofing material, notably heather. Some of this may derive from demolition deposits, whilst the weeds and ruderals of disturbed ground comprise mainly annuals, indicating cultivation or a recent abandonment (p 119). The interpretation of 651 as a demolition deposit also receives support from the mixture of outdoor and house insect fauna (p 137), as well as from the presence of a collapsed wall or fence (659) which immediately overlies it. By contrast, deposit 672 contains much less of the demolition material, whilst the waterlogged taxa indicate a long-term rather than a recent abandonment (pp 119-20). The few insects present are not interpretable (p 137).

The two deposits abutted in a straight north-south line, but as this appeared not to reflect either underlying or later features, it is presumably a function of the deposition process. The simplest explanation for the apparent dichotomy between the two deposits is to suggest that they were not deposited simultaneously, but that 651 accumulated slowly whilst 672 was dumped in a more rapid operation. The interval of time between the deposition of 651 and 672 need

not have been very long.

Overlying deposit 651 was part of a collapsed wall or fence (659, Figs 26-7), not dissimilar to a group of planks in OGL B Period 4E (230; cf also OGL A 641, Period 8A-B; OGL A 486, Period 9E). It consisted of over 28 fragments of wood, most of which was oak, and much of which was still either articulated or semi-articulated. It included three posts or cross-pieces overlaid by a series of planks. The longest of the three posts or cross-pieces was 1.14m in length. They were 0.07-0.09m wide and 0.03m thick. The posts were 0.50m and 0.55m apart. All three pieces had numerous nails and nail holes on the broadest face.

The posts or cross-pieces were mostly overlaid by a series of planks which had clearly been nailed into position. The longest surviving length of plank measured 1.65m. Although some plank fragments were less than 0.1m wide, it was clear from the edges, where present, that many were, or had been, wider; the maximum surviving width was 0.22m. All the planks were 0.06m to 0.01m thick, with one exception which was 0.08m thick. Some planks showed adze marks and some had nail holes which tended to occur near one edge. The ends of several planks had been squared off.

When found, some fragments of wood had clearly been disturbed, perhaps at the time of deposition as several were displaced. Nevertheless, it is clear that a number of pieces had not been moved to any significant degree. A number of nail holes on the planks corresponded closely with holes in the underlying posts and it was

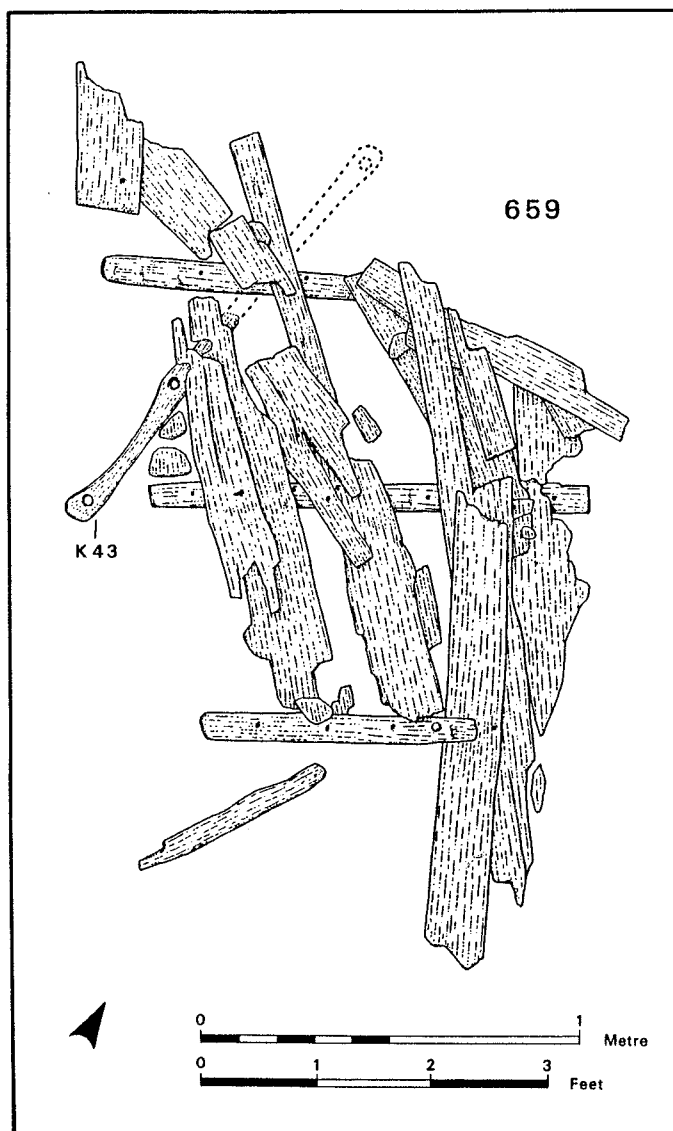


Fig 27 Detail of collapsed wall or fence 659, Period 7A

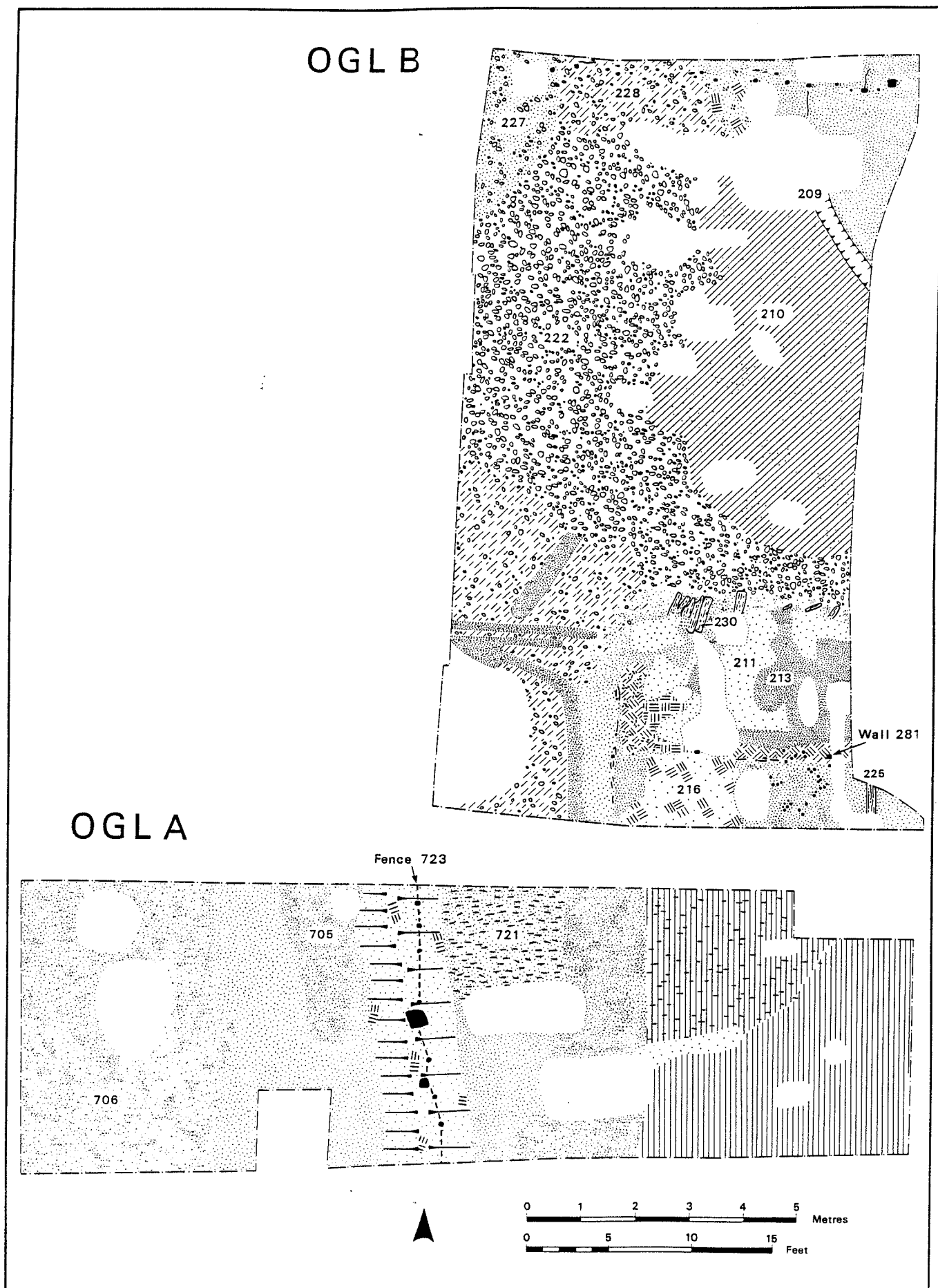


Fig 28 Plan of OGL A Period 7B and OGL B Period 4F

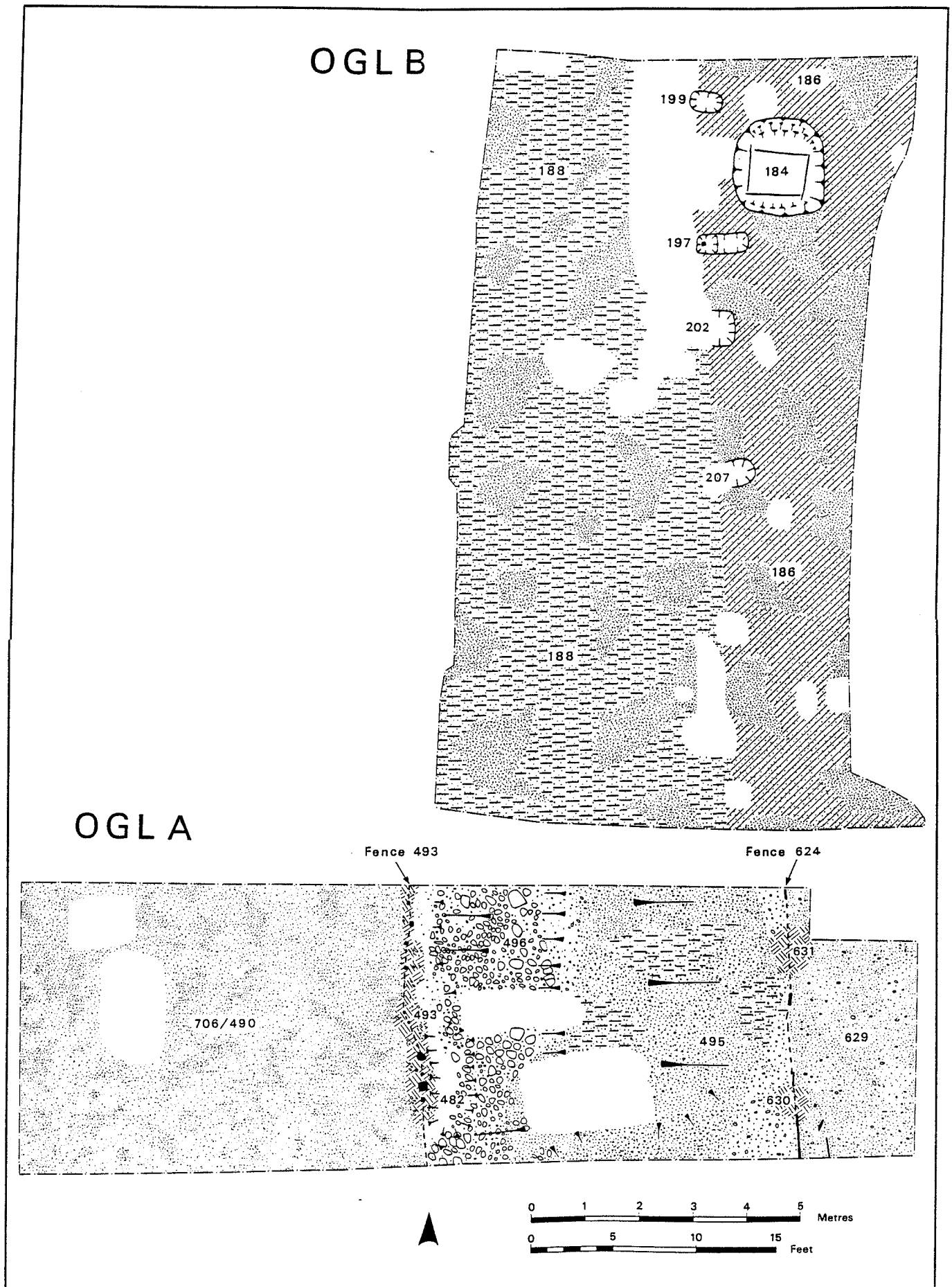


Fig 29 Plan of OGL A Periods 7-8 and 8A, and OGL B Period 5A

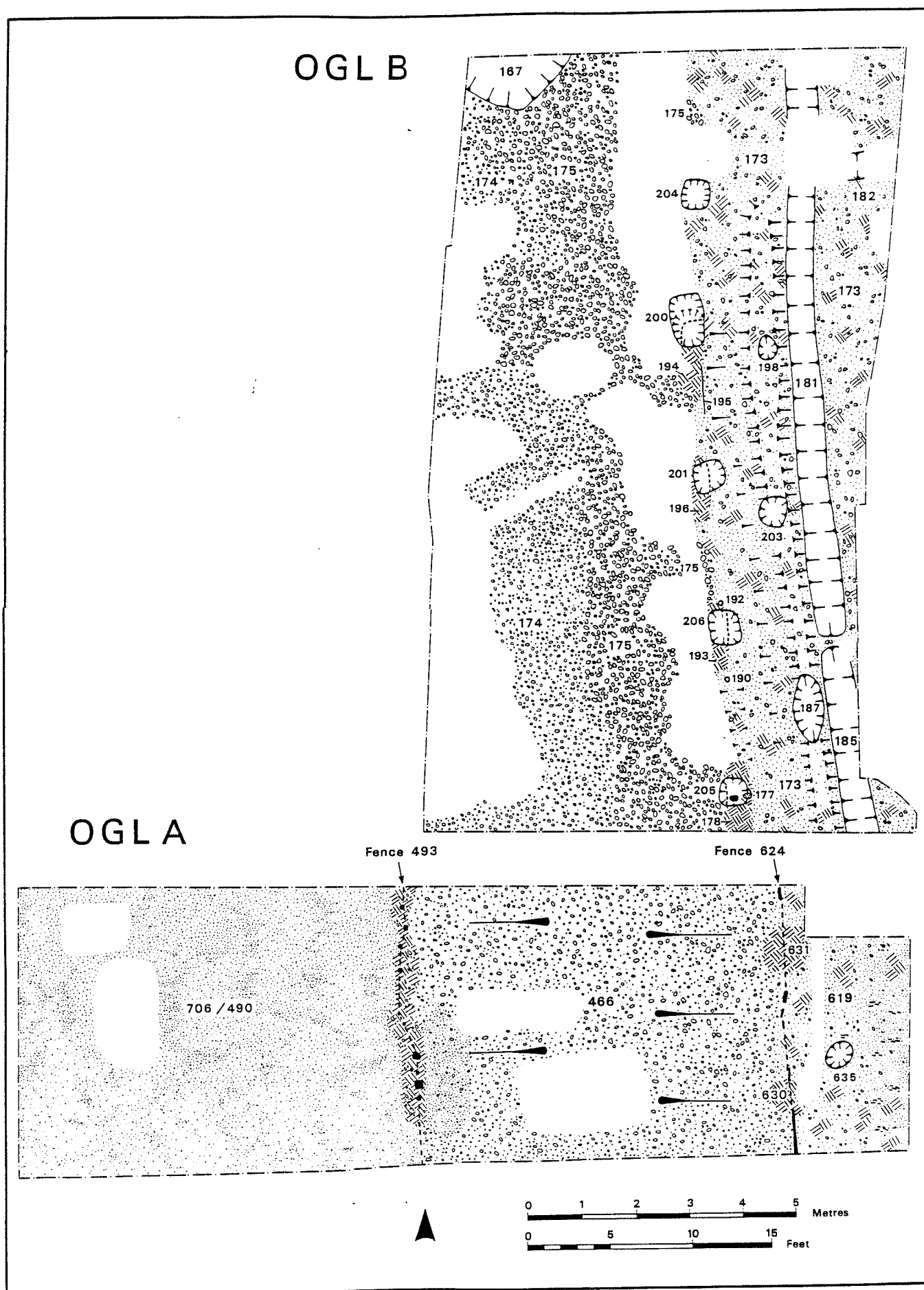


Fig 30 Plan of OGL A Period 8B and OGL B Period 5B

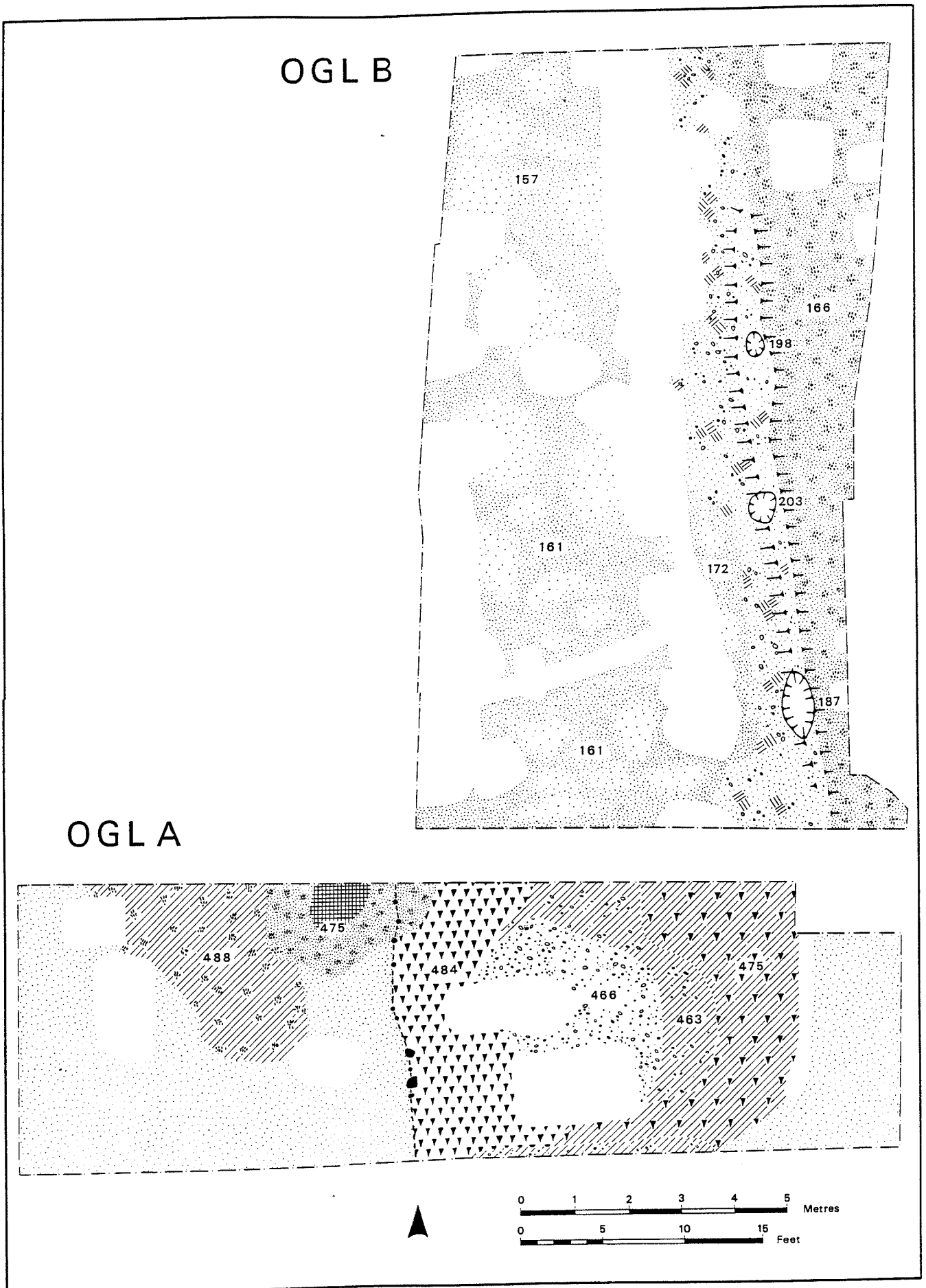


Fig 31 Plan of OGL A Period 8C and OGL B Period 5C

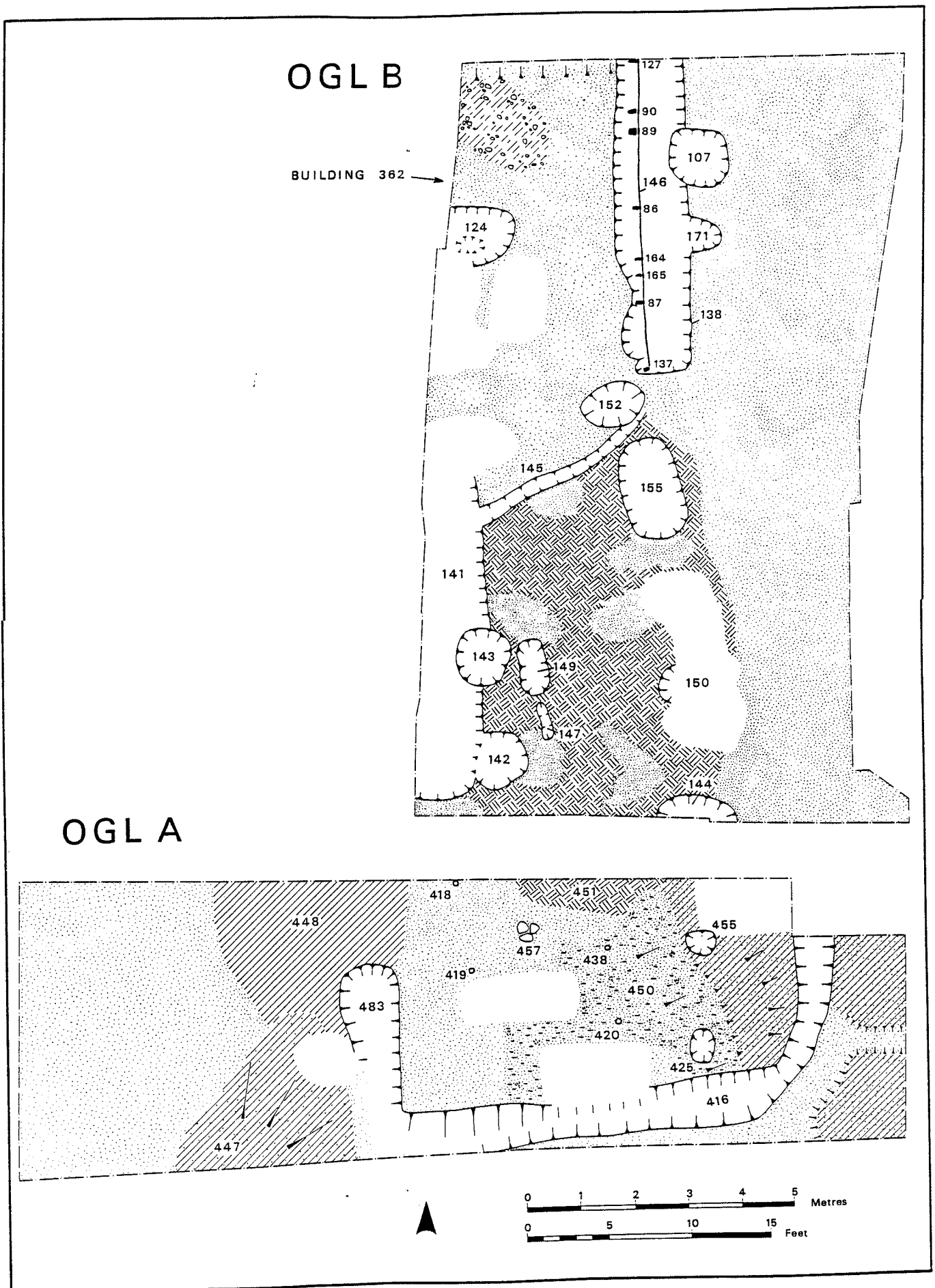


Fig 32 Plan of OGL A Period 9C and OGL B Period 6B

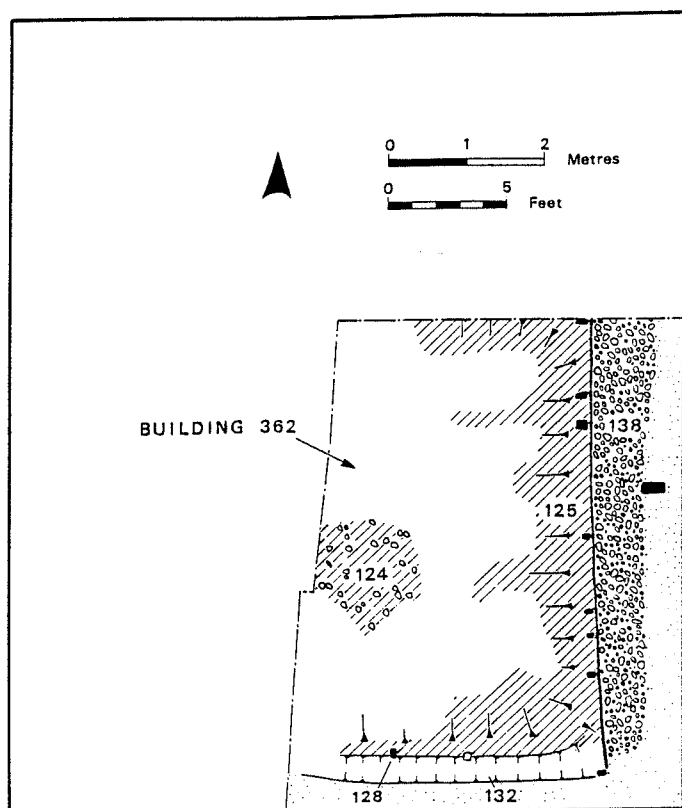


Fig 33 Plan of Building 362 in OGL B Period 6B, secondary construction phase

abundantly clear that nailing had been the method of attachment. The disposition of several fragments suggest that the planks had been overlapped in the manner of weatherboarding (Fig 27).

At the western end of the site there was a deposit of clay sandy loam (717, Fig 26) with pebbles.

Period 7B (= OGL B Period 4E-5B)

There were a number of very minor changes from the previous phase. They include the start of the soil accumulation (706, Fig 28) at the western end of the site. Some activity is attested in the form of a patch of burning and the deposition of a silty loam (705). To the east of hedge/fence 723, which may have survived into this phase, there was an accumulation of soil with abundant twigs (721), sedge-rich plant remains possibly from dumped bedding/flooring (p 120), and decomposer beetles associated with dung (p 137).

Period 7-8

At the western end of the site soil deposits (490, 706, Fig 29), first formed in Period 7, probably continued to accumulate into Period 8.

Periods 8 and 8-9

Period 8A (= OGL B Period 5A)

A metallated surface (496, Fig 29), approximately 6.5m wide, was laid across the middle of the site. It did not extend northwards into OGL B but it was bounded on its eastern side by posts and a wall or fence of posts (624), beyond which was an accumulation of silty loam (629). Only two post positions (630-1) were present within the excavated area; they were 2.8m apart, centre to centre. Post 630 comprised a roundwood stake, 0.03m in diameter, set in a pink clay matrix. Post position 631 was represented only by a clay and cobble pad.

The intervals between the post positions were filled with oak planks (641) in a very fragmentary state. The surviving pieces suggest a width of about 0.1m by about 0.005m thick. The planks were arranged vertically in the ground but it was not certain as to

whether they were butted edge-to-edge or overlapped. As this method of construction is inherently unstable, there must have been horizontal rails connecting the posts to which the planks were affixed (cf 659, Period 7A; 486, Period 9D).

The western boundary of the metallating was defined by a fence (493, Fig 29) consisting of a series of decayed stakes under 0.1m in diameter, and a tree, whose root system survived. A shallow gully (482) in the metallated surface, approximately 0.1m deep, was recorded next to the fence.

The metallated surface (496) was overlaid by a silt (495, Fig 29) similar to that recognized in OGL B.

The correlation of this period with OGL B Period 5A cannot be regarded as certain, as the nature of the deposits in the two trenches differs. The equation is based upon the presence, in both trenches, of a line of posts that almost certainly represent the same feature.

Period 8B (= OGL B Period 5B)

There were few changes from the previous period. The metallated area was re-surfaced in the centre and on its western side (466, Fig 30). Beyond the eastern fence line a new post was dug (635). The post, which had a cobble fill in a circular hole, 0.6m in diameter and 0.3m deep, was located 1.1m east of fence 624. The deposits east of the fence (619) included a clay loamy surface with abundant pebbles and fragments of wood.

Period 8C (= OGL B Period 5C)

The metallated area (466) was covered with silts including abundant wood shavings and twigs (463, 475, 484, Fig 31), masking most, but not all, of the underlying surfaces, together with the posts and fence (624) on the eastern side of the site. It should be noted that the wood shavings and twigs were confined to the area of OGL A. The fence on the western side of the former metallated area may have continued to function, although silts and charcoal spreads (475) emanating from a hearth spread across the line of the fence. Further west were more spreads of clay and charcoal (488).

Period 8-9

The western boundary fence (493) identified in Period 8 probably continued to function into Period 9. Several minor soil lenses and stakes (not illustrated) associated with this fence can be attributed to both periods.

Period 9

Period 9 comprises a prolonged series of soil accumulations and metallated surfaces, with structural elements in the middle of the sequence. The position of the western boundary seems to have remained fairly constant, although it was not evident in every phase, and was renewed several times. A number of gulleys were also identified.

Period 9A (= OGL B Period 5D)

Immediately east of the western fence a possible north-south wall line was recognized (not illustrated). It consisted of a shallow post-pad (461) and a linear arrangement of pebbles which may have supported a beam (462). Deposits of soil with pebbles (458) were associated.

Period 9B (= OGL B Period 6A)

The putative wall in the previous phase was overlaid by mixed deposits of clay, soils, charcoal and pebbles (435, 437, not illustrated).

Period 9C (= OGL B Period 6B)

The centre of the site was occupied by a structure incorporating posts and stakes associated with a gully (Fig 32). The form of the structure cannot be reconstructed, although its alignment appears to have been roughly parallel with the western boundary fence.

The linkage with OGL B Period 6B is tentative; the structure and gulleys were not identified in OGL B in either this or other phases. There are three possible reasons for this: posts in OGL B could have been removed by later activity; the structure represented by the posts may have been insubstantial and did not extend into OGL B; or the posts may have been missed by the excavators.

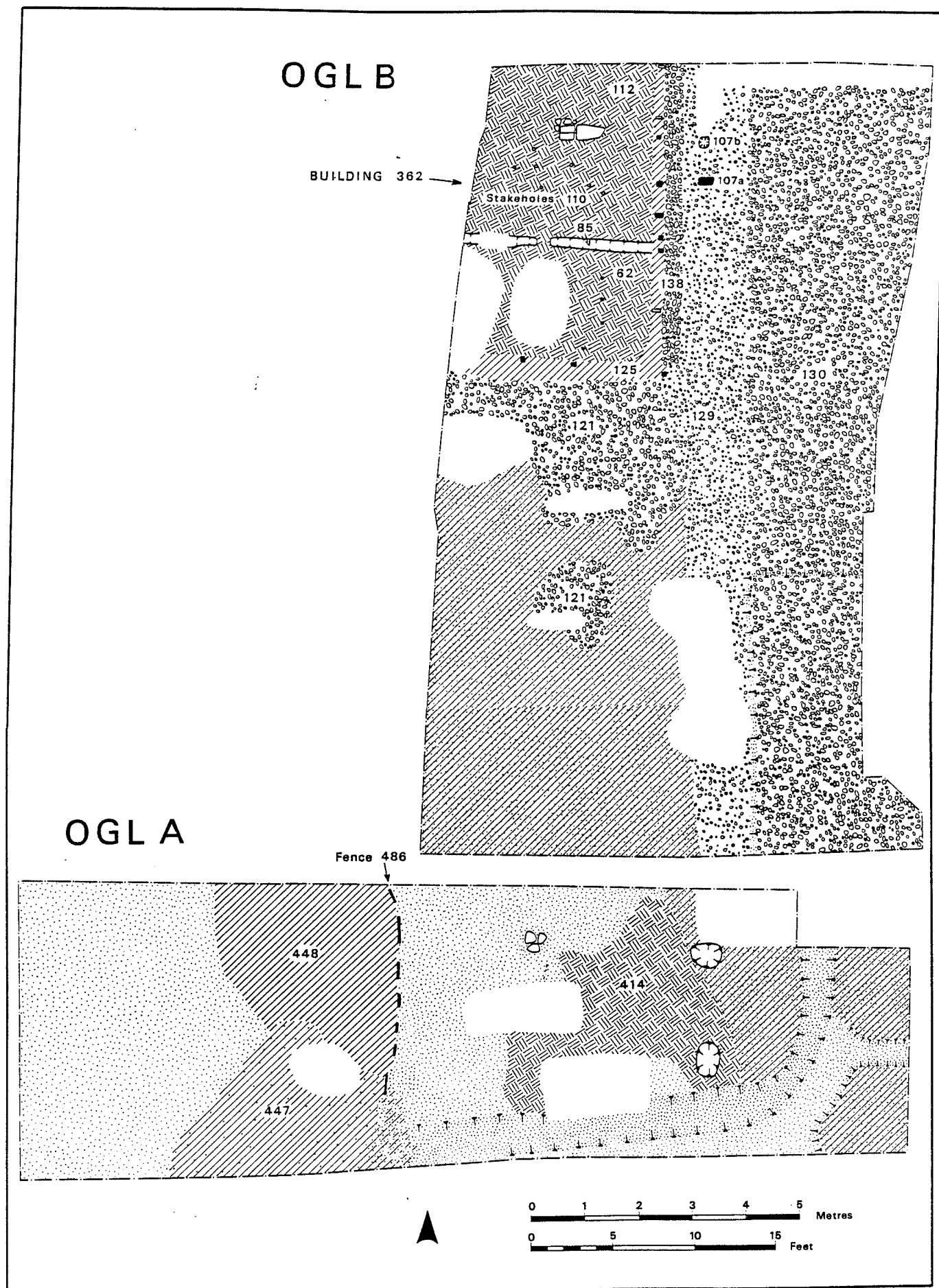


Fig 34 Plan of OGL A Period 9D and OGL B Period 6C

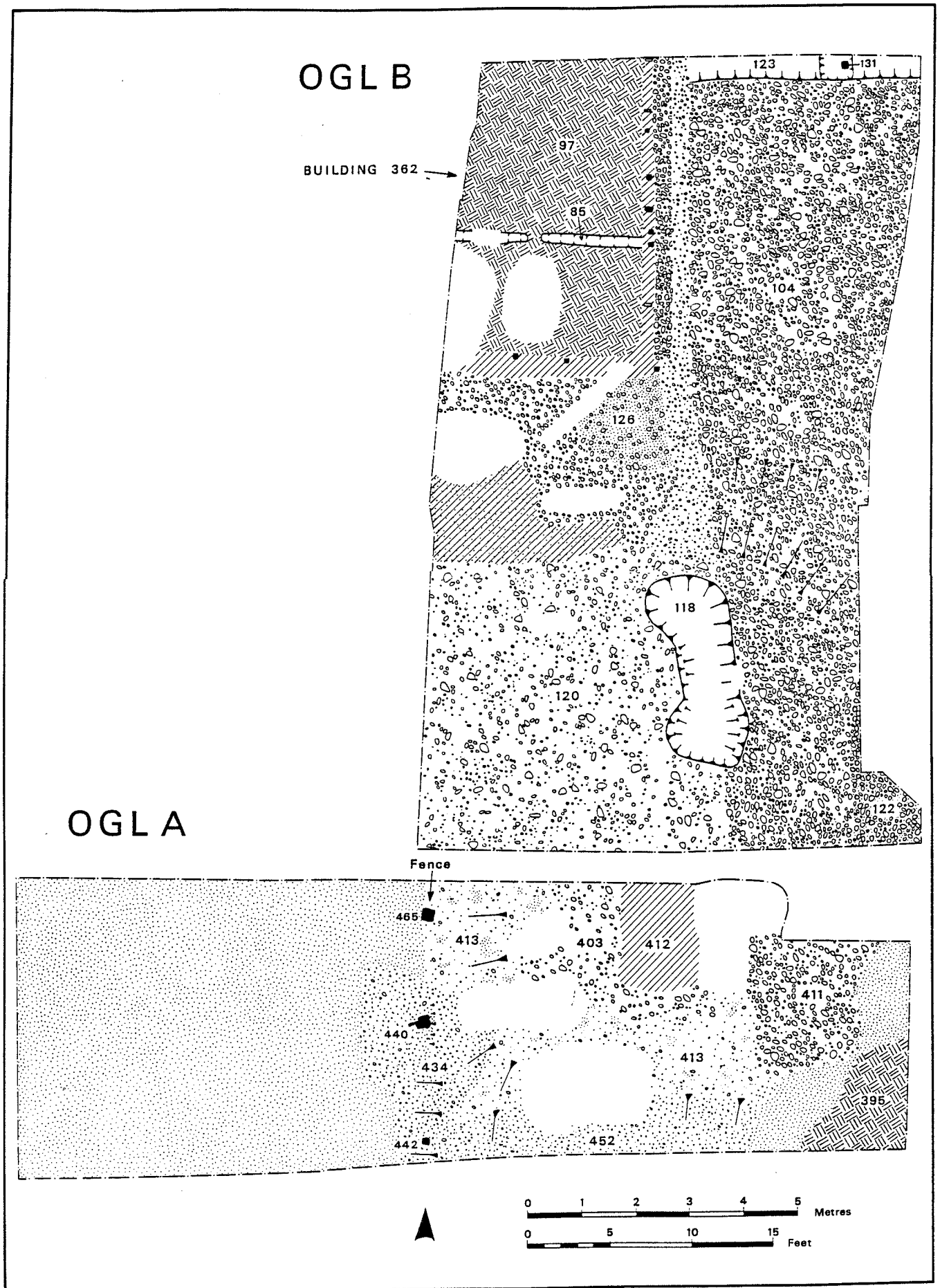


Fig 35 Plan of OGL A Period 9E and OGL B Period 6D

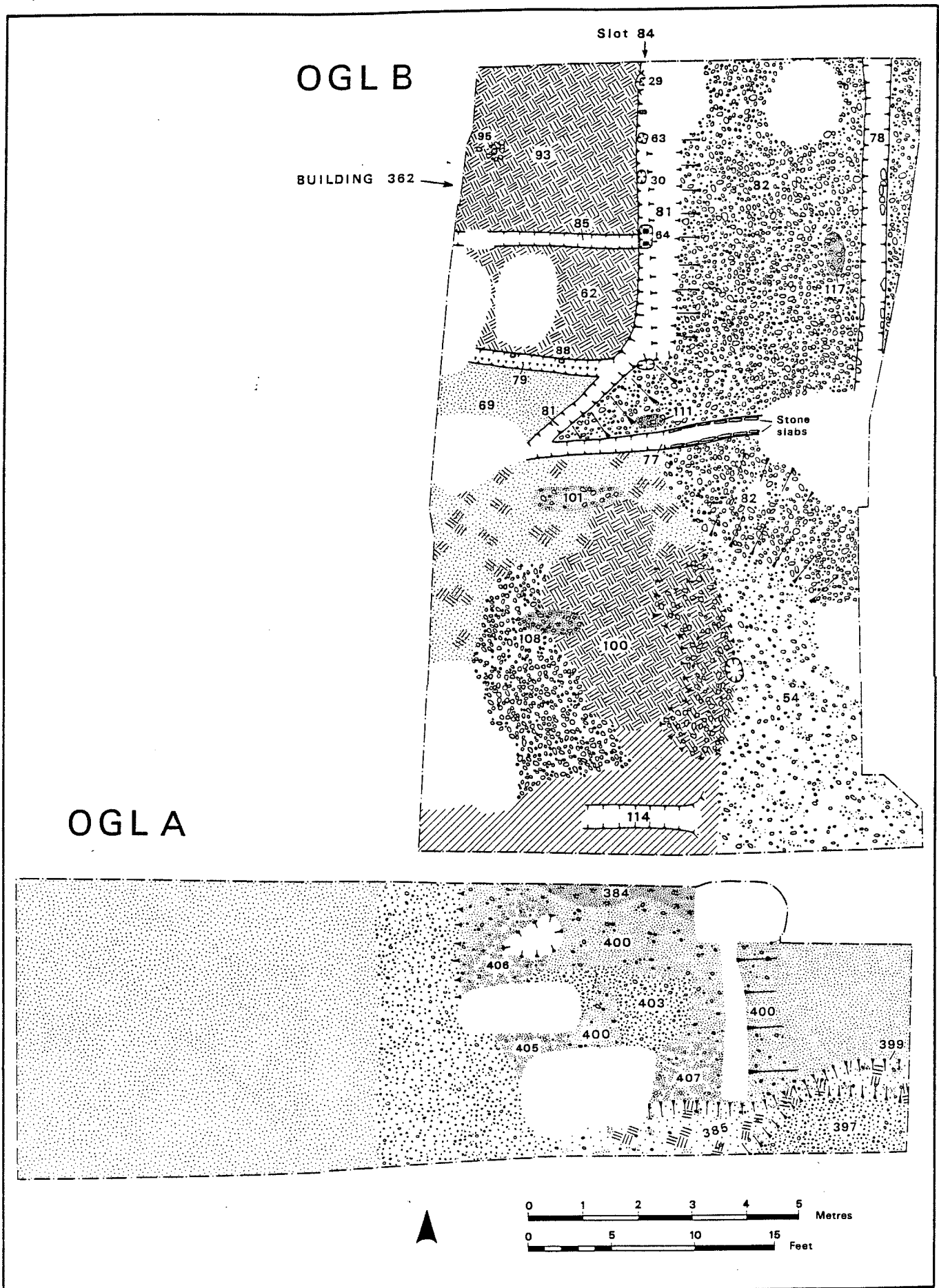


Fig 36 Plan of OGL A Period 9F and OGL B Period 6E

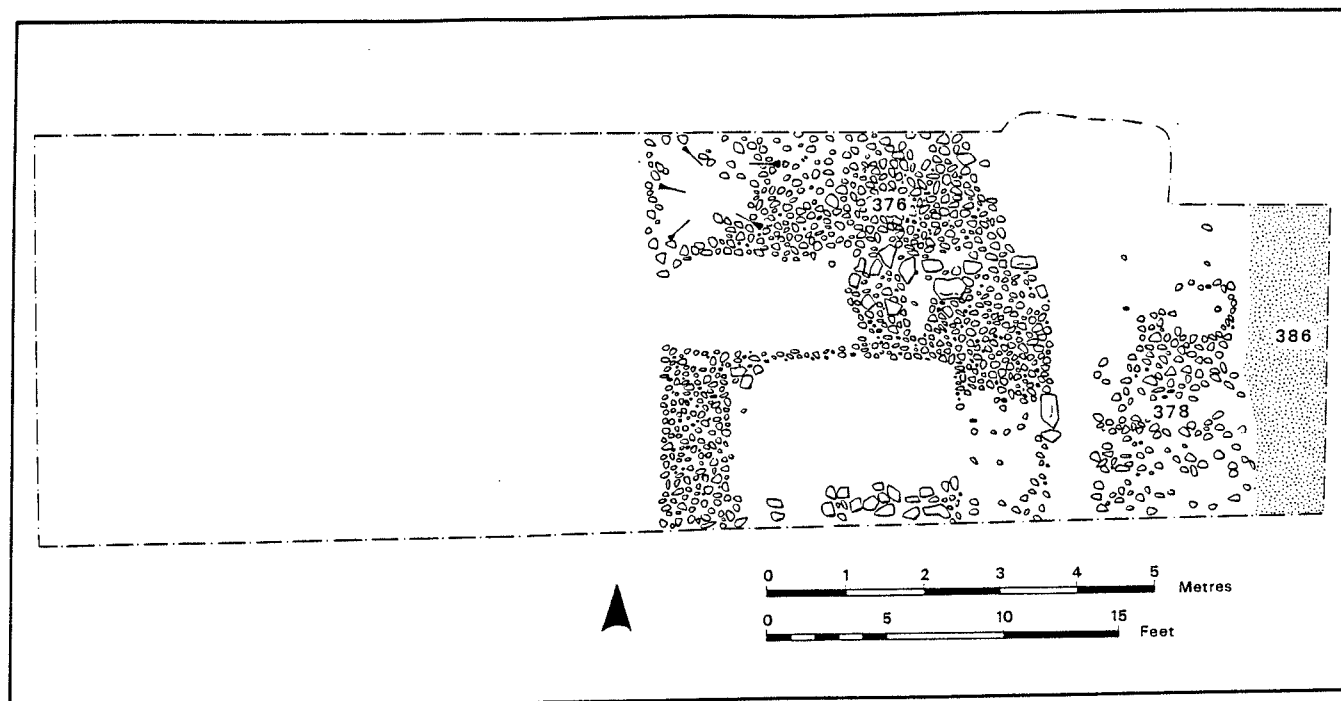


Fig 37 Plan of OGL A Period 9H

The eastern side of the structure was represented by postholes 425 and 455 (Fig 32), spaced at 2m intervals, centre to centre. Posthole 425 was 0.84m by 0.56m and 0.35m deep. Posthole 455 was 0.5m by 0.45m wide and 0.25m deep. Post position 457 was located 3.3m west of posthole 455, and comprised three large stones up to 0.3m across. Halfway between post positions 455 and 457 there was another posthole (438), 0.2m in diameter, and a second posthole (420) with similar dimensions lay 1.5m to the south. The western side of the structure was marked by postholes 418-9, also approximately 0.2m across.

In the centre of the structure was a silt deposit containing fragments of wood and charcoal (450). To the south and east was a broad U-shaped gully (416), 0.6m wide and 0.15m deep. It may be connected with a similar gully (483) which cut through the western boundary fence, and which was renewed in the subsequent period. Gully 416 did not continue north into Trench B. Around the remnants of the western boundary fence, and further west, were deposits of clay (448) and sandy clay (447) which may be dumps.

Period 9D (= OGL B Period 6C)

The only change from the previous phase was the deposition of a clay dump (414, Fig 34) which may be a floor. The western boundary fence, not evident in the immediately preceding phases, was renewed (486). The surviving remnants of this fence consisted of vertically-set overlapping oak planks, 0.1-0.14m wide by 0.01-0.02m thick. As with fence 641 in Period 8A-B, these planks would have required an additional post and rail structure to secure them in position (cf also 659, Period 7A).

Period 9E (= OGL B Period 6D)

Surfaces of gravel (403, 411, 434, 452), sand (413), sandy clay (412) and clay (395) occupied the whole of the centre and eastern ends of the excavation (Fig 35). The western boundary fence was renewed with roughly squared oak posts (442, 465) with flat bases. A tree (440), with a root system spreading at least 1m from the base of the trunk, was also present on this boundary.

The multiplicity of deposits attributed to this period is not replicated in the equivalent phase in OGL B (Period 6D).

Period 9F (= OGL B Period 6E)

Surfaces of pebbles mixed with silts (385, 397, 400, 403, 405-8) and black silts containing charcoal (384) were distributed across the site (Fig 36). On the southern side was a gully 0.25m deep containing

a mixed deposit of soil and stones (399).

Although deposit variability is a feature common to both Trenches A and B at this time, the nature of the contexts shows some differences. To what extent these differences are significant is uncertain.

Period 9G (= OGL B Period 6E)

The western boundary fence was redefined as a slot or gully (426, not illustrated) with a U-shaped profile, 0.4m wide by 0.2m deep; it was filled with silty clays. The nature of the boundary was not apparent as no posts or tree root systems were discovered. It is unlikely to have been a lined drain as no restraining pegs or peg holes supporting plank sides, to be expected by analogy with other drains discovered in Carlisle, were found. Equally, it does not appear to have been a beam slot.

Gravel with randomly placed sandstone blocks formed a solid yard surface in the centre of the site, whilst sandy clay and a thick deposit of cobbles were present at the eastern end (not illustrated).

Period 9H (= OGL B Period 6E)

The western boundary line (426, not illustrated) may have been retained, but a substantial deposit of cobbles (376, 378), up to 0.3m in diameter, was laid across most of the centre and eastern end of the site (Fig 37). The eastern boundary formed a more or less straight north-south edge, beyond which was a soil accumulation (386). The cobbled area was 7.5m wide.

Period 10

The pattern of activities for this period is less well represented than for earlier periods. Only the centre and eastern end of the trench was excavated, and a machine trench disturbed some of the deposits to the centre and north. The essential picture is clear, however. Overlying the Period 9 metallings a building (377) was erected, occupying most of the exposed area.

Period 10A (= OGL B Period 6F)

Building 377

The northern and southern walls of Building 377 lay beyond the limit of excavation. A wall which might be the eastern wall, and one

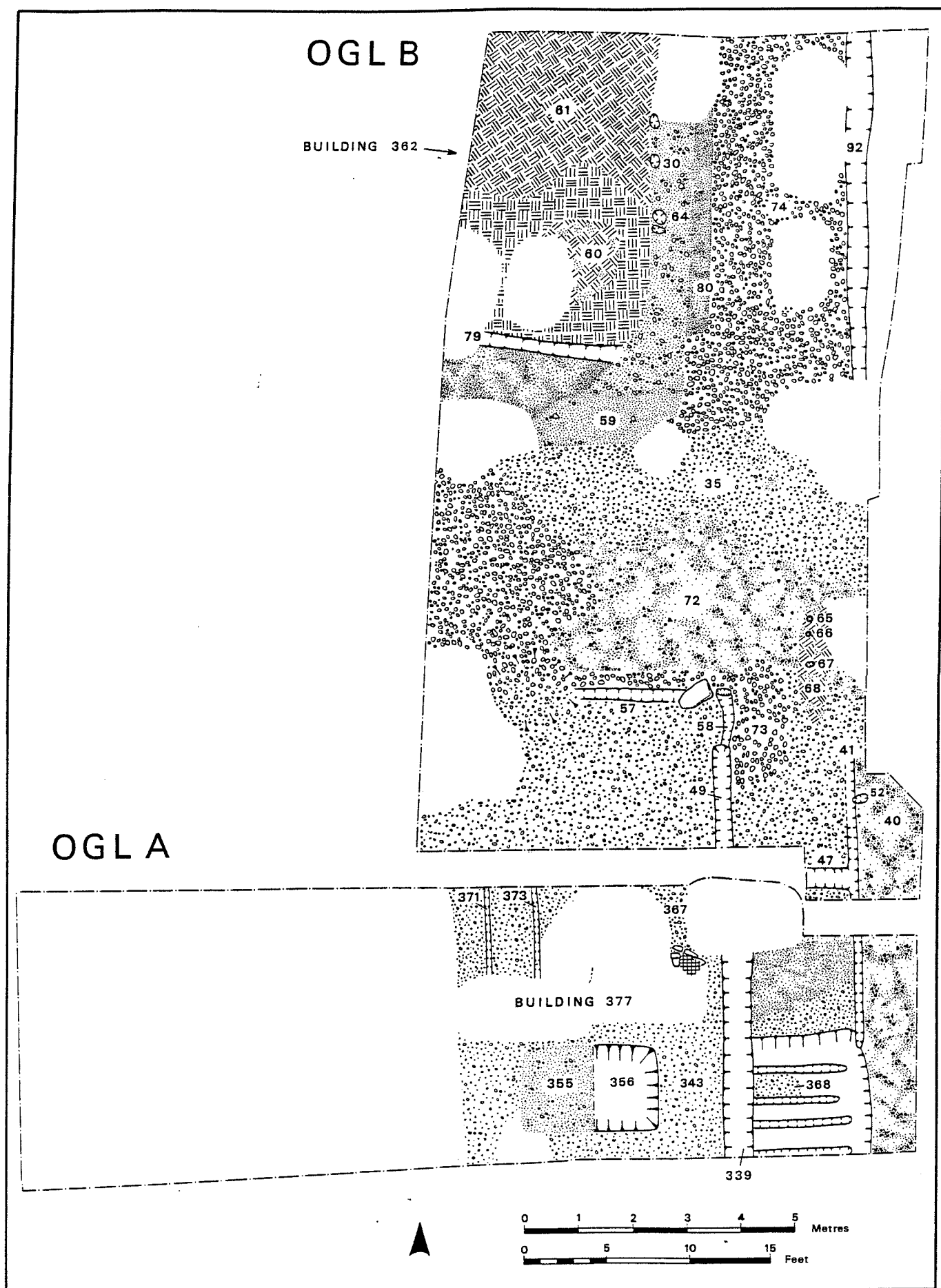


Fig 38 Plan of OGL A Period 10A and OGL B Period 6F

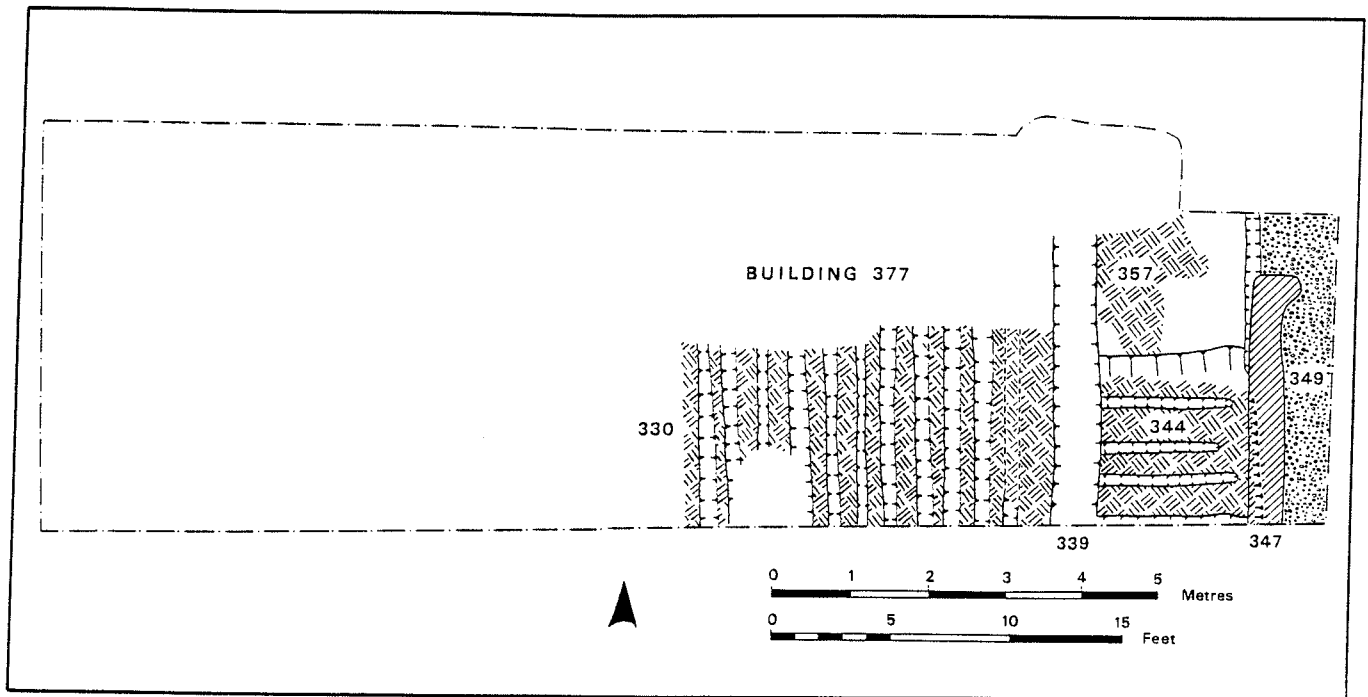


Fig 39 Plan of OGL A Period 10B

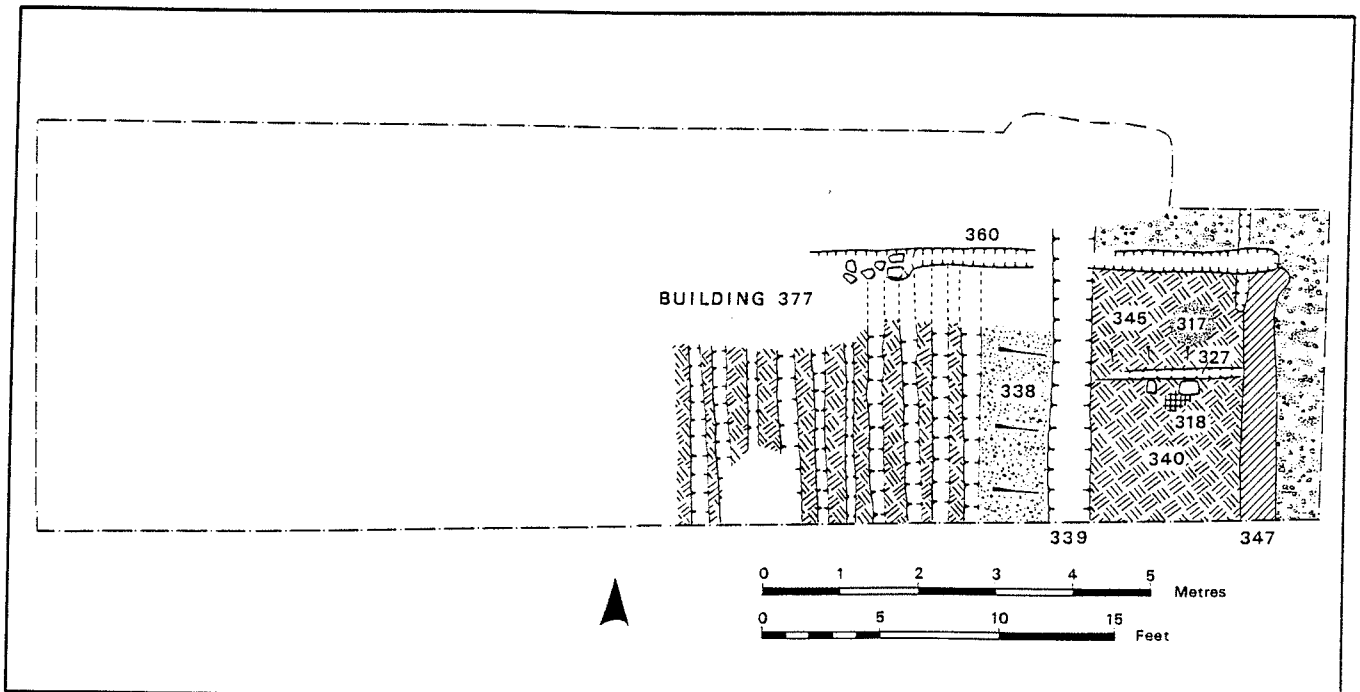


Fig 40 Plan of OGL A Period 10C

internal north-south wall, were identified (Fig 38).

The position of the possible eastern wall was marked by a narrow slot and by the difference between a gravel sub-floor (368) and a slightly uneven surface (343) formed from a mixture of pebbles and cobbles. The latter has the appearance of being an external surface. Some 2m to the west was an internal wall (339), whose position was marked by a slot, 0.55m wide, originally intended for a sill beam.

Between the possible eastern wall and the internal walls, variations in the surfaces may reflect subdivisions of the interior. The southern area had a floor distinguished by four parallel slots, which

were almost certainly for joists, about 0.1m across and 0.04m deep. There were four within the excavated area, bedded in a compact dirty gravel (368). The joists clearly imply a boarded floor. These surfaces were laid within a shallow depression, but no internal room divisions were noted. The northern room also had a dirty gravel surface but no joists.

Further west, the largest room was at least 5m wide. It had a gravel surface (343, Fig 38) which, being clean, may be interpreted as a bedding or sub-surface. Two slots (371, 373), which may have been for joists approximately 0.1m across, were noted. There was a large flat-based, vertical-sided pit (356) in the centre of the room. It

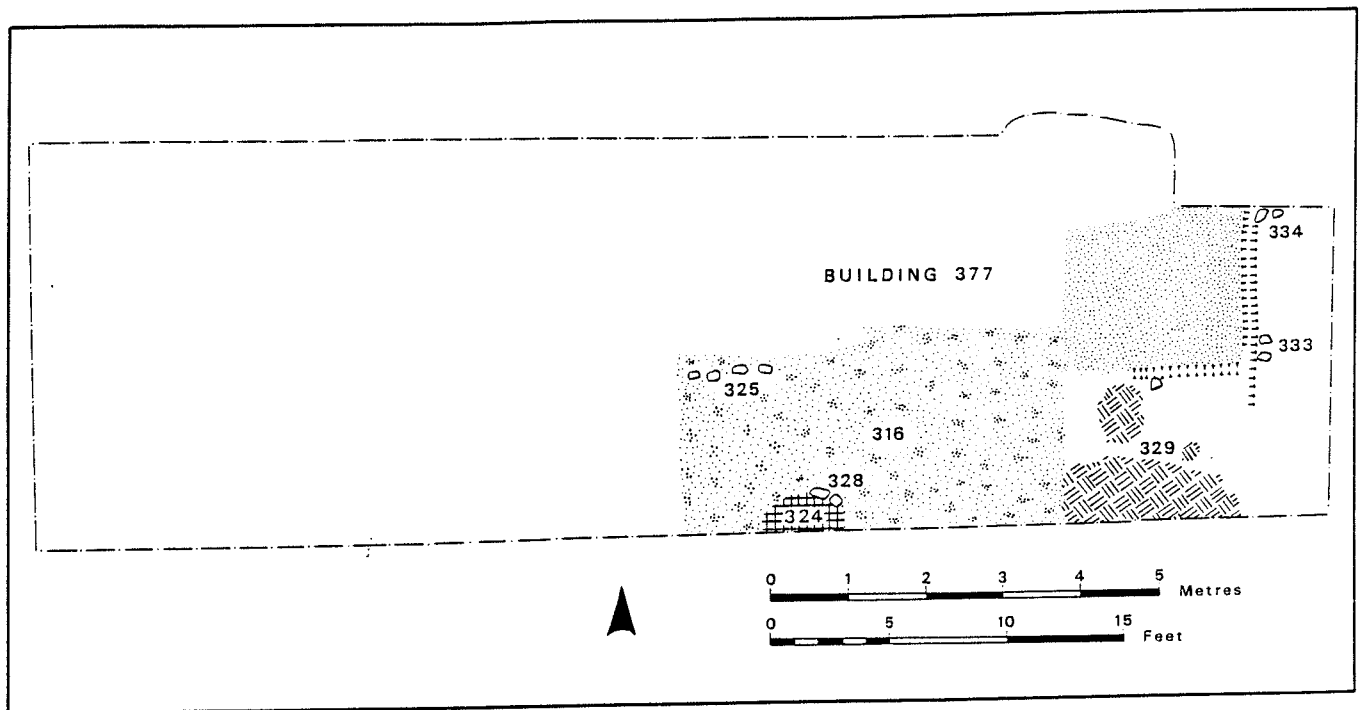


Fig 41 Plan of OGL A Period 10D

was rectangular, being 2.5m by 1.6m and 0.8m deep. Although no lining material was present and no postholes were observed in the bottom, the regular shape suggests that it was originally lined with timber. The lower fill was a black soil, but overlying this were layers of sandy clay loams with pebbles and cobbles.

Period 10B (= OGL B Period 6F)

The eastern wall of Building 377 was redefined as a clay band 0.5m wide by 0.2m deep (347, Fig 39). The clay probably formed a base for a sill beam. The eastern area was refloored with clay (344) and joists. The surface on the eastern limit of the excavation was an even compacted pebble surface (349) resting on a base of sand.

The floor in the northern room at the eastern end of the excavation was renewed with clay (357). The floor in the large room to the west was also renewed. Here a deposit of clay (330), 0.1m thick, was laid across the entire width of the room, sealing the Period 10A pit 356. The clay was cut by a series of 11 more or less regularly-spaced joist impressions. The impressions were 0.08-0.27m across, with a maximum depth of 0.11m. No traces of floorboard wood or nails remained.

Period 10C (= OGL B Period 6F)

An east-west internal wall (360) was introduced in Period 10C (Fig 40). It took the form of a slot, probably for a sill beam, 0.4m wide by 0.05m deep. To the south of this, the eastern room was divided by a minor internal partition (327) approximately 0.1m wide. The room to the north of wall 327 was floored with clay (345) and contained an oval charcoal smear (317) which may have been a hearth. The southern room also had a clay floor (340) and a hearth (318). The position of an internal feature was marked by sandstones placed against the southern side of wall 327. This may possibly have been a door providing access between the two rooms, but as the stones were only 0.5m apart centre to centre, a distance which seems a little narrow for a door, they may reflect the position of some other internal feature or fitting. This suggestion is rendered more likely as the hearth (318) effectively blocks the entrance and is adjacent to the eastern sandstone.

Period 10D (= OGL B Period 6F)

The eastern wall of Building 377 is represented only by a shallow slot, against which were placed two post positions (333-4), 1.3m apart, on the external face of the wall (Fig 41). The posts had been removed, but were probably door jambs marking an entrance from the outside; the post positions were marked by large cobbles and

sandstone fragments.

The east-west internal wall (360) and the north-south wall (339) were no longer in evidence. New surfaces of clay (329) overlay the former wall positions, whilst further west the former joisted floor was covered with black silts and charcoal (316), together with a hearth (324) and sandstone blocks (328). An east-west line of rough sandstone fragments (325) may define a new internal partition wall.

Period 10E (= OGL B Periods 6F-7 and 7A)

The internal arrangements which characterized Building 377 in Period 10D were continued in this period (Fig 42). The surfaces were renewed with the deposition of a 0.1m thick sandy clay (307) over the western part of the building. In the eastern part a silty clay, 0.5m thick, containing numerous pebbles and some sandstone fragments (313), was laid. The former line of the internal wall 339 (Fig 40) was marked by a break in the floor levels.

The external surfaces east of the building were renewed with clay, sandstone blocks, cobbles and pebbles (315).

Period 10F (= OGL B Period 7B)

Overlying Building 377 were extensive deposits of clay with pebbles (205) and silts (64). Most of the internal features and the position of the eastern wall were covered over by these layers (not illustrated), which must mark a destruction phase.

Some 45 stakeholes (not illustrated), showing no discernible pattern, cut the Period 10E surfaces and were partially sealed by the Period 10F deposits.

Periods 10-11 and 11 (= OGL B Period 8)

Context 205 may have continued in use for a while but the chief features of Periods 10-11 and 11 were the deposition of a pebble surface (158, Period 10F-11) and overlying stone-free soils (37, 64, Period 11) (not illustrated).

Period 12

With the exception of the small stake-built structure, Building 618, many of the deposits are characteristic of external levels. They appear to be yards or footpaths. Little can be said about Building 618, although attention is drawn to another, larger,

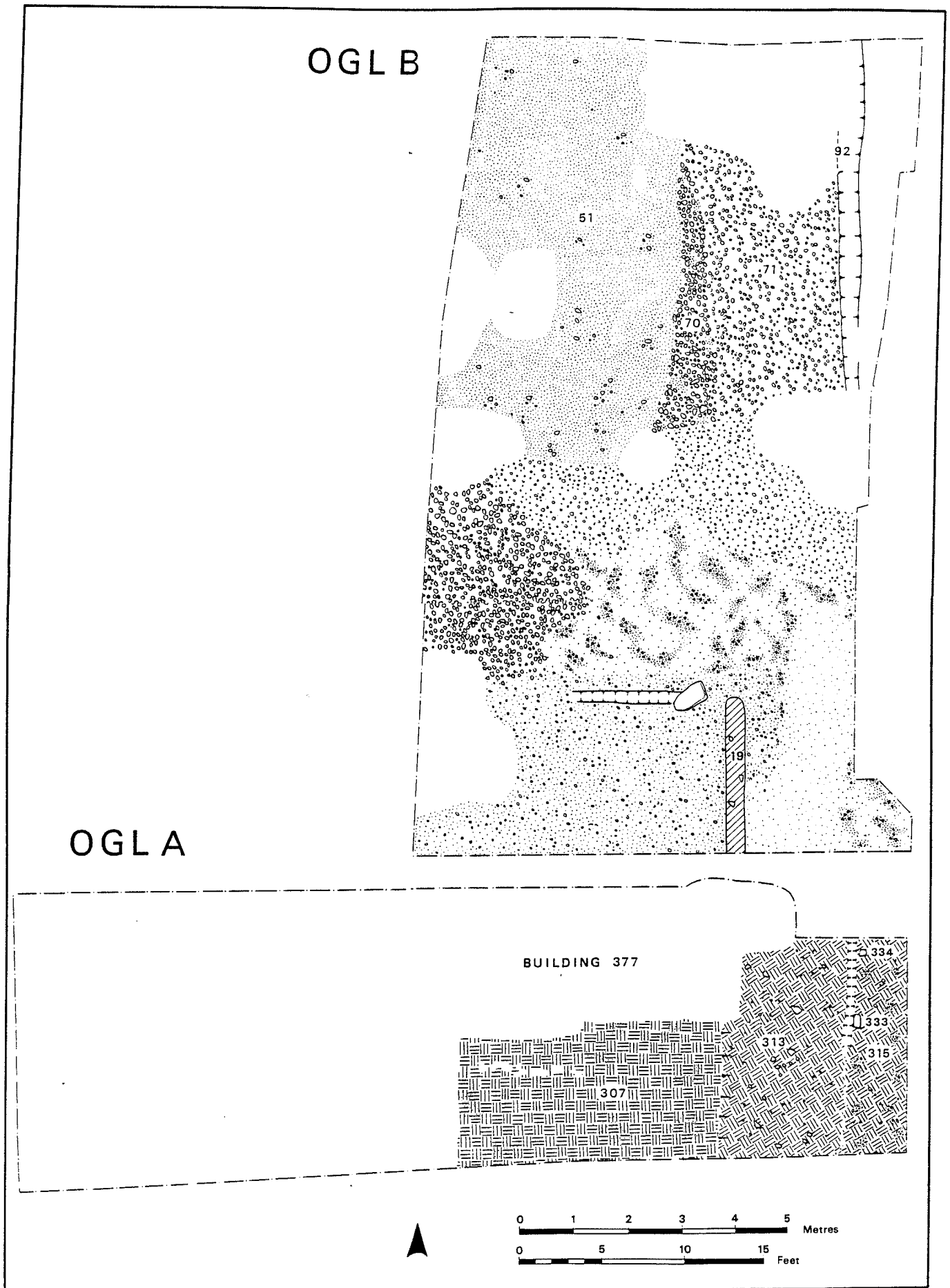


Fig 42 Plan of OGL A Period 10E and OGL B Periods 6F-7 and 7A

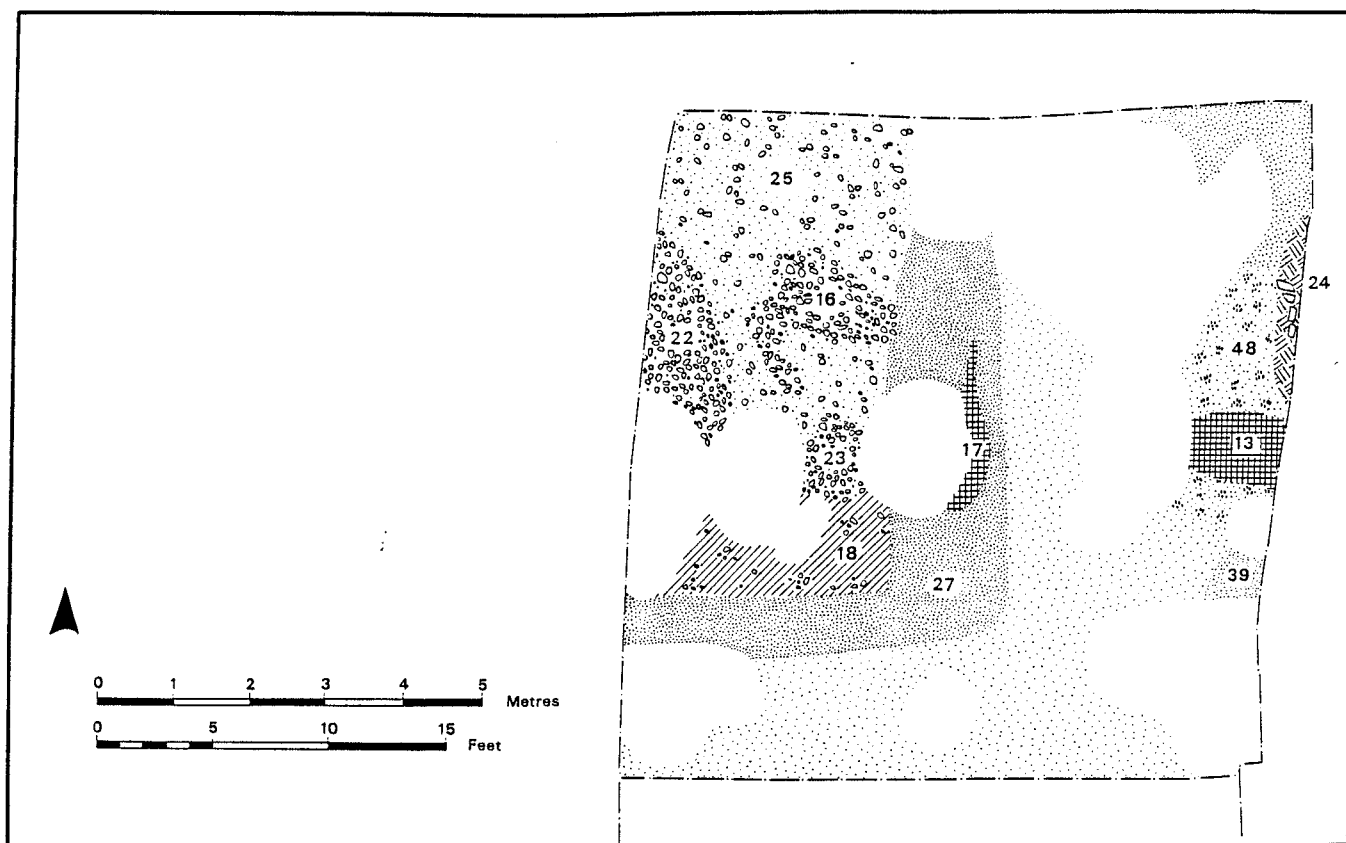


Fig 43 Plan of OGL B Periods 8A and 8B

example in LEL A Period 15, Building 668 (p 87).

Period 12A (= OGL B Period 9)

Features attributable to this period were located along the northern edge of the trench and at the western end. They included soil deposits with substantial numbers of cobbles and flat sandstones, which probably formed surfaces (38, 127, 157, Fig 44), together with patches of clay. A small number of stakeholes were located but no pattern could be discerned. Towards the eastern end was a bank of cobbles (28) aligned north-south. This is almost certainly part of the 'bank' recognized by Clack in Trench 1, Period 3. This is the only point at which the two excavations can be stratigraphically linked.

At the western side of the excavation a shallow 'cut' (124) marked an 'edge'. To the west of the 'cut' there were silty clay deposits (114, 121) and a slot (134), 0.2m wide by 0.2m deep. The slot was V-shaped in profile.

Period 12B (= OGL B Period 9)

Building 618

A certain amount of re-surfacing with pebbles took place along the northern edge of the site, along with a soil accumulation (12, not illustrated). These were cut by stakeholes forming part of the north, east and west walls of a small building, 618 (63, 76, Fig 44). To the south there was another row of stakeholes (108) which have no stratigraphic links with 63 and 76 but which are assumed to belong to the same structure. The building thus defined measured about 3m north-south by 3.2m east-west. The stakeholes were 0.01-0.02m across, and were closely spaced at 0.05-0.2m intervals.

To the west of Building 618, the Period 12A slot (134) was replaced by a flat-based gulley (126, Fig 44), some 2m wide by 0.25m deep. It was aligned roughly north-south and was filled with a clayey silt.

Period 13 (= OGL B Period 9)

This period includes all post-Period 12A-B features, apart from the

modern ground surface, machine disturbances and features associated with cellars. The essential features include soil deposits, a pebble surface and a variety of pits, not all illustrated in Figure 44 (8, 10, 19, 25-26, 33, 184). Some pits were relatively insubstantial, but one (pit 6), and another possible example (pit 25), resembled the pits in OGL B Period 9, although the sample from OGL A is too small to permit conclusions as to function. The date of the pottery from pit 6 would agree with such a correlation (Fasc 3, p 00), but pit 25 produced no medieval pottery.

Pit 4 (Fig 44) was roughly circular in shape, 1.1m in diameter and 0.25m deep. It had vertical sides and a flat base as though it had formerly been lined. No lining material was discovered but the fill included nine horizontal deposits of silts and loams, some with wood chippings, some with gravel and cobbles. Carbonized oats were present in small numbers in the fill (3, p 120).

Pit 4 cut pit 6, which was 2.65m long, 1.35m wide and 0.55m deep. Its upper fill (5.1) contained sand and charcoal fragments but no seeds. This was probably a genuine feature rather than a factor of preservation, for the underlying fills (5.2-5.7) contained abundant straw and grass stems as well as seeds from a variety of sedges, grassland taxa and weeds (pp 120-1). Although small amounts of bran and other faecal-derived material were present, the pit was not primarily used for cess deposition. Rather it seems to have been used for depositing general organic rubbish such as waste bedding. The botanical suite from this pit is not dissimilar to that recovered from most of the other pits.

Pit 16 (Fig 44) was little more than a shallow scoop. Pit 25 was roughly circular with a diameter of about 1.5m. It had a similar fill to pit 6. Pits 20, 26 and 33 just impinged on the excavated area on the northern edge of the trench; no details of size or fill were recorded. At least some of the pits may be equated with Period 9 in OGL B although there are no stratigraphic links.

Well 1237

Much of the surface area of this well (Fig 44) was excavated by Clack in his Trench 1 (p 57). It appears from Clack's section that the well was cut from either layer 70 or 72 (Periods 1 and 2), or from within layer 68 (Period 4). Clack attributed the well to Period 5 on the basis

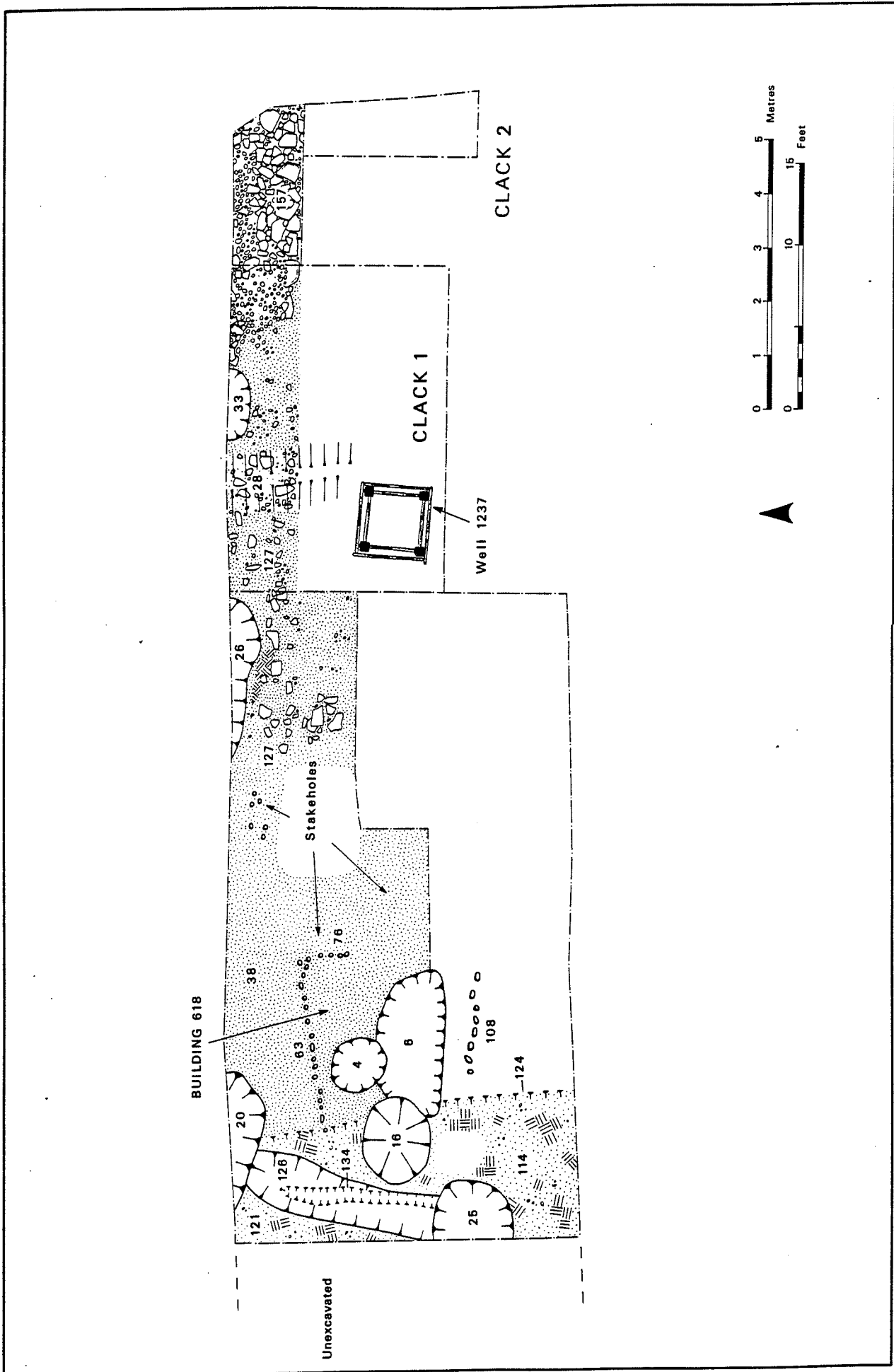


Fig 44 Plan of OGL A Periods 12A, 12B and 13

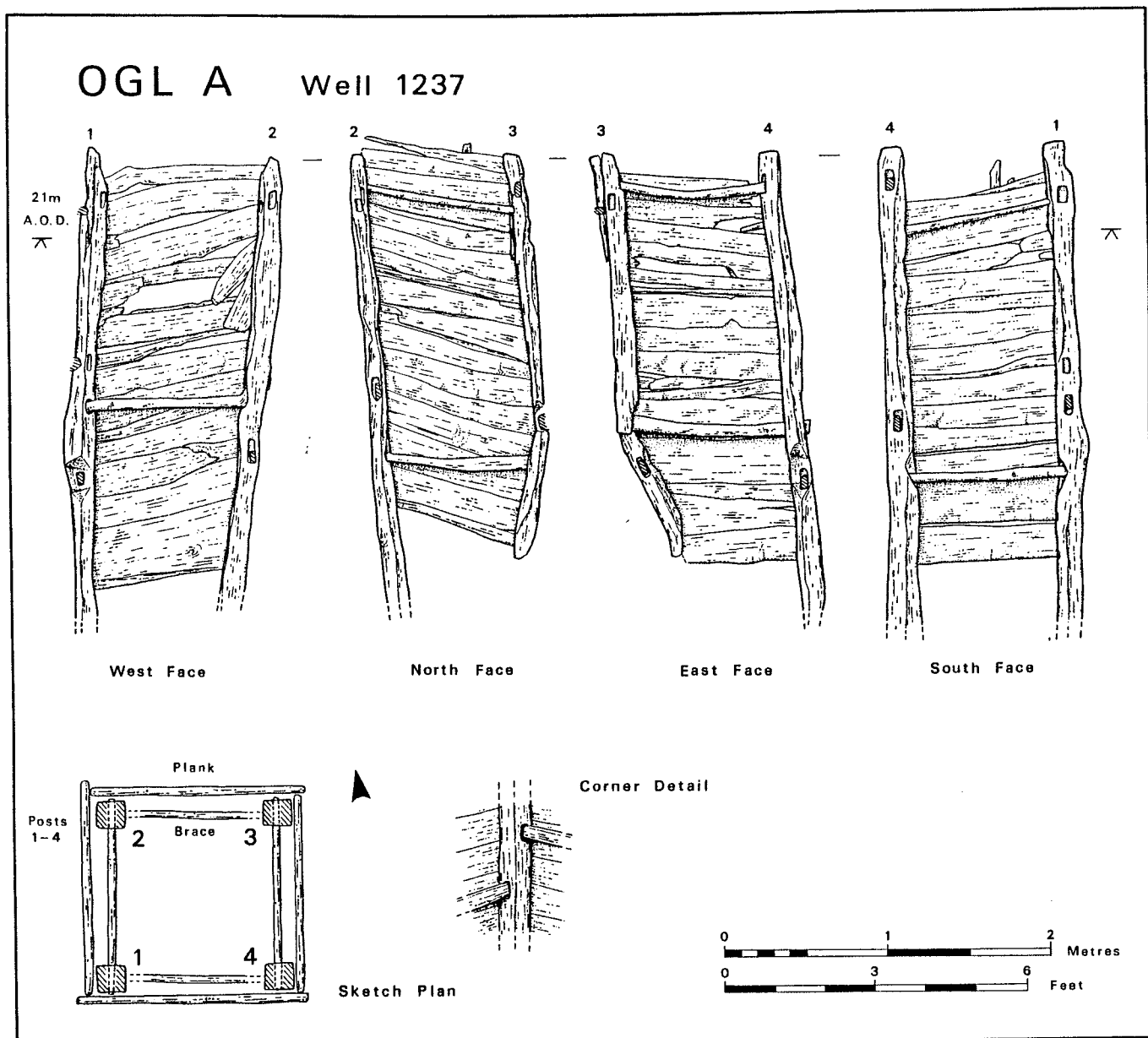


Fig 45 OGL A, details of the timbers in well 1237, Period 13

that it 'cut through all the preceding phases', but the evidence is not argued through in the site notes and appears to be ambiguous. The excavator was probably influenced to some extent by his views on the dating of Periods 1 to 4, which he regarded as Roman, and the radiocarbon determination for the well which suggested that it was ninth century. Clack's dating is certainly incorrect because the pottery from many of his 'Roman' layers includes medieval sherds, and because the well was clearly in use in the medieval period, as witnessed by the dendrochronology dates (p 104) and the pottery in the fill (Fasc 3, pp 416-7).

The well was a complex construction. It was probably built within a conical construction pit backfilled with clay (Clack's layer 72). The cone appears to have been relatively shallow, perhaps no more than 0.5m deep and about 2.7m in diameter. Below the base of the cone the well formed a roughly square shaft which was exposed in 1975 to a depth of about 0.5m, and in 1981-2 to a depth of 3.75m. The original depth of the well is not known. The bottom of the well was not excavated because there were signs of collapse in antiquity and instability.

The shaft was lined with timber (1239). The corners consisted of oak posts. The posts varied in length from 2.57m to 3.14m, and were sub-rectangular in section, measuring up to 0.22m wide by

0.18m thick. Through-mortises were cut in each post, and these held horizontal oak braces. The mortises were carefully cut into the posts by drilling holes from either side and sawing. The braces varied in length from 1.17m to 1.29m. They were sub-rectangular in section, and 0.08-0.04m across. The braces showed signs of adzing, sawing and chamfering, especially at the ends where they penetrated the mortises.

The posts and braces essentially formed a free-standing frame within the well shaft. Behind the frame the well was lined with planks which rested against the sides of the shaft (Fig 45). The planks, varying in length from 0.95m to 1.52m, were all sub-rectangular in cross-section, and showed signs of having been sawn at the ends. They varied in width from 0.1-0.2m and in thickness from 0.03-0.13m. One plank which retained its sapwood was given a felling date range of AD 1193-6 (p 104 and Table 3 below).

The well was filled to a depth of 1.9m by a clay, silt and cobble mixture. Below that point the deposits were waterlogged, containing small mammal bones, fragments of wood and silts. The botanical remains were largely undiagnostic of any specific type of activity. Faecal material was not deposited in the well but there were some grassland taxa, possibly representing hay or dung (p 121). Parts of the well fill contained large numbers of insects similar to Roman and

Anglo-Scandinavian house fauna, and it is suggested (p 138) that much of the material originated within a dry, possibly domestic, building.

Although the well could not be linked with the surrounding stratigraphy, it could have been in use at the same time as some of the stone surfaces and may be contemporary with the 'bank' discovered by Clack and identified in the 1981-2 excavations.

Old Grapes Lane Trench A West

The trench abutted Trench A at its western end (Figs 3-4). It was 10.8m in length by 6.6m wide. There are no definite stratigraphic links with OGL A and there are no deposits in OGL B which can be regarded as equivalent to those here.

Periods West 1 and West 2

The earliest features (Period West 1, Fig 46) comprised cobbled surfaces (560-1) and a mixture of clay and cobbles (547 and 558). Overlying these were more surfaces of pebbles (532, Period West 2) and mixed cobbles and clay deposits (not illustrated). The surfaces identified may be yards but they could be floors or roads.

Period West 3

Buildings 515 and 550

Traces of two possible buildings (515 and 550) separated by a lane, both having a common frontage on their south sides, overlay the Period West 2 surfaces (Fig 46).

The western building (550) was represented by its south-eastern corner. The south wall (549) comprised a shallow foundation trench 0.7m wide, filled with an upper layer of clay and a lower deposit of large cobbles. The eastern wall (551) was less substantial, being represented by a shallow trench approximately 1m wide filled with silty loam and gravel.

Within Building 550 there were a number of deposits, not all adequately recorded, but including a silty loam with pebbles up to 0.05m deep (545), a hearth and other deposits.

The eastern building (515) was built on post-pads (522, possibly 523, 524, 533-4). The pads were 0.3-0.5m long by 0.25-0.4m wide and 0.15m deep. They form a rectilinear arrangement at least 0.4m wide from front to back (north-south) and at least 0.3m east-west. The northern and eastern sides of this structure cannot be adequately defined because they lay beyond the limits of the excavation. No floors were recorded within the building, but the clay and pebble surface (532) in OGL A Period West 2, which underlay the padstones, may have continued to function as the internal surface. The western limit of this surface is coincident with the western wall of the building.

In between the two buildings there was a narrow lane, partly cobbled and partly paved. The paving (517) continued along the south side of Building 550 (516) and is probably the same as paving adjacent to the south-east corner of Building 515 (518, 521).

The function of other features (519, 528, 553, 556) is uncertain, although some may relate to Building 515.

The presence of shallow foundation deposits (540, 551) but the absence of postholes or post-pads in Building 550 may imply either a framed structure, perhaps based on sills, or a cob-walled building constructed around crucks. No evidence for cruck construction was found, however, and would in any case be difficult to identify with certainty. Building 515 incorporated posts based on padstones.

Although it is not possible to establish the dimensions of the buildings in any phase with any certainty, the positioning of the posts in Building 515 in Periods West 3 and West 6 is very similar. This may be taken to imply a degree of continuity and suggests that the depth of the building may be around 3.5-

4m, measured from pads 533 and 534 to pads 522 and 524. If the northern wall was represented by pads 528 and 556, the depth of the building would be increased to over 4m. The possibility of a further room, or an outshut, against the north wall cannot be ruled out, and pads such as 528 and 556 may be so associated. The two buildings were separated by a cobbled lane.

Periods West 4 and West 5

Only two pits can be attributed to Period West 4 (Fig 46). Pit 539 was 1.3m in diameter and about 0.3m deep. Pit 542 was sub-rectangular in shape, 0.95m by 0.8m and 0.2m deep. It was filled with sandstones and cobbles with clay. Both pits resembled post-pits and their location was coincident with the southern walls of Buildings 515 and 550 in Period West 3.

In Period West 5 a black soil (513, Fig 46) overlay the eastern end of the trench and pit 539.

Period West 6

Building 510

At the eastern end a number of features which may indicate the presence of a timber building (510) cut the black soil (513) of Period West 5 (Fig 46). The building was based on roughly rectilinear and circular arrangements of cobbles which could have formed post-pads (500-1, 503, 505). The pads were approximately 1.2m in length by 0.8-0.9m across. In addition, a length of sandstone blocks (502) may have formed the base of a 1.5m long wall, whilst a large sandstone (520) may be another post-pad.

Post-pad 505 overlies, but may be contemporary with, a rectangular pit (506) containing charcoal and soil. This pit was 1.62m by 0.7m and 0.2m deep; it had vertical sides and a flat base.

With the possible exception of two strips of clay (526-7) which were identified as possible wall bases or floors, there were no convincing associated floors or lane surfaces. The postulated building was rectilinear in shape, being at least 3.5m east-west but of uncertain north-south dimensions, located in a very similar position to Building 515 in Period West 3.

The structural evidence for Period West 3 can be interpreted in two ways. Firstly, it is possible to argue that there were two buildings (515 and 550) separated by a narrow lane in Period West 3, succeeded in Period West 4 by a structure based in two pits (539, 541). This was followed by the deposition of a black soil (513) in Period West 5. Finally one, or possibly two, buildings were erected in Period West 6.

Secondly, the sequence from Periods West 3 to West 6 could be viewed as representing two phases of a single building, separated by a soil deposit (Period West 5). According to this interpretation, the cobbled lane dividing the ends could be regarded as an internal passageway. On either side of the passageway, the two pits (539, 541) in Period West 4, despite being constructionally later, may provide a link between the south walls of the two buildings. Such a hypothesis involves conflating Periods West 3 and West 4. It is impossible to be certain on the evidence available whether the remains represent one or two buildings.

The significance of the black soil (513) in Period West 5 is also questionable. It did not extend over the west end of the site. Superficially it appears to form a division between Periods West 3/4 and West 6, but it may be stretching the evidence too far to see it as anything more than dirt accumulating in and around the Period West 3 building. The archaeological record, however, is insufficiently detailed.

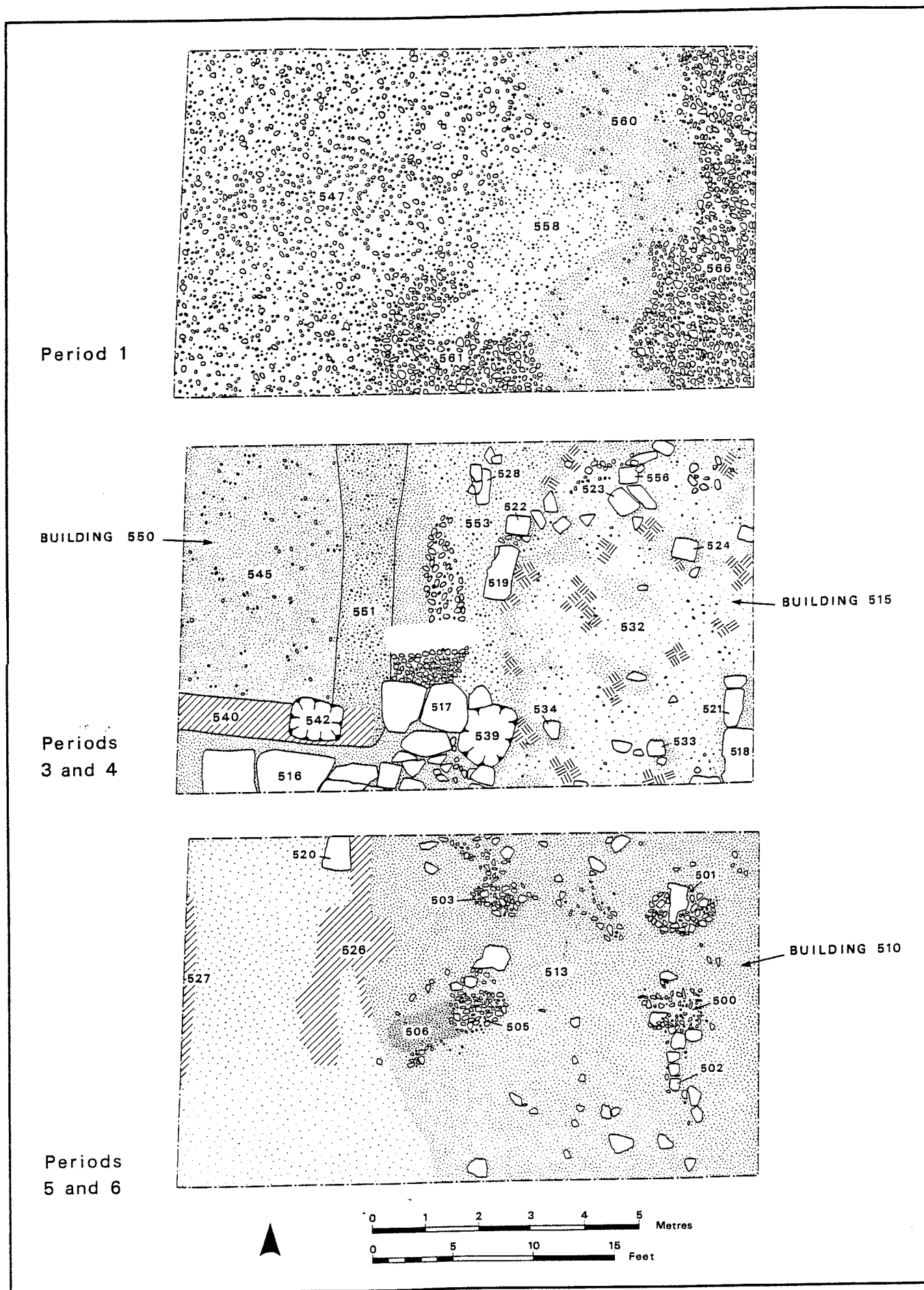


Fig 46 Plan of OGL A Periods West 1 (top), West 3 and 4 (middle), and West 5 and 6 (bottom)

Periods West 7 and West 8

Overlying the features of the previous period a layer of black soil (199, Period West 7) was distributed across the entire area (not illustrated). The latest deposits comprised context 2 (Period West 8), which was the detritus left after machining.

Excavations by P Clack, 1975

In August 1975 Peter Clack, working on behalf of the Department of the Environment and the University of Durham, with assistance provided by Carlisle City Council, excavated two trenches (1 and 2) in the space between Old Grapes Lane and Grapes Lane. At the same time Paul Gosling excavated a trench in Hodgson's Court. The latter excavation will be summarized in Volume 2 of The Lanes excavations (McCarthy forthcoming). Details of Clack's work are in the site archive, and what follows summarizes the results.

The western trench (1) was located on the site of number 11 Old Grapes Lane, a building identified in 1926 as a 'wash house'. The eastern and western ends of the trench extended slightly into the adjoining properties, numbers 9 and 13. The trench was very small, measuring 6m by 4m at the top, but it was subsequently stepped down so that the bottom, at a depth of 2.3m, measured 4.6m by 2m.

The eastern trench (2) lay 2m east of Trench 1 and occupied the sites of numbers 13 and 15 Old Grapes Lane, both described as 'cottages' in 1926. It measured 8m by 3m and was excavated to a depth of 0.5m over most of its area, although the west end appears to have been taken to a greater depth.

When Carlisle Archaeological Unit's excavations commenced in 1981, the site records of Clack's earlier work were not available. As a result, the work could not be located to take full advantage of Clack's discoveries. Only Clack's western trench (1) was identified in OGL A, and this appeared as a

disturbance. It included Clack's timber-lined well (69; OGL A 1237). No further work was done in the area of Clack's eastern trench (2).

The site records

Clack produced a stratigraphic report and discussion on both his trenches, and obtained specialist reports on some of the artefactual and animal bone data. The records for Trench 1 include a report for Periods 8 to 11 and contextual records for layers 1 to 65 only. In addition there is a summary of the sequence from Period 1 on and this contains a brief description of the periods for the entire sequence. Attempts to re-work the sequence in the light of the more recent work have proved impossible, and Clack's period numbers have been retained for ease of cross-referencing. The original dating based on pottery and one radiocarbon determination has been shown to be misleading. In particular the timber-lined well, thought by Clack to date to the ninth century, can be shown to have utilized timbers felled at the very end of the twelfth century (p 54).

As the site records contain no mention of the natural subsoil or of a buried ground surface, it is assumed that the archaeological sequence is incomplete. This may be due to the 'appalling weather conditions'.

Clack Trench 1

Period 1

A deposit of yellow clay underlay a surface of cobbles mixed with sandstone. A narrow gully, aligned north-south, lay to the east, apparently forming an edge to the cobbles. A significant proportion of the trench was occupied by the medieval timber-lined well.

Period 2

The cobbled surface of Period 1 was renewed as far east as the gully, which appears to have continued in use, and a deposit of clay which laid beyond.

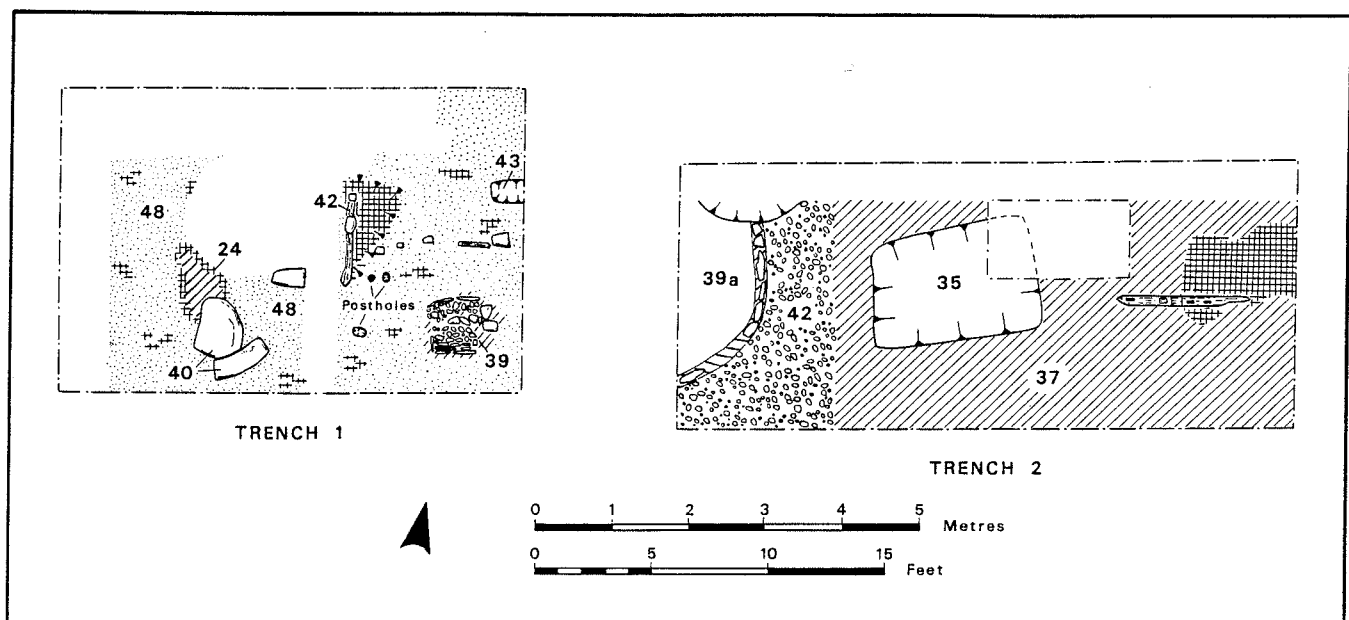


Fig 47 Plan of Clack Trenches 1 and 2

Period 3 (= OGL A Period 12)

The cobbled surfaces were overlaid by 'a bank consisting almost entirely of cobbles (66)'. A very similar feature (28) was identified in OGL A in Period 12, where it was associated with stone and soil deposits.

Clack attributed the 'bank' to the late Roman period but this must be mistaken for two reasons. Firstly, it contained a considerable amount of medieval pottery (Fasc 3, p 423). Secondly, its position in OGL A can be shown on stratigraphic grounds to be late in the sequence.

Period 4

A dark clayey deposit accumulated against the Period 3 'bank'. Overlying the 'bank' on its eastern side, a sub-rectangular, unnumbered shape labelled 'pink clay' is recorded in section. The clay occupied a similar position to the gully recognized in Periods 1 to 2. The clay feature was not planned or separately described, but the fact that it appears in both north and south sections suggests that it was a linear feature.

An accumulation of cobbled surfaces is clearly present. None of the features is adequately described and several are unplanned, making interpretation extremely difficult. However, the coincidence of the eastern edge of the surfaces, marked firstly by a gully (Periods 1 and 2) and then the 'bank' (Period 3), followed by a linear clay feature in Period 4, suggests that some sort of linear feature existed at this point for a prolonged period of time. It is impossible to say whether this was one side of a building, a property boundary, or something else.

Period 5 (= OGL A Period 13)

A timber-lined well is the only feature attributed to this phase. The well shaft cut through all earlier phases. The well is described in detail above (OGL A 1237, pp 52-4). Clack notes that 'the precise stratigraphic relationship between the well and the overlying deposits could not be determined due to the collapse of the latter into the former at a relatively recent date'. The section shows that the pit may have been cut when layer 68 (Period 4) was in the process of formation. (See also Period 11, pit 10.)

Period 6

Overlying the Period 4 deposits there accumulated further deposits of 'black clayey material (67)', together with clean sand and clay layers.

Period 7

A deep deposit of soil overlay Period 6. It varied in depth from 0.55-0.75m and was featureless.

Period 8

Overlying Period 7 was a complex sequence of buildings and other features.

In the south-east corner of the trench a line of wattling was associated with a posthole and some paving. To the west lay a layer of twigs overlaid by clay.

Period 9

The area of the trench was covered by a compact cobble surface through which two pits were cut.

Period 10A

Three postholes (26), aligned north-south, lay at the western end of the trench. In the centre of the trench there was a burnt timber (42) and, at the eastern end, other postholes (eg 44) and sandstones, which might be interpreted as partition walls. A substantial area of burnt clay and sandstone (40) is a possible hearth. Associated with these features were layers of burnt daub and charcoal (24A and 24B).

Period 10B

Part of a second structure was located at the eastern end of the trench. It included postholes (43, 51) cut into a clay deposit (33). A hearth (39) comprising small sandstones set in a bed of clay was associated with these features.

Pit 10 appears to have been visible from the point at which the Period 11 remains of the post-medieval cottages were removed. The position of this pit is very similar to the timber-lined well (69, Period 5). The context notes imply that they are one and the same feature, and much of the pottery from pit 10 belongs to vessels from the well fill (Fasc 3, p 426). There is some room for doubt, however, because on the section which shows both pits, the bowl-shaped depression of pit 10 is not located precisely over pit 69, rather it is to one side, and the plans consistently place pit 10 slightly to the north of pit 69.

The small area excavated, combined with inadequacies of recording, precludes a detailed interpretation of the features. Clack identified two structures although he conceded that they could be part of the same building. The arguments in favour of two buildings cannot be sustained in the light of the available evidence, and the matter must remain open.

Four north-south walls can be tentatively suggested in Trench 1. The western line is represented by three postholes (26) and the eastern line by posts 43 and 51, although the latter may not be a post. In between is a beam (42.1), resting on sandstones, and miscellaneous other posts (including 44, the others being unnumbered), which may form two wall lines about 0.2-0.3m apart.

Two east-west walls can also be tentatively suggested. In the western part of the trench a wall can be envisaged between the northern post (26) and a sandstone pad to the east. A second line is hinted at in the eastern part of the trench, where a line of sandstones links up with a beam (42.2).

No floors were recognized as such, but two hearths (39-40) were present in Trench 1. The building(s) in Trench 1 appear to have been burnt down, for they were covered by a thick layer of burnt daub (24) and ash (48).

At least one, and possibly two buildings, were present in Trench 1. Most of the trench probably lay inside these buildings.

Period 11

The latest structure comprised the sandstone, cobble and brick foundations of the cottage demolished in 1963 (for further details see the site archive).

Clack Trench 2

The excavation in Trench 2 only penetrated the medieval levels; the sequence begins with Period 8 and ends with Period 11. This suggests that Clack regarded Periods 8 to 11 in both trenches as contemporary, although there was an unexcavated gap of about 2m in between. The pottery evidence suggests that such a precise correlation is invalid, however (Fasc 3, p 00), although both sequences are medieval to post-medieval in date. The numbering of the periods as allocated by Clack has been retained without prejudice, for ease of cross-referencing.

Period 8

The earliest context identified consists of a layer of dark clay and a row of sandstones.

Period 9

At the western end of the trench part of a large pit was lined with stones set in clay. It had a fill of charcoal, burnt daub and clay. It was associated with a compact clay and cobble surface which appeared to terminate in a straight line.

Period 10A

Most of the trench was covered in a deposit of clay (37, 38) interpreted as a levelling deposit. The clay was cut by a shallow

rectangular pit (35), charcoal (21, 22) and a second pit (20), associated with the charcoal there was a timber beam (possibly a sill beam), in which there were four mortises and a trace of a lap joint. Another posthole and burnt timbers, including at least three planks, were associated with it.

Period 10B

The site was covered by a deposit of mixed clay and stones (17, 18) which was cut by a pit (30), postholes (23, 25) and a possible hearth (32).

A square timber-lined pit (8) lay on the northern side of the excavation. It was overlaid by the mixed deposit (17, 18). The pit was 1.8m square and was filled with rubble from the 1963 demolition programme. The pit was not fully excavated due to water problems, but it was thought to have been a well.

The very small areas excavated, combined with inadequacies of recording, preclude a detailed interpretation of the features. Structural elements were present in the form of postholes, stakeholes and timbers (possible sill beams).

In Trench 2 there is a line of three stakeholes and a mortised beam which forms a convincing east-west wall. No other walls are apparent, although there are some features, including postholes (23, 25, 32), on the southern edge of the trench.

Apart from one wall in Trench 2, the true status of which is not known, it is impossible to ascertain whether the features were external or internal.

Period 11

The latest structure comprised the sandstone, cobble and brick foundations of the cottage demolished in 1963 (for further details see the site archive).

Old Grapes Lane Trench B (OGL B)

Period 0 (= OGL A Period 0)

The natural subsoil (not illustrated), a pale clay, was recognized under the old ground surface. The subsoil was not exposed over the whole area of the excavation but sufficient was cleared on the northern and western sides to demonstrate that there were no plough marks.

Period 1

Period 1A (= OGL A Period 1A-B)

Two features (339-40, not illustrated) were located overlying the subsoil. Context 339 appeared as a roughly linear east-west area of yellow and red-brown sandy clay, 1-1.5m wide. Context 340 lay to the west of 339 and was characterized by grey silt. It is possible that both features are of natural origin.

Period 1B (= OGL A Period 1C)

A buried ground surface (335), black to grey and humic in composition, was present over the whole site (Fig 17). The thickness of the deposit varied from area to area, depending on the extent to which later activities intruded, but in general it was around 0.05m deep at the southern end of the trench and up to 0.16m deep at the northern end. Subtle variations were observed during the cleaning and excavation of this deposit. The lowest (earliest) part of the deposit was black, smooth and silty in texture, whilst the uppermost part was less smooth and greyer.

Period 1C (= OGL A Period 2)

A number of features cutting and overlying the old ground surface in Period 1B were sealed by the widespread deposit (299) attributed to Period 2A.

Root systems (342, 347-8) were observed in three places (Fig 18). In the case of systems 347-8 the roots themselves survived in

the north-eastern corner of the trench. System 347 comprised 11 roots, all aligned more or less north-south. The longest was 1.5m in length. System 348 was a single strand aligned north-east/south-west. They are probably from different trees or shrubs.

System 342 was identified as a root system during excavation but as no roots were found, it could equally well be interpreted as of animal origin, perhaps burrows. Several shallow U-sectioned gulleys about 0.05m wide filled with soft grey silt were located towards the centre of the northern half of the trench. The gulleys broadened out in places and in one case formed an irregular shape measuring roughly 0.4m by 0.8m.

Overlying the old ground surface there were two black burnt patches of soil (343, 345, Fig 18) indicating hearths or bonfires, together with a large number of stakeholes (346). As no infill material was found to link any of the stakeholes, the wood of which did not survive, it can only be assumed that they were contemporary. Several alignments can be recognised. In one case the spacing between the stakes varied from 0.2m to 0.5m. In another instance the stakes were spaced at intervals averaging 0.7m, with a 1.5m gap. Some stakeholes appear to be paired, whilst others appear in irregular clusters. There was one possible posthole (341).

Gulley 336 (Fig 18), identified on the southern edge of the trench, was 0.08m wide by 0.05m deep. It was U-shaped in cross-section and formed an arc roughly 2m in length. At the time of excavation, and in the knowledge that a possible round-house had been identified in OGL A, context 336 was thought to have had a structural function. This is possible, but only one cobble and one stakehole were associated, and it could have been a root impression or an animal burrow similar to 342.

A number of fragments of oak roundwood, blocks and chips were noted in this period.

Period 2

Period 2 is divisible into two sub-phases. Period 2A represents the deposition of bedding material and Period 2B consists of recognizably structural elements.

Period 2A (= OGL A Period 3)

A bed of clean, pink-brown silty clay (299) was found across the entire site (Fig 19). The layer was generally about 0.05m in depth, although there were places where it was up to 0.1m deep. Although this deposit sealed many of the features attributed to Period 1, it is possible that, because of the superficial nature of some aspects of the excavation of 299 and the underlying upper part of the old ground surface, root system 348 and some of the stakeholes in Period 1C may in fact post-date Period 2.

To the west and south-west, layer 297/308 (Fig 19) was a pink-orange clay with cobbles, and 318 was a patchy white-yellow clay. Layer 297 was partially overlaid by a soil deposit (307). These layers have no stated relationship with 299 (as they should have if 299 extended across the entire trench), and their contemporaneity with 299 is therefore assumed.

Period 2B (= OGL A Period 4)

A number of structural features were identified on the west side of the trench (Fig 20). Gulley 303 was aligned east-west and was 0.2m wide by 0.22m deep; it was U-shaped in section and filled with grey silt and some cobbles. The line of 303 is continued to the east by a substantial oak post (316), 0.16m by 0.14m across, surviving to a height of 0.45m. The post was set in a post-pit (315) containing white clay, silt and fragments of wood including chunks of oak.

Separated from 303 by a gap of only 0.1m was wall 314, set in slot 304. This wall was aligned east-west and consisted of a wooden post and vertically-set planks. A single post, 0.1m by 0.08m across, survived in the middle of the trench. The planks were largely rectangular to wedge-shaped in section, but there was some variation in width, from 0.12m to 0.03m. A small stake (312) continued the line of this wall to the east.

North-south returns for these slots/gulleys and the wall were not recognized. Other features included post 317, 0.14m long by 0.9m across, set in a shallow rectangular post-pit (306) filled with silt, cobbles and twigs. To the south of the slots lay gulley 305, 0.3m wide by 0.16m deep, containing twigs and silt. To the north, gulley

295, aligned north-east/south-west, was 0.3m wide at the south-western end but tapered to 0.1m wide at the other end.

The remaining areas were characterized by the presence of extensive surfaces (294, 294A and 296, Fig 20), formed of pebbles and cobbles, associated with fragments of oak roundwood.

Period 3 (= OGL A Period 5)

Overlying many of the features attributed to Period 2 was an extensive deposit of soil (256, 279, 288-90, Fig 21), varying in thickness and composition but including numerous fragments of wood. Much of this was unrecognizable, but there were fragments of planks, blocks, chips, chunks, roundwood, and stakes, some with sawn ends and others with burnt surfaces. The wood was almost entirely oak, with only the very occasional fragment of alder and birch.

This deposit clearly represents a hiatus in the structural sequence. Much if not all of the wood is almost certainly woodworking detritus, but whether this is connected with the destruction of Period 2 or the construction of Period 4 is uncertain. The botanical suite, including both weeds and ruderals, is not sufficiently extensive to add to the interpretation (p 122).

This period is linked with OGL A Period 5 because both represent a soil accumulating before the building in the subsequent period was erected.

Period 4 (= OGL A Period 6-7)

The building on the southern edge of the site, which can be equated with Building 674, OGL A Period 6, was divided into four occupational phases, 4A-D, and two destruction phases, 4E-F, the latter being equivalent to OGL A Period 7A-B.

In the open areas to the north of the building as far as the fence/hedge line (293/300), six phases were recognized and equated with Periods 4A-F within the building. As there is no stratigraphic linkage between the areas inside the building and the external areas, however, except in so far as the earliest phases overlay Period 3 and the latest were sealed by Period 5, the correlation of phases must be regarded as unproven.

Periods 4A to 4D

Building 674

The building lay on the southern edge of the site and extended southwards into OGL A Period 6 (Figs 23-5). An L-shaped construction trench (284) was dug. The north-south trench (wall 282) was 0.35-0.4m wide and 0.5m deep. The east-west trench (wall 281) was slightly wider and deeper, at 0.5-0.55m wide and 0.6m in depth. It was filled with redeposited clay mixed with soil and some fragments of oak roundwood.

The northern wall, 281, consisted of eleven posts spaced at 0.3-0.5m intervals (Fig 23). The posts (286A-K) were of oak and were square to rectangular in section. They measured 0.13m wide or slightly less, by 0.08m thick or slightly less. The two largest were post 286K at the corner of walls 281 and 282, and post 286B. The latter, which also contained a mortise joint, may be the western jamb of a door of which the eastern jamb could be part of wall 233. All the posts had flat bases and some displayed saw marks. Some wattle fragments were planned but no other details were recorded.

There was one internal wall (233, Fig 23) which is thought to be a primary feature. It was based in a slot 0.4m wide by 0.5m deep with some redeposited clay and silt. There is some doubt about the stratigraphic position of this slot, and it was noted earlier (Period 2B) that it could be equivalent to a slot in OGL A Phase 4 (slot 1140). This seems unlikely, however, as it continues the line of wall 832 in OGL A. The wall was based on a rectangular sill beam (225), 0.15m wide by 0.1m thick. No surface features were present but fragments of wood were associated with the beam.

The internal wall (233) divided an eastern room, nearly all of which lay beyond the limit of excavation, from a western room, as in OGL A. The western room displayed four recognizable phases of surfaces (eg 242, 259; Figs 24-5), mostly consisting of black sandy

deposits and silts with occasional fragments of wood. The surfaces were present largely at the western end of the room, where a linear depression (not illustrated) could also be detected in some phases, as in OGL A. The only traces of surfaces at the eastern end of the room are probably late in the sequence. This variation in surface survival may reflect wear patterns in the floors.

Phases A-D were identified in the sequence of surface deposits within the building and are not described separately as they do not contribute individually to an understanding of the way in which the building functioned. Most of the surfaces did not extend as far as the wall posts, but stopped at the edge of the post-trench. By analogy with the excavations at Castle Street (McCarthy 1991a, 57-8), the implication is that the wall timberwork was covered with a thick coating of daub, although none survived. The daub would have occupied the full width of the post-trench on either side of the timberwork.

The northern adjunct to Building 674

Immediately north of Building 674 was a small area separated from the external areas beyond by a wall or fence (298; Figs 23-4). This comprised a line of stakes with diameters averaging 0.04m; they were spaced at 0.2-0.27m intervals. Feature 298 was a primary element in the building, but the use of stakes alone, a different construction technique to that of the building itself, suggests that feature 298 may have been a fence rather than a wall, and that the northern room was a small unroofed enclosure rather than an additional room. This northern adjunct to the building thus mirrors a postulated southern adjunct identified in OGL A (p 00).

Wall or fence 298 was replaced by wall 240 (Fig 25); this seems to have been a more substantial wall in that it incorporated two rectangular post-pits (263-4), measuring 0.5m by 0.32m by 0.45m deep (Figs 23, 25). Pit 264 contained a post 0.03-0.05m wide by 0.01m thick. The fill of pit 263 included a fragment of a plank. The posts originally set in these pits formed the principal uprights for wall 240. The infill comprised a line of oak planks set in a U-sectioned slot (252, Fig 23), 0.07m wide and 0.07m deep, filled with grey silt and sand. The slot cut through the post-pits. The planks, although extremely fragmentary, were at least 0.07m wide and less than 0.01m thick; they may have been weatherboarding attached to posts 263-4.

There were signs of several phases of both cobble and clay resurfacing in the northern room/enclosure. Initially patches of sand and cobbles, followed by sandy clay floors (248), were laid down (Fig 24). When the fence or wall 298 was replaced by wall 240, more floors of clay (241, Fig 25) and other silts were added.

External areas

On the northern edge of the excavation there was a fence and hedge line (300) taking a fairly irregular east-west course (Fig 24). Three major posts (350-2) set in pits, spaced at 2.7m and 3.4m intervals, appeared to form major components in this fence. Post 350 measured 0.73m in length by 0.12 wide and 0.085m thick; it had a flat base. Post 351 measured 0.81m in length by 0.18m wide by 0.1m thick. Post 352 tapered to a point at the base and was 0.91m in length by 0.15m wide by 0.12m thick.

In between the three principal posts was a motley collection of wood fragments. Some appeared to be stakes whilst others were miscellaneous, smaller fragments of roundwood of uncertain function. The species included willow, oak and alder. Most striking was the presence of several very irregular fragments resembling the base of tree trunks with root protuberances. One of these was identified as a willow or poplar. The base of the fence/hedge line comprised a spread of mixed grey silts, clay and cobbles.

There were occasional gulleys and a short length of fence represented by stakeholes (278, Fig 24). Two isolated stakes, 0.03m and 0.04m in diameter, were present on the eastern side of the trench in Periods 4A-D. Stakes 353 and 357 are unrelated to any identifiable structures. Below fence 293/300 were gulleys approximately 0.15m wide by 0.07m deep aligned roughly north-south. A short length of gully aligned roughly north-west/south-east may have linked in with gully 269 and may also have debouched through the fence. Various stakeholes and postholes (eg 262, 359, not illustrated) were recorded. A shallow rectangular pit (287), measuring 1.3m by 0.5m and 0.15m deep, was located near the northern fence.

The surfaces were largely confined to the northern half of the site, there being relatively few attributable to these phases in the

centre, on the western side or adjacent to the walls of the building. This distribution shows that earlier levels were exposed during Period 4 and may reflect wear patterns characteristic of footpaths. On the south-western side of the site the sequence was destroyed by later features. The deposits throughout the sequence largely comprised pebble or cobble surfaces (eg 238, 244, 258-60, 280, 285, Figs 24-5).

Periods 4E to 4F (= OGL A Periods 7A-B)

In Periods 4E to 4F the presence of surfaces and soil deposits (216-8, Figs 26, 28) confined within walls 281-2 could argue for the continuation of Building 674, but if that was the case the northern adjunct had certainly fallen from use. The surfaces and soils within the building may imply that elements of walls 281-2 were still in evidence, although perhaps in a state of collapse. Grey soil deposits (220), sandy lenses (219) and patches of clay (236) accumulated. Other features included gulley 209.

Period 4F represents a secondary phase to the destruction and change of use which took place at this time. An extensive deposit of brown to orange sand mixed with charred twigs, and including traces of white plaster lying face down (211, Fig 28), represents a collapsed wall. Samples from this deposit revealed the presence of grassland taxa, possibly hay, represented by both plant and insect remains (pp 122 and 139). The latter also included strong hints of house fauna.

The site of the northern adjunct was removed and the wall line disappeared, but immediately north of its position a group of oak planks was discovered (230, Figs 26, 28). The planks may be the collapsed north wall (240) of the adjunct. There was one group of five overlapping planks aligned more or less north-south and two other isolated examples. The longest surviving plank was 0.69m. The widest surviving plank was 0.15m, whilst the thicknesses were in the region of 0.01m. One plank contained a nail hole and another a peg hole. There were no other surface features. Another collection of planks was recognized in the same stratigraphic position in OGL A Period 7A (659, Figs 26-7).

The planks overlay a shallow gulley (229, Fig 26). The gulley contained large numbers of beetles, fly pupae and mites, representing a varied ecological fauna (p 139). Grain pests and some decomposers may suggest the presence of dung or other stable litter.

Period 5

Period 5 represents a major change of plan. Extensive deposits sealed the Period 4 levels and a new structure aligned north-south was constructed across the former external areas on the eastern side. The western side remained unencumbered with buildings.

Period 5A (= OGL A Period 8A)

The eastern side of the trench was covered by a mixed deposit (186), a dirty and fairly soft clay and silt with numerous fragments of wood including post and plank fragments which overlay and obliterated all vestiges of Period 4 (Fig 29).

On the western side of the trench was an extensive accumulation (188) which, whilst having no stratigraphic link with 186, is nevertheless considered to be contemporary. Deposit 188 was a dark, organic silt containing pieces of turf identified archaeologically (not botanically), a stake fragment and a post (176). This deposit varied in thickness from 0.05-0.2m but it was not recognized in the same form in OGL A to the south, although similar silts were present.

The botanical and insect remains show concentrations of both grain pests and corncockle seeds (pp 122 and 139) in 188, leading to the conclusion that spoiling grain was deposited. There were few seeds of species other than corncockle, which may be a function of the preservation conditions, but if not, it may imply the presence of partially processed grain within which the corncockle element had not been removed. Context 186, although containing relatively few seeds, appears to represent a more established grassland, or possibly dumped hay or dung.

A similar, though not identical, distinction between the east and west appears in OGL A Period 7A. In this case, however, the suite of plants and insects is rather more numerous than in OGL B.

Period 5A can be said to have two sub-phases, comprising firstly the deposition of 186 and probably 188. Secondly, cutting through

deposit 186 were four post-pits (197, 199, 202, 207) and a well or pit (184) (Fig 29).

Post-pit 197 measured 1m in length overall by 0.35m wide and was 0.7m deep. Post-pit 199 was 0.6m long by 0.35m wide but was only 0.14m deep. The original dimensions of posts 202 and 207 could not be ascertained as they had been cut by Period 5B post-pits.

Well 184 was constructed in a pit measuring 1.85 by 1.65m at the top. The shaft, approximately 1.15m by 0.7m, was lined with oak planks in varying states of preservation. The longest surviving plank was 0.99m and the greatest width was 0.2m. They were generally 0.04-0.06m thick. A few displayed evidence of saw and adze marks, and there were two possible lap joints. One plank with two unengaged mortises was probably re-used. A few fragmentary posts, rectangular in section, were also discovered, although not in their original positions. Posts and some form of bracing would have been required to hold the planks in place, as can be seen in the medieval well in OGL A (1237; Fig 45).

Much of the well lining appears to have been removed before the commencement of the next period (5B), as it was overlaid by context 173. The fill consisted of three deposits of black organic material mixed in with silt, cobbles and wattle fragments of oak, birch and alder, together with fragments of oak planks and chips. The waterlogged seeds were mainly sedges and grassland species, probably representing a fairly pure hay (p 122).

Period 5B (= OGL A Period 8B)

The basic division of the site into east and west was maintained in Period 5B (Fig 30). On the eastern side there was an extensive deposit (173) comprising a mixture of silt, clay, pebbles and cobbles, together with some wood, including a fragment of plank and several stakes. This layer did not appear to be a floor but resembled a combination of destruction material and make-up. It overlay and slumped into the fill of well or pit 184.

Cut through 173 were a number of post-pits filled with clay representing a north-south boundary, possibly a wall. This period, like Period 5A, can be regarded as comprising two sub-phases. The earliest is 173 and the latest is the boundary. The distinction between 5A and 5B is justified stratigraphically, but it is questionable how significant the two sub-phases are. If deposit 173, for example, is a continuation of 186, it could be regarded as the equivalent of 188 on the western side of the trench.

Post-pit 205 was approximately 0.6m square and was filled with pink clay (178) in which a posthole (177) was present. The clay formed a capping to the post-pit. These characteristics were shared by post-pits 200-1, 204 and 206; their clay fills (193-4, 196), in some cases associated with cobbles, also formed a capping to the post-pits. Two other posts (190, 192), and a wooden plank set on edge (195), were also noted. The post-pits were placed at intervals varying from 2.8m to 3.2m, centre to centre.

To the east of this boundary or wall, a linear feature with the appearance of a bank, essentially part of layer 173, incorporated the remains of three post positions. The northern end of this feature lay close to post-pit 204. The post-pits associated with the linear bank included 187, which measured 0.9m by 0.53m by 0.46m deep. Post-pit 198 measured 0.5m by 0.36m and was 0.23m deep. Post-pit 203 measured 0.55m by 0.46m by 0.35m deep. The three post-pits contained a similar mixture of dirty clay with cobbles. The two measurable intervals between these post-pits were 3.2m and 3.8m, centre to centre.

Immediately east of the posts and the bank there was a shallow gulley (181, 185). The gulley, U-shaped in section and 0.5m wide by 0.17m deep, was filled with a grey organic silt. The relationship of this gulley to the Period 5A well (184) is ambiguous, and although it appeared to cross the well, the sides were not satisfactorily defined. This may be due to the fact that the well fill had consolidated and slumped. Gulley 181 may have extended to the north of the well as well as forming a corner with a second length of gulley (182). This gulley appeared to be of similar width but was shallower, being only 0.08m deep. It was filled with a silty clay loam.

The western side of the site was defined by two extensive cobbled surfaces (174-5, Fig 30), each of which was 0.1-0.15m thick. The earlier surface (175) extended across the whole area, whilst 174, which was confined to the western side, may be a re-surfacing. The surfaces were virtually featureless apart from a shallow pit or scoop (167) at the northern limit of the excavation. The scoop, which was only 0.15-0.2m deep, was filled with silts and pebbles.

Period 5C (= OGL A Period 8C)

A series of soil deposits (161, 157, 166, 172) covering much of Period 5B represent a change of use (Fig 31).

Overlying 173, substantial deposit 166 comprised a mixture of black silt and charcoal with gritty soils. It extended only as far west as the linear feature incorporating posts 187, 198 and 203, and it may, therefore, be contemporary with the Period 5B deposits.

Layer 172 was a mixture of silt and sand. This deposit partly overlay the 5B wall, especially post 201. Layers 161 and 157 were identical in character to 172.

Period 5D (= OGL A Period 9A)

Silty soils, pebbles and wood were present on the eastern side of the site (not illustrated). Further west, pebbly grey soils and a clay surface, together with a short length of gulley, were present, but later disturbances preclude further characterization.

The basic sequence within Period 5 may be summarized as follows: (i) 5A saw the deposition of extensive deposits which were cut by a linear series of posts dividing the site into eastern and western halves; (ii) in 5B further deposits were cut through by a second linear series of posts; (iii) in 5C and 5D more extensive deposits accumulated, once again with an apparent difference between the eastern and western sides.

The deposits on the western side of the site, which included cobbled surfaces, appear to be yards and were, therefore, open to the sky.

The boundary and the features to the east present greater problems of interpretation. In the first sub-phase (5A) four post-pits extended almost as far as the northern limit of excavation. Although it is impossible to be certain, the absence of any other structural features may imply that this line of posts was a fence or property boundary rather than the wall of a building. If, on the other hand, the posts represent a wall rather than a fence, the implication of the lack of any other posts or slots may be that the building was unfinished. The boundary, whatever it was, although stratigraphically later than the deposits (186, 188), was significant as the differences in the environmental data and the quantities of bones and pottery on either side indicate.

In Period 5B the post-pits of Period 5A were replaced by others at more or less regular intervals. The boundary could be interpreted equally well as a fence, as might be the case if two different properties were involved, or as the wall of a building. Whatever it was, the very limited evidence for any infilling between the major posts, together with the wide intervals, especially in Period 5B, is a problem. If this boundary was a fence, clear traces of stakeholes, perhaps combined with roots if there was a hedge, would be expected. Only two postholes (190, 192) were found, and these were equally spaced to either side of post 191 (not illustrated). On the other hand, if this was a wall in which the infill material was based upon ground-based sill beams, as at Castle Street (Period 6; McCarthy 1991b, 32-3), traces of the infill could be negligible to non-existent. In this regard it is worth noting here that there was a slight linear depression south of post 191. A sill beam based on fairly soft ground would probably make a depression such as this.

The three posts to the east (187, 198, 203) which appear to be incorporated into the linear bank-like feature pose similar problems to those outlined above. There are no traces of intermediate posts, stakes or roots, so that it seems unlikely to be a fence. If this was a solid wall, it is necessary once again

to postulate the presence of sill beams between the posts. If there were no sill beams this wall would have to be reconstructed as an open structure such as a colonnade. The 1-1.2m wide space between the two lines of posts, which appeared as a linear depression, was probably caused by wear.

Although it could be argued that the boundary was a wall, it is impossible to offer a satisfactory interpretation for these features on the basis of the evidence available. It is clear that the deposits on either side of the boundary were different and that those to the west are almost certainly open yards or working areas. The deposits to the east may also have been open but there is no certainty about this. Periods 5C-D seem to represent a continuation of 5A-B.

*Period 6**Period 6A (= OGL A Period 9B)*

The soil and pebbly spreads of Periods 5C and 5D serve to separate Period 6 from earlier phases. A number of pits and gulleys (not illustrated) can be identified as cutting Period 5D but overlaid by Period 6B.

The features include shallow pits, short lengths of gulley and a variety of surfaces of clay and cobbles, and other sandy deposits. Some of these features are probably related to the construction of Building 362 but others could reflect activities distinct from Periods 5D and 6B.

Period 6B (= OGL A Period 9C)

In Period 6B, in addition to the continued digging of pits, a new building (362) was erected in the north-western corner of the site. This period defines the constructional elements of the building and is illustrated on two plans, showing the primary and secondary construction features (Figs 32-3).

Building 362

The eastern and southern walls lay within the area of excavation. In the eastern wall there were at least six posts (86-7, 89-90, 127, 137, and possibly 164-5; Fig 32). Posts 89 and 90 may have been paired in the same way that posts 64N and 64S are certainly paired in Period 6E. The eastern wall was based in a substantial foundation trench. It was 0.95m wide by 0.3-0.4m deep, and was divided on its long axis by a series of posts and wall 146, all of which rested on its base. The posts were 0.13-0.19m wide by 0.07-0.16m thick. Most of the posts had flat sawn bases, and one (89) had two mortises on one side. This post was almost certainly re-used, as one of the mortises had been sawn through and the other would have barely been visible at floor level. The posts were spaced at irregular intervals. The largest post (137), 0.19m by 0.15m across, formed the south-eastern corner of the building.

The posts lay on the inside (western face) of wall 146, the cladding of which was formed from horizontally-arranged planks. One was found *in situ* at the base of the posts in 138. There is no evidence to show how the planks were attached to the posts.

An oval post-pit (107, Fig 32), 1.20m in length and width by 0.75m deep, contained indications of two posts, one of which was approximately 0.27m by 0.13m, in the middle of a loose soil and cobble fill (107a and b, Fig 34). Pit 171 had a similar fill to that of 107 but contained no post. Both these post-pits appeared to be integral with 138.

Pit 124 lay on the western edge of the excavation. A roughly rectangular pit, 1.3m by 1.10m by 0.5m deep, it was filled with large cobbles and pink clay. A smaller rectangular shallow posthole in the base of the pit, 0.5m long by 0.25m wide, probably locates the post position.

To the east of wall 146, the foundation trench (138) was filled with tightly packed cobbles (Fig 33). The purpose of the foundation trench, which is very wide for a timber wall, is uncertain, although the cobble fill would have assisted drainage and helped to keep the bottom of the wall posts dry. Another problem concerns wall 146, the lowest part of which is on the bottom of the foundation trench. It is possible that, instead of forming the wall for the building, it

represents shuttering at foundation level only, with the purpose of providing further protection for the wall posts. Other explanations are possible. For example, the planks forming wall 146 may have continued above foundation level.

The southern wall of Building 362 was defined as a shallow slot (132) cut into an extensive spread of pink clay (125, Fig 33). The slot varied in width from 0.3-0.4m and was up to 0.15m deep. It was cut by a posthole 0.25m by 0.14m across, containing post 128, and there was a trace of at least one other post. The infill probably rested upon the ground surface.

If the distribution of the clay spread (125) reflects the position of the walls, as seems to be the case on the eastern and southern sides of the building, its presence along the northern perimeter of the excavation shows that the north wall lies only just beyond the edge of the excavation.

Miscellaneous pits and gulleys

In the central and south-western part of the trench, a number of pits and a gully were recognized as probably belonging to Period 6B (Fig 32). On the western edge of the trench, feature 141, filled with silty loam and cobbles, was 0.25-0.3m deep. Pit 143 was 1.10m by 0.9m by 0.45m deep. Pit 142 had a similar fill but was 1.10m by 1m by 0.25-0.3m deep.

Immediately east of 142-3 lay two short lengths of slots or gulleys (147, 149). Slot 147 was 0.16-0.23m wide and 0.12m deep. Slot 149, by contrast, was 0.45-0.5m wide and 0.4m deep.

Pit 144, located further east on the southern edge of the site, was up to 1m long and 0.3m deep. The other pits included 150, 0.55m in diameter and 0.4m deep, cut by a later feature; pit 152, which was irregular in profile and was 1.2m by 1.0m at the top and 0.5m deep; and pit 155, which was 1.6m long by 1.2m wide at the top but was only 0.25m deep. Gully 145 was 0.25-0.38m wide and 0.2m deep.

Period 6C (= OGL A Period 9D)

This sub-phase defines the first period of use of Building 362 (Fig 34). The interior was divided into two rooms by a slot (85), 0.28m wide and 0.1-0.15m deep, marking the position of an internal wall. The edges of the slot retained traces of charred wood. The slot was interrupted by a gap 0.2-0.3m wide in the middle of the room.

The northern room had a clay floor (112), up to 0.08m thick, overlying the construction deposits (125, Period 6B) and abutting the internal faces of the wall posts. The floor was overlaid by a black silt with much charcoal and traces of cobbling, which were probably contemporary with the use of the room. If the flat stone feature was a post-pad, the northern room may have been subdivided. Six stakeholes (110), 0.03-0.06m in diameter, cut the clay floor, probably reflecting the presence of some temporary internal feature. The southern room also had a clay floor (62), and this too was cut by a group of stakeholes.

To the east of Building 362 lay two extensive pebble and cobble surfaces (129-30). Surface 129, a compact smooth surface of small pebbles, partly overlay the cobble-filled foundation (138), the rest of which remained exposed. Both surfaces could be traced from the northern to the southern ends of the trench. The point at which they abutted coincides very closely with the underlying gully 163 (Period 6A).

To the south of the building were a cobbled surface (121) and a spread of soil and clay.

Period 6D (= OGL A Period 9E)

On the northern edge of the excavation there was a gully (123), 0.4m wide by 0.3m deep, filled with cobbles and silt (Fig 35). The gully cut through the underlying Period 6C surface (130), but its relationship with later levels was indeterminate. The gully contained a single flat-based oak post (131), 0.13m by 0.08m across.

No other significant changes can be identified at this stage. The interior of Building 362 was partly re-floored with clay (97) and some cobbles, whilst surface 130 was extensively, but not wholly, resurfaced with compacted cobbles (104). An area of wear indicated by a shallow depression was identified on surface 104. To the south of the building, cobbled surfaces 120, 122 and 126 were laid. A depression (118), scooped into surface 120, contained silts and some loose fragments of planks.

Despite the activity implied by these resurfacings and the depression, they appear to represent less than the multiplicity of

deposits identified in the equivalent phase in OGL A (Period 9E).

Period 6E (= OGL A Period 9F)

The eastern wall of Building 362 was rebuilt with posts 29-30 and two sets of paired posts, 63 and 64 (Fig 36). A slot (84), 0.15-0.2m wide by 0.07m deep, formed the base of the new east wall.

The southern wall of the building was also rebuilt in a new slot (79), which was cut through the earlier one (132). The new slot was stepped in profile and had a posthole (88), 0.10-0.12m across, on the shallower northern step. There were traces of a second posthole further west. No features were recorded in the deeper southern step of this slot, which may have accommodated the basal planks of wall cladding.

Inside the building the only change was the insertion of a clay floor (93) and a posthole (95) in the northern room.

Immediately east of Building 362, a shallow gully (81) overlay the formerly exposed cobble fill of context 138. This gully may be a drip trench. The gully continued to the south of the building, presumably taking ground-water away from the walls. The gully linked up with the east-west-aligned red sandstone slab-lined gully 77, which may in turn have linked in with the north-south gully 78. The relationship of these two gulleys is not certain due to the presence of a later pit at their junction.

Elsewhere the external surfaces were renewed with cobbles and pebbles (54, 82) as well as clay (100) (Fig 36). As before, they were compacted and relatively smooth, showing that they had sustained considerable wear. A shallow gully (114) of uncertain function was recorded close to the southern edge of the site.

Three widely separated pits (108, 111, 117), ranging from 0.85-1.16m by 0.3-0.43m by 0.2-0.32m deep, cut through the external surfaces. All three were filled with charcoal and cobbles, the latter possibly derived from the material through which they were dug. A similarly sized and shaped pit (101), 1.5m by 0.4m by 0.25m deep, was filled with black silt and cobbles.

Period 6F (= OGL A Period 10A-D)

In Building 362 the interior of the northern room was re-floored with a sandy clay (60-1, Fig 38). Outside the eastern wall, gully 81 was renewed, and filled with silts and cobbles (80). Drain 78 was also partly renewed (92). The hard-packed cobble surface (74) to the east of Building 362 represents a continuation of the surfaces evident in earlier phases.

New developments took place at the southern end of the site. In what was formerly an open area, a new timber building (377; see OGL A) was erected, but the stratigraphic relationship of this building with Building 362 cannot be established with certainty. The placing of these buildings in this sub-phase is, therefore, a rationalization of the evidence. The basis of this is that the buildings at both ends of the trench were overlaid by Period 7 soil layers which indicate a change of use for the site involving the entire trench.

Between the buildings at the northern and southern ends of the trench, cobble and pebble surfaces were laid (35 and 59), along with crushed red sandstone surfaces (40, 72). Surface 40 can be equated with an identical surface in OGL A (353, Period 10A; Fig 38).

Building 377

Building 377 is represented by slots (Fig 38). Slot 57, 0.25m wide by 0.1-0.15m deep, formed a northern wall. Beyond the eastern end of the slot there was a large flat stone slab. Next to the slab, and forming a right angle with slot 57, there was another slot (58). This rather less regular slot was 0.12m wide by 0.2m deep, and may have accommodated a threshold beam. Slot 58 terminated in a posthole for a corner door jamb. To the south of slot 58 was slot 49, which had squared corners. It was 0.28m wide by 0.25m deep and can be equated with slot 339 in OGL A. Slots 49/58 and 57 form the north-east corner of a building or room.

To the east there were two other slots. Slot 41 was 0.2m wide by 0.17m deep. Cutting slot 41 was posthole 52; its post-pipe was 0.33m by 0.14m by 0.24m deep. The relationship between the posthole and the slot suggests that the post had originally been recessed into the beam which presumably occupied the slot. This technique is attested elsewhere in Carlisle (McCarthy 1991a, 57-9). Slot 47 joined up with slot 41, forming a right angle; it was 0.37m wide by 0.04m deep. Although the stratigraphic connection between these two groups of slots cannot be established beyond doubt, apart

from the fact that both cut through pebble surface 54 (Period 6E), there is no reason to suppose that they are not contemporary and part of the same building. Moreover, using the analogy with timber construction techniques at Castle Street (*ibid*), post 52 is probably on the external face of slot 41. If this was the case, slot 41 would only be explicable as an external wall.

Adjacent to slots 49 and 57-8 was a further surface of cobbles (73) with amphora sherd packing (Fasc 3, p 364), whilst to the east there was another remnant of a sandy clay surface (68) cut by a north-south line of stakeholes (65-7).

Periods 6A and 6B, defined on stratigraphic grounds, are confusing in the sense that whereas some of the features certainly belong to Building 362, other features (141-5, 147, 149-52, 155, 162-3) may reflect a separate set of activities unrelated to the building.

Some of these features (143, 149-50) were identified during excavation as possible post-pits, and if this was the case, they indicate the presence of a structure, possibly a building, at the southern end of the site, but this cannot be regarded as certain. An alternative explanation is that all the features are related in some way to the construction of Building 362.

The construction of Building 362 proceeded through Periods 6A-B. The elaborate method of construction for the east wall, entailing an unusually large foundation trench, indicates a substantial building. Furthermore, there is a suggestion that some of the posts may have been paired as though to provide additional strength. The posts in pit 107, together with that which originally occupied pit 171, should be regarded as part of the building, as their pit fills were integral with the foundation 138. They may have formed buttresses, provided support for a roofed verandah, or supported a very wide eaves.

The elaborate and deep foundations so obvious in the east wall were not matched in the south wall, which was far more superficially built. The posts were set in individual pits and the infill rested on the ground surface.

At least one internal room division (85, Period 6C) was recognized. This was differently constructed to the external walls, being based on sill beams. A second possible partition was discovered in the northern room, and stakeholes in both northern and southern rooms attest the presence of internal features. Both rooms witnessed considerable activity as the re-floorings suggest, the northern room receiving greater wear, as indicated by the greater number of surfaces and silts, than the southern room.

All features to the south and east of Building 362 in Periods 6C to 6E are external. The repeated remetalings have the appearance of roads or yards, and were cut by drains. It is not always easy to distinguish between road and yard surfaces in limited exposures, but in this case a distinction between the surfaces to the east and those to the south of the building may be discerned. The distinction is apparent in that the nature of the surfaces in Periods 6C-D was subtly different. Furthermore, a north-south line could be recognized extending along the entire length of the site. This line, which originated in Period 5A and continued through to Period 6E, seemed to divide the external areas into zones of similar character. But if the zones are real and significant, they may have had different functions; the surfaces to the east may, perhaps, have been part of a different property, whilst those to the south may have been yards belonging to Building 362.

An important additional point is the presence of gulley 123 extending from the building along the northern edge of the

site. The function of this gulley, which contained a substantial post set in a pit (131), is not certain. However, bearing in mind the Period 4 fence line, which is almost certainly a property boundary, this gulley may be regarded as a later successor.

Although the above interpretation seems valid for Periods 6C-D, an alternative explanation of these surfaces is possible for Period 6E. At this point an east-west drain (gulley 77), probably leading into a north-south drain (gulley 76), was constructed. It is possible that this was a roadside drain and not just a yard drain. This raises the question of a road junction in the centre of the eastern edge of the site. Further support for this can be seen in Period 6F, in which a new building (377) was erected on the southern edge of the site. The position of the putative east wall of Building 377 more or less coincides with the alignment of drain 76, partly renewed in this period (92).

This interpretation clearly entails such a radical subdivision of land and alignment of boundaries that the distinction between Periods 6A-D on the one hand, and 6E-F on the other, may be greater than is implied by the phase subdivisions. A case can be made for suggesting that Period 6E-F should be regarded as Period 7. That this has not been adopted is due to the continuity apparent in the sequence in Building 362, and because the trench was not large enough in an east-western direction to provide conclusive proof.

Periods 6F-7 and 7

Periods 6F-7 and 7A (= OGL A Period 10E)

Building 362, including all the walls and floors, was covered by a blanket of grey silty loam and cobbles (51, Period 7A; Fig 42). The eastern limit of this layer is more or less coincident with the east wall of the building but it extends to the south for some distance.

To the east of layer 51 were two areas of metallurgy (70-1, Period 6F-7), which were probably present from Period 6F and continued in use into Period 7A. The eastern limit of the cobbling also continued to be defined by the drain 92 which survived from Period 6.

There is no equivalent layer to 51 at the southern end of the site, although here too Building 377 fell from use. Slots 41 and 47 were overlaid by a mass of charcoal and black silt (34, Fig 42) derived from a hearth. The wall formerly represented by slots 49 and 58 may, however, have been replaced by another wall (19), 0.4m wide, formed of clay with occasional sandstone.

Period 7B (= OGL A Period 10F)

The whole of the northern half of the site was blanketed by a layer of yellow-flecked silty loam, and at the southern end there was a similar layer containing many pebbles (15, 20; not illustrated). The absence of any equivalent layer in the centre of the site may indicate a continuing use for the metallurgy areas identified in Period 6.

There is no evidence for the destruction of the Period 6 buildings, 362 and 377. The soil deposits in Period 7 clearly show, however, that the site underwent a radical change of use and lay open for a period of time. The metallurgy surfaces in the north-eastern corner suggest a continuing function for this area.

Period 8

Period 8A (no real equivalent in OGL A)

Traces of a feature overlying spread 15 were identified in the north-western corner of the site (Fig 43). It consisted of a band of grey soil (27), 0.35-0.55m wide, seeming to form a south-eastern corner. Within the L-shape of the corner there were a number of surfaces of clay, gravel and cobbles mixed with soil (25).

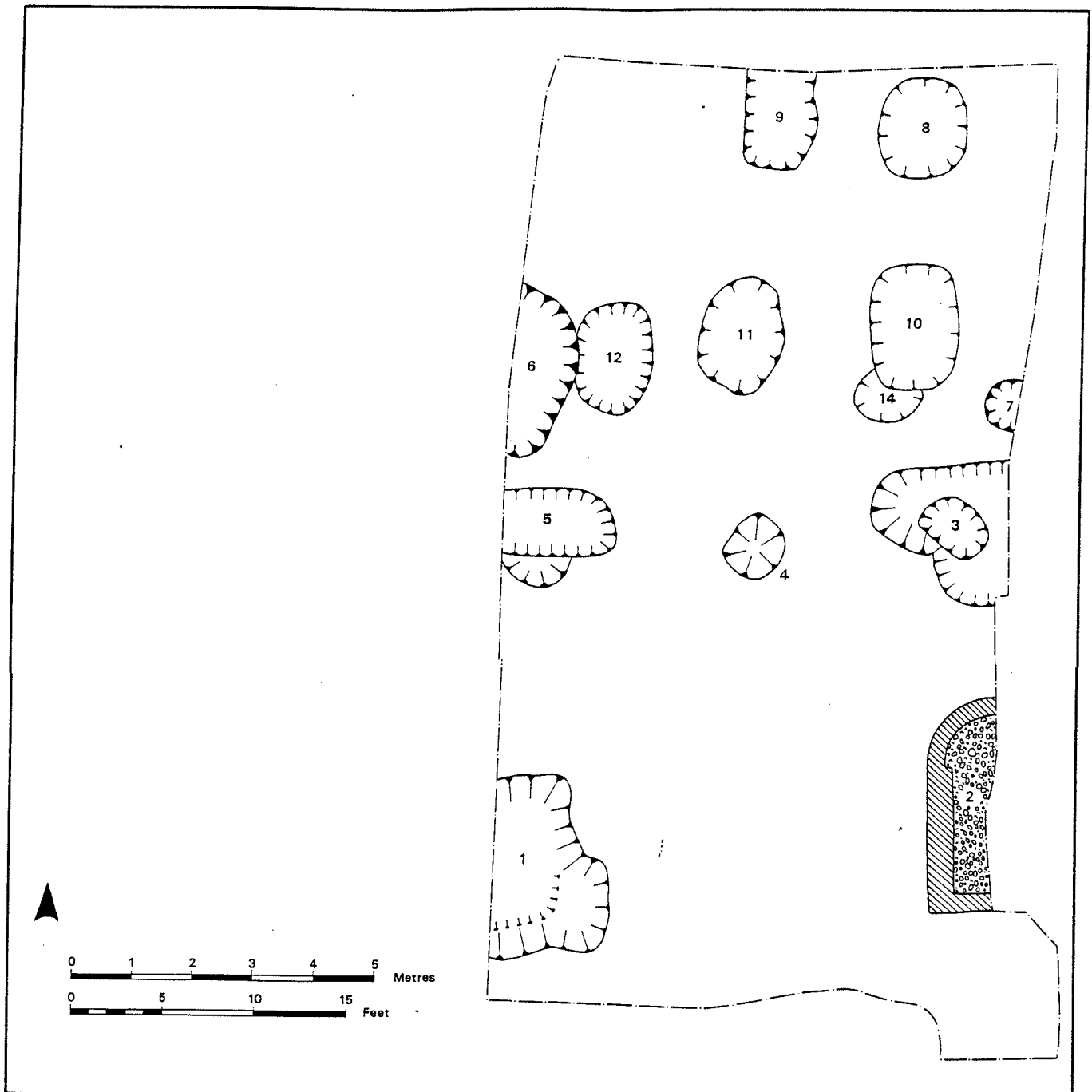


Fig 48 Plan of OGL B Period 9

Period 8B (no real equivalent in OGL A)

Overlying the surfaces attributed to Period 8A there were more cobbled surfaces (16, 22-3, Fig 43). Layer 18, which also has straight edges as though forming a corner, consisted of cobbles packed in clay to a depth of 0.04m. This was interpreted as the base of a wall.

On the eastern limits of the site there were a number of other features. They included a hearth (13), a clay surface (24), and soil deposits (39, 48), all interpreted during excavation as possibly belonging to a structure.

Despite the lack of detail the features recorded may represent the 'shadow' of a ground-based building in the north-western corner of the site. Although few other features survived, this hypothetical building occupied a precisely simi-

lar position in the trench to Building 362 in Period 6. This may well suggest that the time lapse between Period 6F and 8A was relatively brief - sufficiently short for the position of the Period 6 building to be remembered.

The remaining features are too imprecisely defined to allow further useful comment. It is not possible to correlate Period 8 with OGL A.

Period 9 (= OGL A Periods 12A-13)

This incorporates all features post-dating Period 8. Machinery was used initially to clear modern rubble and medieval deposits to a depth

of approximately 0.65m below the modern ground surface. In addition to the machining programme it was established that cellars had also destroyed areas of the medieval and later archaeology. The initial works revealed Roman deposits and a series of later pits and other features (Fig 48).

Pit 1 was irregular in shape, filled with dark organic silts. The plan and section shows that it consisted of at least two pits penetrating deeply into Roman levels. The pits were cut by a post-medieval or modern sandstone wall.

Feature 2 was a Victorian coal cellar with an apsidal northern end and a cobble floor. The walls were of brick on a sandstone foundation.

Pit 3 was a complex of at least three pits with a grey silt fill and dense matted deposits of uncertain origin. Pit 4 was a roughly rectangular pit, about 1m by 0.9m across, and was U-shaped in profile. It was filled with dark organic silts.

Pit 5, consisting of at least two pits with a varied fill of clay, cobbles and silts, was truncated by a cellar wall. The larger pit was sub-rectangular in shape and at least 1.8m long by 1.1m wide and at least 0.7m deep. The smaller pit was about 1.1m diameter.

Pit 6 was at least 3.5m wide at the top and was over 1.2m deep. In addition to silts the fill incorporated a number of red sandstone blocks. Pit 6 cut through pit 12, which was roughly oval in shape, 1.9m by at least 1.2m by 0.9m deep, with vertical sides and a flat base, and black organic silts in the fill.

Pit 7 was about 0.95m across, vertical-sided and at least 0.8m deep. There was an upper fill of clay overlying silty, clay loams.

Pits 8, 9 and 10 had black organic silts in the fill. Pit 8 was oval in shape, 1.7m by 1.5m by 0.3m deep. Pit 9 was sub-rectangular in shape and at least 1.6m long and over 1.2m wide. Pit 10 was sub-rectangular in shape, 2m by 1.5m by 0.2m deep.

Pit 11 was roughly oval in shape, 1.9m by 1.4m by 0.3m deep. It contained silty clay loams. Pit 14 was oval in shape, 1.1m by about 0.8m wide.

The most striking point about the pits is their spatial relationship. They are mostly arranged in a north-south/east-west grid with a space varying from 1-2m between the rows. The exception to this is pit 1, in the south-western corner of the trench. This arrangement does not suggest random pit digging for the disposal of general domestic waste. Rather

there is a strong case for them not only being contemporary, but that they were dug for a specific purpose.

There appears to be a degree of consistency in the size and shape of the pits in that many tend to be oval or sub-rectangular, and 1.6-2m in length. Four pits (3-4, 7, 14) were much smaller in size. Evidence for the depth of the pits is less reliable because the upper parts were lost through the process of cellar excavation and machining. Nevertheless, it is possible to suggest there were two general depths, some pits being markedly deeper than others. Thus pits 5, 7 and 12 were 0.7-0.9 m deep, whilst pits 8, 10 and 11 were only 0.2-0.3m deep. Whether or not these figures have any real significance in terms of the function of the pits is uncertain. The pits fills were consistently described as including black silts, or silty loams, often with an organic fraction. In a few instances other materials, such as stones or cobbles, were found. Several pits contained fragments of wood. Pit 4, for example, contained a fragment of a substantial post, 0.75m in length by 0.22 by 0.17m. Pits 5, 6 and 9 contained stakes with pointed ends. Pits 5 and 10 contained fragments of planks up to 0.6m in length. Pit 8 had numerous very fragmented pieces of wattle and occasional post and plank fragments. There was no evidence for pit linings of wood or other materials *in situ*, although it is possible that some of the stakes and planks found were used for that purpose.

Rows of pits similar to these have also been excavated at Law's Lane, where again their function is not yet determined, although wooden linings were partly preserved in some cases. At other sites, as in Northampton for example, rows of clay-lined pits, similar in size and in their spatial relationships, were associated with tanning. There is no evidence, however, that the pits in this trench were tan pits.

CHAPTER 4 OLD GRAPES LANE (OGL) TRENCHES C AND J

The location of Trenches C and J is discussed in the previous chapter (p 25; see Figs 3-4). A primary objective in the excavation of Trench C was to assess the nature of the archaeological remains mid-way between Scotch Street and Lowther Street in the light of data recovered further north in Keay's Lane, Law's Lane and Sewell's Lane. Trench C was chosen because cellars had already destroyed the uppermost deposits, and removal of the cellar walls and floors offered a rapid and relatively inexpensive way of making the assessment. The phasing is based almost entirely on the content of drawn sections and plans of those features which were identified below the floors. Resource constraints determined that Trench J was excavated largely by machine.

Old Grapes Lane Trench C (OGL C)

Period 0

The natural subsoil was exposed in places, but it was not separately described except as 'white clay'. There was no significant difference between the natural subsoil in OGL C from that uncovered elsewhere (eg OGL A, CAL). It lay at a depth of approximately 2.35m to 2.65m below the modern ground level.

Period 1

A black, buried ground surface, approximately 0.1m thick, was present in places (not illustrated). There were no plough marks or other associated features.

Periods 2 and 2?

At the western end a series of horizontal deposits about 0.65m in depth overlay the old ground surface; these comprised clay, silt and clay, and gravel (not illustrated). The uppermost deposit consists of a flat spread of gravel 0.15-0.2m thick.

Amongst the earliest features in the centre of the trench were horizontal spreads of silts and gravels up to 0.15m thick. Three parallel north-south slots (32-4, Fig 49), two terminating within the trench, were filled with grey silts. The slots varied in width from 0.36-0.43m and were between 0.09m and 0.25m deep. They appeared from their spatial arrangement to be contemporary.

Further west were two parallel wall or fence lines (51, 58), roughly aligned east-west and set 2.6m apart. Wall or fence 51 contained 13 stakes. Wall 58 contained a series of upright planks set in a slot. Neither the planks nor the stakes were recovered.

At the eastern end of the trench there were at least four parallel wall or fence lines aligned north-south (15, 10, 41, 48, Fig 49). Their stratigraphic relationships are uncertain. Wall 15 comprised a slot, 0.35m wide by 0.32m deep, filled with silts and gravels. A line of stakes (10), set at about 0.3m intervals, lay parallel with the slot 0.6m from its eastern edge. Both the stakes and the slot appeared to cut through an earlier pit (16).

Wall 41 was a slot, 0.4m wide and 0.53m deep, filled with gravel, silts and fragments of wood. The slot terminated within the trench. Some 0.2m east of its eastern side was slot 48, which was only 0.1-0.13m deep and 0.3m wide.

Although slots 41 and 48 are not contemporary, together with slot 15 and fence or wall 10 they probably represent successive phases of the same structures. In the southern section these slots are

associated with a complex sequence of deposits, many of which are clearly clay floors. At least three successive clay floors are present at one point, whilst elsewhere, post-trench-like features later in date than 15 are also recorded.

The northern section differs from the southern to a significant degree. There are thicker deposits of silty loams (4, Fig 50), but few features identifiable as floors. Immediately north of slot 41 is a layer of clean gravel up to 0.1m deep extending between the Period 3? linear features 11 and 23. This probably belongs to Period 2 and has the appearance of being a road or yard surface (Fig 50); it was overlaid by a steeply cambered deposit of pebbles and gravel (Period 2?), which could be a re-surfacing or a dump.

In addition to these features, isolated posts were also recorded (6, 14, 27, Fig 49). Post-pit 6 contained a very large squared post with a flat base measuring 0.38m by 0.33m. The post-pit cut through slot 15. Posthole 14 contained large cobbles. Post-pit 27 measured 0.74 by 0.6m by 0.35m deep, and contained a large squared post 0.2m across.

Periods 3 and 3?

Period 3A (= OGL J Period 2)

The only features attributable to Period 3A were at the western end of the trench. Overlying the thick gravel deposit of Period 2 was a substantial dump of turf (68, Fig 49), 0.35m thick, interpreted as a turf rampart. In the northern section (not illustrated here) it could be seen that the western end of this deposit dipped down from east to west where it terminated in a V-shaped hollow. To the west of the V-shaped hollow were silt accumulations and gravel surfaces, and beyond, on the bottom of the trench, the tail of the turf coincided with a line of substantial posts (54-5, 66, Fig 49).

Feature 54 was a double post-pit, 1.78m by 0.94m and 0.47m deep. It was filled with silt and large cobbles and had two large squared posts, measuring 0.48m by 0.45m and 0.26m by 0.17m. The posts were 0.3m apart, edge to edge. Post-pit 55 contained a squared post measuring 0.42m by 0.30m, and a distance of 0.8m separated this post from the southern post in 54. Another post (66) was observed in section but was not recovered; this was 1.10m from the post in pit 55. Post-pit 56 contained a post, measuring 0.18m by 0.06m, in a pit similar in size and fill to 54-5. This post, which was not as substantial as the others, lay 0.9m, edge to edge, east of the post in pit 55.

Overlying post-pits 54-5 and to the west of the posts, there was a plank-lined drain which was observed only in the western section. It appeared to consist of planks lining the sides (69) and horizontally-laid planks forming a cover. Doubtless pegs held the sides in place and cross-pieces provided support for the cover, but if so, they were concealed in the section. This kind of drain has been recorded elsewhere in OGL J, as well as at Annetwell Street (Caruana forthcoming).

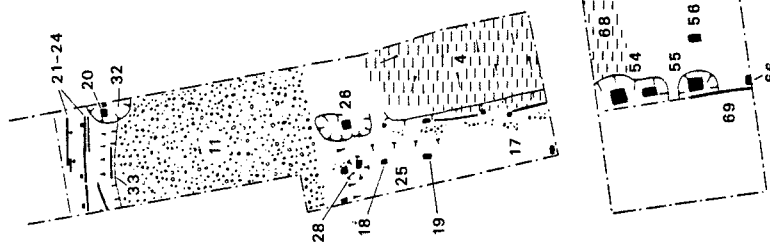
Period 3B

As the trench sides collapsed in part when the cellar walls were removed, it is not possible to describe the eastern end of the Period 3A turf deposit. The sections do, however, record substantial deposits in the centre of the trench, consisting of turf mixed with clay forming thick irregular-shaped layers, petering out at a distance of about 13m east of the line of posts forming the edge of the rampart. The turf and clay layers, which varied from 0.1-0.3m thick, resemble dumps rather than laid surfaces.

Period 3C

Overlying the Period 3B turf and clay dumps in the centre of the trench were further accumulations of silt, charcoal, clay and sandstone. Some of these were mixed deposits whilst others were relatively clean. They resemble dumps rather than laid floors in that the thicknesses varied, none were flat, and many had a 'pear-shape'

OGL J



OGL C

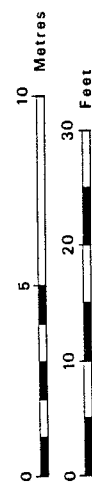
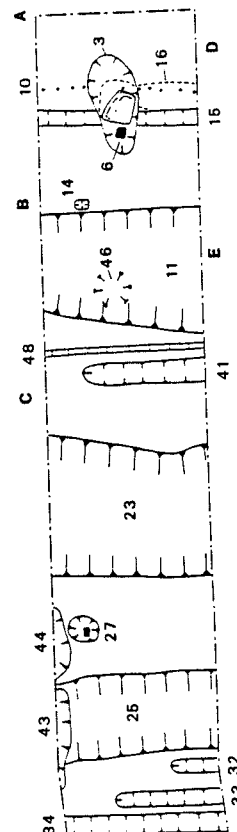


Fig 49 Plan of OGL C and OGL J (for plan conventions, see Fig 9)

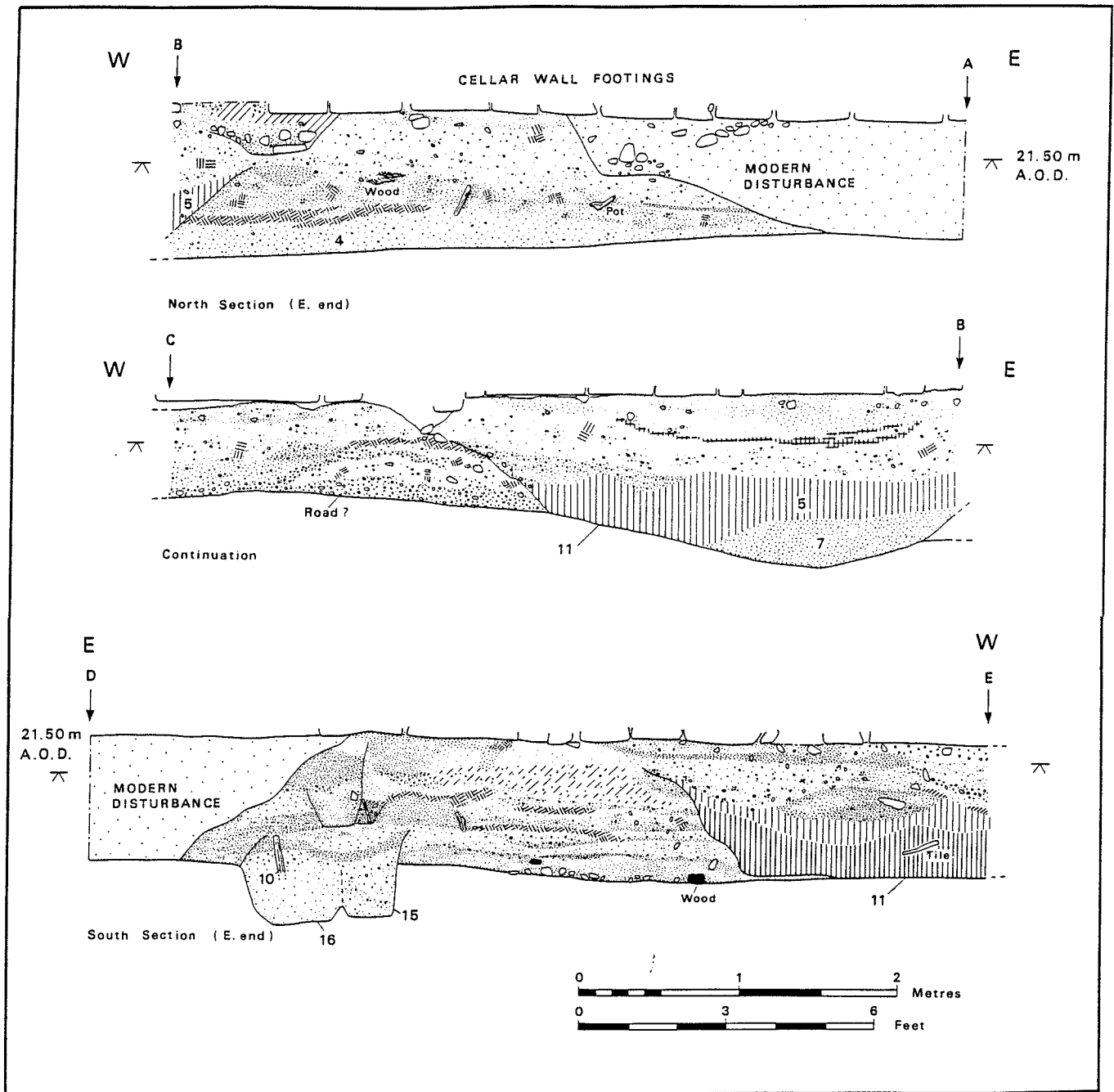


Fig 50 OGL C, the eastern end of the northern and southern sections

viewed in section. There were no signs of posts, slots or other wall-like features.

Period 3?

The precise stratigraphic position of a north-south linear feature (23, Fig 49) in the centre of the trench is uncertain. The western side of the ditch appears to be cut from the top of Period 2 features, but the eastern side seems to be cut from a higher level. The feature was 4m wide, had sloping sides and a relatively flat base. It cut into the natural subsoil to a depth of only 0.2m. The lower fill (22) included rectangular turves, whilst the upper fill comprised a thick organic accumulation of clay loam.

A second north-south linear feature (11) was recorded to the east. This was cut from the top of the steeply cambered gravel deposit attributed to Period 2?. It was 3.75m wide at its southern end, and achieved a maximum depth of about 0.8m deep. It was filled with silts (7), organic loams (5), gravels and soil. This feature clearly cut through the accumulated floors and walls of buildings recorded in

plan and in the southern section.

Attention is also drawn to a third north-south linear feature (25), 2m wide, which was filled with organic matter and pebbles; details of its stratigraphic relationships were not recorded.

A fourth linear feature (38), of which only the eastern edge was recorded, may also have existed. The western side was lost in removing rubble from the trench collapse, but the site records suggest that it may not have been more than about 1-1.5m wide.

Although many of the stratigraphic links along the trench are uncertain sufficient was recorded to make the basic sequence clear. In Period 2 considerable activity, including the erection and use of buildings, took place over a prolonged period of time. Several structural phases are certainly present on the evidence of the southern section. Attention is drawn to the presence of seven parallel slots, all on exactly the same

alignment. Disturbances by the linear features (25, 23, 11) may have removed others. Some of the slots are probably to be interpreted as post-trenches, two of which (33, 41) terminated in the middle of the trench. It seems reasonable to assume, in the absence of linking stratigraphy, that some of these post-trenches are contemporary. It should also be noted that there were no cross-walls, although other features were present, for example posts 6, 14, and possibly a depression (46) between fence or wall 10, slot 15 and slots 41 and 48. Further west, traces of two lines (51, 58) represent another building and fence.

A major east-west road was located in CAL B-C and OGL J, as well as on the eastern side of Lowther Street, and a property boundary fronting the south side of the road was located in OGL B. The road was in existence from a very early point in the Roman occupation of The Lanes; indeed it may have been a primary feature in the southern part of The Lanes area. The structural features observed in OGL C are at 90° to the road. As the southern edge of the road is about 4m north of the northern edge of the trench, the clean gravel observed in the northern section at the eastern end of the trench cannot be part of it. This probably represents open areas, such as yards or other features, lying between the buildings and the road.

The turf deposit recorded at the western end of the trench (Period 3A) is provisionally interpreted as a turf rampart. No timber strapping was noted. One face of the rampart, probably the inner face, was revetted by large posts. Immediately behind the posts was a plank-lined drain, whilst beyond that, gravel in the north section suggests the presence of a metalled road.

The three, possibly four, linear features (11, 23, 25, 38) are also tentatively assigned to this phase, although the stratigraphic links are extremely tenuous. They are thought to represent ditches, but it is admitted that the profiles are quite unlike military ditches. One explanation for their shallow depth and flat bottoms is that the ditches were not finished, and that a change of plan intervened to prevent them being excavated to their full depth. All four ditches are parallel with the rampart and at 90° to the road.

In Period 3B spreads of turf and clay have the appearance of a rampart that has been slighted, whilst the burning and deposits of charcoal, clay and sandstones in Period 3C could represent a secondary phase of rampart destruction.

The presence of a rampart and ditches would have had drastic implications for the existing buildings recorded in Period 2. These buildings would clearly have been swept away as the land was reorganized. If, however, there was a change of plan in which the ditches were not fully excavated, and perhaps the rampart was not extended to the north of the road, it might be expected that new buildings would appear as a ribbon development alongside the road. The north sections show the presence of grey silts and cobbles overlying the backfilled ditches, but no convincing signs of buildings. Although the recorded archaeological data cannot be regarded as definitive on this point, they nevertheless hint at an abandoned area in the post-ditch, post-rampart phase.

Period Post-3

The rampart (68) at the western end of the trench was overlaid by a

thick deposit of gravel (not illustrated). Over the rest of the deposits in the northern section, including the fills of the linear features, there were spreads of soils, silts, clay and stones, but little that clearly implied the presence of buildings. The exception was a sub-rectangular feature that resembled a clay and cobble foundation.

Later features were truncated by the cellar walls, but the bottoms of some pits (eg 43, 61), probably varying in date from medieval to post-medieval, were noted. A timber-lined well (50, Fig 49), similar in construction to OGL A 1237, was also identified.

Old Grapes Lane Trench J (OGL J)

Trench J was excavated by machine. Work did not progress as far as the undisturbed natural subsoil, but tacit recognition of the existence of earlier features is allowed in the period numbering, which begins with Period 2.

Some of the major structural features are regarded as belonging to Period 2, but most of the other deposits are simply identified as being post-Period 2. Many of these features can be ordered into a stratigraphic sequence, but because of the way in which the trench was excavated, it is felt that they should not be distinguished by different phase numbers.

Period 2 (= OGL C Period 3A)

The rampart and other features

The earliest feature confirmed stratigraphically is a post-pit (26, Fig 49) containing a mixed grey clay with cobbles. The pit was located in the centre of the trench, about 5m from its southern end. It was 1.4m by at least 0.7m wide; its depth was not established. The plan of the pit strongly suggests that there were two post-pits, one cutting through an earlier pit. This could not be confirmed, but a substantial squared post, 0.3m by 0.22m, which was not recovered, lay at the possible intersection of the two pits.

This pit partially underlay a dark sandy deposit (7), which extended along for a distance of at least 5m to the south. This deposit, which was relatively thick, itself underlay sandy, clay-like deposits (4) which resembled decayed turves. The outlines of some turves could be distinguished as blocks up to 0.2m in length and about 0.1m thick.

Apart from a remnant on the bottom of the trench, the turves and underlying sandy deposit (4, 7) were present only in the eastern section at its southern end and in the southern section (Fig 51). The western section was quite different in appearance. The profile of the deposit in the southern section showed a slight dip from east to west, with a possible plank revetment.

Immediately west of the turf deposits (4), a line of posts extended south of pit 26 (Fig 49). The posts were not individually numbered and none were recovered. They were spaced at intervals of 0.7m to 1.4m, and varied in cross-section from round to rectangular, 0.1-0.2m across. In between the posts there were clear traces of planks.

At the time of excavation, all these features were interpreted as a turf rampart which was held in place on its western side by a post and plank revetment.

There is a suggestion that the rampart had spilled over, on to a heavily organic deposit (17, 25) containing silts and pebbles. This feature was described as a post-trench, the recorded dimensions of which are 1.4m wide and 0.8m deep. Superficially the width seems excessive for a post-trench, but would be acceptable if the post-trench had also contained a timber-lined drain, as seems to be the case further north (compare 33-35 below), as well as in OGL C. No evidence for a drain was recorded in OGL J, however.

A second line of posts parallel with the back of the rampart was observed. The northern two posts were adjacent, in a single post-pit (28). They were 1.2m west of the post in pit 26 and, as with that pit, there appears to have been two periods, with one post replacing the other. These posts were not recovered, but they were irregular in cross-section, the largest being up 0.3m in diameter.

To the south of 28 lay posts 18 and 19. Both posts were of oak, and were sub-rectangular in section. Post 18 measured 0.31m wide

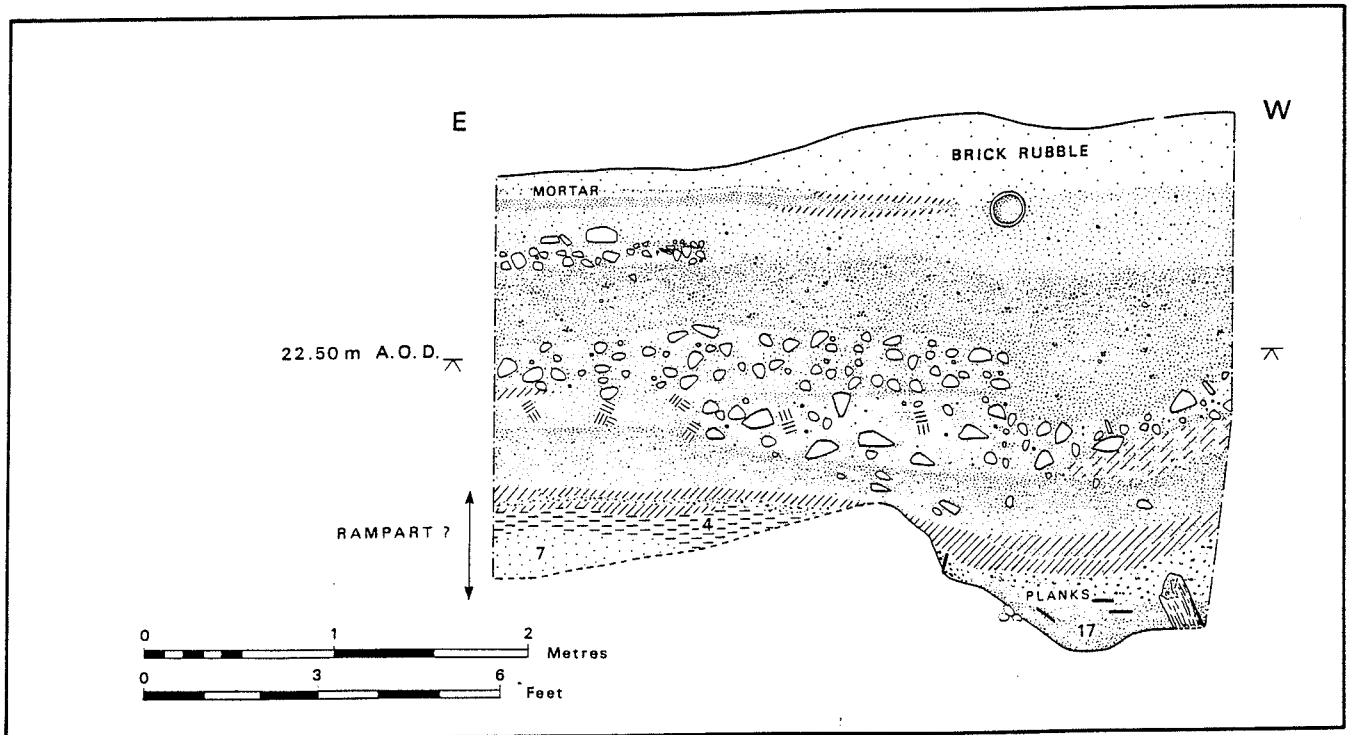


Fig 51 OGL J, the southern section

by 0.13m thick, and was flat-bottomed. Post 19 measured 0.15m wide by 0.14m thick. In the south-western corner of the trench there was another substantial post with dimensions similar to post 18.

This second line of posts was separated from the back of the rampart by a distance of approximately 0.9m. It is not clear what originally occupied this space. Spillage from the rampart lay in this space on the bottom of the trench, but no investigation below the spillage took place.

The east-west line of posts represented by post-pits 26 and 28 was continued to the west, with an interval of 0.9m, by another post, about 0.18m wide by 0.1m thick.

The road and features to the north

To the north of posts 26 and 28 lay a sequence of gravel and cobble road metallings. The road appears to have been flat and was approximately 6m wide.

The northern side of the road was clearly defined by a post (20) and a timber-lined drain (Fig 49). Post 20 was of squared oak, 0.21m wide by 0.18m thick. It lay adjacent to a second smaller squared post at least 0.11m square. The two posts were contained within the same pit (32), which was 0.5m deep and filled with silts and cobbles. As with post-pits 26 and 28, the presence of two posts suggests two periods. No other posts west of 20 were located. The point from which the post-pit cut was not established beyond doubt, but it seems to have cut metallised surfaces which suggests that the roads were already in existence when the posts were put up.

A possible drain (33), filled with silts and cobbles and containing two planks on its southern side, defined the northern side of the road. If feature 33 was a drain, it was replaced by a second drain which survived more or less intact. The drain was lined with oak planks (21-4), forming a channel with a maximum width of 0.38m. The planks measured 0.21-0.28m wide and were 0.04-0.09m thick. Signs of re-use, including at least one certain mortise, were visible. One plank (21) contained a V-shaped notch, which may be a carpenter's assembly mark. The planks were held in place against the sides of the drain trench by wooden pegs.

To the north of post 20 and the drains, the only recorded evidence is in the eastern section. This shows a long sequence of gravel, cobble and clay or silt surfaces. There is no evidence of any turf-like deposits which might indicate a continuation of the rampart northwards.

Period Post-2

The road was resurfaced (11, Fig 49) but most other features were recorded only in section. The western section revealed a complex sequence of gravel and cobble surfaces with silty clay deposits at the southern end. At the northern end, further layers of cobble with dark soils were observed.

The eastern section shows the presence of clay surfaces on top of the rampart, which was also cut by pit 1, whilst at the northern end there were more gravel and cobble surfaces. The impression created by the sections is that they mostly record metallised roads rather than internal surfaces.

The southern section contained several cobble and sandstone deposits overlying the rampart and associated features (Fig 51).

The upper portion of all sections shows a series of pits which, with the exception of 1, 2 and 29 (not illustrated), were not separately numbered. The pits are probably medieval in date.

Old Grapes Lane Trenches C and J

Confirmation that there was a significant amount of pre-rampart activity, tentatively suggested in OGL J, was also recovered in OGL C.

The road metallings recorded in the centre of OGL J can be equated with the road recorded in Crown and Anchor Lane Trenches B and C. This road is, therefore, recorded at three points within The Lanes area, and has more recently also been recorded on the east side of Lowther Street in a watching brief (p 101).

The rampart recorded in OGL C was also present in OGL J, where the turf spreads and the posts behind the rampart were all recorded. The latter site provided the additional detail that planks forming the revetment lay between the posts. The drain behind the rampart in OGL C was not recorded in OGL J, but this is probably due to the limitations of the excavation.

However, the presence of gravel surfaces in OGL J behind the rampart may suggest that there was an intervallum road.

An important observation is that no sign of the rampart was observed north of the road and drain in OGL J. The reason for this is not clear but its absence appears to be real and not a function of excavation technique, as the section here (not illustrated) shows there was a build-up of surfaces which appear to be road metallings. It should be noted also that there

was no sign of a rampart further north in Old Bush Lane Trench D (p 99), a machine-cut trench specifically dug to locate it.

An interesting additional detail is the presence of a road-side drain at the point where the road passed through the rampart. The drain is identical in construction to that behind the rampart in OGL C and in the Annetwell Street fort (Caruana forthcoming).

CHAPTER 5 LEWTHWAITE'S LANE (LEL) TRENCH A AND OLD BUSH LANE (OBL) TRENCH B

Lewthwaite's Lane Trench A (LEL A)

This trench was situated below 65 Scotch Street. The west end of the excavation lay between 1 and 2m east of the position formerly occupied by the front wall of the shop, and the trench, 11m east-west by 6.8m north-south, was contained within the main walls of the property (Figs 3-4). Immediately to the north of the excavation was Lewthwaite's Lane.

The site was selected for excavation because, unusually for a property on the Scotch Street frontage, it was uncellared. This factor led to the expectation that a sequence of medieval, and possibly Roman, street frontage buildings might survive. It was also hoped that light would be shed on the post-Roman period at this point in The Lanes. It was the sequence from the medieval period into the late seventeenth century, when number 65 was built, that was identified as of particular interest. This was because it was the only site available where it was hoped to relate the archaeological development to that of the earliest surviving buildings in The Lanes. In the event this hope was not realised, as it was found that the post-medieval

levels rested directly on features of twelfth- to thirteenth-century date.

Machinery was only used in the demolition and clearance of rubble from the site prior to excavation, and the archaeological work proceeded entirely by hand down to the undisturbed natural subsoil. This resulted in the recovery of a complete sequence, but gulleys and ditches, which created islands of stratigraphy, led to some problems of correlation.

Period 0

The natural subsoil was exposed (not illustrated), and was similar to that exposed elsewhere.

Period 1

In places there was a buried ground surface (642), comprising a very clean dark brown silty loam surviving to a depth of 0.2m (Figs 52 and 76). There were no traces of cultivation marks, burrows or tree holes, and insufficient seeds to advance the interpretation.

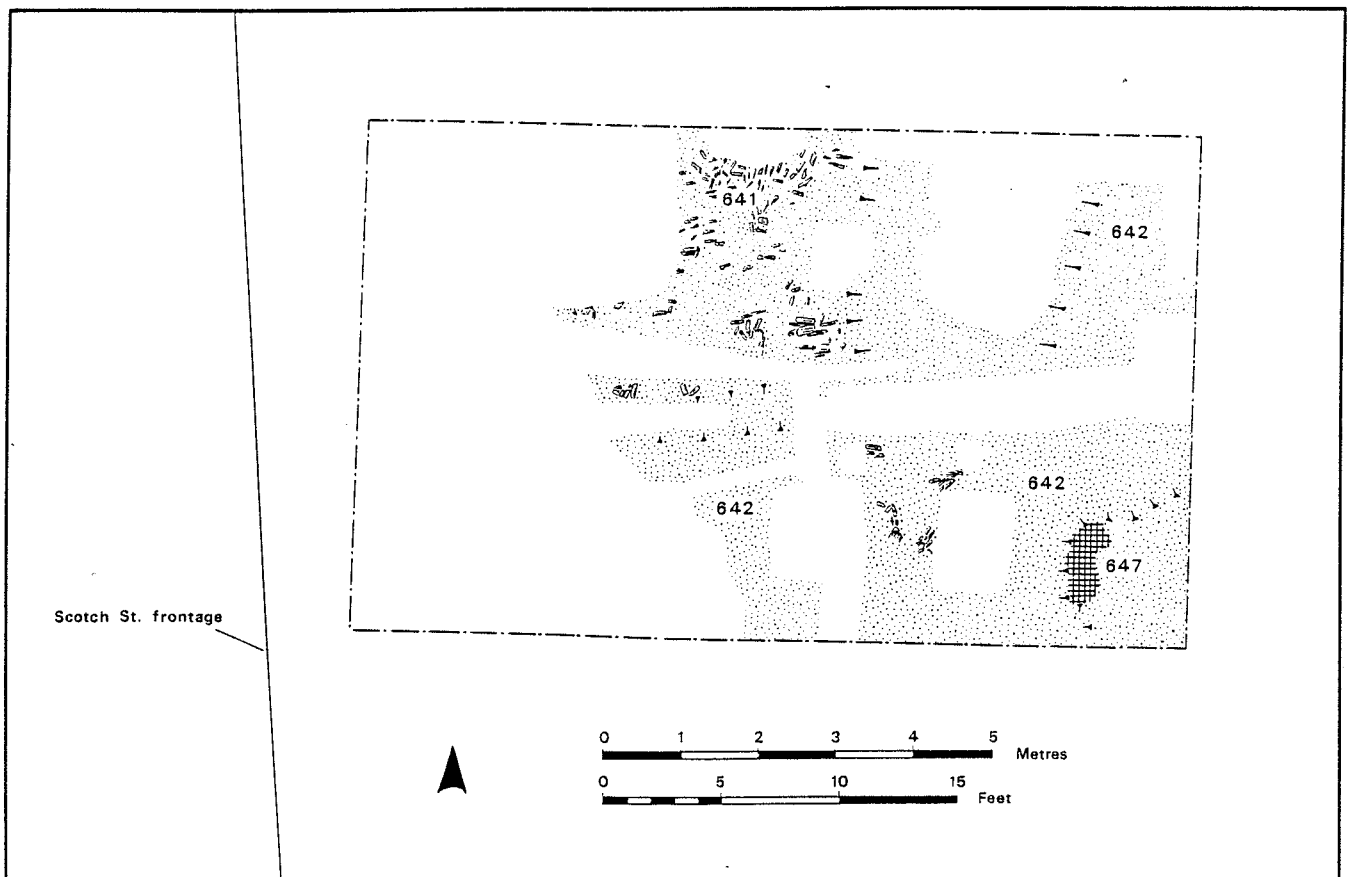


Fig 52 Plan of LEL A Periods 1 and 2A (for plan conventions, see Fig 9)

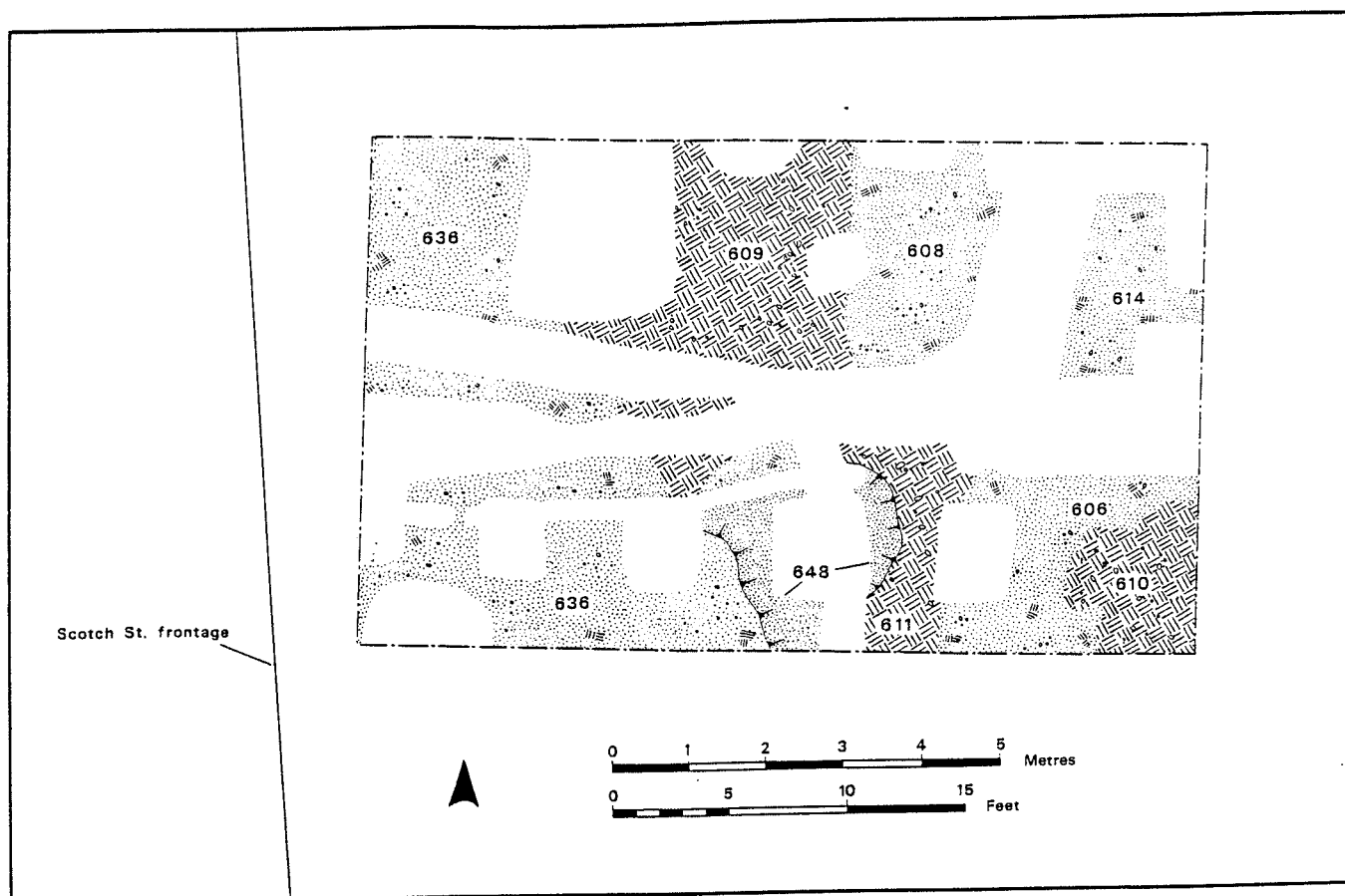


Fig 53 Plan of LEL A Periods 2B and 2C

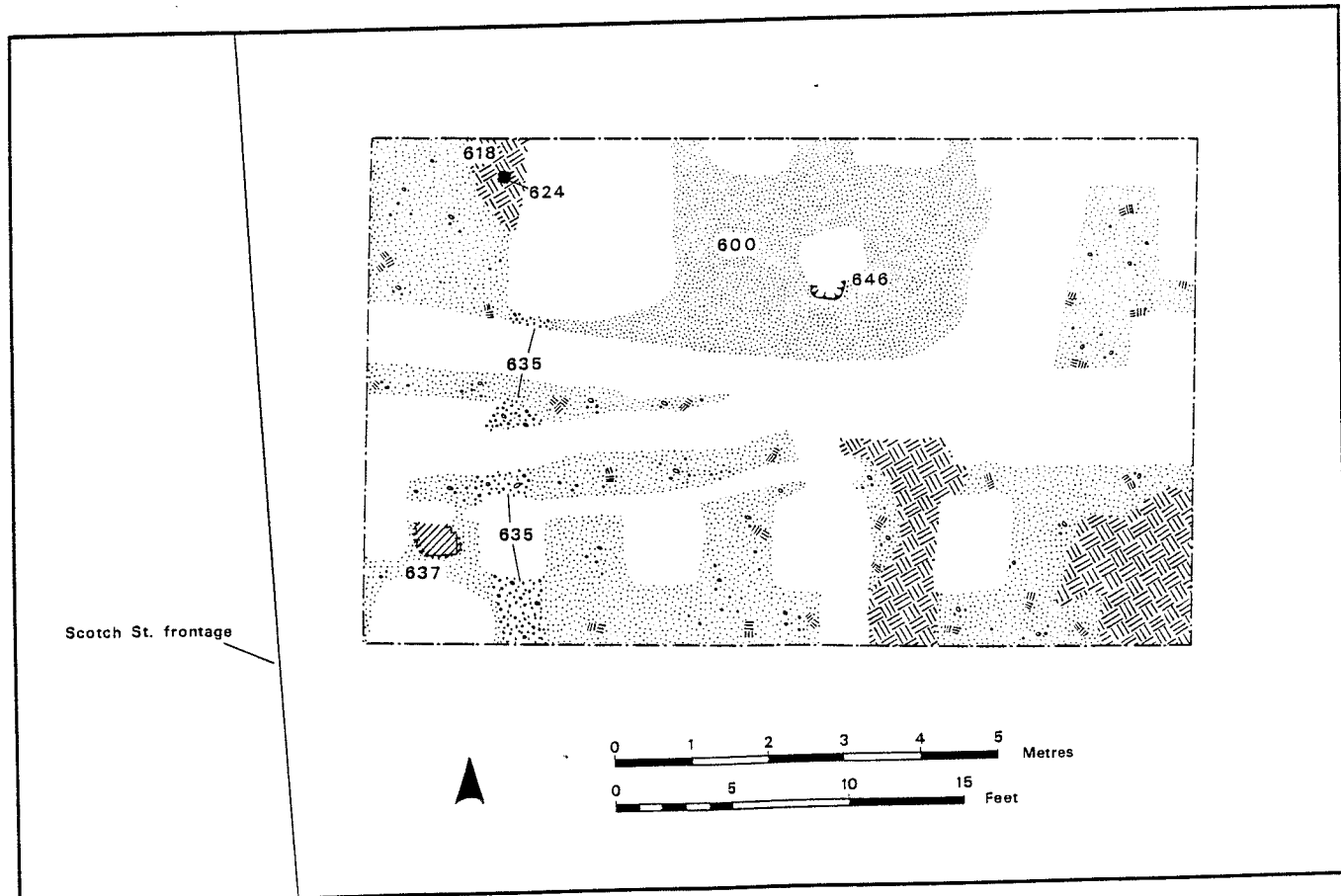


Fig 54 Plan of LEL A Period 3

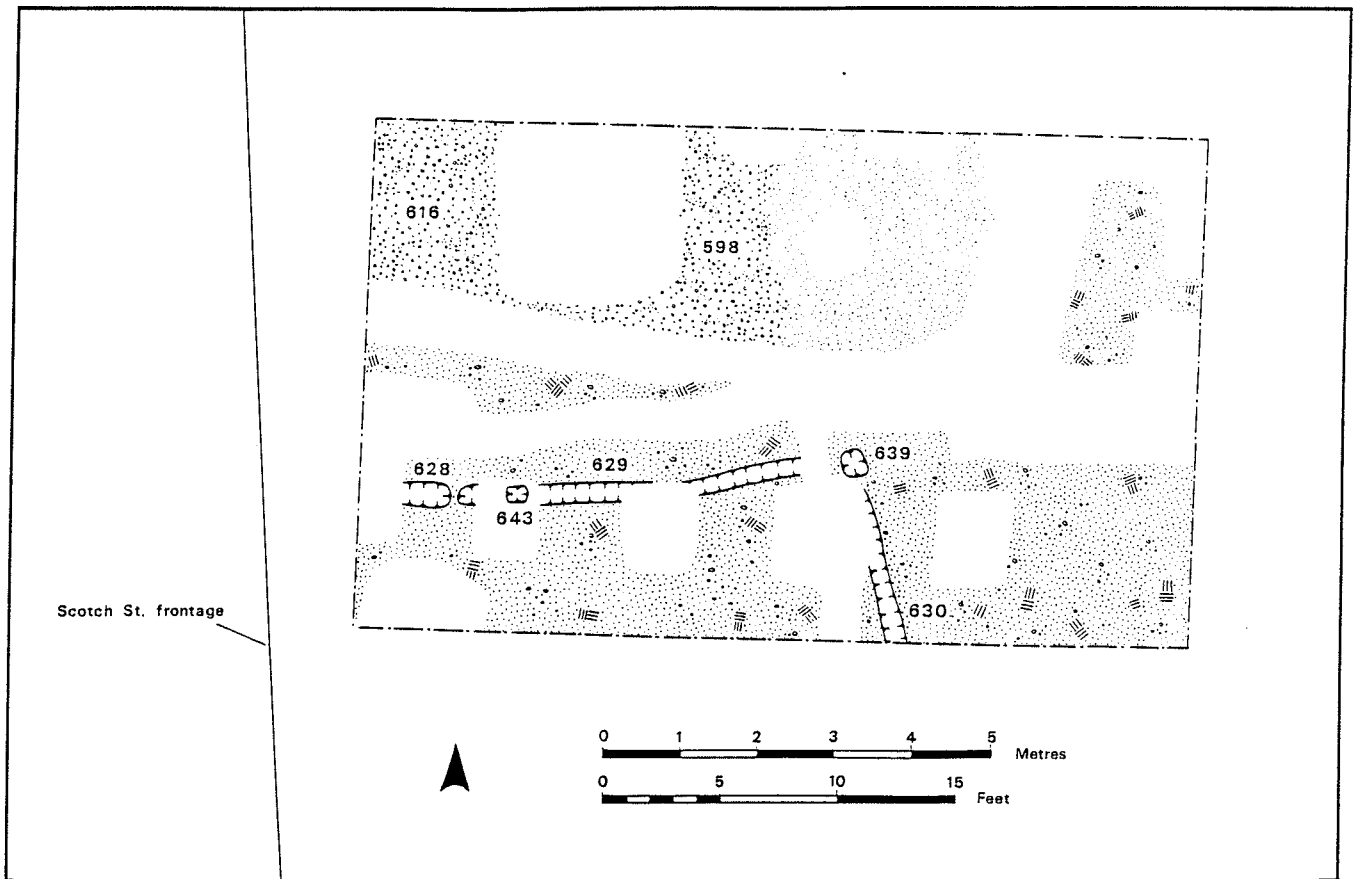


Fig 55 Plan of LEL A Period 4

Period 2

Period 2A

Immediately overlying the natural subsoil there was a spread of oak plank fragments and chips (641, Fig 52), probably resulting from woodworking. A small patch of burning (647) was perhaps of an industrial origin.

Period 2B

Several extensive clay surfaces (609-11) were present over much of the trench, on top of the wood chips and old ground surface (Fig 53). There was no evidence for walls or anything to aid the interpretation of the surfaces.

Period 2C

A depression (648, Fig 53) filled with a dark brown loam cut through earlier clay surfaces. Elsewhere spreads of silty and sandy clay loams, sometimes with a stony element (606-8, 614, 636, 638), were spread over much of the site. These features were more than simple superficial lenses; they were up to 0.2m thick and contained much dumped organic material, including substantial amounts of wood-working waste chips and offcuts, mainly of oak but with one of yew, as well as charcoal and some food waste mixed with grassland taxa (606, p 124).

Period 3

Slight structural remains cut through Period 2C. On the north side of the trench, posthole 646 (Fig 54) was 0.3m across by 0.2m deep. Posthole 624 was square in shape, 0.3m across, and contained an oak post 0.12m by 0.10m across. This was adjacent to a sandy clay surface (618). The posts are 4.6m apart, centre to centre, but they are not necessarily linked in structural terms.

A north-south gravel and sand pathway (635), 0.6-0.7m wide, formed a useful stratigraphic link with other features on the south

side of the trench. A small area of clay (637) with a burnt rim may have been a hearth.

Period 4

On the north side of the trench an extensive surface (598, 616) terminated in a more or less straight edge and sealed most of the features of the previous period (Fig 55).

On the south side of the trench was an L-shaped slot (628-30) which is probably associated with postholes (639, 643). The long arm of the slot, which was aligned more or less east-west, had a break of 0.1m towards the eastern end. The slot was about 0.25m wide by 0.15-0.2m deep. Post 639, 0.3m in diameter by 0.2m deep, lay at the junction of the two arms of the slot. Post 643, which had similar dimensions, is assumed to be part of the long arm of the slot, although its stratigraphic position is uncertain as a result of later disturbances.

No floors contemporary with the slots were recognized and the status of the slot as a fence or building line is uncertain. It should be noted, however, that the eastern end of the structure represented by the slot is also more or less coincident with the western end of the gravel surfaces on the northern side of the trench.

Period 5

Gulley 632 (Fig 56), 0.35-0.5m wide by about 0.25m deep, seems to have cut across the Period 4 slot, although the relationship was ambiguous. Gulley 632 probably linked up with a more substantial east-west gulley (619), which varied from 0.5m to 0.8m wide and was up to 0.45m deep. This was an L-shaped gulley, the short arm of which (650) contained part of a timber-lined drain (615, seen in section in Fig 76). The drain was lined with oak planks, 0.20m wide by 0.08m thick, held in place by a series of pointed oak stakes 0.05-0.03m in diameter. The fill of both gulleys included sandy clay loams with some stones and charcoal. The lower fill of gulley 619

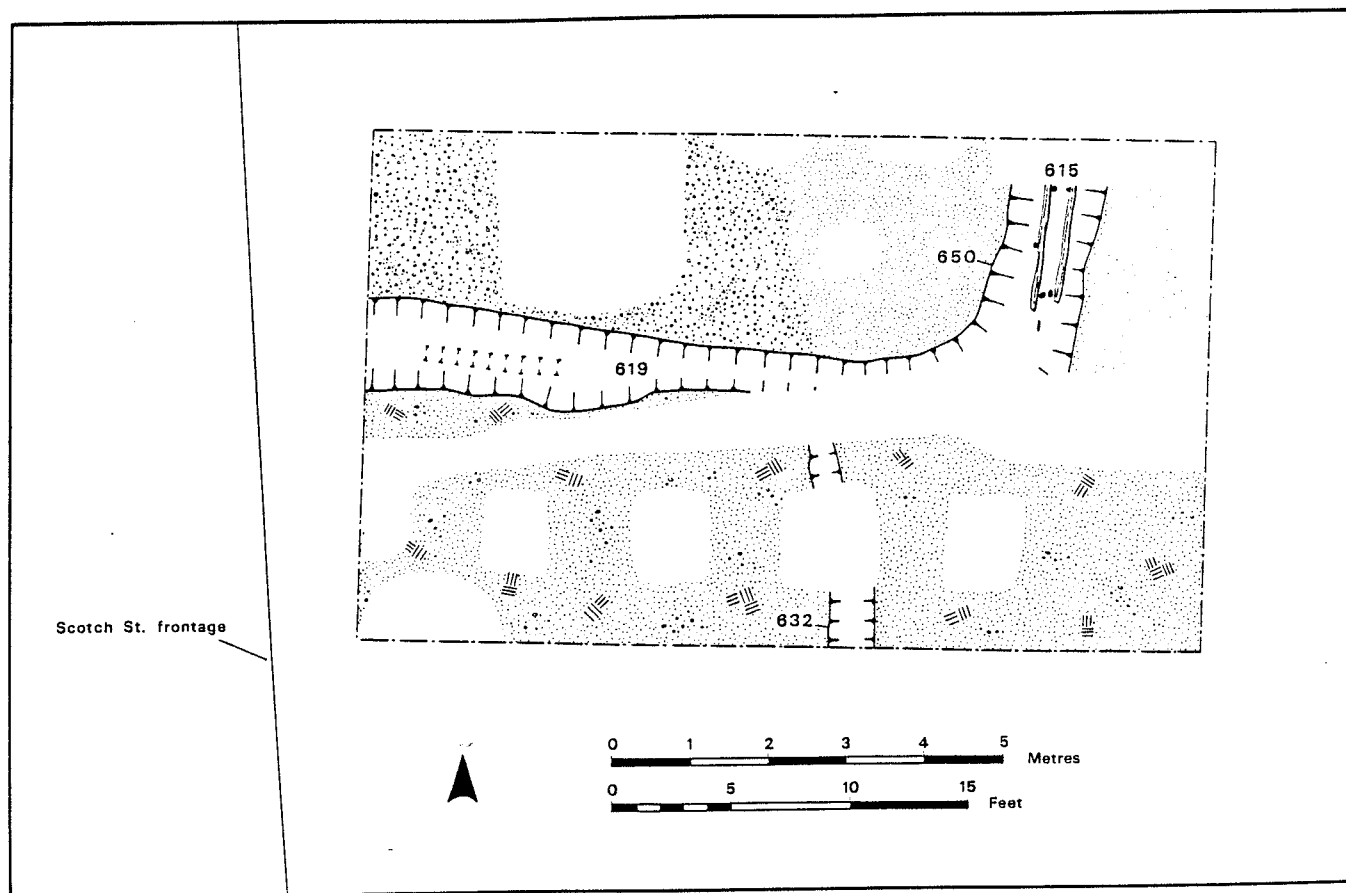


Fig 56 Plan of LEL A Period 5

was a fine silt with seeds of wetland plants and the eggs of waterfleas, demonstrating the permanent presence of water (pp 125 and 140).

No surfaces can be attributed with certainty to this phase, but the gravel deposits in Period 4 (598, 616), although stratigraphically earlier than gulleys 619 and 650, could have continued to function into Period 5.

Period 6

Period 6A

The divisions between northern and southern parts of the trench continue to be maintained throughout Period 6. The distinction is emphasized by an east-west gully (573, Fig 57), 0.5-0.7m wide by up to 0.45m deep. A slightly deeper channel (574) at the eastern end of the gully may represent a phase of cleaning or recutting. Unlike the gulleys in previous phases, this gully extended from one end of the trench to the other.

There is no doubt that gully 573 belongs to Period 6, but its precise stratigraphic position within the period is less certain. It is recorded as cutting surfaces attributed to Period 6D, but a consideration of the site records suggests that it was a primary feature within the period.

On the northern side of the gully there were gravel and cobble surfaces (593-5), covered with silts. Although nothing was recorded in the north-eastern corner, soil deposits from previous periods probably continued in use.

On the southern side of the gully there was a line of oak stakes (605) forming a continuous boundary. The stakes had sharpened ends, averaged 0.05m across, and were closely spaced, mostly less than 0.15m apart. They probably formed a fence, but no wattle infill was discovered. The stakes defined an area with a sandy clay loam (607, 612). Two posts (621, 631) may represent an entrance.

A patch of clay surface (617) survived at the eastern end of the site.

Period 6B

A pit (620) in the south-west corner of the trench measured at least 1.7m by 0.9m by 0.7m deep; it contained sandy clay loams, silts and charcoal over a primary silt (Fig 58). A shallow gully or depression (583), also in the south-west corner, may belong with this phase, although as it was overlaid only by layer 550 (Period 7), an attribution later in Period 6 or even in Period 7 may be more appropriate.

On the southern side of the site was a deposit (578, Period 6B-E) with flakes of wood chips and blocks and bark from a variety of trees including alder, oak and ash, probably representing woodworking in the vicinity. To the north of gully 573 the gravels and silts of Period 6A were overlaid by more metallings of gravel and cobbles mixed with sand (582, 584-5), up to 0.1m deep.

Period 6C

The metallings on the north side of the trench were partially covered by a spread of withies and branches (570, not illustrated; 577, Fig 59), mixed with silts containing charcoal and some wood fragments (576). This feature was set within a fenced enclosure (581), and represented woodworking waste in the form of wood chips rather than roundwood (570, p 126). The fence (581) was formed mainly of oak, alder and hazel stakes with sharpened ends, set at intervals of 0.2-0.32m. The wattle infill, which survived for short distances, comprised roundwood between five and ten years of age (p 126 and Figs 85-6). The greatest length of roundwood recorded was 1.47m.

The east-west arm of the fence was located on the northern edge of gully 573, now partially filled (560), and some of the stakes penetrated the gully. The north-south arm cut through the fill of the Period 5 timber-lined drain (650). A pit (587), 0.75m by 0.6m and 0.55m deep, cut through the surfaces. Its fill, consisting of sandy loam with stones, wood fragments and clay, was not diagnostic of any specific activity.

In the south-western corner, pit 620 was partly filled with gravel and sands and sandy clays (568-9), as well as fragments of wooden beams. A linear, slightly cambered band of gravel (559) may be a footpath; it is in the same position as path 635 identified in Period 3.

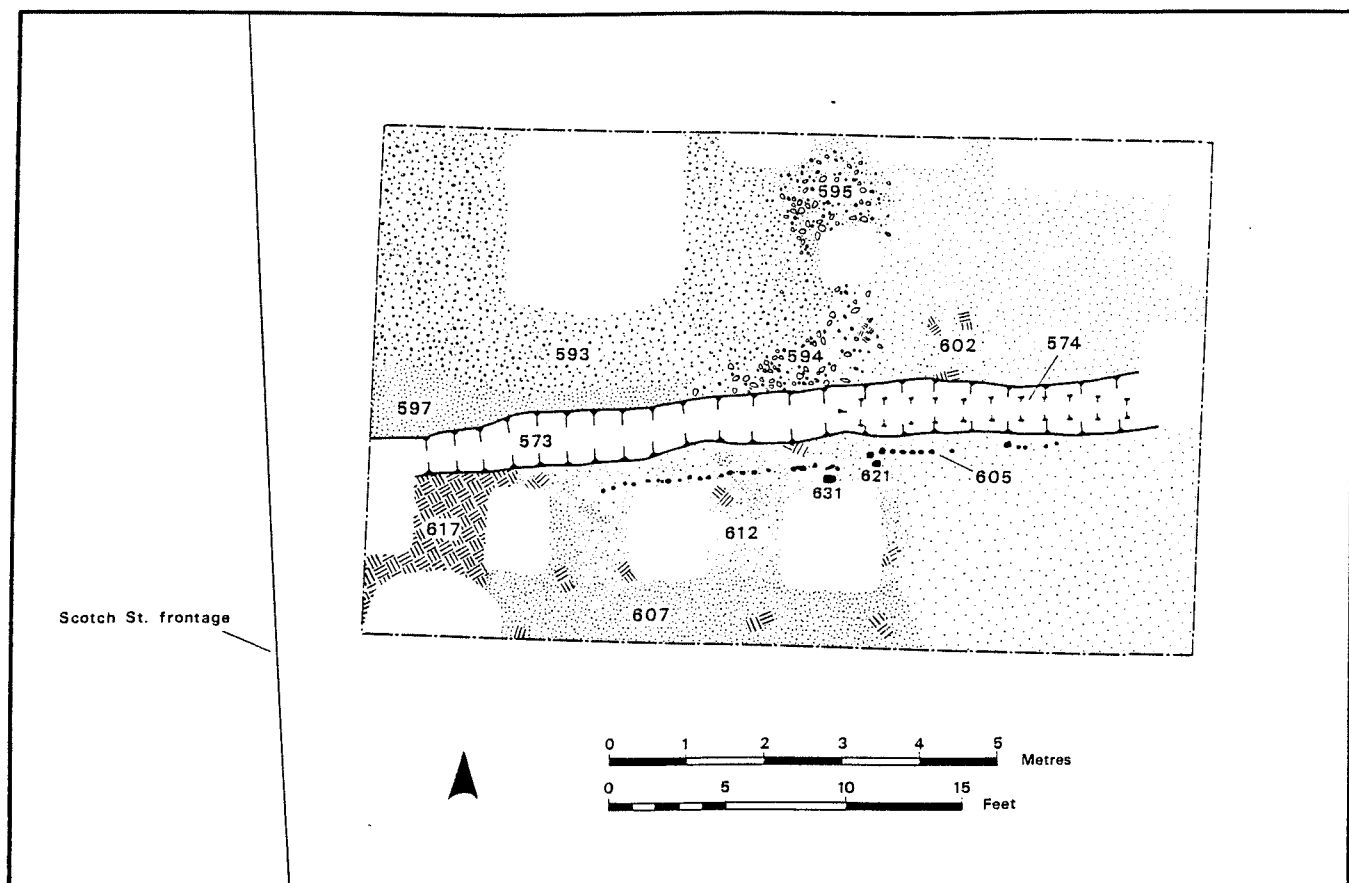


Fig 57 Plan of LEL A Period 6A

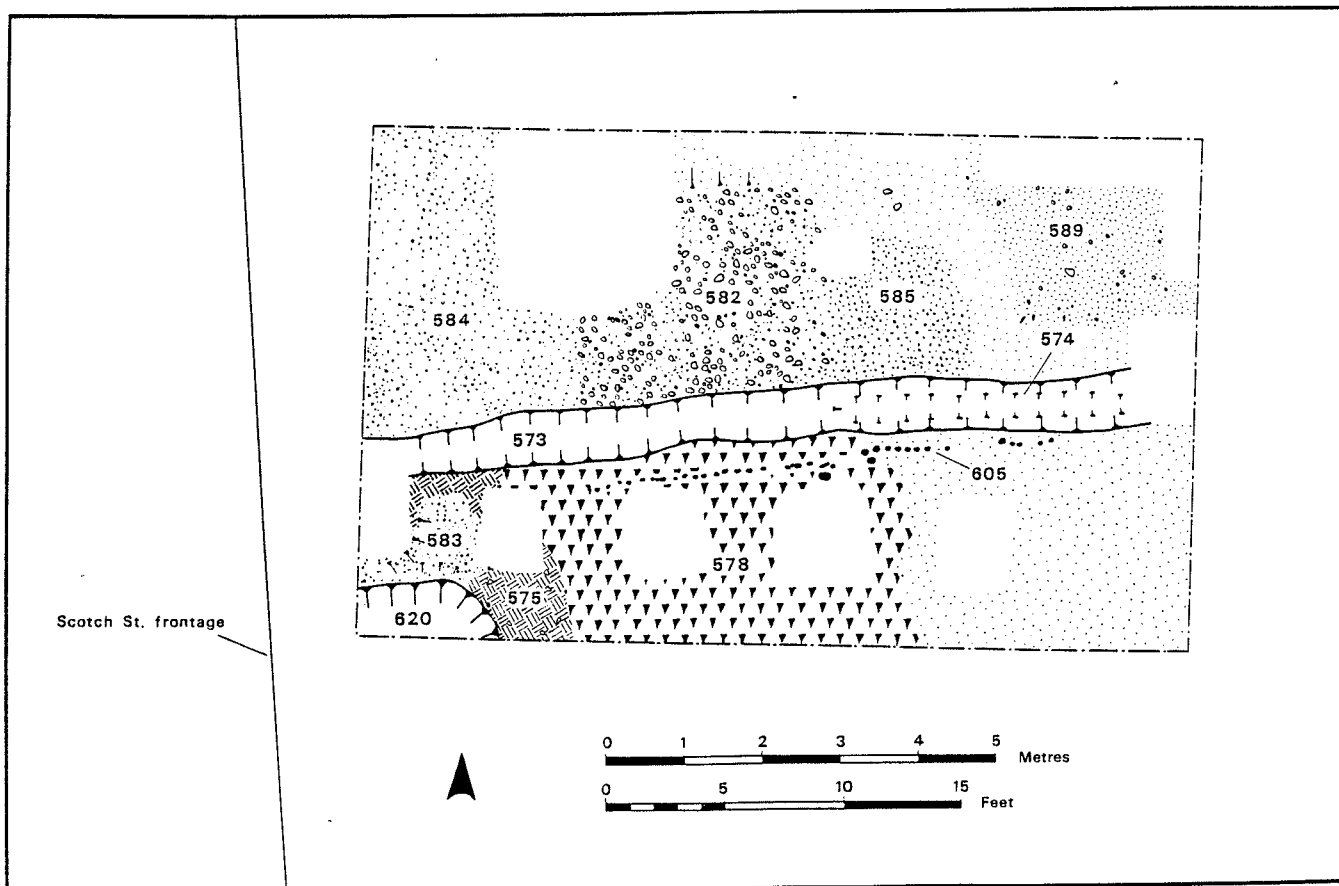


Fig 58 Plan of LEL A Period 6B

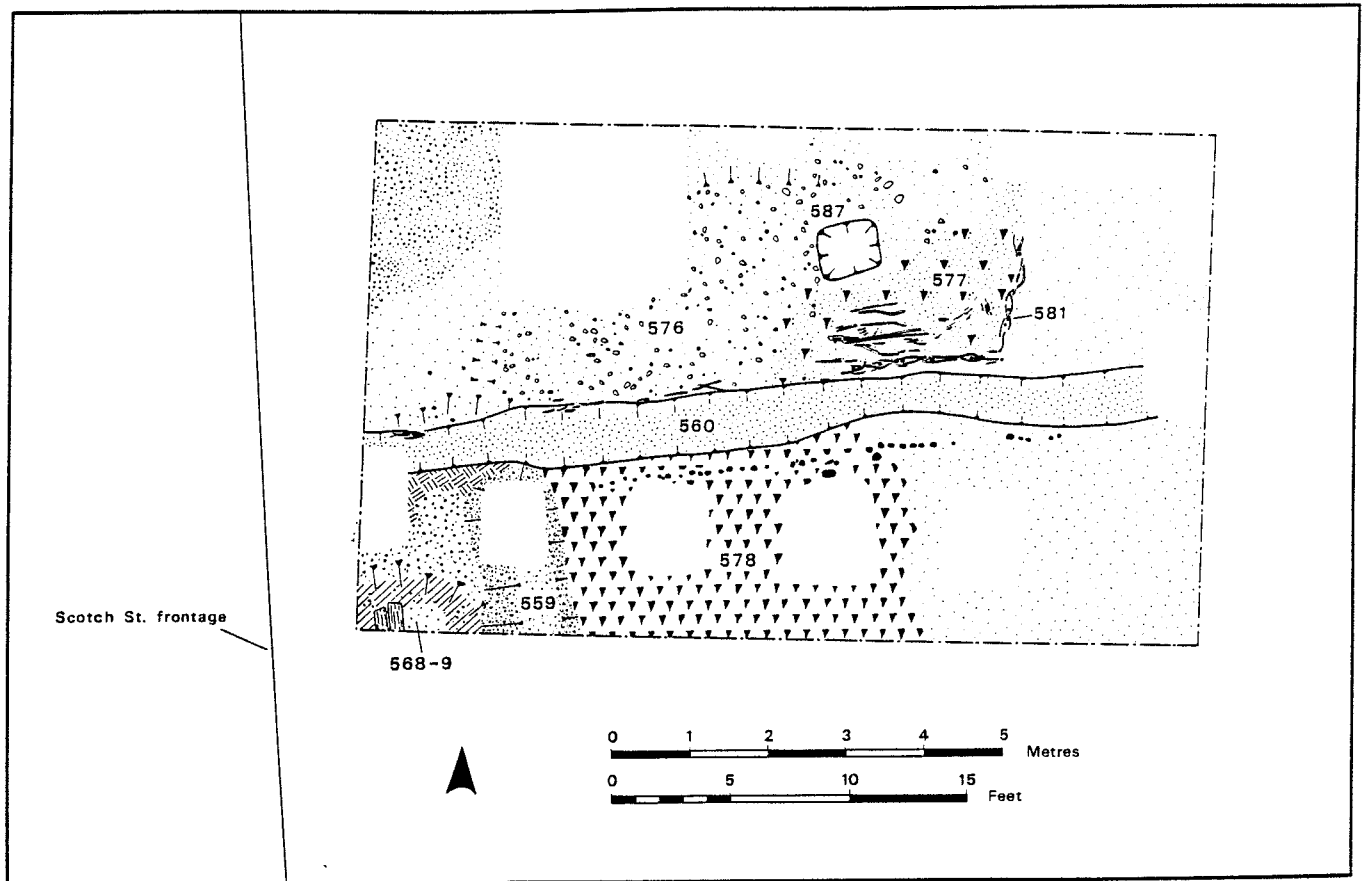


Fig 59 Plan of LEL A Period 6C

Periods 6D-E and 6E

Fence 581 continued in use, but the withies and silts associated with it were overlaid, first by further silts with numerous fragments of wood (564, 566), and then by a fine sandy gravel (567) in Period 6D (not illustrated). More metallings were laid down (558) in Period 6E (not illustrated).

Period 7

Period 7A

A substantial deposit of grey sandy clay loams, incorporating patches of clay, charcoal and stones (550, 553), blanketed all earlier features across the site to a depth of up to 0.25m (Fig 60). It is an important deposit which marks a break in the pattern of occupation. It was not a slow or natural accumulation and was interpreted during excavation as a dump; although the plant species identified in the deposits are highly suggestive of a cultivated but abandoned soil, this could have been brought in from elsewhere (p 126). Much of the pottery from the deposits is residual (Fasc 3, p 373).

Periods 7B and 7C

At the western end of the site, further relatively featureless deposits accumulated in Period 7B (not illustrated). They included sand and silt deposits mixed with stones, a group of stakes, and a shallow slot, 0.7m wide by 0.25-0.3m deep. One deposit (546) contained large quantities of pure hay-like material, with the absence of ruderals and weeds suggesting that it had been rapidly covered up after deposition (p 126).

In the south-western corner, a shallow pit (548, not illustrated) contained a great many oak planks varying in length from 1.4-0.26m. Several mortises, both circular and rectangular, together with grooves, were recorded.

In the centre and at the eastern end, a silty loam (539, Fig 61) containing small stones and wood fragments mixed with weed and grassland taxa, including sedges and wet meadow species (p 126),

accumulated to a depth of about 0.1-0.15m.

On the southern margin of the site there was a spread of turf (not illustrated), the individual blocks of which could be clearly distinguished in places. The maximum width of the turves was around 0.25m and the thickness was about 0.1m; the lengths could not be ascertained. Smaller fragments of turf were also present. The deposit as a whole was 0.25-0.3m deep.

In Period 7C, sandy loams and compacted silts with an organic component accumulated (not illustrated).

Period 8

Period 8A

The distinction between Periods 7 and 8 is made on the assumption that a metallised surface and a wattle fence in 8A may reflect a different set of activities or a different organization of space. This may be an incorrect assumption as there is little else to distinguish the periods, which in other respects could be regarded as a continuum.

At the western end of the site, a metallised surface (544), comprising a mixture of gravel, cobbles and sand, extended over a width of about 3.2m (Fig 61). It may be one side of a yard.

An east-west line of oak posts and stakes with pointed ends formed a fence line (543) extending over a distance of 4.2m. The intervals between the uprights could not be determined with accuracy because of later disturbances. The scantling was within the range 0.08m by 0.03m. No north-south lines were present, and the fence line could not be related to any other structural feature except in so far as it did not extend across the metallised surface.

A dump of sandy loam mixed with clay patches, stones and silt (531, Period 8A-D) lay at the eastern end of the site.

Period 8B

The metallised surface was overlaid by silt (537), and an extensive dump (515) of clay silt and stones covered the central part of the

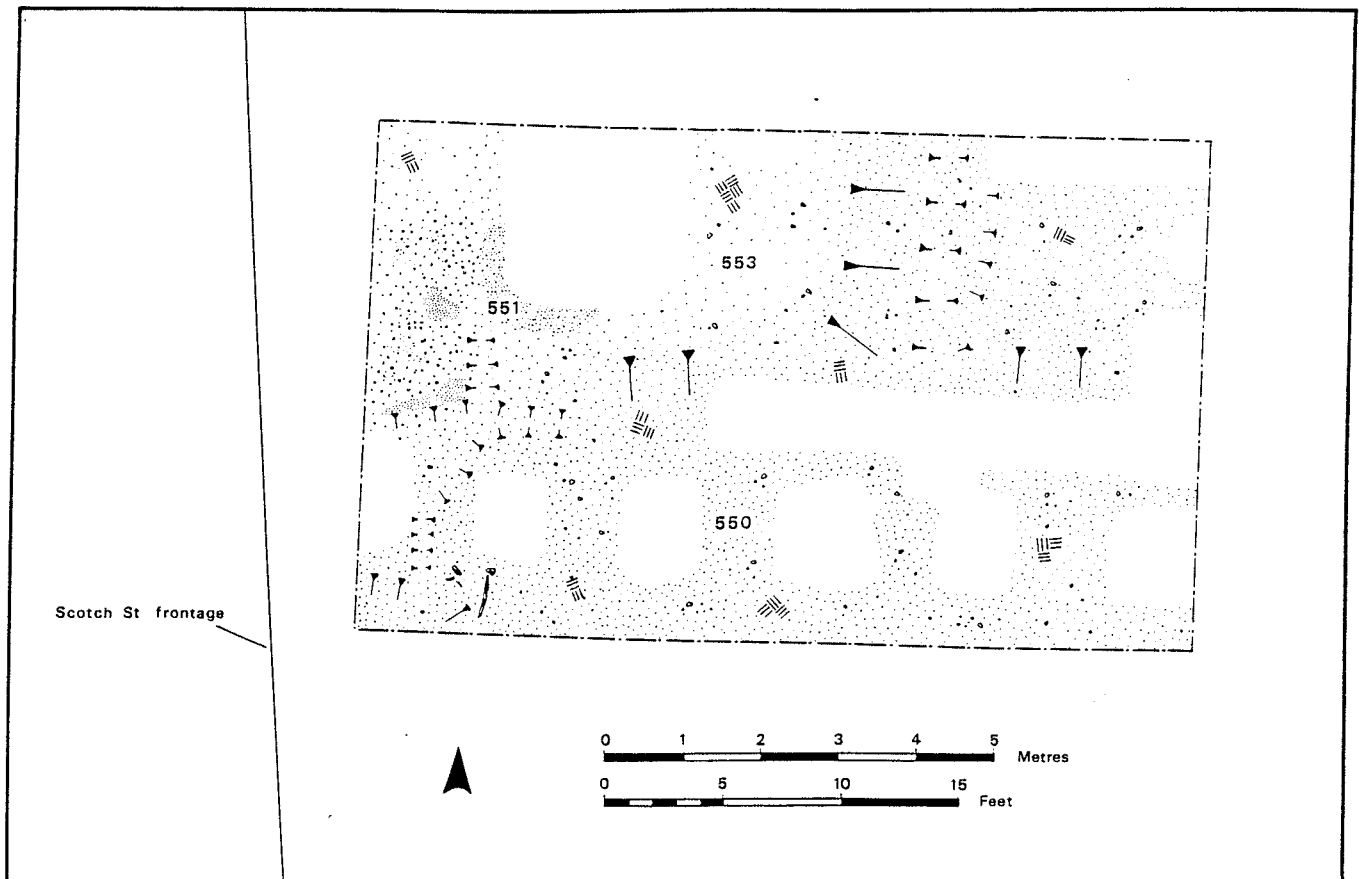


Fig 60 Plan of LEL A Period 7A

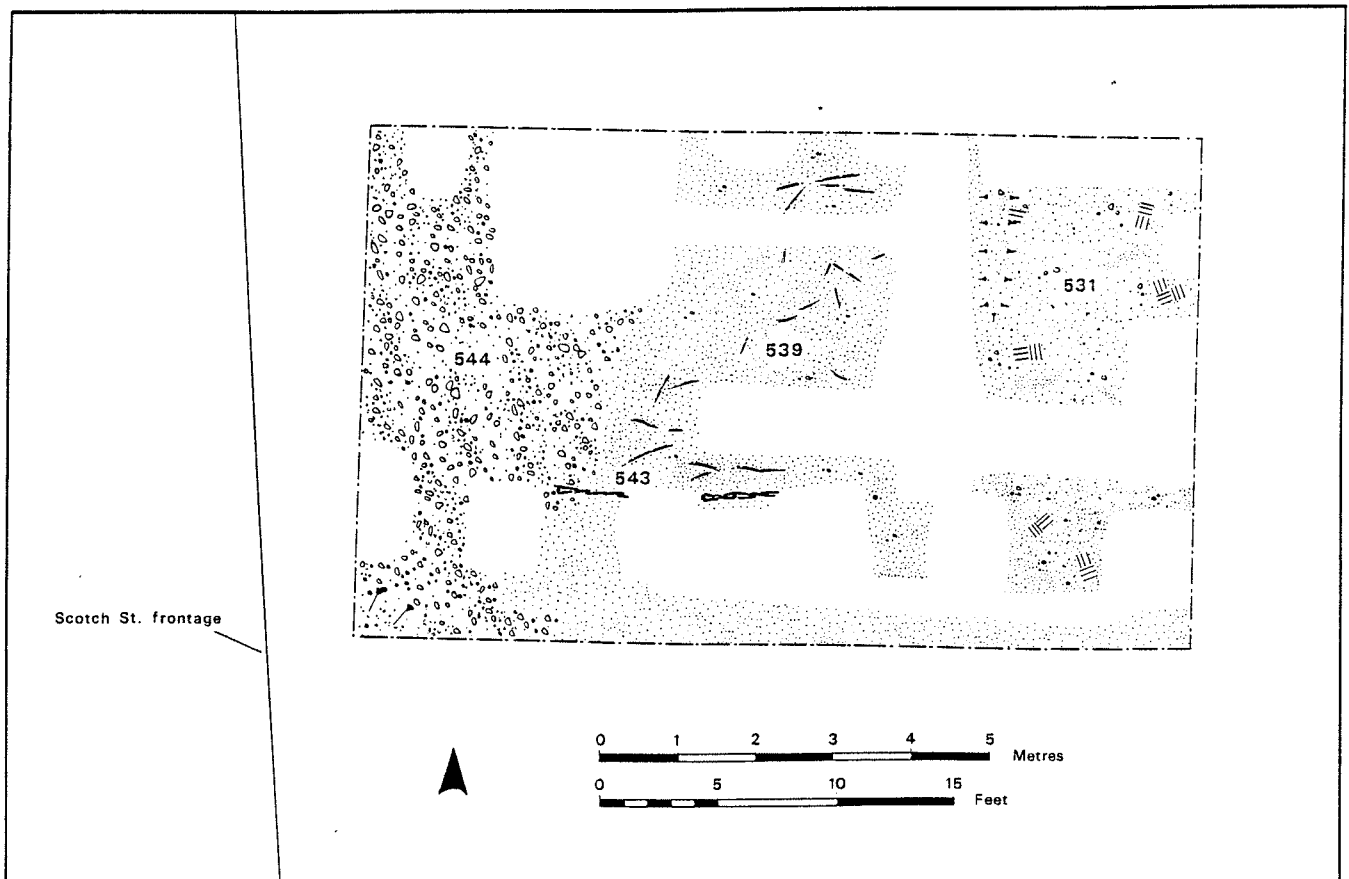


Fig 61 Plan of LEL A Periods 7B to 8A

site and the fence line to a depth of 0.15m (not illustrated).

Period 8C

A further soil level (542, Fig 62) accumulated over the Period 8A metallised surface (544). The 8B dump (515) probably continued as a visible feature.

On the northern margin of the trench, there was a large pit (651, Fig 62), some 2.7m wide at the rim, 1.7m wide at the bottom, and 0.85m deep. The sloping sides may be a weathering cone. It was filled with highly organic silts mixed with clays and stones, charcoal and wood (seen in section in Fig 76). The environmental suite comprised only plant remains, there being no insects at all (p 141), which is surprising in view of the rich assemblage of plant remains. These suggested that the pit was mainly used for the disposal of rubbish, such as cereal waste and hay/bedding, but not faeces (pp 126-7).

There was also a gully aligned east-west (533), 0.9-1.0m wide and 0.4-0.5m deep, filled with relatively clean black silts and sand.

Period 8D

In the north-west corner, three deposits abutted each other in relatively straight lines. Two possible dumps were composed of sandy loam with many clay patches and small stones. A sandy layer, described during excavation as 'bedding', was overlaid by more sand. The disposition of these features (not illustrated) suggests that they were remnants of floors, although no associated structural features were found. All were overlaid by a compacted sand (513, Fig 63) and a black silt.

At the eastern end was an extensive deposit of soil overlaid by a further soil accumulation, and silty sand (511, not illustrated).

Period 8E

Two intersecting gulleys cut the earlier deposits (Fig 63). Gully 517 was aligned east-west and was 0.4-0.5m wide and 0.2m deep. It was filled with a black silt with some sand, which extended widely over adjacent areas and included some turves. Other similar deposits were present elsewhere.

Gully 518, aligned north-south, was wider and deeper, measuring up to 1.6m wide at the top but only 0.6m wide at the bottom (not seen in the northern section as it was cut away by a later pit). It was 0.4m deep and contained two fills of mineral material. The lower fill (502) contained no seeds, although there were fragments of sedges and rushes. The absence of a seed-bank is surprising in a gully, and may suggest that the gully was deliberately backfilled with sterile material. The insect fauna is helpful in that it represents an outdoor community from an area of heath or moorland. Many of the beetles and plant remains suggest an origin in an area of humified peat (pp 127 and 141).

The upper fill of gully 518 (500) contained a great deal of plant material indicative of a periodic flow of water and wet muddy conditions in which plants such as water crowfoot would flourish (p 127); this would also account for the presence of aquatic insects (p 141).

On the margin of the gully were extensive deposits of what appeared on excavation to be black silty loams (501, 503, Fig 63). The insect fauna from one of these deposits (501) included large numbers of beetles typical of heathland and moorland (pp 141-2). The assemblage is strongly indicative of peat, but the absence of heather suggests that it was perhaps less likely to be roofing material, and may have been the residue of a peat intended as fuel. A fragment of bone identified as a human tibia (not separately reported) was recovered from deposit 501.

A shallow depression (552), filled with sandy loams and small stones, lay adjacent to a patch of sandy clay (516) in the centre of the site.

Three stakes (521-3) were present at the eastern end, where deposits (511) survived from the previous phase. On the southern margin of the trench were deposits or dumps of soils with clay (532, 534-5).

Period 8F

This is represented by a relatively small area of clay floor located towards the western end of the site (not illustrated). No other features were associated, although the underlying sand may be a sub-surface deposit.

The sequence appears to comprise miscellaneous activities which are difficult to characterize in purely stratigraphic terms, but which has a very strong outdoor component, to judge by the palaeobotanical evidence where it exists. If buildings were present nearby, the samples examined for plant and insect remains do not convey the impression of human habitation. Rather the impression is one of an agricultural area, perhaps with an element of woodworking (?crafts).

In OGL A and B, property boundaries seem to have remained in place for prolonged periods of time, and the organization of space within the boundaries seems not to have been altered on very many occasions. In LEL A, the 20 periods and sub-phases between 2A and 8F, including several apparent changes of layout, seems by contrast to convey the impression of instability. It is worth examining this point a little further to see whether it can be sustained.

In Period 2 floors seem to be distributed over the entire area of the trench. In Period 3 they seem to be restricted to the western end of the trench, together with a footpath. Periods 2 and 3 may, therefore, represent different layouts.

Period 4 also contains surfaces at the western end of the trench, as well as a new fence/wall line represented by the slot. This pattern may continue through into Period 5, at which time the slot was superseded by a system of gulleys, one containing a drain. No surfaces are associated with this stage, although other deposits are present. Periods 3 to 5 could be regarded as variations on what is essentially the same pattern.

Period 6 probably belongs to the same developmental sequence. The status of the east-west gully, which replaces the Period 5 gulleys, is reinforced by the fences on either side. Within the fences are what may be the ephemeral traces of buildings represented by a variety of deposits.

Period 7 is quite different in that all traces of earlier features were concealed by widespread deposits blanketing earlier levels. Period 8 is also different. Open areas are implied by the pits and gulleys, although hints of buildings are also present at the latter end of the period.

The changes seem to have occurred between Periods 2 and 3, 6 and 7, and 7 and 8. The extent to which an unstable settlement pattern may be implied by these changes is uncertain, but rapid changes in the organization of space may not be too surprising on the periphery of the settlement where general agricultural activities took place.

Period 9

The whole area of the trench was blanketed by a sandy silty loam (460, 498-9, Fig 64), 0.2m deep. It was probably a dump as it comprised a mixed deposit with stones, clay patches and charcoal.

Period 10

Building 663

A large clay and cobble-founded building (663) was recognized, of which two walls were present within the excavation, together with a series of internal and external deposits. The wall foundations created islands of stratigraphy, resulting in difficulties in creating linkages between some deposit sequences and the walls. It is partly for this reason that Period 10 has not been subdivided. Indeed, it is possible that the latter part of the sequence of internal deposits should be attributed to Period 11.

The position of both the north and west walls is not known as they lay beyond the limits of the excavation. The minimum internal

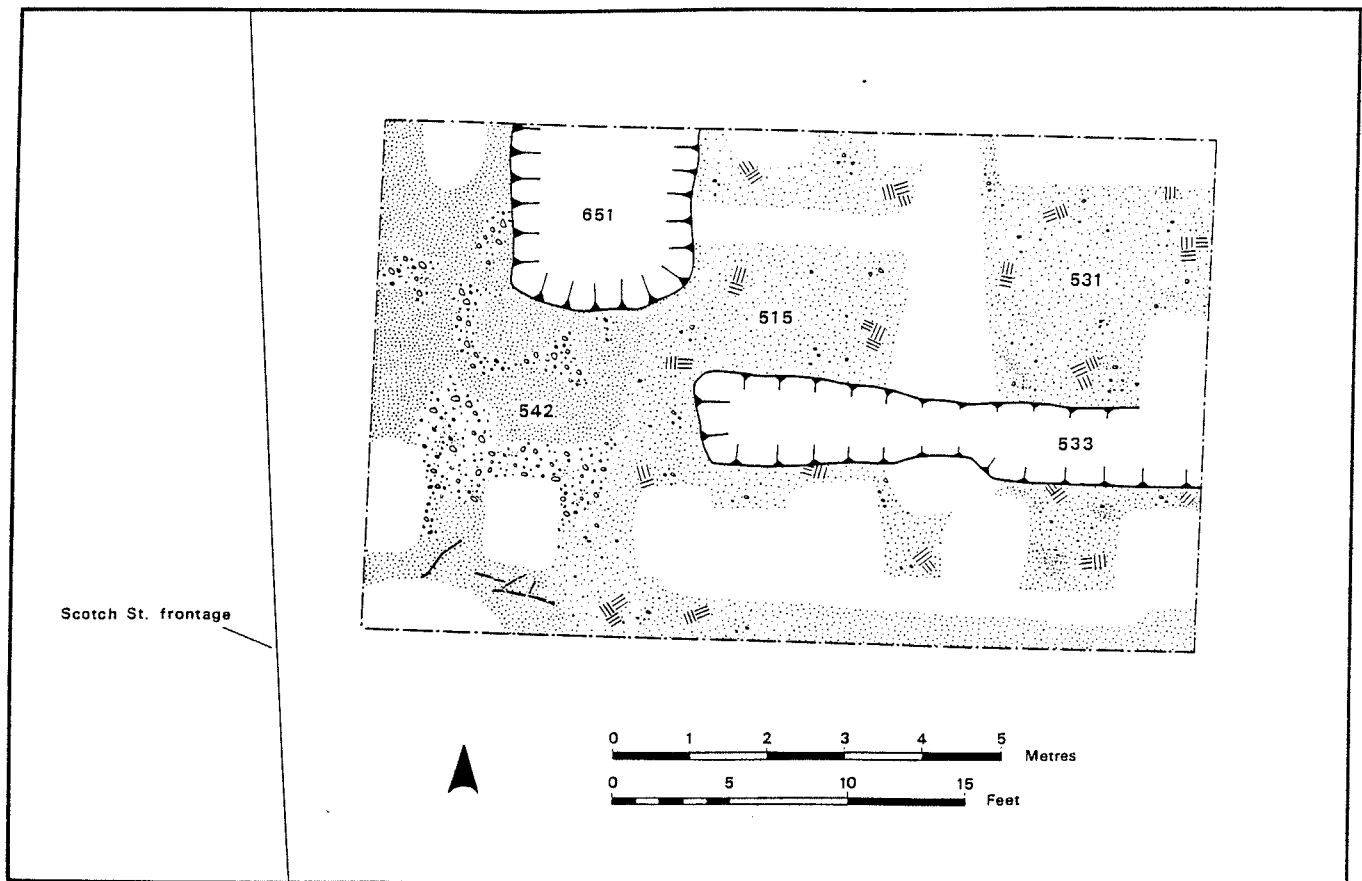


Fig 62 Plan of LEL A Periods 8C and 8D

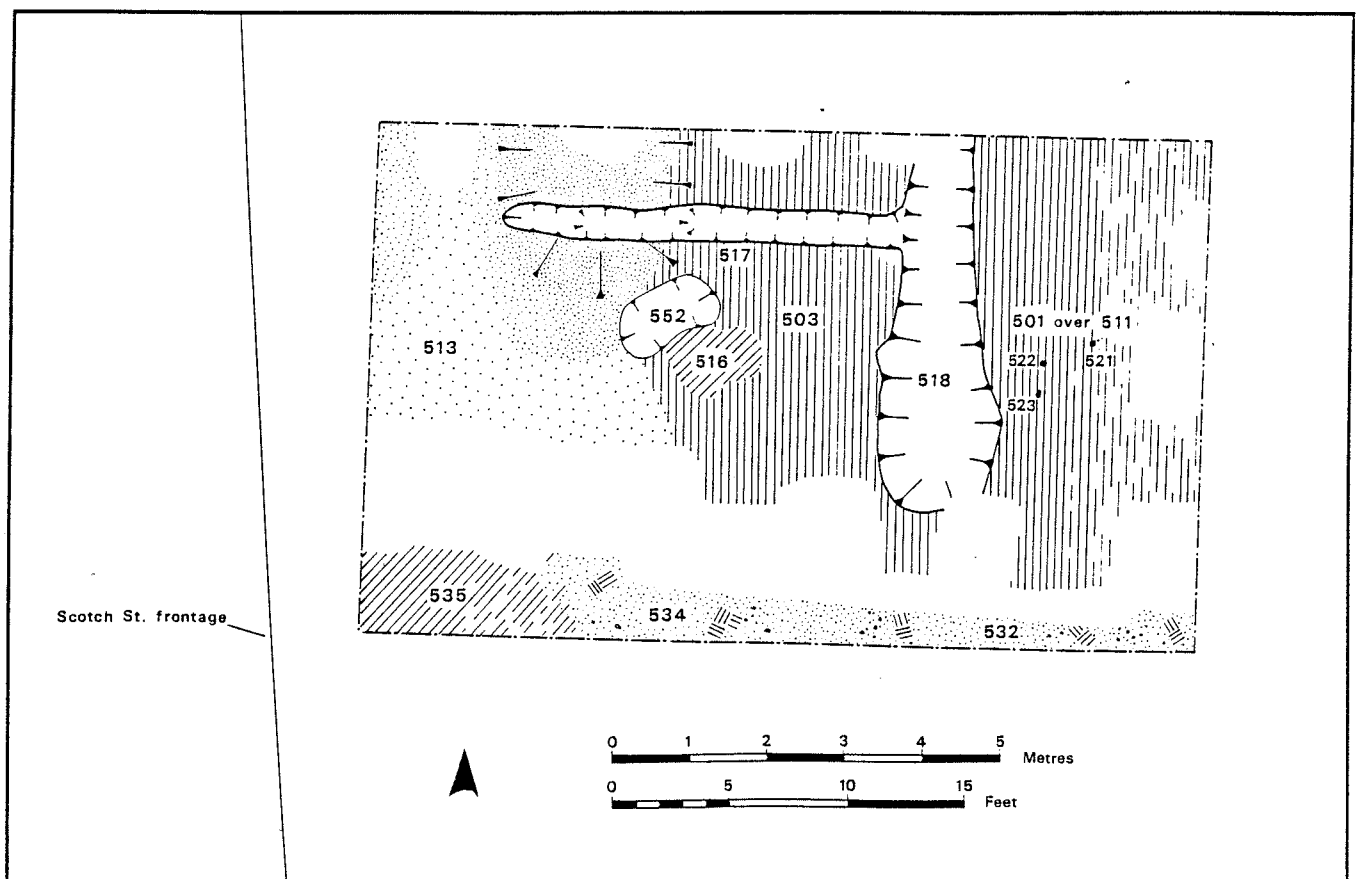


Fig 63 Plan of LEL A Periods 8D and 8E

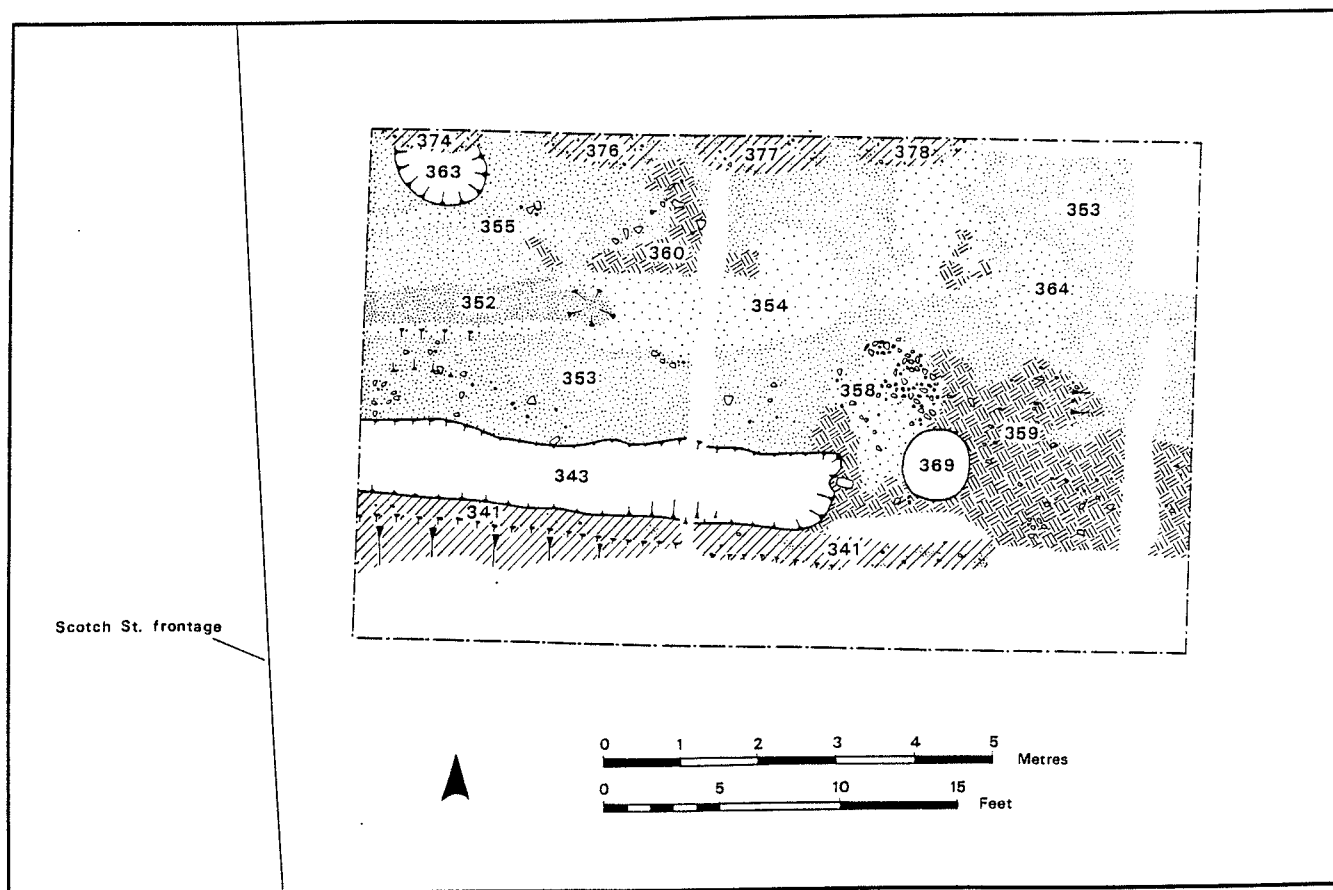


Fig 66 Plan of LEL A Period 11

dimensions of the building are 10m east-west by 5.3m north-south. The characteristics of both walls suggest that they are both major features and could be external walls, an interpretation partly supported by the drain (656) beyond the south wall.

The south wall

The earliest feature consists of an east-west foundation trench (653, Fig 64), 0.95-1.05m wide but only 0.2m deep. It was filled with clay and cobbles. At about the same time two post-pits were dug on the same line as the foundation trench. Pit 493 measured 1.15m by 0.9m and was 0.65m deep; it contained a layer of cobbles sandwiched between dirty clay. Pit 652 measured 1.5 by about 1m and was 0.65m deep, and was filled with clay and cobbles. Overlying the foundation trench and pits there was a continuous band of sandy clay mixed with cobbles about 1.2m wide (471, 478).

Four other pits (494-7) were also excavated on the same line. They are thought to have cut through the clay, but the relationship could not be established with certainty. If they are constructionally later, these substantial pits may represent an afterthought or a change in foundation design on the part of the builders. Alternatively the pits may represent another building phase, but this suggestion has been rejected following a consideration of the other structural elements (see below).

There were slight variations in the size of the pits, with measurements ranging from 1.4m by 1.05m to 1.5m by 1.35m, and depths from 0.9m to 1.15m. All were filled (475-7) with roughly coursed dirty clay and cobbles mixed with occasional sandstone blocks. Some of the cobbles were nearly 0.3m in length. Three of the pits contained large, squared, flat-based oak posts (486-8, Fig 65), measuring 0.28m by 0.16m, 0.3m by 0.23m and 0.35m by 0.21m. There were intervals of 2m and 2.1m between these posts.

In between the posts there were flat stones (467, 472-4, 482-4) which are almost certainly padstones (Fig 65). The intervals between the pads and the posts, centre to centre, averaged about 1m, although three (482-4) were adjacent. The posts and padstones were linked in some cases by a slot (416, 458), 0.15-0.2m wide by 0.05-0.08m deep.

This wall continued beyond the western end of the trench, and at its eastern end it linked up with a north-south wall. Padstone 467, which lies on top of pit 652, probably supported a corner post.

Some 0.2m south of the wall there was a shallow gully (656), 0.25-0.3m wide and 0.2-0.3m deep. The gully extended along most, but not all, of the south wall from the south-east corner. It was filled with gravel, clay and silts (463), and a short fragment of an oak plank. The gully is probably a drain, but it was not a primary constructional feature associated with the wall for it cut the uppermost clay (464) of the wall foundation.

The east wall

The construction of this wall differed from the south wall in that there was no foundation trench equivalent to 653. Instead the earliest features consisted of two pits (654, 657, Fig 64). Pit 654 measured 1.5m by at least 1m and was 1.15m deep; it had a similar fill to the pits in the south wall. The absence of a post is not significant as the pit lay on the eastern edge of the excavation. Pit 657 lay in the corner of the excavation; its depth was similar to 654 and it contained a similar fill. The other dimensions could not be ascertained.

Overlying pit 657, and linking this wall with the south wall, was a shallow foundation trench filled with clay (438, Fig 65). A flat sandstone (466) and a large water-worn boulder (465), separated by an interval of 3m, probably served as padstones. Halfway between these padstones, a post in pit 654 can be conjectured. The intervals between the posts in the east wall, measuring from the corner padstone (467), are slightly greater, at about 1.5m centre to centre, than in the south wall.

Internal deposits

There were few recognizable floors (Fig 65). Most of the deposits were mixed loams with charcoal, clay and sand patches (431, 442, 444-5, 450), but there were areas of sand (452), burning (433-5, 441) and hearths. There were some possible floors made of clay (436).

In relatively late stages in the sequence there were some pits (Fig 65). Pit 423 measured 1.10 by 0.8m by 0.45m deep, and was

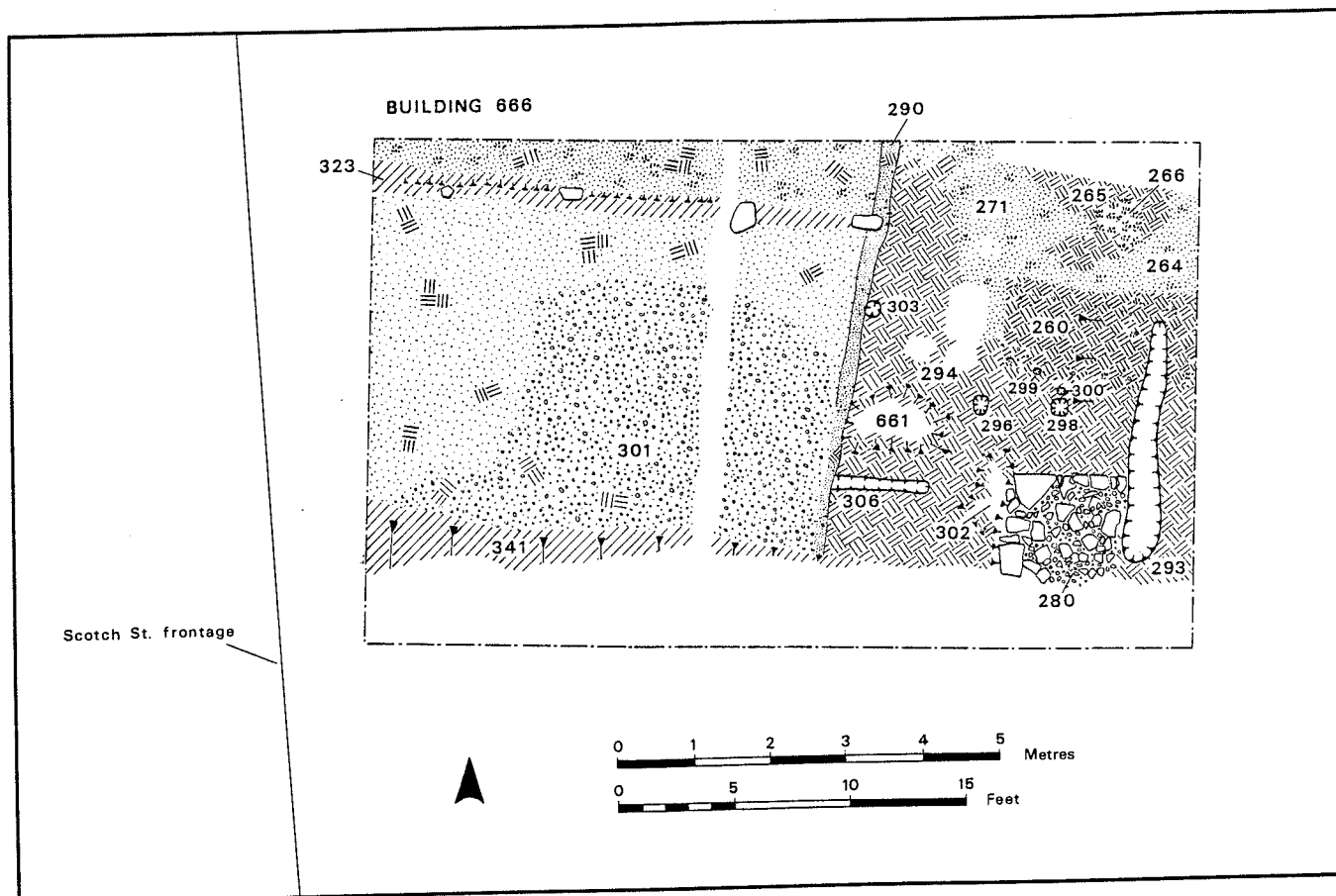


Fig 67 Plan of LEL A Period 12B

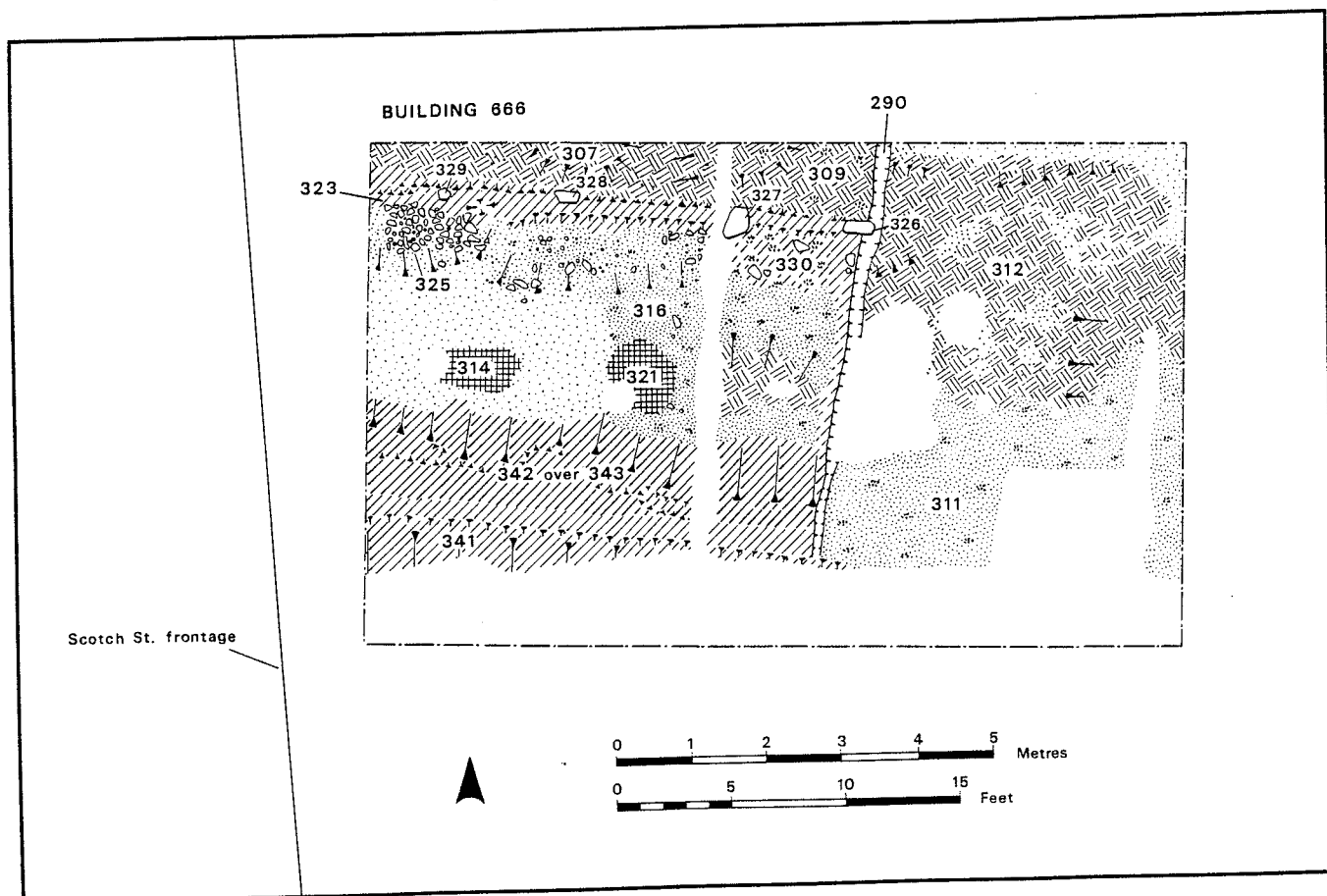


Fig 68 Plan of LEL A Periods 12B and 12C

filled with a silty loam. Pit 427 was 1m by 0.8m by 0.55m deep, and was filled with clay and charcoal.

There were also a number of postholes and stakeholes clustered towards the eastern end, but forming no recognizable pattern. The holes, which were all filled with silts, averaged 0.8m in diameter and were about 0.15-0.18m deep.

External deposits

A sequence of deposits was recovered from a strip immediately south of the southern wall (Fig 65). The deposits are assumed to be in an external context.

Part of this sequence, notably surfaces incorporating sandstone, cobbles or clay or a mixture of silts, sand and gravel deposits (429), was cut by the drain (656). Later deposits of silt and gravel or sandstone slabs (361-2, 366, not illustrated) were contemporary with the drain. Much of the sequence is characteristic of a series of road or yard surfaces.

Period 11

There is evidence for the construction of two new possible walls on the northern and the southern sides of the trench (Fig 66). The southern wall (341), which clearly cuts Period 10 and predates Period 13, cannot certainly be regarded as belonging to this period rather than Period 12. There was a degree of confusion during the excavation about the interpretation of wall or linear feature 341 and the later linear feature 343 (Period 12B). This wall, described below, is included on plans of both Periods 11 and 12 (Figs 66-7).

The southern wall, more properly described as a linear feature, was based in a foundation trench filled with a mixed clay deposit (341). Although both sides of the feature were cut by later disturbances, its minimum dimensions were 0.6m wide by 0.35m deep. Within the excavation, the wall extended from the western end for a distance of 7.8m and was not linked in with any other wall.

The northern wall was based in a series of post-pits, of which four lay on the northern edge of the excavation (374, 376-8). The pits were 1-1.5m in length but of unknown width; they were 1-1.2m deep and filled with clay and cobbles. This wall also extended from the western limit of excavation for a distance of 7.8m. The northern wall may have cut a shallow pit (363) containing chips of sandstone in a varied fill of clay, gravel and charcoal.

Between the walls were a number of deposits including burning, sand and sandy soil accumulations (353-4, 364), gravels and silts (352). None of the deposits were recognized as floors, and there is no intrinsic evidence as to whether they were internal or external features.

Towards the eastern end of the site was a barrel-lined pit (369, Fig 66), which was 0.9m by 0.8m and 0.75m deep. The lining comprised 17 staves forming the lower portion of a large barrel (Fasc 2, No K28). The pit had a lower fill of silt mixed with gravel overlaid by soil and clay, which produced woodworking debris and what was probably dumped hay/bedding, with no cereal remains (p 127). By contrast, the insect fauna had large numbers of grain beetles and dry habitat decomposers but only a very small outdoor component and nothing to suggest directly that the deposit was animal litter (p 142). The apparent dichotomy between the floral and faunal assemblages can be resolved by supposing that the fill of the barrel included the sweepings of a byre or stable in which animal feed had become mixed up. The absence of cereal grains could be a problem, although a combination of fungi and the activity of the beetles themselves may have destroyed what had been there.

Period 12

Period 12A

Overlying the northern wall of Period 11 was a deposit, possibly a dump, of sand, sandy clay and charcoal (335, not illustrated in plan but seen in section in Fig 76). A silt (338, not illustrated) was also present.

The status of layer 335 is not certain. It may represent a short phase of disuse intervening between Periods 11 and 12B, but is regarded here as representing a constructional feature related to Period 12B.

Period 12B

Building 666

Overlying Period 12A a new building (666), three walls of which were present within the excavated area, was erected (Fig 67). At least two rooms were present in the early phases. The southern side of a northern room was present on the northern edge of the excavation. A large southern room was present, whilst to the east was an area thought to be external to the building. Building 666 was associated with a large number of floors and other deposits, but these have not been divided into separate sub-phases.

There is a problem over the interpretation of this building in Periods 12B-C. The stratigraphic sequence indicates the presence of three possible walls (290, 323, 343). There is little doubt about 290 and 323 being wall foundations, but clay foundation 343 may have had some other purpose, especially as it was clearly overlaid by Period 12B sandy gravel surfaces (301) in which there were no signs of a superstructure.

Feature 343 consisted of a broad foundation trench extending for a distance of 6.4m from the western end of the trench. This wall cut wall 341 (see Period 11). It was 1-1.3m wide and varied in depth from 0.35-0.6m. The trench was filled with clay (342) which extended beyond the limits of the trench, but the superstructure cannot be reconstructed as there were no features associated with the clay, although some slight irregularities may indicate the position of features which have vanished.

If 343 was a wall it cannot have continued in use for long, because during Period 12B it was overlaid by a substantial sandy gravel deposit (301). This clearly shows that the south wall, if indeed 343 is correctly identified as a wall, must have been superseded by another wall further south. There is, however, no evidence for this hypothetical wall, unless it is supposed that wall 341 (Period 11) should be attributed to Periods 12B-C. This interpretation can be sustained without affecting other features in the stratigraphic sequence. In that case, 343 may be better interpreted as a linear clay-filled feature which was not a wall but had some other purpose.

A north wall comprised a long strip of clay (323) about 0.2m wide; into the clay were set four sandstones (326-9) forming padstones. The clay was relatively even in width and thickness for much of its length, except for the area between padstones 328-9 where it became wider, less well defined and was penetrated by a shallow posthole-like depression. It is possible that there was an entrance at this point. The padstones varied in size, but the largest measured 0.5m by 0.3m overall. Padstone 326, 0.3m by 0.15m, was at the assumed position of a corner. The posts which were presumably placed on the stones would have been set at intervals of 1.6m, 2.2m and 1.6m centre to centre. This wall, referred to subsequently as the north wall, may be an internal division of Building 666 rather than an external wall. The argument for this is based not so much on the nature of the wall itself as the continuation of the east wall to the north of padstone 326.

The evidence for an eastern wall at this stage is ambiguous. Slot 290 formed an eastern wall, but the relationships, as recorded, contain uncertainties. In the absence of other evidence, it is assumed that the slot was constructionally contemporary with the north wall. It also marked the end of the clay foundation for the south wall. The slot was 0.15-0.25m wide and the same in depth, and it extended from the south wall to the northern limit of excavation. The minimum dimensions for the room may be reconstructed as at least 6m in length by about 4.5m wide.

A number of deposits were recognized inside the southern room of Building 666. They include an area of cobbling (325), associated with a depression, against the north wall at the point where an entrance was postulated above. These features were overlaid by a spread of clay containing stones and charcoal, areas of burning associated with considerable amounts of charcoal (316), and a circular hearth (321) consisting of an area of burnt clay about 1m in diameter. The hearth was placed about midway between the north and south walls and about 2.6m west of the east wall.

Much of Building 666 was resurfaced with clay. This covered the hearths, but another area of burnt soil and clay (314) was identified at a point slightly west of the earlier hearth.

A major re-surfacing took place, entailing the deposition of a sandy gravel layer both inside the building and outside to the west (301). This extensive deposit overlies feature 343 and abuts the wall

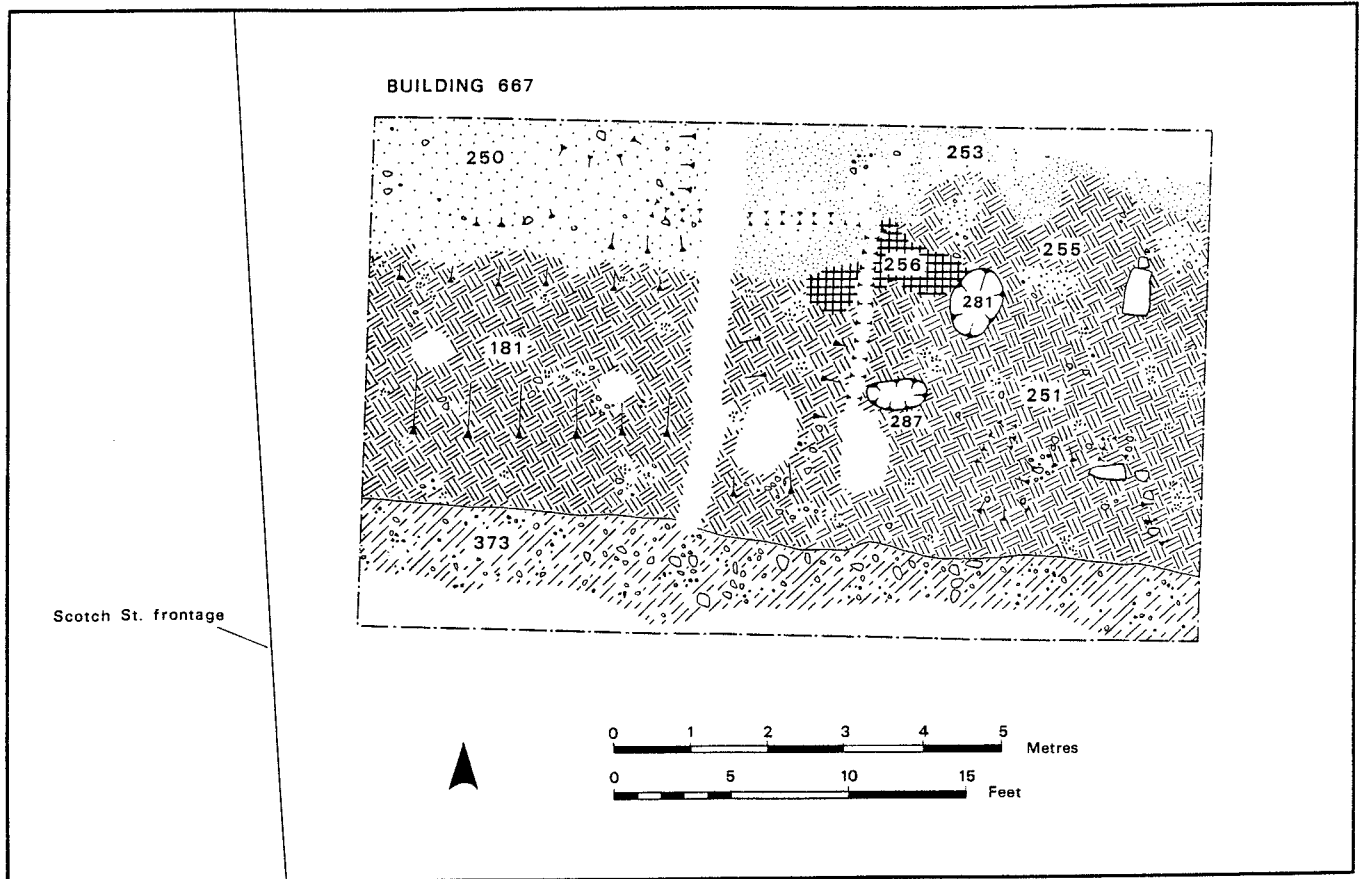


Fig 69 Plan of LEL A Period 13

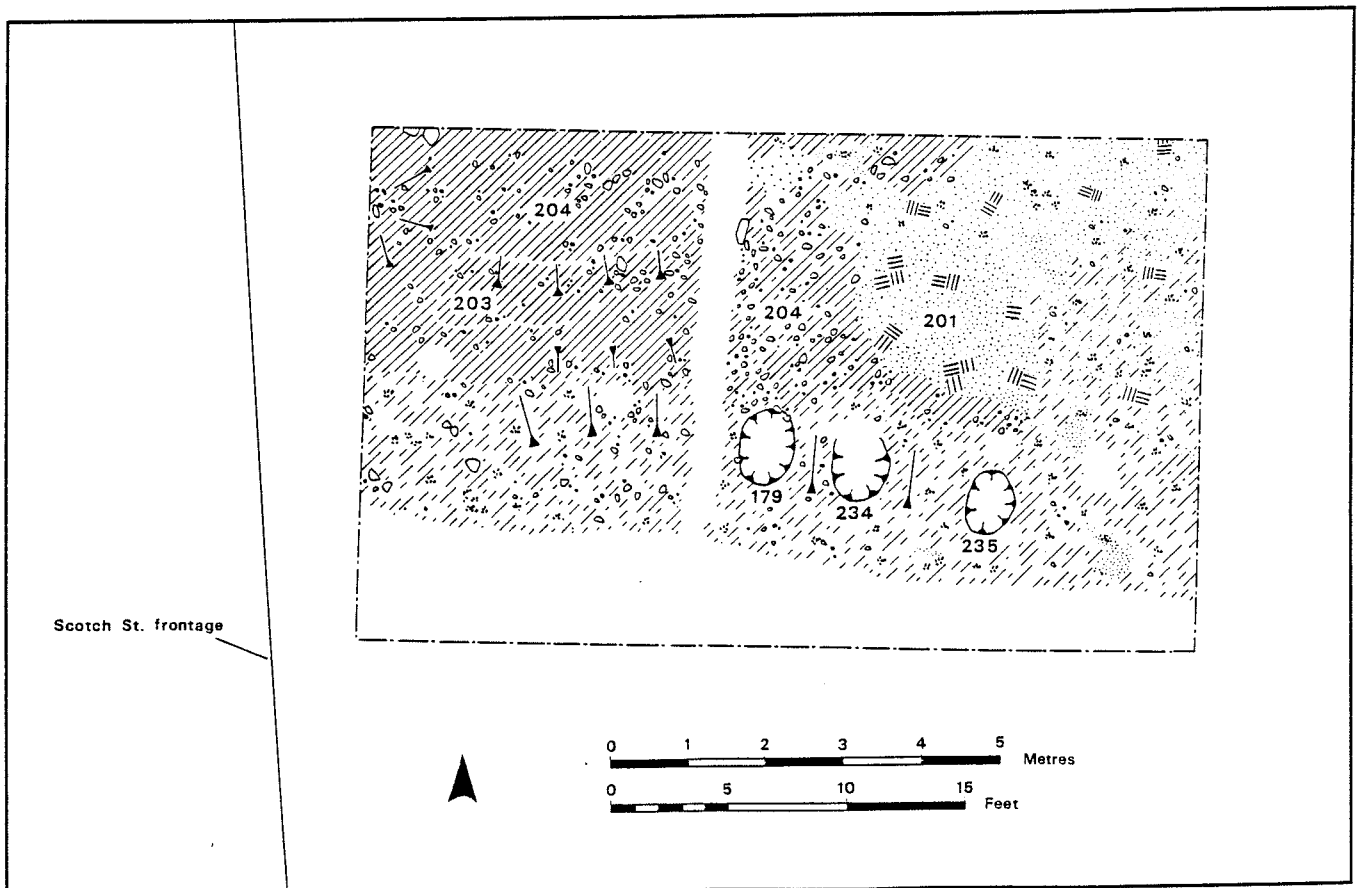


Fig 70 Plan of LEL A Period 14

foundation 341. Within the northern room, overlying the earliest feature, a sandy loam, there was a short sequence of surfaces including two clay floors (307, 309) and a silt.

External deposits

To the east of the building, and contemporary with it, was a sequence of deposits which are believed to be external. They include early sandy loams, a clay surface, and patches of burnt clay and charcoal which may be hearths or the remnants of bonfires. This was overlaid by an extensive deposit of sandy loam. This was in turn re-surfaced by an extensive sandy clay surface (312) associated with silts (311) (Fig 67). The sandy gravel layer was deposited both inside and outside the building as a major re-surfacing or bedding for the next deposit, an extensive clay floor. This was associated with widespread sandy loams mixed with charcoal.

Period 12C

Changes took place to the east of Building 666 in what was formerly described as an external area. It is possible that the building was extended eastwards, with a new east wall being defined by a slot or gully (293, Fig 68), up to 0.55m wide and 0.15-0.3m deep, and filled with clay, gravels, silts and cobbles. The slot was 3.2m long, and lay 3.8m east of wall 290. The southern end of the slot terminated about 0.25m north of the projected line of the south wall, but the fill overlapped the terminal and was present as far south as the projected line of the south wall. Alternatively, feature 293 may be a gully or drain, in which case the eastern end may have remained as an external zone.

Cutting through the earlier surfaces, and adjacent to the original east wall of Building 666 (290), were shallow depressions (302, 661), 0.15m deep, filled with a silty loam and patches of clay. It is possible that these resulted from constant traffic through a door in the eastern wall. No firm evidence for a door exists, however, although a posthole (303), 0.2m across and 0.24m deep, located on the eastern edge of slot 290, could represent the position of one jamb.

Other features in the eastern zone included several postholes, of which two, 296 and 298, both 0.25m in diameter and 0.2m deep, 0.9m apart, were on line with the long axis of the building. There were two other stakeholes (299, 300), 0.1m across, close by.

Associated with these features were a number of additional surfaces and deposits (Fig 68) including clay floors (260), silts and soil accumulations (271), and parts of sand bedding layers (272, not illustrated). At the northern end of the eastern zone there were similar deposits (264-5), as well as a possible hearth (266), the location of which may indicate the position of a wall.

There was a short length of slot (306), 1.25m long by 0.1m wide and 0.15m deep, at right angles to and adjoining wall 290.

In the angle formed by slot 293 and the projected line of the south wall of Building 666, there was a sandstone and cobble foundation measuring 1.4m north-south by 1.6m east-west (280). It consisted of a mass of cobbles and red sandstones set in clay and partly bedded in the depression 302. The two sides were relatively straight and bordered by sandstone blocks, of which the largest was 0.6m long by 0.5m deep.

Period 13

Building 667

A new structure (Building 667) was located, represented by one wall, together with a number of surfaces and other deposits (Fig 69). The wall (373) was present on the southern side of the site. Its length is uncertain, but it certainly extended for a distance of 8m and is illustrated as continuing along the whole of the southern side of the trench. It was 0.45-0.55m wide. The foundation trench, about 0.4m deep, was filled with clay, cobbles and sandstones. No other characteristics relevant to the superstructure of the wall were observed.

The latest feature cut by the wall is the Period 10 gully/drain (656). The wall could, therefore, belong to Periods 11 and/or 12, but this is not considered to be likely given the stratigraphic position of walls 341 and 342-3.

Further confirmation that a new structure was erected is provided by the surfaces. The Period 12 east wall (290) and the north wall foundation (323), together with most of the post-pads, were largely overlaid by extensive surface deposits incorporating clay, charcoal and small stones (not illustrated). Some repairs, in the form

of patches of gravel, were carried out. At the east end of the site there were widespread sandy loams and two pits (Fig 69). Pit 281 measured 0.65m in diameter by 0.35m deep, and was filled with a sandy clay. Pit 287 measured 0.65m by 0.46m but was only 0.21m deep; it contained soil and sticky clay.

The surfaces were overlaid by a series of sand levels (246), which may be interpreted as bedding deposits, extending over most of the trench. The sand formed a sub-surface for more floors comprising mixed clay, cobbles and sandstones (181, 250-1, 255, Fig 69), and a possible hearth (256) which may be contemporary with a mixed clay and cobble deposit. One of these surfaces (181) incorporated a fragment of bone identified (but not separately reported on) as an adult human radius shaft.

A sandy loam, together with a patch of clay which accumulated over the surfaces, presumably represents the usage of the floors. Finally a new floor of clay, with some cobbles and fragments of sandstone (not illustrated), was laid. It extended over most of the trench.

Period 14

Three possible post-pits cut the surfaces of Building 667 (Fig 70). Pits 179 and 234-5 were oval to sub-rectangular in plan, and measured roughly 0.75-0.8m in diameter but were only 0.1m deep; they were filled with clay, sandstones and cobbles. They were spaced at 1.4 and 1.8m intervals, centre to centre. Three deposits (201, 203-4) may form a surface associated with the pits. The deposits consisted of a sandy clay mixed with charcoal, soil and stones. Deposit 204 is also seen in section (Fig 76).

The interpretation of these features is not certain. They may belong to a building(s). The pits, which could represent the position of posts, are on the same alignment as a later (Period 16) structure, but this may be no more than coincidence. The other deposits could be both internal or external features, and there is no certainty that they were surfaces in their own right.

Period 15

Building 668

A new stake-built structure, Building 668, occupied the western half of the site (Fig 71). It was rectangular in plan, and was constructed from stakes with diameters in the range 0.05-0.1m and depths varying between 0.09-0.2m. The stakes were spaced at regular intervals of between 0.25-0.3m.

The northern, southern and western sides were present. A possible eastern wall was represented by a number of stakes, but this interpretation is not certain as several stakes lay beyond. As far as it is possible to reconstruct this building, it measured approximately 6.4m long (east-west) and was 3.8m wide. The walls were formed from single lines of stakes, but there were some examples of two stakes being placed as if in a pair. This is especially noticeable beyond the south-east corner. These stakes may form part of an eastward extension to the structure, perhaps as an unroofed fenced area.

The position of the entrance is not clear. The only gaps in the stakes are one of about 1.7m at the northern end of the possible east wall, and one of about 1.1m in the south wall, between stakes 155 and 172.

There are a number of stakes in the interior. No convincing pattern can be discerned in the distribution of these stakes, although some (200, 212, 216-9) can be seen as a rather uneven line which could indicate the presence of a western room 1.8-2.6m deep.

Only two deposits can be tentatively assigned to this phase (Fig 71). They include a sand deposit (195), and a remnant of a floor (118) made of clay and cobbles.

Period 16

A pathway (182), varying in width from 0.8 to 1.1m, made of rammed gravel and pebbles, extended in an east-west direction from one end of the excavation to the other (Fig 72). To the north of path 182 there was a possible hearth (191, 194), associated with charcoal and ash.

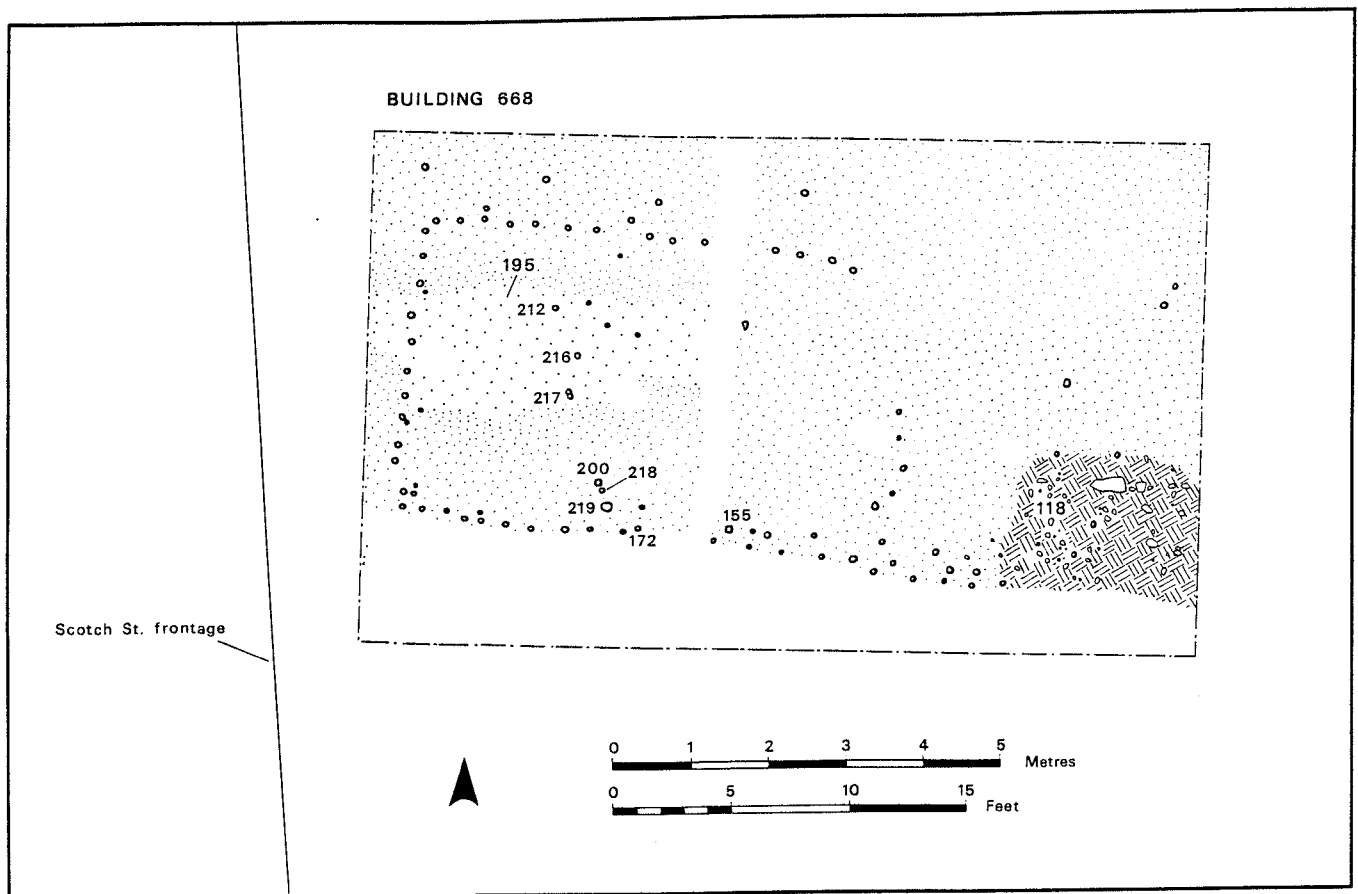


Fig 71 Plan of LEL A Period 15

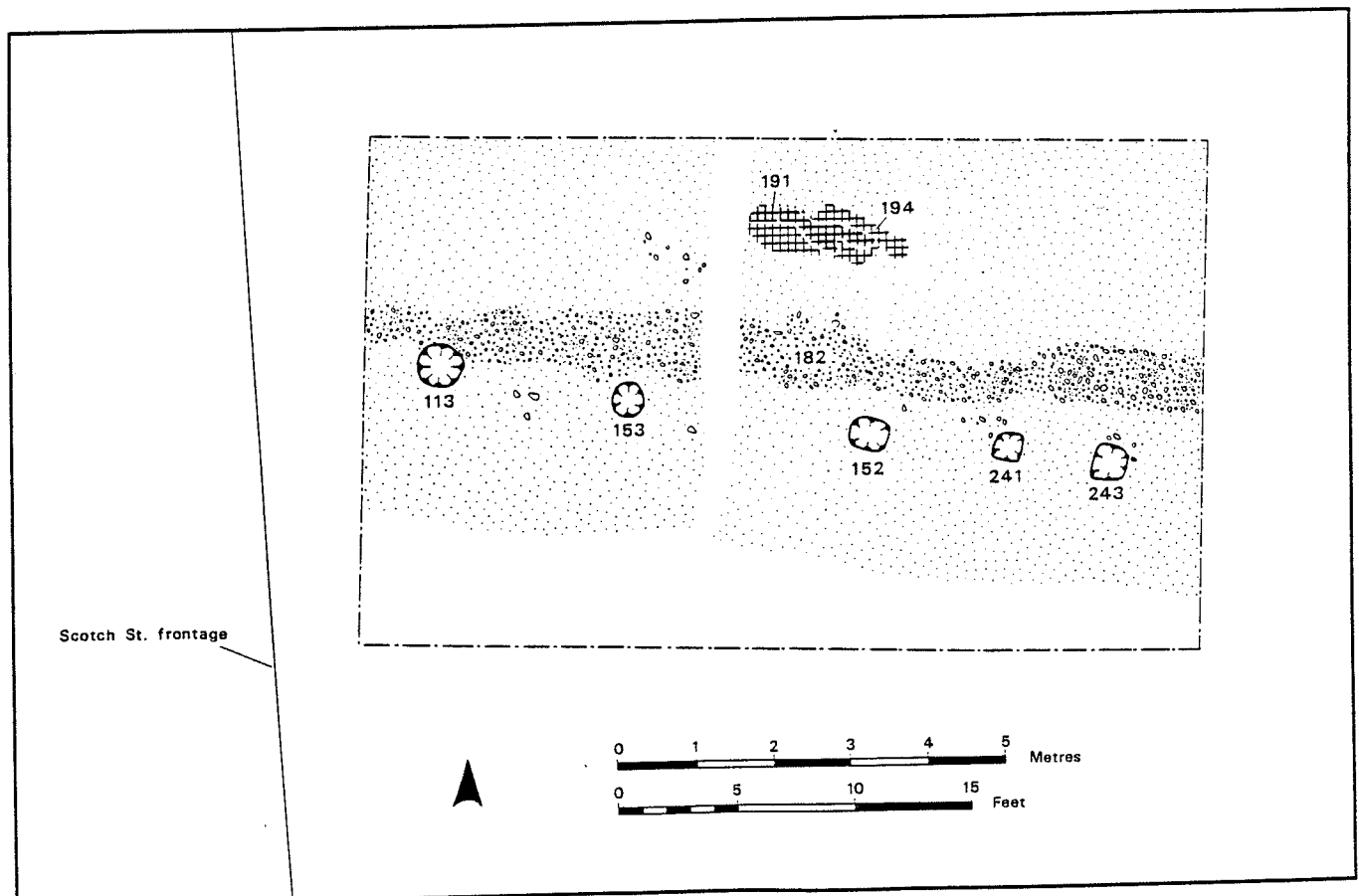


Fig 72 Plan of LEL A Period 16

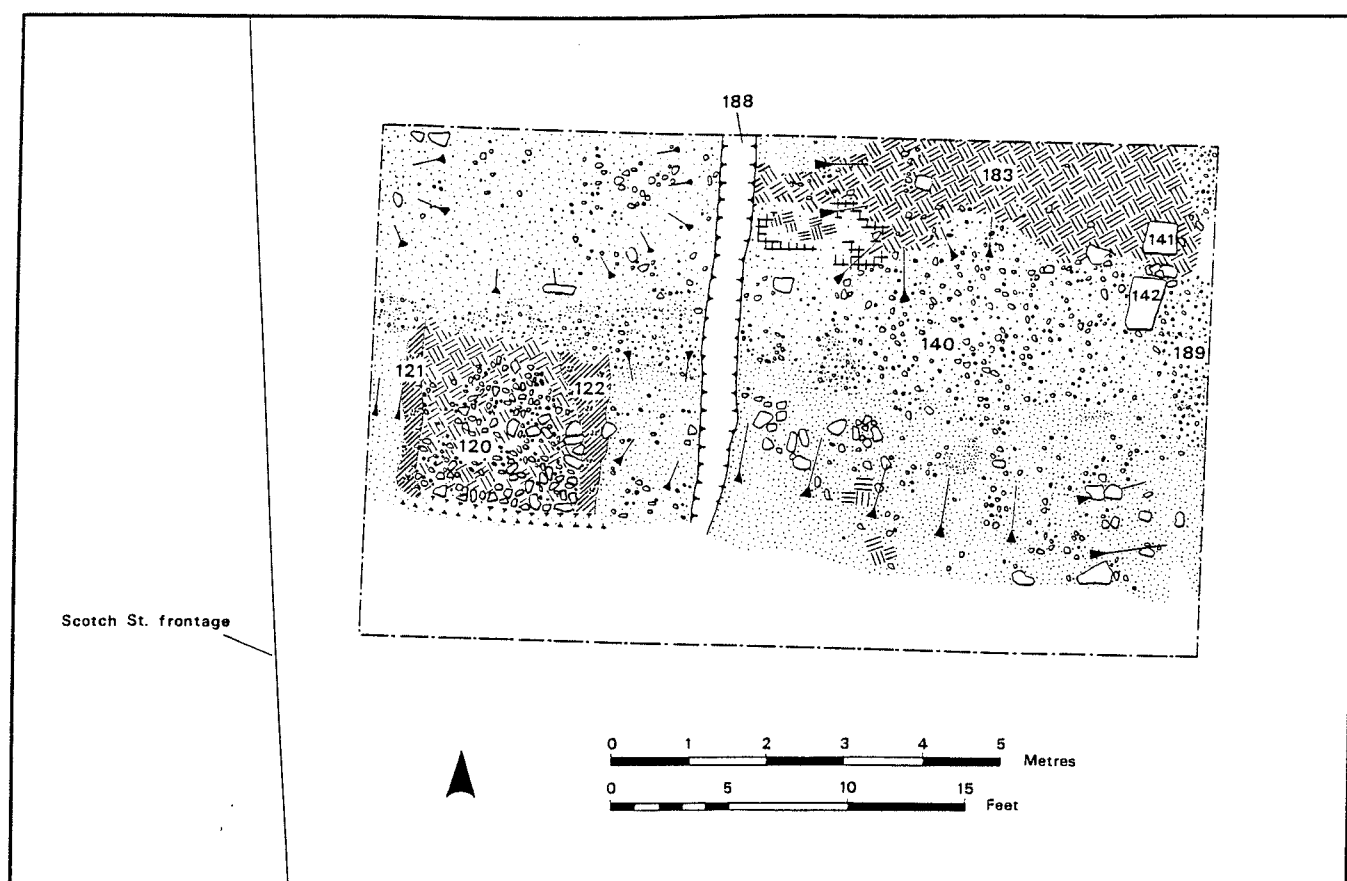


Fig 73 Plan of LEL A Period 17

On the southern side of the path there were five post-pits. Three pits (113, 152-3) were circular in plan, and two (241, 243) were roughly square. The precise stratigraphic position of these pits is not certain. Pit 152 cut through the Period 14 pit 234, and the other pits also cut Period 14 deposits; there is no direct relationship with Period 15 features, however. The post-pits are assumed to be contemporary with the pathway (Fig 72).

Pit 113 was 0.6m in diameter and 0.6m deep. Pit 152 was 0.5m in diameter and 0.45m deep; it contained a sandy loam and fragments of sandstone. Pit 153 was 0.38m in diameter and 0.55m deep, and contained sandy loam, clay and sandstone fragments. Pit 241 was 0.4m square but only 0.1m deep, and pit 243 was 0.50m by 0.37m and 0.11m deep; these two pits had a similar fill to the others, but their depths are closer to those in Period 14 than to the other three in this period.

The pits were widely spaced, at intervals of 2.6m and 3.2m (pits 113-153-152). The intervals between pits 152, 241 and 243 were less, at 1.9m and 1.4m. Despite this variation, they form a convincing line as the north wall of a building, or a fence line, adjacent to the pathway.

Period 17

Once again the site was reorganized. Cutting across the path in a north-south direction was a slot (188, Fig 73), 0.45-0.5m wide by 0.35m deep, containing silts, burnt clay, charcoal and stones (seen in section, Fig 76). The function of the slot, as a drain or sill beam, is not certain and there were no associated structural elements.

Some 1.2m west of the slot was a floor (120) made of clay with cobbles embedded. The floor measured about 2.2m square. It was bounded on the eastern and western sides by linear zones of burnt clay (121-2) about 0.2-0.3m wide. On the southern side there was a shallow slot, 1.5m long and 0.25m wide, filled with silt and sandy loam. No sign of a northern wall was present, although at this point the underlying pathway had been eroded away. This structure is not

fully understood and it may relate to other structural features beyond the limits of the excavation.

Other deposits to the east include an area of clay flooring (183) associated with two large squared sandstone post-pads (141-2), and other rough surfaces of gravel, cobbles and sandstone (140, 189).

Period 18

A substantial deposit of soil between 0.15-0.2m thick blanketed the entire site (Fig 74). The earliest part of the deposit (111, 114) was a sandy clay loam with cobbles and sandstone fragments. The upper part (84, 106) was similar, although there was less stone and the soil had a distinctly finer texture. There is insufficient evidence to indicate the presence of sub-phases but the period may represent a hiatus, perhaps an abandonment phase.

Period 19

Overlying the soil deposit of Period 18 was a succession of surfaces and other features.

Period 19A

The earliest phase included patches of clay mixed, in some cases, with cobbles and sandstone fragments (102-4, Fig 74; 102 is seen also in section, Fig 76). There was also a posthole (108), 0.3m across and 0.15m deep. A number of other patches of clay, not allocated context numbers, were also present.

The significance of this material is not clear. If, however, the clay patches are considered along with the sandstones embedded in the top of the underlying deposit, a roughly rectilinear pattern of features can be discerned. Such an arrangement may be indicative of a building, in which the structural members were based on top of, rather than set into, the ground. The putative structure may have measured 8-10m in length and 4-4.5m wide.

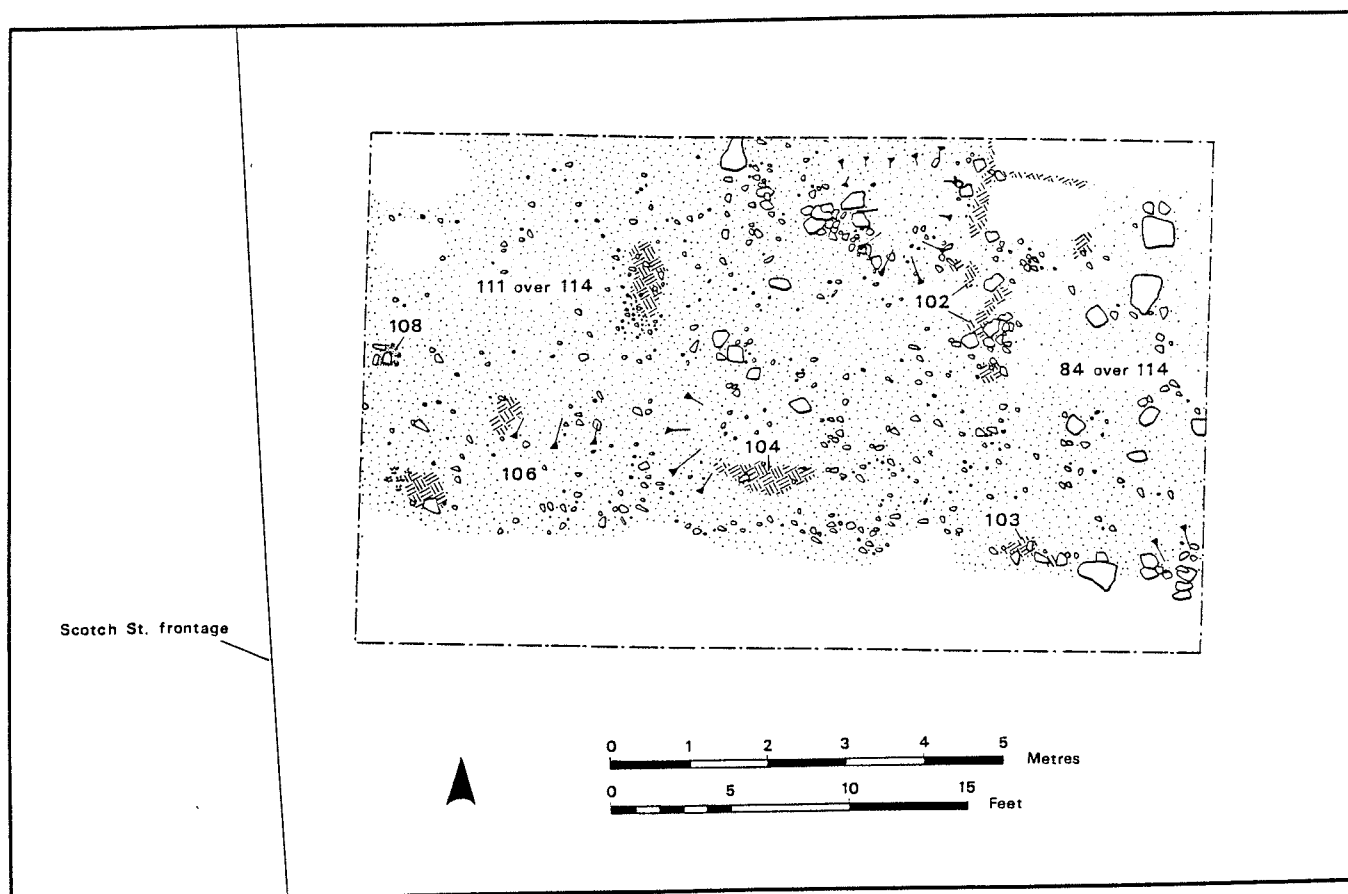


Fig 74 Plan of LEL A Periods 18 and 19A

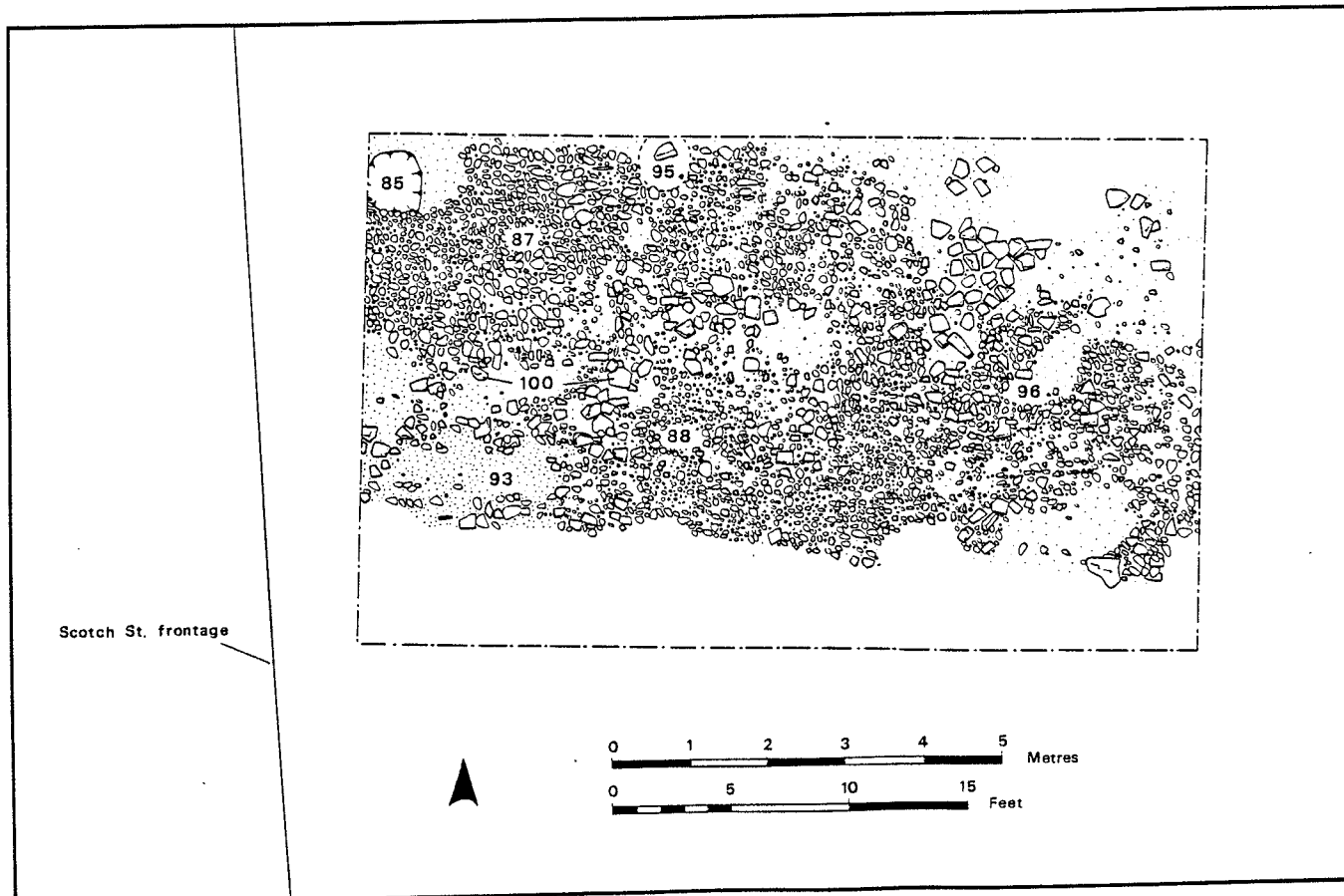
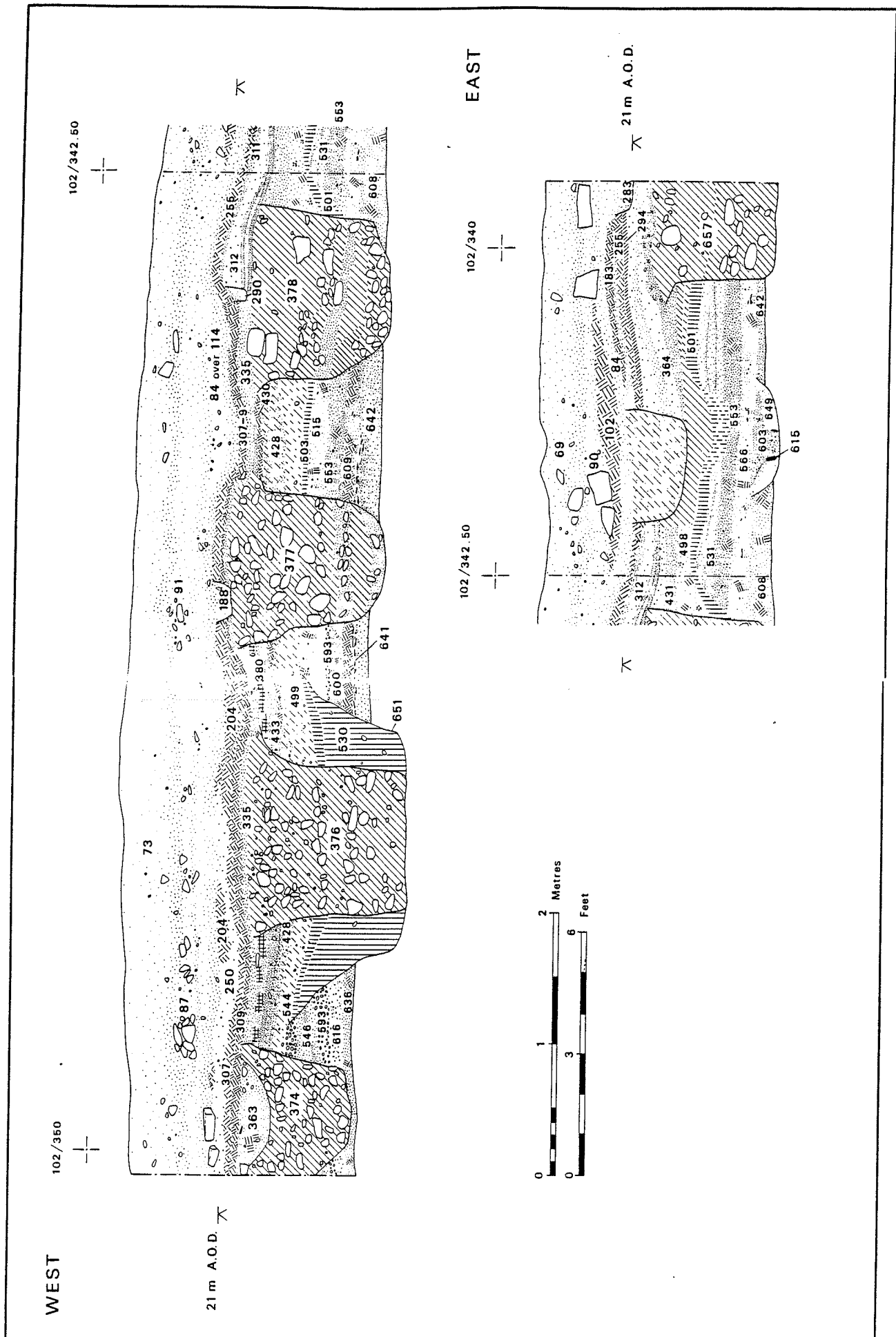


Fig 75 Plan of LEL A Period 19B



Period 19B

Overlying a substantial part of the eastern half of the trench was a surface of closely packed river cobbles (88, Fig 75). In the western half there were few cobbles, but there was a spread of sandstone rubble (100) associated with a soil deposit (93). The cobbles and sandstone do not form neat areas, so that it is not possible to draw positive conclusions about the nature of these deposits. Nevertheless, the heaviest concentration of large sandstone fragments in context 100 would not be inconsistent with the position of a wall.

Overlying the cobbles and sandstone features there was another layer of closely set cobbles and sandstone fragments covering most of the site (87, 96, Fig 75). A number of gaps can be seen in the cobbles, notably on the northern edge of the trench where a post-pit (85), measuring 1.3 by 1.08m and 0.5m deep, occurs at the north-eastern corner. Another post-pit (95), 0.5m across and 0.25m deep, was located about 3.8m east of 85. Another gap, occupied by the soil (93), occurs near the south-east corner. It is possible that these pits and gaps reflect the position of walls.

Overlying these deposits was a concentration of tooled sandstone blocks, interpreted at the time of excavation as a collapsed wall. Other deposits include silts and sandy loams.

Period 20

The entire site was covered by a deposit of sandy clay loam mixed with cobbles, pebbles and sandstone fragments (69, 73, seen in section in Fig 76; 74, not illustrated) up to 0.3m thick. This relatively unsorted deposit may be a dump of imported soil.

*Period 21**Period 21A*

A linear feature and over 26 other features indicating the presence of timber buildings were recognized and attributed to Period 21. All cut through the thick underlying sandy loam. There were no associated floors or other deposits with which they could be contemporary. Nevertheless, a sequence was established in that the linear feature (72) was cut by post-pits, postholes and post-pads. However, it is not possible to establish from the stratigraphic record whether any chronological significance is to be attached to this sequence. On the northern perimeter of the site a sequence could not be established. All the principal 'cut' features are illustrated in Figure 77.

The earliest feature comprised a linear cut (72) extending from the eastern to western ends of the site. It was 1.3-1.6m wide and 0.75-1m deep, and contained a sandy clay loam mixed with cobbles, sandstone blocks, sandstone fragments, and patches of clay, some of which was burnt (28). This feature could be a robber trench.

Features of this period and later are not shown in the section, Figure 76.

*Period 21B**Building 669*

Period 21B, which may not have any real chronological significance, depending on the interpretation of 21A, comprises post-pits which post-date the linear feature 72 and a variety of other pits (Fig 77).

These features represent walls on all four sides of the trench. The large post-pits cutting feature 72 on the south side of the trench can be linked in terms of their dimensions, and in three instances the nature of the fill. The dimensions of all the pits is generally greater than for most of the other features, and they are regarded as being contemporary. Two pits (67 and 71) appear to be either a double pit or intersecting pits. The intervals between pits 47, 66 and 67 is about 3.4m, centre to centre. The same distance separates 67 from a slightly smaller pit (50).

On the north side of the trench, this same interval (3.4m) can be recognized between features 27, 55 and 40 (Fig 78), all of which are smaller than those on the southern side. If this interval on the east-west axis is significant, and the differences in scale between features on the two sides of the trench are less important, other features respecting the same module can be identified. In the eastern half of the trench, for example, a similar 3.4m interval separates post-pit 78 from the pad 48 (Fig 78). There are also two other features. One is a group of sandstones (665, Fig 78) which could

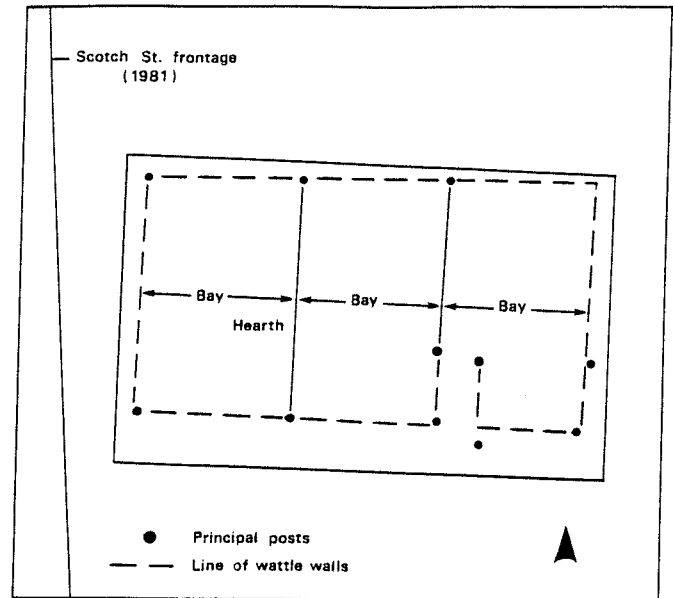


Fig 79 Schematic plan of Building 669 in LEL A Period 21B

have served as a pad, 3.4m west of pad 48. These sandstones are themselves 3.4m east of the west end of the trench. The other is a posthole (664, Fig 77) which occurs at 3.4m from the west end of the trench.

The interval between posts and possible post positions on the north-south axis can also be established. A line linking posts 66 and 55 can be drawn through 664 and 665 (Figs 77-8). The interval here is about 1.8m. This same interval is present between posts 67 and 48 (Fig 78) and between posts 50 and 78 (Fig 77). It is interesting to note that this interval is almost half that between the posts on the east-west alignment.

On this basis it is possible to suggest the presence of a major three-bay timber building (669) aligned east-west, with a nave and aisles of equal width (Fig 79). The complete dimensions of the structure remain uncertain, as it could have extended beyond the limits of the excavation. Its approximate measurements are at least 10.2m east-west and about 5.2m north-south.

Thus defined, the building is wholly contained within the boundaries of the seventeenth century property later known as 65 Scotch Street. It is suggested that, with the exception of a porch or outshuts, the ground plan of the building is more or less complete in terms of its principal structural members. The west end, represented only by posts 27 and 47, is very close to the Scotch Street frontage, so that the position of the west gable can be regarded as established, on the assumption that the position of the early medieval street frontage was close to that of the present day.

The grouping of postholes at the east end (50, 41, 78, Figs 77-8) suggests that they may reflect the position of the south-east end of the east gable wall of Building 669. Post-medieval building work destroyed the north-east end of the gable. The southern wall occupies the same position as the southern wall of the post-medieval building on the site, and the northern wall flanked Lewthwaite's Lane. The antiquity of Lewthwaite's Lane has not been established, but other lanes (eg Keay's Lane and Hodgson's Court) have been traced back, through documentary and archaeological evidence, into the medieval period.

This interpretation of the evidence leaves out of account the other features, most of which fall into no neat pattern but probably indicate additions or are evidence of reconstruction. Attention is drawn to pads 42 and 49 which could be regarded, with posts 67 and 48, as the southern end of a cross-passage wall (Fig 78).

The slot in the northern wall (25) is stratigraphically later in date than some of the posts. Pits 75, 29 and 57 make little sense in structural terms, however, and could post-date the building (Figs 77-8). Pit 75 was relatively shallow and contained burnt red sandstone, coal and charcoal. The pit is slightly off-centre and could be

seen as a possible central hearth.

Period 22

None of the remaining features are sufficiently distinct, or are well enough recorded, to allow detailed discussion and phasing.

Overlying the Period 21 features were spreads of soil (4, 7) and cobbles (5), some of which may be dumped material (not illustrated). On the southern side of the site were four postholes (16/20, 17/21, 18/22, 19/23), roughly 0.3-0.4m square (not illustrated). They contained fragments of brick and mortar in the fill, which suggests that they are relatively late.

Period 23 - number 65 Scotch Street

No apparent stratigraphic linkage could be established between number 65 Scotch Street and the underlying archaeological remains. The deposits attributed to Periods 20 to 22 contain, in addition to residual Roman pottery, medieval pottery which is almost entirely attributable to the twelfth-thirteenth centuries (Fasc 3, p 00). The virtual absence of anything later suggests that there is a break in the archaeological record between the deposition of the dumped material (Period 22) and the construction of number 65 Scotch Street. The break may be explicable if the builders of number 65 removed archaeological features which had accumulated between the late medieval period and the late seventeenth or early eighteenth century, the assumed date at which number 65 was built.

Number 65 Scotch Street was a three-storey, uncalled brick building with a rendered frontage (Figs 80-1). The building had sandstone foundations. No specific type of bonding in the brickwork could be identified, as headers and stretchers seemed to be randomly placed. The roof, which was parallel with the street, was collared with through purlins. The fenestration on the street frontage comprised four equally spaced, wooden, two-light, sash windows with curved heads and a false keystone at first-floor level. An identical set of windows was present just below the stone cornice at second-floor level. The ground floor had large shop windows inserted.

At the time of demolition, the building comprised a roughly rectangular property, approximately 7.3m wide internally along the street frontage by a maximum depth of 12m along Lewthwaite's Lane. A room oversailed Lewthwaite's Lane.

A large number of buildings in The Lanes were recorded prior to demolition. The earliest were situated on the Scotch Street frontage, where it was hoped that sufficient might survive to facilitate a reconstruction of the street in the early or middle post-medieval period. Much of this detail will be reported on in Volume 3 of The Lanes. Suffice it to say here that many of the buildings proved to have been so heavily modified in the present century that few ground-floor plans can be reconstructed with any degree of confidence. Number 65 Scotch Street survived better than most.

At the time of demolition it was a three-storey, double-fronted building, two rooms deep. The disposition of boxed beams in the ground floor ceilings suggest a centrally placed entrance, of which no trace survived. If the rooms to either side of the entrance were heated, no evidence of a stack remained in the party walls.

Although the development of this building is not certain, there is some evidence to suggest that it originated as a double-fronted building with a rear stair-turret located behind the southern room. The two rear rooms both have walls with rounded corners, as well as a blocked-up stone-mullioned window.

Rounded corners of this type are features of external walls. Although at the time of demolition the north wall of the southern room wall and its rounded corner were internal, the

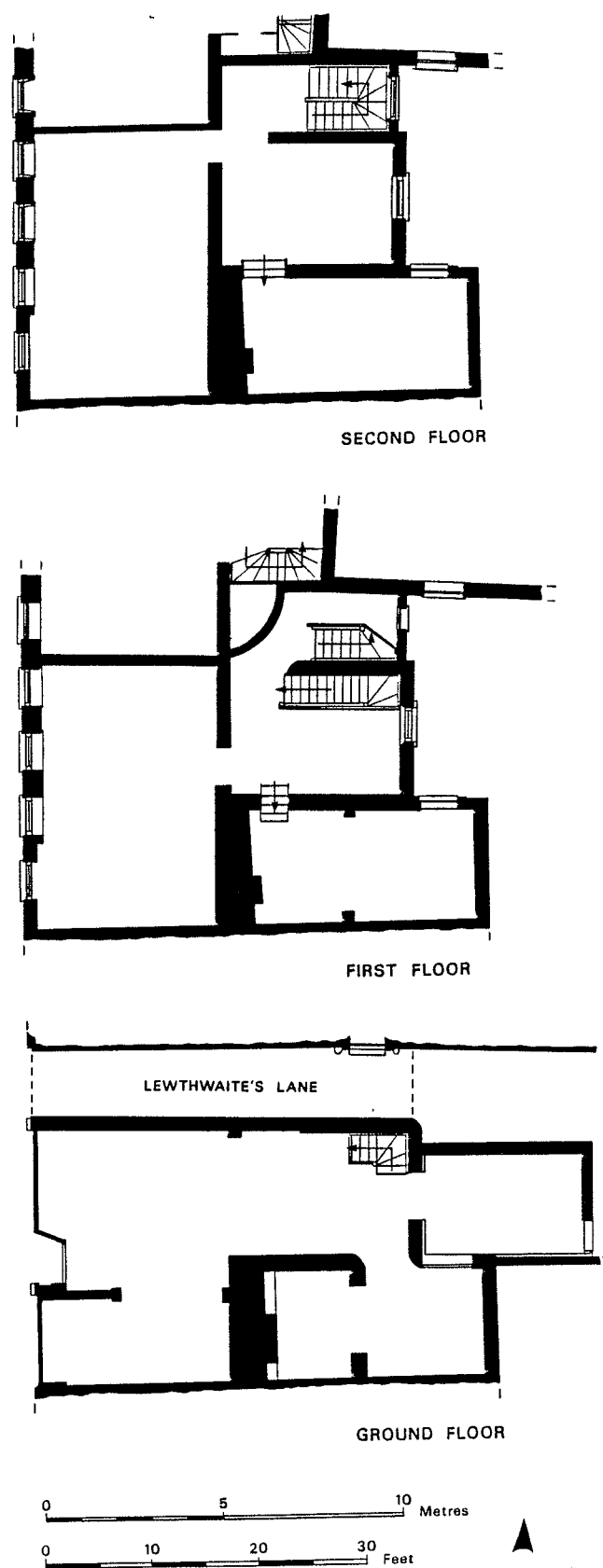


Fig 80 Plans of no 65 Scotch Street

presence of the rounded corner is most easily explained if the wall was formerly an external wall, as in the case of a rear



SCOTCH STREET FRONTAGE

Fig 81 Elevation of no 65 Scotch Street

projecting stair-turret. Confirmation that this may have been the case can be seen in a blocked, two-light, stone-mullioned window discovered in this wall straddling the ground-floor ceiling. The window cill was just over 2m above the ground floor. The otherwise curious position of the window could be explained if it lighted a stair-turret. The stone mullions were plain chamfers. The window lintel did not sit evenly on top of the mullions, a feature which may point to the window originally having been longer, comprising three or more lights.

There is no evidence for the means of access between the front rooms and the stair-turret, although it could have been destroyed in the next phase. This included the construction of a northern rear room and the relocation of the stair to the north wall against Lewthwaite's Lane. Although at first this new room need not have resulted in more than the building of a door communicating with the front room through the rear wall, eventually the whole rear wall was removed to create an L-shaped open-plan effect. Despite the presence of a cast iron column providing support for the upper storeys, the removal of the rear wall must have seriously prejudiced the structural integrity of the building.

The former stair-turret room was also enlarged, possibly at the same time that a stack heating the rear room was inserted. This may have been the occasion when the original entrance between the front and the stair-turret was blocked and obscured.

The dating of the architectural sequence can only be gleaned from a consideration of the architectural style. Double-fronted houses were being built in many places, including Whitehaven and Kendal in Cumbria, from the late seventeenth century to the first half of the eighteenth century (Collier 1991). From this time on other plan forms were being adopted. Similarly, rear stair-turrets are common features of the late seventeenth/early eighteenth centuries. They were replaced by staircases built within the body of the house. The earliest examples of these integrated staircases in houses of fairly simple plan date from about 1740 at Whitehaven. Stone-mullioned windows are a feature of this period.

There are few architectural features to help refine the dating. The windows on the Scotch Street frontage (Fig 81) are late eighteenth century in style, and may represent a complete re-fenestration of the building, probably replacing mullioned and transomed windows.

Number 65 Scotch Street is built of brick, a material which was not used extensively in Carlisle before the late seventeenth century (Jones 1983). The earliest examples of brick are late medieval, in the castle and the Guildhall, but these are exceptional. At Tullie House and within the Cathedral precinct brick was being used from the 1680s or 1690s, as can be seen, for example, in numbers 2-4 and 6 Canonries.

In summary, it can be suggested that the earliest house probably belongs within the period from 1680 or 1700 to 1740.

Old Bush Lane Trench B (OBL B)

The excavation was located below the cellars of number 63 Scotch Street (Figs 3-4). The trench was roughly rectangular in shape, being a maximum of 5m wide (north-south) and 13m long (east-west). The west end of the trench lay 4m east of the Scotch Street frontage. The north side of the excavation was adjacent to the Old Bush Lane frontage, whilst the south side of the excavation was less than 4m north of Trench A at Lewthwaite's Lane (LEL A). This point is important, as the proximity of the two investigations naturally leads to the expectation that the results may be directly comparable. For this reason Old Bush Lane Trench B is included here.

Period 1

An old ground surface (not illustrated) survived to depths varying between 0.05m and 0.15m across the trench. There was no evidence of cultivation marks either in the cleaned sections or in the natural clay.

Period 2

The earliest feature attested stratigraphically is a ditch (111), aligned north-north-west by south-south-east (Fig 82). The profile of the ditch varied from being a true V-shape to one with a cleaning channel. The ditch measured 1.1-1.2m across at the lip and was 0.7-0.9m deep. The fill consisted of silts with wood and large numbers of twig fragments. The waterlogged seeds indicate the presence of standing water in the ditch with a grassy weedy community of plants nearby. Amongst the wood fragments were alder and ash roundwood, and oak woodworking waste (p 128).

Some 3.6m to the east there was a gully (113), 0.7-0.8m wide and 0.4m deep, with a sand, gravel and soil fill. The gully and the ditch are linked only by virtue of their common alignment.

The drawn section shows wood and turf fragments overlying the old ground surface (not illustrated).

Period 3

A deposit of clay up to 0.2m thick was laid. It was overlaid by a thin lens of grey clay loam with abundant wood shavings. A further deposit of sandy clay mixed with pebbles and cobbles was laid to a depth of about 0.1m. These deposits (not illustrated) appeared to extend over wide areas of the site and were interpreted during excavation as levelling deposits.

may be considered that Building 117 is unlikely to be contemporary with Period 2 because of the different alignments of the ditch (111) and gulley (113). Similarly the alignment and the construction techniques of Period 4 would seem to be an unlikely partner for this building. The posthole structure represented by Period 6 cuts across the line of Building 117, showing that they cannot belong to the same phase. The relationship of the construction trenches of Building 117 to the Period 5 levelling deposits is ambiguous, although it is clear that the former were cut from an early point.

If the building is contemporary with any of the early phases, the most likely candidate is Period 3. The alignments of gulley 2 and its associated fence lines are not exactly the same as that of the building, but are nevertheless fairly close, and may suggest contemporaneity. It is also possible, however, that the building may represent a period on its own distinct from those already defined.

Gulley 16 (Fig 82) was located inside, but may be stratigraphically earlier than, Building 117. The gulley was 0.3m wide and 0.15m deep. A shallow posthole (52), 0.05m deep, was also located

inside Building 117, but its stratigraphic position is uncertain.

Period 6 or later

A pit, at least 1.4m long and 0.55m deep, with sloping sides and a flat base, certainly post-dates Period 3 and is probably later than Period 6, but its precise position within the sequence is unclear.

A series of five very large stones and boulders (101-5) were arranged in a north-south line at the eastern limit of excavation (Fig 82). The stones lay on top of the backfilled Period 6 pit (100). They ranged in size from 0.7m by 0.6m to 0.6m by 0.3m, and were 0.3-0.4m thick. They were placed so that the upper side was flat, and they may be padstones.

Another pit (95) had an organic fill (94) with cobbles. The main botanical component of the fill was sedge, cut before flowering, and woodworking debris of oak, silver fir, pine and yew (p 130).

CHAPTER 6 MINOR SITES

Included in this category are outlying watching briefs from which the environmental and artefactual yield is minimal to non-existent. The sites are generally of value in terms of a specific piece of information which is usually of a structural nature.

The site records vary in quality from adequate to poor. In some cases the records are confined to drawings with no individual context numbers. In other cases context numbers were assigned and sequences can be constructed. Such sequences are generally of limited archaeological value as a result of the nature and purpose of the investigation, however.

The sites included in this category are Lewthwaite's Lane Trench B and the King's Arms Lane and Pack Horse Lane watching briefs. A brief report on a watching brief undertaken at 46-52 Lowther Street in 1991 is also included because, whilst it is technically outside The Lanes area, the results are relevant to a consideration of features observed in Crown and Anchor Lane Trench C.

A number of other machine-cut trenches, Crown and Anchor Lane Trenches G and H, Old Grapes Lane Trenches D and H and Old Bush Lane Trench D, were also observed. No usable records were made, although a few artefacts were recovered; these are regarded as unstratified.

Lewthwaite's Lane Trench B (LEL B)

The trench was located immediately behind number 85 Lowther Street (Figs 3-4). It was 8m long (north-south) and 1.3m wide; the northern edge almost abutted the south side of Lewthwaite's Lane. There was a short projection of about 1m extending eastwards from each end of the trench. The trench was excavated entirely with a JCB excavator, with work by hand being confined to cleaning the sections. The features are not illustrated here.

The primary purpose of the investigation was to obtain a section across the former Lion and Lamb Lane. In 1981, when the investigation was carried out, the lane only existed behind the Scotch Street and Lowther Street frontages (Fig 2). Indeed there was no clue to the lane's existence at the Scotch Street end. Originally, however, it debouched through no 67 Scotch Street.

Period 1

An old ground surface, consisting of a black humic deposit about 0.05m thick, overlay the undisturbed natural clay. No cultivation marks were observed.

Period 2

Period 2A

Period 2 features are all believed to be of Roman date. A sequence of deposits overlying the old ground surface was present. Many are characterized only as 'soil', but there were a number of surfaces, the earliest of which was a thin spread of clay.

Period 2B

A clay surface, overlaid by an accumulation of silty loams, was probably contemporary with a cobble and sandstone surface, 0.2-0.25m deep, and a clay surface.

Overlying these deposits were miscellaneous features including clay surfaces, soil, and a hearth, 0.7m wide and 0.1-0.15m deep. There was also a possible wall, roughly aligned north-south, made of loose cobbles with voids.

Period 3

Features attributed to this period are thought to have been medieval or later in date, although no pottery of these periods was recovered.

Deep deposits of 'garden soil' overlay most of the features, with the exception of a loose cobble and pebble surface. This is probably the surface of Lion and Lamb Lane. Although it proved impossible to obtain further details of this feature, it was clear that it did not have a long history extending back into the Roman period, unlike Crown and Anchor Lane.

King's Arms Lane Trenches A-M (KAL A-M)

A watching brief was carried out following the demolition of a large garage at 51-7 Lowther Street. The site lies south of King's Arms Lane, and the archaeological work consisted of observations recorded in the sides of contractors' trenches (Fig 3). The trenches were dug by machine and varied in stability. Twelve trenches were watched but only five (KAL F, G, H, J, K) were adequately located. No useful information was recorded in Trenches A-E, but the lack of a location for Trenches L-M is unfortunate.

Trenches F-M

Trench F was 3.5m long (roughly north-south) by 2.35m wide (roughly east-west). It was 2m deep. The centre of the trench lay 8.5m west of the front wall of the garage on Lowther Street, and 8m south of the wall fronting King's Arms Lane.

The section revealed a V-shaped ditch cutting the natural clay (Fig 83). The top of the ditch was recorded at a depth of 1.5m below the modern surface; it was 1.2m wide at this point, and narrowed to an almost vertical channel 0.6m wide. It may have been less than 1m deep. It had an organic fill with wood, some possible turf, silts and clay. At the western end of the section was what appeared to be the lip of a second ditch.

Trench G lay 10.3m south of trench F. It measured 1.6m (roughly north-south) by 3.4m (roughly east-west). The section revealed a V-shaped ditch similar in dimensions and fill to that recorded in Trench F (Fig 83).

The centre of Trench J lay 11.5m west of the front wall of the garage on Lowther Street, and 7m south of the wall fronting King's Arms Lane. The trench measured 1.2m (roughly north-south) by 2.4m (roughly east-west). The eastern part of the section revealed an oblique cut through the natural clay. This cut (Fig 83), and the associated fill, closely resembled the ditch fill observed in Trench F. The cut was truncated by a vertical-sided feature believed to be a pit.

Trench H lay 11m south of Trench J. It measured approximately 1.2m (roughly north-south) by approximately 2m (roughly east-west). The eastern end of the section revealed an oblique cut through the natural clay (Fig 83). The surface of the natural clay at the western end of the section was flat.

Trenches L and M (not illustrated) also revealed the western sides of a ditch roughly aligned north-south.

Trench K measured 5.2m north-south by 3.5m east-west. The north-eastern corner of the trench, which abutted King's Arms Lane, was 14.9m west of the corner of Lowther Street. The south section was cleaned (not illustrated). Overlying the natural clay, at a depth of about 1.8m below the modern surface, was an old ground surface or buried soil similar to that observed in many other parts of The Lanes. No cultivation marks were noticed. On top of this there were two metallised surfaces sandwiching a soil deposit. The metallings consisted of cobbles and pebbles, 0.1m and 0.2m thick. The eastern edge of the surfaces was present about 0.5m from the south-eastern corner, but no associated features could be discerned. The western edge of the surfaces lay beyond the limits of the excavation. The surfaces were at least 2.5m wide.

The north section was not thoroughly cleaned but it was apparent that the metallised surfaces recorded in the south section were present here as well. No features in the upper part of the trench were recorded.

These are important observations. They revealed a north-south ditch system consisting of parallel ditches with no intervening berm. The profile, as recorded in Trenches F-G, suggests that the inner ditch had a central cleaning channel, or 'ankle-breaker', typical of military ditches.

It was not clear from any of the observations where the rampart was located, whether to the east of Trenches F-G, or to the west of Trenches H-J. Trench K, however, revealed metallised surfaces, possibly roads, which appear to be running parallel with the ditches, and from their position overlying the old ground surface, are probably contemporary with them. The eastern edge of the road is approximately 3m west of the lip of the western ditch. In Trench H the natural clay not only lacked a buried ground surface, but it was flat; it could be explained as a berm, but this would leave a space of about only 2.5m for the base of a rampart next to the metallised road of Trench K. A rampart of this width would be a little narrow, but this would make the metallised surfaces an intervallum road.

The military style of the ditches is apparent, and a relatively early Roman date can be postulated (the ditches appeared to be cut from the top of the natural clay), but the question of where the rampart was located, and the status of the roads, must remain open at the present time. The clear implication of these observations, however, is that there was at least one other fort in early Roman Carlisle in addition to that established at Annetwell Street in AD 72-3.

Pack Horse Lane Trench A (PHL A)

This was a large trench excavated by machine for the contractors; it measured about 14m north-south by a maximum of 19m east-west. The trench was located between King's Arms Lane and Pack Horse Lane, with the western end being some 30m behind numbers 17-19 English Street (Fig 3). Archaeological work was confined to a very limited watching brief only.

The sections, where examined, showed that many archaeological features survived (not illustrated). They included a V-shaped ditch observed about halfway along the north section. The ditch cut through an eroded old ground surface, and was 1.18m wide at the lip and 0.8m deep. Its fill was organic and included roots, turf-like material and silts. The ditch was traced along the bottom of the contractors' trench in an arc, the southern end being almost at the south-western corner of

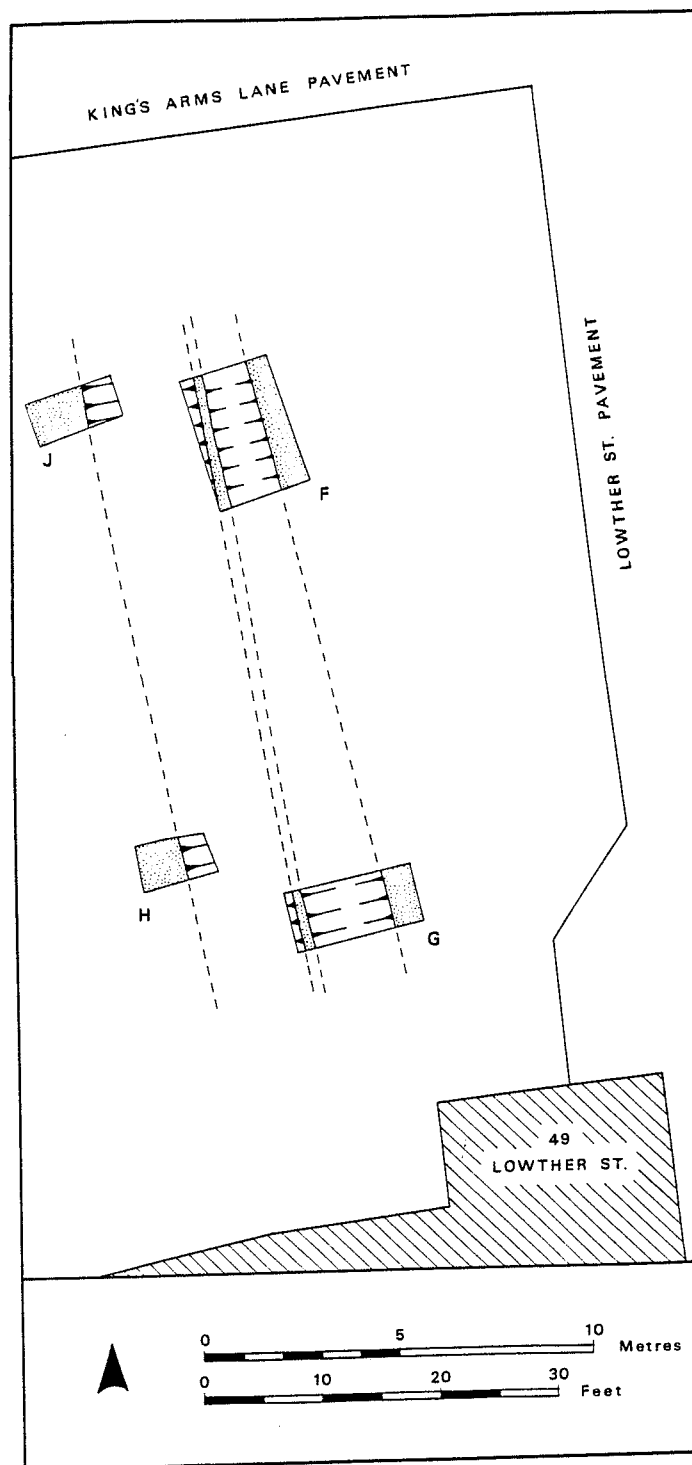


Fig 83 Plan of KAL F, G, H and J

the trench next to Pack Horse Lane. The ditch was cut by a succession of at least three other features, including a slot and a pit.

Other features recorded included a medieval timber-lined well (1) revealed in the bottom of the contractors' trench, and a possible medieval pit (15).

The ditch is probably an early feature as it was cut from the top of an eroded old ground surface. It was similar in size and stratigraphic position to the ditches identified in King's Arms Lane. The distance between the Pack Horse Lane ditch and the western lip of the western King's Arms Lane ditch is

approximately 60m. There is no certainty that the ditches are related, however, even if they are contemporary. The difficulties are compounded by the curving shape of the Pack Horse Lane ditch which is impossible to explain without further evidence.

Lowther Street (LOW)

P A Flynn writes:

A watching brief was carried out during July and August 1991 during construction work following the demolition of numbers 46-52 Lowther Street. This site lies on the opposite side of Lowther Street to Crown and Anchor Lane Trench C (Fig 4).

The results of this watching brief will be published in detail in the *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society*. Salient details (not illustrated) are included here because they are relevant to a consideration of CAL C.

Extensive cellaring destroyed much of the archaeological deposits on the western side of the site. However, a dark humic deposit up to 0.2m thick represented an old ground surface extending over the area east of the cellar. A number of V-shaped linear marks, thought to be plough marks, were recorded below the old ground surface.

Two V-shaped ditches between 0.9 and 1m wide by 0.8m deep filled with grey silts appeared to form a right angle. The ditches seem to have been laid out in relation to a metalled road, which was laid directly on top of the old ground surface. The earliest road surface appeared to have a width of 4.5m, but later re-surfacings, recorded to a depth of 1m, extended the width to 6m. The road was traced for a distance of 9m in this watching brief.

This watching brief is important for several reasons. No

plough marks were recorded at any point in The Lanes excavations, despite the fact that the work was extensive and the old ground surface was seen many times. The possibility that there may be traces of ploughing east of The Lanes clearly hints at prehistoric land-use in this area. The road metalling continues the line of the Roman road recorded in Crown and Anchor Lane Trenches B and C and Old Grapes Lane Trench J. The presence of ditches, perhaps laid out with regard to the road, may provide a hint of ribbon development along the road in its early phases.

Bowling Green, Spring Gardens Lane (BLG)

P A Flynn writes:

A very small-scale excavation was undertaken at Spring Garden Lanes in March 1992 prior to the construction of a Probation Day Care Centre. This site lies close to the eastern side of Lowther Street on Spring Gardens Lane.

The results of this will be published in detail in *The Lanes* Volume 2 (McCarthy forthcoming). This note is included here to draw attention to the existence of important Roman remains east of The Lanes area.

A substantial ditch, at least 4m wide by 2m deep and aligned approximately north-south, was recorded. The ditch was deliberately backfilled. Cutting through the fill are a number of large pits containing Roman pottery. A late phase of activity included the deposition of cremation burials as heaps of calcined bone and ash.

Very little archaeological information is available for Carlisle east of Lowther Street. The work at 46-52 Lowther Street and the Bowling Green clearly testify to activity taking place within the Roman period, and demonstrate the need for vigilance when opportunities for archaeological investigation in these areas occur.

CHAPTER 7 THE DENDROCHRONOLOGY

by C Groves

Introduction

Some 143 samples of wood were submitted for dating by dendrochronology. Thirteen samples were originally examined in Belfast in the late 1970s and early 1980s in the Tree-Ring Laboratory at the Queen's University, Belfast, as part of their research into the production of a continuous chronology for the British Isles on which to base the radiocarbon calibration curve (eg Brown *et al* 1986). The remainder were processed by the Dendrochronology Laboratory, University of Sheffield.

The detailed findings are set out in the Ancient Monuments Laboratory Report (Groves 19XX). The principal results are summarized here.

Many of the timbers used in the construction of buildings or other features attributed to the early Roman phases survived. Later phases were less well preserved but some timbers from the Anglo-Scandinavian and medieval periods were still extant. Table 2 lists the sites and numbers of samples submitted.

Table 2
Samples submitted for dating

Site	No of samples
CAL A	7
OGL A	84
OGL B	20
OGL C	6
OGL J	7
LEL A	10
OBL B	9

Methodology

The samples received at Sheffield were prepared following the method given by Hillam (1985). The non-oak samples, one alder (*Alnus glutinosa* Gaertn) and one elm (*Ulmus* sp), were identified by taking thin sections of wood from the transverse, tangential and radial planes and making temporary slides. The identification of these slides was carried out using reference material in the form of permanent slides and an identification key (Schweingruber 1978; 1990).

Dating is achieved by crossmatching ring sequences within a phase or building and establishing a site master curve. All previously unmatched sequences from the site are compared with this master curve, and if any additional patterns are found to crossmatch these are incorporated into the site master

curve. The site master curve and all unmatched ring sequences are then tested against reference chronologies to obtain absolute dates. The most commonly used reference chronologies were the Roman chronologies from Castle Street and Annetwell Street, Carlisle (Groves 1991 and forthcoming), medieval Carlisle (Baillie, pers comm), Papcastle (Hillam 1988), Vindolanda (Hillam 1991), Droitwich (Groves and Hillam 1992) and Scotland (Baillie 1977). A master curve is used for absolute dating purposes whenever possible as it enhances the common climatic signal and reduces the background noise resulting from the local growth conditions of individual trees.

Results and interpretation

The recorded details of the tree-ring samples and the results of the analysis are presented in full in the Ancient Monuments Laboratory Report (Groves 199X); a summary of the most significant results is given below. A total of 104 oak samples were considered suitable for measurement, of which 54 (52%) were absolutely dated. The lack of sapwood, and hence the lack of precise felling dates, prevents any comparisons being made from the tree-ring results regarding the relationship of the phasing sequences identified in the various trenches. The dating framework implied by the tree-ring results is summarized in Table 3.

Crown and Anchor Lane Trench A

The dated sequence on one timber from pit 64 spans the period AD 512-649. Its outer 113 rings, including one sapwood, had broken away from the measured sequence. The felling date range for this timber was originally quoted by Belfast as AD 793±9. If the sapwood estimate now used at Sheffield is applied, however, a felling date range of AD 771-816 is produced. This date indicates the period in which this plank was initially used for building purposes. It does show signs of re-use, however, which therefore suggests that the pit was constructed some time after AD 771.

Old Grapes Lane Trench A

A dated plank from Period 5-6 spans the period 116-1 BC. As the outermost heartwood rings were unmeasurable, and as it lacked sapwood, a *terminus post quem* of AD 15 is produced.

Six timbers from Building 674 (Period 6) were dated. Bark surface was present on the corner post 675 and its outermost sapwood ring was complete, indicating that it was winter-felled in AD 93/94. Timber 854, also a corner post, had retained some sapwood but did not have bark edge. However, the high *t* value (9.7) between these posts, combined with the excellent visual match, suggests that they were derived from the same tree. This being the case, timber 854 must also have a felling date of AD 93/94.

Table 3
Summary of the tree-ring dates

Site	Period	Structure or context	Estim. felling date range/constr. date
CAL A	Post-Roman	Pit 64	AD 771-816
OGL A	3	Post 1129	Before AD 94
	5-6	Deposit 1007	AD 10-93
	6	Building 674	AD 93-4
	6	Fence 739	After AD 39
	6	Fence 1024	After 14 BC
	6	Various	After AD 60
	7A	Wall 659	After AD 94
OGL B	13	Well 1237	AD 1193-6
	2B	Post 316	After AD 83
	4E-F	Wall 230	After AD 94
	5A	Well 184	After AD 94
OGL C	6A	Post 124	After AD 99
	2	Post 21	After AD 6
	3A	Post 54	After AD 84
OGL J	3A	Drain 69	After AD 84
	2	Drain 23	After 15 BC
LEL A	4	Surface 616	AD 75-120
	7B	Deposit 548	After AD 60
	10	Post 486	After 111 BC
OBL B	2	Gulley 113	After AD 6
	6	Post 92	After AD 6

The remaining four dated timbers from Building 674 were felled after 51 BC, AD 63, AD 68 and AD 71 respectively. It is therefore possible for them to be contemporary with the AD 93/94 felling period, but this cannot be proved from the tree-ring analysis. If the timbers are all contemporary and primary (ie not re-used), the date for post 675 indicates that Building 674 was probably constructed shortly after the timber was felled in AD 93/94. This is based on the precise felling date obtained for a single timber, but it is compatible with major felling events at both Castle Street and Annetwell Street, Carlisle, in the early 90s AD (eg McCarthy 1991; Caruana forthcoming a; Groves 1991 and forthcoming). The results for Building 674 imply that construction in Periods 3-5 probably occurred before AD 94.

It is not possible to determine precise felling dates for another four timbers from Period 6 due to a lack of sapwood. The *termini post quos* for felling range from after 14 BC, AD 39, AD 40 and AD 60.

None of the Period 7A timbers from the collapsed wall 659 had retained any sapwood. The end dates range from 101 BC to AD 66 which, assuming that they are contemporary, implies a *terminus post quem* for felling of AD 76. As a felling date of AD 93/94 has been produced from Period 6, however, it appears likely that the timbers from 659 were probably felled and used in construction after AD 94. It is therefore likely that a large number of heartwood rings were lost during conver-

sion and several of the timbers probably represent the inner section of a tree trunk.

There are 13 dated timbers from the plank lining of the medieval well 1237 (Period 13). The sapwood of one was complete, although due to damage to the outer edge it was not possible to determine whether the outermost measured ring was immediately below the bark surface or within 2-3 rings of it. Consequently a felling date range of AD 1193-6 is obtained for timber 401. The first sapwood ring on another plank dates to AD 1163, so this timber was felled after AD 1172 but probably before AD 1218. The other 11 timbers have *termini post quos* for felling varying from the late tenth to mid twelfth centuries. It is therefore possible for 392 and these 11 other timbers to be contemporary and to have been felled after AD 1193-6.

Two timbers from the framework in the well shaft were felled after AD 1180 and AD 1163 respectively. If these two timbers are contemporary and associated with the initial construction of the well, it cannot have been built before AD 1180. If the timbers from the plank lining are also primary, however, a construction date of AD 1193-6, shortly after the felling of timber 401, is implied for well 1237.

Old Grapes Lane Trench B

The single dated timber from the Period 2B wall or fence has a *terminus post quem* for felling of AD 83. If this post is associated with the initial erection of this structure, it is unlikely to have been constructed before AD 83.

Timbers from the Period 4E-F collapsed wall (230) were felled after AD 88 and AD 94 respectively. There is no other archaeological evidence indicating that the timbers are re-used, and so if they are contemporary, the wall was probably built after AD 94. This is consistent with the dating of OGL A Period 6, with which this period is to be equated.

None of the dated Period 5A timbers from well 184 had retained any sapwood. The end dates of the three sequences are 101 BC, AD 21 and AD 19 respectively, which, assuming that they are contemporary, implies a probable *terminus post quem* for felling of AD 31. As one Period 4E-F timber was felled after AD 94, however, it is likely that well 184 was also constructed after this date. At least one of the timbers (207) must represent the inner portion of a trunk and have had a large number of outer rings removed during conversion (Fig 84).

A post from Period 6A was probably felled after AD 99. The visual appearance of the timber indicates that it is a whole trunk which, although shaped, has been left virtually intact. This implies that it was probably used in construction during the second century and was not a primary Period 4 post re-used.

Old Grapes Lane Trench C

One of the dated samples is a post (21) from Period 2 which yielded a *terminus post quem* for felling of AD 6.

Post 54, associated with the rampart revetment in Period 3A, has 12 unmeasured outer rings and was felled after AD 84. The date of the outermost ring of a plank (69) from a lined drain is AD 5. As timber 54 was probably felled after AD 84,

however, it is likely that the drain timbers were also felled and used after this date.

Old Grapes Lane Trench J

It is not possible to determine precise felling dates for the three timbers submitted due to an absence of sapwood. The outermost measured heartwood ring of one post (4) dates to AD 8, so its *terminus post quem* for felling is AD 18. Two planks associated with a roadside drain (23-4) were probably derived from one tree, which was felled after 15 BC.

Lewthwaite's Lane Trench A

Three of the samples from Periods 4 and 7B were from trees felled after the Neronian and mid-Flavian periods. This does not assist in establishing the chronology.

Old Bush Lane Trench B

None of the samples can be used to confirm or refute the late first- to early second-century date indicated by other archaeological evidence.

The timbers

The vast majority of the structural timbers from all periods were heavily trimmed or worked. Over half of the Roman timbers were radial or tangential planks. The majority of the remaining Roman timbers are halved or quartered trunks which have been hewn into the required shape. Less than 10% of the structural timbers obviously represent a trunk which has been left virtually intact. These include an example from Old Grapes Lane Trench B (Period 6B) and another from Old Bush Lane Trench B (Period 2-7, Building 117).

The post-Roman timbers are all either radial planks or halved and quartered trunks that have been trimmed to the required shape.

It is not possible to give an accurate assessment of the size and age of the parent trees due to the infrequent occurrence of sapwood and pith on the vast majority of samples. The trees used in the Roman phases must have ranged from less than 50 to well over 300 years old when felled, and the dimensions of the samples suggest diameters of about 100mm to over 600mm. Although the average growth rate ranges from 0.3-7.1mm per year, over 60% of the trees have average growth rates of less than 1.6mm. This implies that many of the trees must have grown under conditions that were limiting, possibly dense woodland, where competition from neighbouring trees would result in slow growth. This, combined with the fact that at least 60% of the Roman timbers must have been derived from trees over 100 years old, indicates that the timber was being obtained from well established woodland. It is possible that some timbers were derived from very mature trees over 350 years old (eg OGL C 21, Period 2; LEL A 486, Period 10). This assumes, however, that they were felled in the latter part of the first century AD and not reclaimed from pre-Roman native structures.

Similar variations in sequence length and average ring width are apparent in the timbers used in the post-Roman

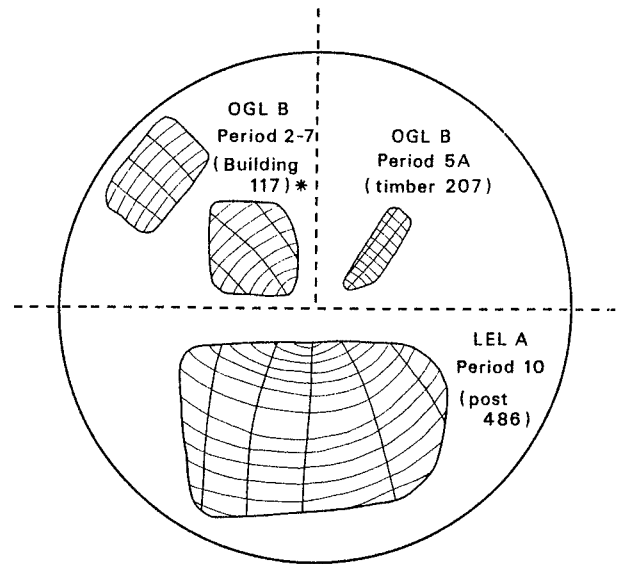


Figure 84 Schematic drawing to show how some of the timbers may have been converted from the parent trunk (* - timbers not dated)

phases. The timbers appear to have been derived from trees ranging from approximately 100 to 300 years old, with diameters varying from about 250mm to 350mm when felled. The average growth rate varies from 0.8-3.5mm, but the majority of the post-Roman timbers are in the range 1.0-2.0mm. The post-Roman timbers were therefore also mostly derived from relatively slow-grown mature trees.

Discussion

Tree-ring dates were obtained for 52% of the measured samples. This success rate is about average for a large complex urban site where woodlands over an extensive area were probably being exploited. Some 64% of the undated sequences contain less than 100 rings, compared with only 30% of those dated. This is frequently the case, but these less-long-lived trees tend to be trimmed to a lesser extent during conversion and so are usually more likely to have retained a full or partial complement of sapwood. It is therefore these shorter sequences that are often important in the determination of precise felling dates (see Hillam *et al* 1987). It has not been possible, however, to produce a precise dating framework for any of the trenches in the southern part of The Lanes due to the scarcity of sapwood.

Only 17 of the 143 samples submitted for analysis had retained any trace of sapwood. One of these was unsuitable for analysis, and only six samples with sapwood were dated. This is in stark contrast to Annetwell Street (Groves forthcoming), where over 300 of the 500 samples analysed had retained at least some sapwood. The close nature of the dating of the Roman Periods 3-5 at Annetwell Street shows the precision

of which dendrochronology is capable, and clearly demonstrates the importance of sapwood and bark edge in the production of a precise dating framework. Unfortunately sapwood is less robust than heartwood and less likely to survive in conditions of poor preservation. However, apart from a small minority of samples, The Lanes timbers were generally in good condition. The wide range of end-dates for the 36 dated Roman timbers is not indicative of a group of timbers which have merely lost their sapwood and possibly a few outer heartwood rings. It is possible that many of the trees used were sufficiently large to allow timbers to be split/cut from the inner and outer parts of the heartwood (Fig 84), but the apparent heavy working/trimming of many of the timbers, combined with the scarcity of sapwood and pith, may be a result of re-use. Secondary conversion would involve additional trimming resulting in the loss of both inner and outer heartwood rings. Other archaeological evidence would be required to support this suggestion, however, and it is noticeable that re-use has only been positively identified for two Roman timbers.

The generally poor quality and frequently inconsistent matching obtained between the individual Roman sequences may result from the exploitation of a large area of local woodland, or possibly be due to the timber being obtained from several diverse sources. The re-use of timber would probably aggravate the mixing of timber groups, as in the case of structures containing timber from various woodland areas.

The lack of intra-site crossmatching within the post-Roman period is also suggestive of the timbers having been obtained from a variety of sources. All the timbers in Crown and Anchor Lane Trench A pit 64 are probably re-used. In contrast, the internal crossmatching of the medieval well and pit timbers at Old Grapes Lane Trench A (1237) is more consistent, implying that, unlike the Roman and post-Roman material, the timber may have been the product of a single source.

The Roman master curve extends the period covered by existing oak chronologies for this area by 23 years, back to 372 BC. It produced very high t values with reference chronologies from other sites in Carlisle, north-west England and

Ireland. The medieval site master sequence crossdates particularly well with local reference chronologies and others from northern England and Scotland, whilst the single dated post-Roman timber matches local and western England reference curves. The tree-ring analysis therefore suggests that the timber from all periods is likely to be of local origin, although it is as yet impossible to source timber in any detail using dendrochronology. This problem is enhanced because the regional distribution of British tree-ring chronologies is different in the Roman, Saxon, medieval and post-medieval periods.

Detailed analysis of the quality of the within-site crossmatching obtained at The Lanes and other previously analysed sites from Carlisle may produce more detailed evidence of the sources of timber utilized in construction work at Carlisle. Further research into the provenancing of timber could also provide an insight into the difficulties encountered during intra-site crossmatching of timbers from Carlisle.

The importance of producing a site master for absolute dating is clearly shown, as relatively few of the individual sequences, particularly those from Roman periods, produced consistent results at their correct dating positions with reference chronologies from outside the Carlisle area. The common climatic signal has been enhanced and the 'noise' from local environmental growth conditions clearly reduced. The isolation of this common climatic signal from the individual sequences has frequently proved problematical with Carlisle material from the Roman period which has previously been subjected to dendrochronological analysis.

At The Lanes this may be due in part to the presence of a distinct nine-year cycle in the raw data (ie a particularly narrow growth ring every ninth year) during the first century BC and part of the first century AD. This phenomenon has been noted at various other Roman sites in Carlisle, but is especially marked in a number of timbers from The Lanes.

It is hoped that future dendrochronological analysis of timbers from the Carlisle area will contribute additional information about the presence of the nine-year cycle, as well as the possibility of re-use of timber.

CHAPTER 8 THE PLANT AND WOOD REMAINS

by J P Huntley

Introduction

The plant remains consisted of seeds, pollen and vegetative fragments from a variety of samples, together with round-wood and miscellaneous other fragments recovered during the excavations. The samples were submitted as both flots and residues from on-site processing ('bulk samples') and as unsieved soil samples ('specialist samples').

The samples were grouped by the excavator into three categories and given priorities based upon their contextual integrity. Only priority 1 material was analysed.

From experience of other Carlisle sites (Goodwin and Huntley 1988; 1991; Huntley 1989a), many samples were expected to be rather similar, with relatively few being different or interesting in a specific way. No correlation had been noted at these sites between feature type and 'different-ness', and it was felt, therefore, that as many of The Lanes samples as possible should be scanned, rather than fully analysed, in order to find those that displayed significantly different characteristics.

Methodology

Sample processing

Full details of the methodology can be found in the Ancient Monuments Laboratory Report (Huntley 1992).

Sub-samples (500g) of the specialist samples were wet-sieved to 500 microns. All the 1mm fraction and a proportion of the 500 micron fraction were scanned at magnifications of up to x50. Seeds, fruits and vegetative material were identified as far as possible, and proportions of waterlogged taxa scored using a system based upon 'occasional', 'frequent' and 'abundant'. The carbonized items were sorted out and full counts prepared.

For the bulk samples, a bag of flot was rinsed and dried in the Laboratory. This consisted of approximately 2 litres in most cases. All of the 1mm fraction was scanned for carbonized cereal grains, chaff and other identifiable plant remains. The residues from these samples were also dried and sorted; this was primarily for the recovery of small bones, but also produced a certain number of seeds, particularly fruit stones.

Identifications were made by comparison with modern reference material. The nomenclature follows Stace (1991) for vascular plants and Smith (1978) for bryophytes. Where identification was unclear and two or more species were possible, a 'type' was used: for example, *Ranunculus repens*-type includes *R. repens*, *R. acris*, *R. bulbosus* and *R. longifolius*.

Bran was identified by comparison with modern material prepared following the method of Dickson (1987). Grass caryopses were largely grouped according to Körber-Grohne (1964), and not identified to species due to the unavailability of a wide range of taxa in the Laboratory's reference collec-

tion. Wheat glume bases were measured, using a calibrated eye-piece graticule at magnifications of up to x25, across the point of articulation in order to determine between species of wheat. The dimensions of *Prunus* stones were measured in order to identify possible cultivated varieties of fruit.

Pollen preparation

Pollen preparations of a limited number of samples were made where specific questions were raised during initial scanning. Standard methods of preparation were used: treatment with sodium hydroxide to remove humic acids, zinc chloride to separate out silicates, acetolysis to remove cellulose, and mounting in silicone oil. Gramineae pollen grains were categorized into wild, *Hordeum*-type, *Avena/Triticum* and *Secale*, according to Andersen (1967). Where parasite eggs were also present, these were measured.

Ecological groups

All British native taxa identified were allocated to a broad ecological category, based upon personal knowledge and descriptions in Rodwell (1990; 1991) and Oberdorfer (1977; 1978; 1983). Each taxon is allocated to one group only, although it must be remembered the groups are not mutually exclusive. Most taxa appear in, although are not necessarily common in, more than one vegetation type.

The following broad terminology is adopted:

Weeds/ruderals

These are plants of disturbed, open ground. This category includes the classic weeds of cereal cultivation which are common on light, sandy soils in a moderately continental climate. In northern Britain the occurrence of such taxa is most likely to represent seeds imported with cereal crops grown either in southern Britain or on the Continent. The category also includes taxa more common on a heavier soil and which are tolerant of colder, wetter climates prevalent in northern Britain. A third group comprises taxa common on slightly longer-term waste/fallow ground, where they can form tall, weedy herb-rich communities demanding moderate levels of nutrients. Although these three groups can form distinct phytosociological associations, they do contain many taxa in common and hence they are all classed as weeds in this report.

Grassland

This group includes taxa which grow amongst grassland in general and hence will tolerate a certain amount of competition, something not tolerated by the weeds. The communities include those on neutral to basic soils, pastures, dry meadows and the sides of paths and roads. It also

includes a later stage in the colonization of open ground following the adventitious annuals of the weeds group. On acidic soils a grassland will develop with different taxa present, and this may relate to heathland communities.

Heathland

Heathland generally is considered to be dominated by ericaceous shrubs such as heather (*Calluna vulgaris*) and other heaths (*Erica* species). The soils are acidic although they may be peats or acidic sands. Heather prefers the drier soils whereas *Erica* species and *Eriophorum* species prefer wetter ground. Bracken (*Pteridium aquilinum*) is characteristic of a heath-grassland, but today it often forms a monoculture.

Wet ground

Two broad categories of wet ground can be distinguished: that on a mineral substrate, common along the edges of streams, ditches and ponds, with some of the taxa growing in flowing water, and that on an organic substrate such as wet peat and wet fen meadows. The latter clearly merges with wet heathland where sedges and *Eriophorum* can dominate.

Woodland and scrub

Most of the taxa in this group can be related to scrubland associations rather than strict 'high wood' species. This probably reflects the lack of mature woodland in the immediate vicinity of the sites, although hedges do seem to be present.

Some taxa are not native to the British Isles, that is to say they do not appear in pollen or seed records prior to the appearance of people, and are generally considered to have been imported. These taxa have been grouped as 'exotic', and 'cereal grain and chaff'. They are all refuse from food or potential food plants. A final category of 'unclassified' covers those taxa which included more than one species, ie most seeds which were only identified to genus, the bryophytes which were not exhaustively identified, and taxa with a broad ecological range, which are therefore not characteristic of any particular vegetation type.

It must be noted that there are transitions between many of the above groups and any boundary is rather arbitrary. This is the main reason why a few, broad terms in English, rather than rigorous phytosociological terms, have been used.

Wood

A selection of the better preserved material was submitted for study; it is considered that little further information would have been gained from the unanalysed material. For analysis, each piece of wood was frozen and planed smooth across; sections were cut transversely, tangentially and radial longitudinally to aid species identification. The diameters and ages of roundwood were noted. For non-round pieces, notes were made of the shape of the wood and the positions of the rings, to gain an idea of how the original timber had been cut up.

Each piece was broadly categorized as to its shape. These terms are used in the tables of wood data below, and include:

'roundwood' - comprising pieces with whole sections and half and quarter sections;

'chips' and 'flakes' - thin pieces, generally rectangular in section and varied in length, indicating waste from timber being cut, chopped or sawn;

'planks' - wide, often thin, pieces, indicating utilized wood;

'wedges' - triangular in section, otherwise like large chips; probably woodworking waste, although some may have been artefacts;

'blocks' - square or rectangular pieces; offcuts from wood-working;

'posts' - described as such by the excavator; either whole roundwood or squared-off material;

'pegs' - short pieces of roundwood with definite working at one end. Some were worked with small strokes all round the tip, others had two or more faces roughly taken off;

'boles' - bases of trunks, generally large and rather chunky;

'chunks' - miscellaneous pieces of varying size, with no clear orientation or shape.

Other categories include 'rim' and 'stave', where there were clear pieces of vessels or barrels, 'charcoal', 'bark', 'cladding' (the excavator's description), 'dried out' and 'rotten'.

Presentation

The results of the analyses are presented by site. For each site, discussions of the plant and wood remains are followed by summaries of the samples from each period, arranged by sub-phase where applicable and then by numerical order of context. For each sample, the context number is listed to the left, and the sample numbers are given below; bulk and specialist sample numbers are prefixed 'BS' and 'SS' respectively. If the sample consisted of wood only, this is stated. Where the specialist samples were also analysed for insect and parasite remains, page cross-references are given.

A general discussion of the results, including the exotic and native food species and their significance, and a broader consideration of the ecological groups, together with an overview of the wood remains, can be found in the monograph (McCarthy 1993, Chapter 00).

Full details of the botanical data, which are too lengthy to be published in full here, are given in the Ancient Monuments Laboratory Report (Huntley 1992) and the archive reports.

Crown and Anchor Lane Trenches A and B

The plant remains

Samples from a total of 17 contexts in CAL A were analysed. The samples ranged in date from the prehistoric through to the

Table 4
CAL A: percentage occurrence of ecological categories by period

Category	1	2	3	4 + 5	No of taxa
Carbonized	2	1	15	16	44
Waterlogged arable	15	21	37	23	13
exotic	-	7	35	17	5
grassland	-	3	35	17	10
heathland	-	-	11	33	3
ruderals	7	4	38	17	15
woodland	7	2	23	31	14
wet ground	9	9	33	23	14
unclassified	19	6	34	18	16
Number of samples	1	3	6	7	

post-Roman period, although the exact dates for these later samples are unclear. They are from a variety of feature types, which are to a certain degree related to period. Pit samples are only from Period 5 and later, whereas the earlier features sampled were on the whole soil layers.

Table 4 summarizes the botanical data in ecological terms by providing information about the frequency of occurrence of taxa within these categories. It assumes that each taxon has an equal likelihood of occurring. Thus the theoretical maximum occurrence for each ecological category per period is the number of taxa in that category multiplied by the numbers of samples in the period. The value presented is the observed number of occurrences x100, divided by the theoretical maximum. This allows comparisons to be made irrespective of both numbers of samples in a period and taxa in a group.

Carbonized items are more frequent in the later periods, but in general, as with the other sites, it is only the occasional context that contains any quantity of such material. There is, however, evidence for the disposal of carbonized cereal waste, in particular, in these later periods. The waterlogged exotic taxa show a very similar pattern, reinforcing the suggestion of moderate human activity in this locality at these times.

Grassland taxa are most abundant in Period 3 although their occurrence values are moderately high throughout (Table 4). The same is true for the wet ground and unclassified categories. Some of these taxa are likely to represent vegetation actually growing on the site, but many are considered to have been deliberately brought here.

The site would appear to have been a convenient place in which to dump rubbish, if not a place where people and/or animals lived and accumulated debris around themselves. Whether the site was, in part, simply where rubbish was dumped, or whether there was some cultivation being carried out and material was being brought in to use as a manure, is more difficult to ascertain. It is suggested that some of the plant remains probably do represent manuring of soil, although the sparse evidence for faecal material in Periods 3 and 4 would indicate that the area was unlikely to have been intensively cultivated.

In summary, the early periods in CAL A suggest no intensive activity with respect to the botanical material. Although buildings were clearly present, the plant remains are sparse and generally reflect clean conditions. During Period 3 the massive spread of material all over the site indicates some cultivated soil, with, perhaps, the cultivation of coriander, although it is not clear whether this material developed *in situ* or was imported from elsewhere. Turf deposits present suggest wet fen vegetation from both seed and pollen evidence. Other spreads show clear dumping of sedge-rich material, interpreted as possible flooring or bedding material, perhaps from elsewhere or perhaps from inhabited buildings on the site.

Later material was only sampled from pit fills, and these were obviously in receipt of some faecal material, although other organic rubbish - animal dung/bedding and food debris - is an important constituent. The food debris is largely represented by sloe/damson stones, apple/pear pips and blackberry pips. Considerable numbers of *Prunus* stones were recovered from pit 64 (Post-Roman) (Huntley 1992, appendix CAL-3). Few exotic taxa were recorded, and none in any abundance. Faecal material comprises cereal bran from a mixture of grains, and numerous parasite eggs. Flax was recorded as both whole seeds and fragments that had apparently been digested. They could have been baked in bread, as commonly found in Sweden and Germany today.

Although there are very clear differences in the botanical assemblages before and after Period 4, these are considered to reflect feature type differences. It is very disappointing that no pits were present in the earlier deposits.

The wood

A total of 211 pieces of wood were identified from 20 contexts in CAL A and 11 contexts in CAL B. There were only 30 pieces of wood from CAL B, all but one being detritus from oak woodworking. CAL A also produced woodworking debris in the form of oak chips and offcuts, and although some of these may have been used as post-packing, much is consid-

Table 5
CAL A and B: summary of wood data by species and wood type

Wood type	<i>Alnus</i>	<i>Betula/Corylus/Alnus</i>	<i>Betula</i>	<i>Corylus</i>	<i>cf Prunus avium</i>	<i>Crataegus-type</i>	<i>Fraxinus</i>	<i>Picea/Larix</i>	<i>Pomoideae</i>	<i>Quercus</i>	<i>Salix</i>	<i>Salix/Populus</i>	Unidentified
Bark	-	-	-	-	-	-	-	-	-	2	-	-	-
Block	1	-	-	-	-	-	-	-	-	11	-	-	-
Chip	3	-	-	1	-	-	-	-	-	35	-	-	-
Chunk	3	2	-	-	-	-	-	-	-	18	-	-	-
Flake/fragment	-	-	-	-	-	-	-	2	-	-	-	-	1
Plank	-	-	-	-	-	-	-	-	-	2	-	-	-
Post	-	-	-	-	-	-	-	-	-	1	-	-	-
Roundwood	22	1	9	14	1	3	1	-	1	29	7	5	-
Wedge	-	-	-	-	-	-	-	-	-	11	-	-	-
Totals	29	3	9	15	1	3	1	2	1	134	7	5	1

ered to represent disposal of waste material. On the other hand roundwood is rare, and seems not to have been disposed of here. Table 5 presents a summary of species and wood types recorded for the two sites.

Oak is the most commonly recorded species, being, as elsewhere in The Lanes, mainly woodworking debris. This was also clear from the general descriptions of the samples, where 'forest bark'-type deposits were regularly noted. A moderate number of other species are recorded, almost always in the form of roundwood. The few chips etc from these species could easily have been produced during minor working of roundwood to put points upon the ends.

There were few obvious structures present in the excavations, and this accounts for the low amounts of roundwood. It also, however, suggests that old wattling etc was not disposed of here, which is somewhat surprising given the general suggestions of dumping from the other botanical material. Perhaps the implication is that this other organic material was being used as a manure prior to cultivation rather than just being dumped in a convenient place.

Crown and Anchor Lane Trench A

Period 1

Pre-Roman old ground surface (124), with no evidence of ploughing.

- 124 Old ground surface. Few seeds present, sedges, grasses, buttercup, sorrel and some chickweed being the most common. The evidence suggests some cultivation, but the taxa may really be thought of as a low-level background assemblage.
CAL A SS 16 and BS 10 Period: 1

Period 2

This period included a metalled road and two timber buildings, 97 (including slot 93 and hearth 131) and 125 (including slot 85).

- 131.1 Hearth. Although mainly mineral material, some wood, monocots and fine organic matter present. A variety of taxa were represented, predominantly sedges and species of disturbed ground. One fig (*Ficus carica*) was recovered, as were moderate amounts of black nightshade (*Solanum nigrum*).
CAL A SS 17 Period: 2B-E
- 131.2 Hearth. Only four seeds, annual nettle (*Urtica urens*) and blinks (*Montia fontana*), were present.
CAL A SS 18 Period: 2B-E
- 131.3 Hearth. No seeds or plant remains.
CAL A SS 19 Period: 2B-E
- 85 Fill of slot (including contexts 104, 105, 109), Building 125. Several *Quercus* offcuts and a few pieces of roundwood, consisting of *Alnus*, *Corylus* and *cf Prunus avium* (gean). It is likely that these species related either to the timbers themselves or to packing for the structural timbers.
Wood only Period: 2C
- 93 Fill of slot, Building 97. There were two pieces of roundwood in *Alnus* (alder), and a few chips and offcuts of *Quercus* (oak).
Wood only Period: 2E

The botanical results give no indication as to the function of the hearth or the buildings.

Period 3

The Period 2 buildings were covered by turf and soil spreads (57, 65, 71, 73, 75, 80).

- 80 Deposit. The sample consisted mainly of an all-mineral matrix, possibly a soil which was either very inorganic, or finely organic and well humified. Variety of seeds present, overwhelmingly dominated by chickweed, sedges, *Chenopodium* species and annual nettle,

suggesting a well-cultivated soil assemblage. Apart from these, the next most frequent seed type was *Coriandrum sativum* (coriander), found in considerable quantities. Overall, the deposit seems like a garden soil with not much else mixed up with it. It is speculated that the coriander was being grown here or at least had been grown in the place from where the soil was brought.

CAL A SS 14 and BS 9 Period: 3A

- 65 Turf deposit, probably the same as 75. Mainly sand and gravel with only small amounts of various organic fragments. The few seeds give no help in interpretation.
CAL A SS 15 Period: 3B

- 71 Deposit. Matrix is a mixture of mineral, wood and charcoal, with some bryophytes, tree buds and monocot fragments. Wide variety of taxa represented. A range of ecological categories present, wet ground and grassland, cultivation, and nitrophilous taxa. Many wheat glume bases and a few exotics, but no bran, were identified. Context presumably of rather mixed origin.

The coarse fraction was 'forest bark'-like and contained moderate numbers of carbonized hulled barley grains. Barley grains were so well preserved that lemmas and paleas were still present and therefore obscured the embryo. This degree of preservation may suggest rapid covering over and no post-depositional working of the deposit. Two hexaploid wheat grains and two large legumes, peas or beans, were also recovered. The usual hazelnut fragments were present, including some nearly whole shells; these were large (up to 1.9cm in length). A fragment of walnut was also found, and one rye and one oat grain.

Pollen showed a dominance of *Calluna* (heather) and *Corylus* (hazel), with moderate amounts of Gramineae and *Alnus* (alder). The Gramineae were predominantly wild-type but with one *Triticum/Avena* and five *Hordeum*-type grains identified. The tree pollen could be, in part, related to the 'forest bark' remains, possibly the result of local wood crafts. A variety of other grassland and/or ruderal taxa were identified.

CAL A SS 10 and BS 6 Period: 3B

- 73 Deposit identified as turf by excavator. Matrix predominantly mineral, charcoal and bryophytes. Mosses are pleurocarpous but with the stems only; leaves are more or less absent, at best only fragmentary. Seeds not abundant although there was a wide variety of taxa represented. Sedges and *Potentilla* predominate, with a good selection of other wet ground taxa; this suggests turf cut from edge of fen/bog?

CAL A SS 11 and BS 7 Period: 3B

- 75 Deposit identified as turf by excavator, overlying 80. Matrix primarily sand and gravel with bryophyte stems. Very few seeds recovered from specialist sample: two sedges and one *Potentilla*. Bulk flots yielded a much greater species-list. This taxa enhancement was particularly obvious for this context compared with some of the others. The taxa are similar to those from context 73 (above), although here trigonous sedges are most common whereas lenticular sedges are present in 73. No other conclusions can be drawn. The occasional fig and coriander remains suggest food refuse but could equally well be rubbish. Both contexts suggest wet fen-grassland vegetation overall.

The pollen is dominated by heather, alder and hazel, with abundant grasses. Moderate range of herbs suggest heathy grassland, but sedges are surprisingly poorly represented. *Succisa* is abundant and reinforces the suggestion of fen-grassland.

CAL A SS 13 and BS 8 Period: 3B

- 57 Laminated layer, overlying 75. Matrix predominantly monocotyledonous fragments with bryophytes, some wood, and legume flowers. Seeds are predominantly from plants of grassland and/or longer-term waste ground but generally not from cultivated areas; seeds from annuals are not abundant. A small number of waterlogged spelt glume bases were present, suggesting that some of the material had derived from cereals, although these were not an important constituent of the layer.

Pollen spectrum dominated by Gramineae, wild-type, with a small proportion of *Triticum/Avena*-type. The latter was probably derived from spelt, although its pollen cannot be distinguished from that of other wheats, or indeed oats. The other pollen taxa were mainly from Compositae (Liguliflorae) (dandelion-type), *Plantago lanceolata* (ribwort plantain), *Rumex* undifferentiated (docks), *Suc-*

cisa (devil's bit scabious), Cyperaceae (sedges) and Filicales undifferentiated (ferns). Alder and hazel was moderately represented, with a little oak. The pollen assemblage suggests a grassland association with some damp ground plus a small amount of local woodland, and some cereal presence, although not necessarily being grown since cereal pollen readily remains amongst the ripe ears of grain. No parasite eggs were noted.

The Compositae (Liguliflorae) pollen probably derives from *Leontodon autumnalis/hispidus*, from which large numbers of achenes were also recovered. It is interesting to note that both spores and frond fragments of *Pteridium aquilinum* (bracken) were identified. Some of the other taxa were represented in either the pollen or the macrofossil studies but not in both. *Calluna* (heather) is the most obvious, but its pollen is wind-dispersed over considerable distances and so it is not surprising to find it in an urban situation. Plants may also have been present in adjacent areas in the form of thatching etc, and flowers may have been present on them. Fern spores, which had lost their outer exines and were therefore unidentifiable, were common, although no other remains were recovered. Given their generally delicate nature this is not surprising.

In all, the botanical evidence suggests the disposal of hay, or possibly dung, in this layer. The former is considered more likely from the apparent lack of parasite eggs and the definite lack of fly puparia etc in the bulk samples.

CAL A SS 9 and BS 5 Period: 3C

Although the general nature of the deposits during Period 3 suggest spreads of soil and turf, there is an indication that other rubbish was being disposed of here too, and perhaps that there was some cultivation.

Considerable amounts of wood were recovered from many of these contexts and they are from a range of species, *Alnus*, *Corylus*, *Quercus*, *Salix/Populus*, *Betula* and *Crataegus*-type being the most common. Most of the species were identified from pieces of roundwood. The *Quercus* was a mixture of roundwood and offcuts, some quite moderate pieces. The roundwood was of a size to suggest that it was the remains of wattling, although some was clearly from branches and may have been waste wood from general timber utilization.

Period 4

Soil deposit 52 covered the whole site in Period 4A. Among deposits immediately overlying 52 was hearth 37 (Period 4B).

- 52 Deposit, possibly a soil dump. Matrix mainly wood chips and charcoal, with some amorphous and coarse organic material. Wide range of species and moderate numbers of seeds present. Wet ground taxa are common but there are few general cultivation indicators. No high nitrogen indicators were present. Some fig pips were recorded but no bran or other exotics, which suggests an absence of faecal material. Grape pips and *Prunus* stones were present. There were also a few hazelnuts, some large (up to 1.8cm in length), which may refer to *Corylus maxima*, the Mediterranean cob nut, rather than the native *C. avellana*.

The bulk sample contains relatively large amounts of carbonized cereals - large numbers of spelt glumes, basal internodes of spelt and barley rachis fragments, hulled barley, hexaploid wheat including some bread wheat - but some weeds and grassland taxa too. Although some of the barley grains clearly had twisted embryos, indicating that at least some was 6-row barley, not enough were identifiable to indicate whether 2-row was also present. The quantities of cereal remains suggests that processing debris was deposited in this layer.

Wood identified from this deposit comprised a few offcut chips of *Quercus*, and one piece of roundwood in *Corylus*.

CAL A SS 5 and BS 1 Period: 4A

- 37.4 Hearth. No seeds or plant remains.
CAL A SS 4 Period: 4B

Period 5

Post-dating Period 4 were a number of features, including hearth 37, pits 67 and 77, and posthole 18, whose stratigraphic relationships were largely destroyed by later cellars.

- 67 Pit (fill 66.2). Mainly mineral material and clinker with a small amount, but wide variety, of organic material, monocots, wood, charcoal, bryophytes, legume flowers, tree buds, bran etc. Moderate numbers of *Sphagnum* leaves and a variety of other seeds present, but the latter only in very low numbers. A few sedges, grasses, hazelnut fragments, *Potentilla*, buttercups, sorrels, nettles and wheat glumes were recorded. A background assemblage; the clinker suggests disposal of some industrial waste.
CAL A SS 8 and BS 4 Period: 5
- 77 Pit (fill 76). Matrix was almost entirely mineral. The few seeds include nettle, sedge, three fig pips, and fragments of corncockle. The pit may have been cleaned out, or the paucity of remains may be due to poor preservation.
CAL A SS 12 Period: 5
- 18 Posthole (fill 17). Wood recovered was entirely *Quercus*, much being offcut chips and flakes, suggesting remains of woodworking, being the type of material expected when large timbers were being dressed.
Wood only Period: 5B

Post-Roman

This period is represented by a timber-lined pit (64), a plank from which has been tree-ring dated to the late eighth/early ninth century (p 79 above).

- 64 Pit (fill 60). The sample contained mainly coarse, organic fragments, some of which had very clean-cut ends, suggesting horse dung. The fine fraction consisted almost entirely of bran fragments and remains of fly puparia. The bran consisted of a mixture of wheat/rye, barley and oats, with a few fragments of *Linum usitatissimum* (flax).
Interestingly, the seeds did not corroborate the general evidence for cereals or even grassland. Very few grass caryopses were recorded (those that were belonged to Körber-Grohne's (1964) classes IIB and IIC. Bracken frond fragments were common, perhaps from bedding. The most abundant remains were from arable weeds of the damper, more nutrient-enriched type (*Chenopodium* species and *Polygonum* species) and from food plants (apple pips, rose hips and sloe/damson stones).
CAL A SS 6 Period: Post-Roman

- 64 Pit (fill 60.1). Sample predominantly fruit stones, sloes, damsons etc, rose hips, apple pips and hazelnut fragments. Moderate amounts of bran were recorded, suggesting presence of faecal material. Flax is present. A moderate variety of other taxa from wet ground, hay grassland and disturbed ground were recorded. Carbonized cereal grains present were mainly hexaploid wheat but included oats and hulled barley. Two of the wheat grains were quite broad and possibly referable to bread wheat. No chaff was seen.

The botanical assemblage suggests a generally rather more heterogeneous mixture than the above sample, although this may be, in part, a reflection of it being a bulk rather than a specialist sample.
CAL A BS 2 Period: Post-Roman

- 64 Pit (fill 60.2). This fill was wholly organic with amorphous organic fragments, monocots, wood, bryophytes and legume flowers abundant. Some bran and quite a few insect and fly puparia fragments were present.

The specialist sample contained mainly blackberry pips, radish pod fragments, and seeds of *Chenopodium* and nipplewort (*Lapsana communis*); quite a few other taxa were represented but none in any abundance.

The bulk sample contained lots of apple/pear pips, rose hip seeds, flax and elderberry seeds. Moderate numbers of carbonized hexaploid wheat grains were recorded. Two of the wheat grains were probably bread wheat; the remainder could have been spelt or a long, thin bread wheat. No chaff was recovered. The pit was obviously in receipt of some food debris, although not necessarily all faecal.

Prunus stones were again abundant; the *Prunus* stones from 60.1 and 60.2 were measured and, following comparison with modern reference material, indicate that a large proportion are referable to *Prunus spinosa*, the sloe. There are, however, a significant number which are closer to bullace or plum/damsons themselves - the cultivated *Prunus domestica*. They are between the general shapes for the two modern populations analysed but they do fall in a narrow size and shape range. They are therefore considered to have been from one population themselves. The fact that few such stones were recovered from Roman levels suggests that this population was not readily available at that time and that, therefore, there was some deliberate breeding or importation of fruit with these larger stones.

Burnt fucoid seaweed fragments were recorded in quantity; what these had been used for is uncertain. The fucoids are the brown seaweeds of rocky coasts and range from high up on the strand line to below the low water mark. They are abundant in archaeological deposits from the north of Scotland (Huntley forthcoming), where they are considered to have been used as a field manure and in the formation of so-called 'lazy beds'. Their ash is also used in the manufacture of soap (Fenton 1978). Although the quantities recovered in this particular context are insufficient to suggest either of these activities, their presence does suggest the deliberate use of seaweed somewhere close by.

A pollen sample confirmed the presence of faecal material by the large number of *Trichuris* eggs, none retaining their polar plugs. The pollen spectrum was dominated by Gramineae pollen, more than half of which was referable to cereals. Most was *Hordeum*-type (which could also relate to some of the larger wild grasses), but 14, from a Gramineae total of 124, were *Triticum/Avena* type. The other pollen taxa indicated a mixed grassland assemblage with representatives of both pasture and wet meadow communities. Two pollen grains were tentatively referred to *Linum*-type. Few tree and shrub pollen types were recorded; of these, *Salix* was most abundant.

See p 140 and Table 28 below for the fish remains from this pit.
CAL A SS 7 and BS 3 Period: Post-Roman

Old Grapes Lane Trenches A, B, C and J

The plant remains

Samples from some 77 contexts in OGL A, ten in OGL B and one in OGL C, and wood samples from all the trenches, were examined.

Table 6 shows the percentage occurrences of taxa within the ecological categories for OGL A. Some differences can be discerned between the periods. Exotic material, perhaps the best indicator of human activity, is best represented in Periods 5, 6 and 7, but is relatively low in Periods 1, 8 and 13. Most of the ecological categories show a similar pattern, with higher occurrences in the middle phases. This may suggest generally more activity during these times or may indicate better conditions of preservation.

Carbonized remains are scarce in Periods 1 and 3, but they are a little more abundant in Period 4, and during Periods 5 and 7 there are large numbers of items in a few contexts. They are generally less abundant in later periods. The same is true for the waterlogged taxa. Although there are few distinct differences between the periods, at the context level there are indications of disposal of specific cereal processing debris. The majority of contexts show heterogeneous contents in terms of their botanical assemblages, and relatively few contexts demonstrate a specific use of plant material or the dominance of particular taxa, a factor which might suggest local vegetation types.

Table 7 summarizes the percentage occurrences of ecological categories in three periods at OGL B. Values for carbonized remains are low throughout, and with the excep-

Table 6
OGL A: percentage occurrence of ecological categories by period

Category	1	3	4	5	5-6	6	7	7-8	8	13	No of taxa
Carbonized	5	4	10	18	11	7	12	23	-	4	44
Waterlogged arable	17	15	8	13	26	23	19	17	8	19	23
exotic	-	13	11	38	7	17	19	29	7	9	7
grassland	4	5	5	8	4	21	28	17	25	12	12
ruderals	12	9	8	18	10	19	25	15	13	16	20
wet ground	15	9	9	12	30	24	39	22	17	10	23
unclassified	13	10	10	16	20	18	23	17	15	10	23
Number of samples	2	9	5	3	2	26	3	1	2	24	

tion of deposit 290, Period 3, this is not considered to reflect only the nature of the original samples, since some of the specialist samples contain as much as the bulk. Overall it seems that organic material did not accumulate to any significance on this site. This may suggest that the area was in regular use for purposes other than dumping.

Although the OGL A and B sites cover a considerably larger area than any of the other sites considered in this volume, they still show a remarkably similar pattern to the other trenches. They appear to have been in receipt of varying amounts of general organic material, some being interpreted as flooring/bedding waste with hay and possibly dung, although there are also indications of local cultivation. Some contexts are clearly within buildings. The pits do not on the whole seem to have been filled with faecal material, although it is clearly present, and there are some concentrations which have been interpreted as evidence for manuring.

The wood

A total of 803 pieces of wood were identified from the four OGL sites. The summary data are presented in Table 8; capital

letters indicate an amalgamation of data from either more than one site or wood species, eg TOTAL ALNUS indicates the total for *Alnus* and cf *Alnus*, and BOLES indicates the sum of that type from more than one site. Where the site is specified, only material of that type was recovered from that site.

Woodworking is clearly reflected as an important aspect of Old Grapes Lane. As with all the sites in this volume, oak is the most commonly recorded species, although at nearly 70% of the material it is more common than on the other sites. Interestingly, nearly 30% of the oak is roundwood, the remainder being chips and other woodworking offcuts or debris. Alder represents only 12% of the total and is mainly roundwood. Birch and hazel account for a further 10% of the roundwood. The amount of oak among the roundwood is unusual for Carlisle, where alder is usually the main, if not the only, species used, although during the second century at the Annetwell Street fort oak did in fact become more commonly used as small roundwood (Huntley 1989b).

Conifers are very rarely present, with silver fir occurring in the form of staves/planks and chips; these probably reflect the re-use of barrels, and are further evidence for woodworking in the vicinity.

Table 7
OGL B: percentage occurrence of ecological categories by period

Category	3	4	5	No of taxa
Carbonized	63	-	11	8
Waterlogged arable	60	25	27	10
exotic	25	-	11	4
grassland	13	25	29	8
ruderals	57	21	37	7
woodland	38	6	20	8
wet ground	46	19	45	13
unclassified	63	25	39	8
Number of samples	1	2	7	

Table 8
OGL A, B, C and J: summary of wood data by species and wood type

Site	Wood type	<i>Betula/Corylus/Alnus</i>	<i>Betula</i>	<i>cf</i> <i>Carpinus</i>	<i>Crataegus-type</i>	<i>Pomoideae</i>	TOTAL <i>ALNUS</i>	TOTAL <i>SALIX</i>	TOTAL <i>SALIX/PRUNUS</i>	TOTAL <i>CORYLUS</i>	TOTAL <i>QUERCUS</i>	TOTAL <i>PRUNUS</i>	<i>Abies</i>	<i>Pinus</i>	<i>Conifer</i>	<i>Calluna</i>	Unidentified
OGL B	?Even wood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
OGL B	Bark	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BLOCK	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-	-
OGL A	Board	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	BOLES	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-
OGL A	Charcoal frag	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CHIPS	-	-	-	-	-	8	-	-	-	173	-	1	-	1	-	-
	CHUNKS	-	2	-	-	-	5	-	-	1	42	-	-	-	-	-	-
OGL J	Cladding flakes	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
OGL B	Dowel	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	DRIED OUT	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	9
	FLAKES/FRAGS	-	-	-	-	-	1	-	-	-	68	-	-	1	-	-	17
	PEGS	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-
	PLANKS	-	-	-	-	-	-	-	-	-	26	-	1	-	-	-	-
	POSTS	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
OGL B	Powder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
OGL B	Rim	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	ROTTEN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
	ROUNDWOOD	2	33	1	1	1	81	13	11	37	162	3	-	-	-	1	6
	SQUARE	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-
	STAKE	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
OGL A	Stave	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
OGL B	Trunk	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	WEDGE	-	-	-	-	-	1	-	-	-	17	-	1	-	-	-	-
Totals		5	36	1	1	1	97	15	12	38	545	3	4	1	1	1	42

Old Grapes Lane Trench A

See also p 132.
OGL A SS 67 and BS 22 Period: 1C

Period 1

Period 1A comprises a depression (1191), possibly a tree-hole, in the natural subsoil. A buried ground surface (1159, Period 1C) survived in many places.

- 1191 Fill of depression. The sample was extremely minerogenic and contained few seeds and no other organic material.

See also p 132.

OGL A SS 70

Period: 1A

- 1159 Old ground surface. The matrix was a mixture of charcoal, wood and fine organic fragments, but only 50ml remained after sieving. Seeds were abundant, with large numbers of *Ranunculus sceleratus*, *Potentilla* and sedges. Some weeds and ruderals were represented but not in any abundance. Carbonized hulled barley grains were recorded, indicating that humans were active somewhere nearby.

There is no strong evidence that this was a cultivated soil, rather it would appear to have been a rather wet grassland.

Period 2

A round-house was represented by a slot with stakes, stake-holes and cobbles. The wood collected from it was in a very poor state of preservation. Only two pieces were identifiable, both of which were alder roundwood, one being 83mm in diameter. Unfortunately its age could not be determined since, as with many alder pieces, the centre was rotten. It was, nonetheless, a moderately substantial post.

Period 3

This period includes various pits (1118, 1141 and 1142), postholes (including 1120, 1129 and 1137) and soil spreads.

- 1118** Pit (fill 1116). The botanical assemblage was dominated by seeds of blackberry, chickweed and buttercups. Other taxa are represented by one or two seeds only, and are largely indicative of weeds and ruderals. Although some food debris may have been incorporated into this layer, its main content seems to have been soil.

See also p 132.

OGL A SS 59

Period: 3

- 1118** Pit (fill 1117). More organic matrix than 1116 above, including moderate amounts of monocots, but also firm, silty lumps which would not break up even with thorough washing in warm water. As well as blackberry, chickweed and buttercup seeds, sedge seeds were also abundant. Grape pips were recorded, as well as a few carbonized cereal grains. These categories were partially mineralized, suggesting that some faecal material was present; no bran fragments were recorded, however.

Overall the assemblage is rather similar to that of fill 1116 but with slightly more evidence for possible flooring material (sedges).

See also pp 132-3.

OGL A SS 60 and BS 19

Period: 3

- 1118** Pit (fill 1126). Matrix was predominantly mineral material, but the fine fraction was almost entirely bran with many tiny fragments of corncockle seeds. The bran was mostly of wheat/rye type but with a small number of barley pieces. Grape pips were particularly abundant and these showed evidence for both mineralization and partial burning. Sedges were abundant but other 'wild' taxa were rare. The seed assemblage was dominated by the remains of food - blackberries, figs, apple/pear, olive, sloes, cherry, coriander, and possibly rose hips (but seeds only present). This was clearly a layer composed of faecal material and food debris almost to the exclusion of anything else.

Wood identified was mainly oak offcuts, but also artefacts - the ends of possible pegs, and plank fragments. Two pieces of hazel roundwood were also recovered.

See also p 133.

OGL A SS 62 and BS 20

Period: 3

The botanical evidence from pit 1118 indicates that it was used as a cess pit and for disposal of food refuse, but that soil has also been thrown into it. This may have been on top of the faecal material in an effort to consolidate the layers and/or reduce odour.

- 1120** Posthole (fill 1119). Seeds were sparse, suggesting only ruderals and weeds.

See also p 133.

OGL A SS 61

Period: 3

- 1129** Posthole (fill 1128). A silty, mineral sample; seeds virtually absent.

See also p 133.

OGL A SS 63

Period: 3

- 1137** Posthole (fill 1136). Matrix predominantly minerogenic, although with moderate amounts of wood fragments. Seeds varied but in low numbers only, representing the usual suite of weeds and ruderals. Sedge seeds were moderately abundant.

See also p 133.

OGL A SS 65

Period: 3

- 1141** Pit (fill 1145). Charcoal flot. Waterlogged seeds infrequent, representing the usual ruderals and weeds. Moderate numbers of carbonized hulled barley grains were recovered, along with a few wheat grains. They are considered to reflect processed grain, given the lack of weeds and chaff.

OGL A BS 21

Period: 3

- 1141** Pit (fill 1147). Charcoal-rich fill with no seeds. It would seem that spent fuel was simply dumped into the pit, whether from a domestic or industrial/craft fire is unclear. If it had been domestic, a few burnt cereal grains might have been expected, although not necessarily.

See also p 133.

OGL A SS 64

Period: 3

- 1142** Pit (fill 1146). Charcoal- and sand-rich fill with few seeds, giving no indication of the function of the pit.

See also p 133.

OGL A SS 66

Period: 3

Period 4

This period includes a ditch/gulley (1222) and a hearth or bowl furnace (1174) with associated channel or flue (1149).

- 1149** Fill of channel or flue associated with hearth 1174. Matrix mainly wood fragments, including chunks of wood and twigs or small branches. The flot was more or less pure charcoal with few waterlogged seeds; these were dominated by buttercups, chickweeds, knotgrass and small grasses, with bracken frond fragments, sedges, nettles and sheep's sorrel common. Food remains were rare. This assemblage suggests the disposal of bedding material on to a cultivated soil. Carbonized material was present in the form of barley and wheat grains, lentils and brome-grass seeds. The insect assemblage contained a hint of a house element (Kenward, pers comm).

The twigs and wood debris are perhaps not to be expected upon an actively cultivated soil, although once composted they would form a useful improver of soil structure. The wood was almost entirely roundwood fragments, but with a few oak and silver fir offcuts, the latter possibly representing re-working of barrel stave material. The roundwood was mainly hazel, with a few pieces of birch, alder, willow and *Prunus*. There was little evidence for perennial weeds, and this suggests that the soil had remained open.

See also p 133.

OGL A SS 68 and BS 23

Period: 4

- 1174.1** Hearth. Moderate numbers of carbonized barley and wheat grains, two being sufficiently broad and blunt to suggest that they were bread wheat. Two were comparable with rye.

The most interesting record for this context is the 94 burnt lentils recovered. Such a quantity is rare but does show that legumes were probably quite an important part of the Roman diet. They were presumably dropped whilst they were being cooked, suggesting that this hearth was domestic.

OGL A BS 24

Period: 4

- 1174.2** Hearth. Much charcoal, flaky pieces of oak with some iron staining. Very few carbonized remains present, included cereal grains, one spelt glume and one brome-grass only.

See also p 133.

OGL A SS 69 and BS 25

Period: 4

The two samples above show the value of scanning as much material as possible and not just taking one sample from a given context. Whilst the second sample contains no useful material, the first, with its considerable numbers of lentils, has important dietary implications.

- 1222** Ditch/gulley (fill 1220). Fill contained large numbers of wood chips and also earthworm egg cases. The waterlogged seeds were dominated by sedges, with *Potentilla* and buttercups also common. The general indication is of wet ground taxa with some ruderals and weeds, with the occasional fig pip dropped in. One grape pip was found.

OGL A BS 27

Period: 4

- 1222** Ditch/gulley (fill 1221). Coarse organic material and monocots with lumps of silty clay. The monocots were in the form of stems and nodes, possibly from *Equisetum* species (horsetails). However, only 20ml remained following sieving, and the bulk of the fill had therefore been fine silt. Seeds were extremely rare, perhaps indicating that the ditch/gulley was regularly cleaned out.

See also p 133.

OGL A SS 72 and BS28

Period: 4

Periods 5 and 5-6

Spreads of soil (including 1006, 1026, 1044) accumulated across the whole site; some of the deposits (1046, 1103) may extend into the early part of Period 6.

- 1006** Soil deposit. Matrix more or less all monocots but with some silt and clay lumps, and considerable numbers of earthworm egg cases. Chickweed and *Polygonum* seeds dominated the natural assemblage, while blackberry, hazelnut shell fragments and fig pips dominated

the economic and exotic group. Other members of the latter group included an olive pit and quite a few *Prunus* stones, including sloe, damson/bullace and cherry. Many of these had been nibbled by a small mammal. Moderate numbers of henbane seeds were present, and these may indicate a patch of ground with longer-term disuse. Sedges and associated plants were present although not particularly abundant.

There were large numbers of carbonized items, with hulled barley and hexaploid wheat being most common. One of the wheat grains was clearly spelt which had germinated, and several others remained in the spikelet. Few glume bases were recorded, however. Interestingly, rather more weed seeds were found in this group of burnt material. They were of the expected taxa from cultivated fields, with persicaria, buttercups, docks, cleavers and brome-grass. It suggests that the cereal crop may not have been as clean as in other contexts, possibly suggesting that it was at an earlier stage in processing than elsewhere.

The botanical assemblage suggests that the deposit consists of an active and cultivated soil (earthworms and weed seeds), but that some quantity of food debris had been dumped on it or incorporated into it. No bran fragments were noted. Given the large numbers of fruit remains, this is unusual; it may reflect a highly active soil in which the delicate bran fragments had decomposed. The carbonized material is considered to have been disposed of here, possibly with other food debris.

See also p 133.

OGL A SS 54 and BS 17 Period: 5

- 1026** Soil deposit; overlies 1006 (above). Moderate amounts of mixed organic material and numerous earthworm egg cases present. The botanical assemblage was, overall, more sparse than that for 1006. Chickweed, small grasses, nettles and fig pips were the only abundant taxa represented, with a selection of other weed seeds in low numbers only. A cultivated soil is indicated, but with perhaps less domestic rubbish. No indications of longer-term perennials nor of particularly wet ground taxa.

See also pp 133-4.

OGL A SS 52 Period: 5

- 1044** Soil deposit. It contained moderate amounts of wood fragments and a general mix of the other organic matrix categories. The taxa indicate weeds and ruderals but little food debris. There is definite indication of longer-term waste ground with moderate numbers of dock seeds, although cultivated soil is perhaps the most likely interpretation, with large numbers of chickweed and *Polygonum* seeds.

See also p 134.

OGL A SS 55 Period: 5

The three samples above are all considered to be related, reflecting a gradual build-up of soil. One of the samples indicates an active and cultivated soil (1026), another is similar but with the addition of quantities of food debris (1006), whilst the third (1044) suggests some time during which only longer-term ruderals flourished.

- 1046** Deposit. The flot consisted primarily of wood and charcoal fragments. The wood included buds of oak and moderate numbers of twigs (species not identified). *Chenopodium* species flowers were abundant, and the seeds of this taxon were dominant. More than one species was present but could not be further identified. Moderate numbers of sloe stones and hazelnut fragments were present. The other taxa represented were a broad spectrum suite with members of ruderals, weeds and wet ground. None of them occurred in any number.

Carbonized hulled barley and hexaploid wheat were present in moderate numbers. Some of the wheat was still in the form of spikelets and was clearly spelt. Spelt glumes were also recovered. Brome-grass seeds were the only burnt weed represented. It would seem that, as in many deposits, the burnt material represents clean grain and a few unprocessed spelt spikelets.

The waterlogged assemblage indicates cultivation, but it is surprising that chickweed is more or less absent, as are *Polygonum* species. It may be that it represents a rather restricted area which had just been overgrown with the *Chenopodium* species.

OGL A BS 16 Period: 5-6

- 1103** Deposit. Matrix predominantly mineral with small amounts of organic material. Seeds present in low numbers, except for chickweed and bristle club-rush (*Isolepis setaceus*) which were particularly abundant. Although the former clearly indicates cultivation, the latter is a plant of open or semi-closed wet ground such as found at the sides of ditches, in fens, marshes and dune-slacks. Its abundance here would suggest some compaction and stagnation of the soil and possibly some standing water. The one *Mentha*-type seed could also have been from a plant such as water-mint, suitable for similar wet places. The same applies to the two water buttercups represented, *Ranunculus sceleratus* and *R. flammula*. The other taxa suggest weeds.

It would appear that this soil, although possibly poorly cultivated at least in the recent past, was suffering from some compaction, and there was also the possibility of some standing water and rather stagnant conditions.

See also p 134.

OGL A SS 58

Period: 5-6

These two deposits confirm the archaeology in indicating an area that was not actively cultivated to any degree, but that soil was present and/or developing.

Period 6

This was a period of intensive activity. At the western end a ditch (1029) ran east-west; cutting the upcast from 1029 was a broad, shallow slot of uncertain purpose (1005). A number of lenses (including 799) overlay the fill of 1029. Ultimately a laminated organic deposit (737) containing patches of clay and cobbles covered the whole western end of the site.

The western end was separated from the eastern end by north-south drains and fence/hedge lines, including drain 751, drain/gulley 793 and fence/hedge 723 set in a bank (718). To the east of this bank, and probably related to it, were shallow scoops (732).

Part of Building 674 lay at the eastern end of the trench. Wood samples from the south wall (652) proved to be all oak roundwood. Within the building there was a succession of deposits and floors (including 658, 722, 810, 822 and 860); internal features included a hearth (858) and a small timber-lined pit (698). The status of the area beyond the south wall is uncertain; deposits here included 817 and 878. West of the building was a cobbled surface, above which lay silty loams and possible surfaces (707, 730/31 and 777).

- 658** Accumulation on floor within Building 674. The sample was almost entirely made up of monocot fragments, and included large numbers of bryophytes and legume flowers. Vast quantities of buttercups, 4mm grass caryopses, sedges, *Potentilla* species and *Leontodon* species were recorded. Plants such as kingcups (*Caltha palustris*), meadowsweet and yellow rattle suggest hay from wet meadows, whilst *Plantago lanceolata*, *Linum catharticum* and *Prunella vulgaris* suggest material from drier meadows. Large numbers of chickweed seeds are present as usual. Although the small grass caryopses are from Körber-Grohne's class IIB, the *Festuca* and *Agrostis* group, many are greater than 4mm in length and are probably remnants of cereals.

The mixture of taxa suggests cereal debris, possibly in the form of straw, and hay from a variety of situations. This building probably housed animals. If it had been simply a store for vegetation such a mixture of types would not be expected. Bracken frond fragments were also moderately abundant, and these may have formed bedding with the straw.

Wood included oak chips and offcuts, and roundwood fragments of oak, hazel, alder, birch and willow/poplar. The offcuts could be from local woodworking activities. The roundwood may have been from coarse flooring material or, if the room was used for housing animals, it could perhaps be the remains of leaf fodder. The pieces were generally too small to be worth measuring and were

considered to be twigs etc in some cases.

See also p 134.

OGL A SS 20 and BS 3 Period: 6

- 698 Small timber-lined pit within Building 674 (upper fill 722). The sample was predominantly fine mineral material, with sand/gravel and monocot fragments present in almost equal proportions. The monocots were not cereals. Sedge seeds were most abundant, with moderate amounts of *Prunella*, buttercups and purging flax. Other species indicate species-rich grassland, of the kind found at the edges of fens for example. Bracken fragments were quite common and a few coriander seeds were recorded.

In general this assemblage suggests a more or less pure fen grassland vegetation and could represent flooring material deposited in this pit. However, it could also incorporate animal feed, although not from a classic hay meadow. The general lack of other vegetation types suggests that this is a clean, non-dung-containing material, and hence the pit may have formed a manger or other feed storage area.

See also p 134.

OGL A SS 25 Period: 6

- 698 Small timber-lined pit within Building 674 (lower fill 822). Predominantly charcoal matrix. The seeds present were all waterlogged, and there was a small amount of amorphous, coarse organic material. Grasses dominated the seeds, with some sedges, plantains and other grassland taxa represented.

Although the numbers of seeds are generally low, there are hints that hay may have been stored here. In this case the hay had been cut from a slightly different community than the traditional one described elsewhere from The Lanes (LEL A 546, Period 7C, p 000 below). There is more evidence for the species-poor grassland at the edges of fens and mires which contains *Stellaria graminea*, perhaps with slightly more acidic soils, rather than the herb-rich and sedge-rich fen meadows with yellow rattle etc. If the timber-lined pit was indeed a manger, as suggested above, then this simply represents a feed material cut from a slightly different community.

See also p 134.

OGL A SS 41 Period: 6

- 707 Soil deposit, west of Building 674, containing mainly oak roundwood. Sedges and weeds of cultivation dominated the assemblage. It may have been a cultivated soil, although there is no indication of what was being grown in it. Nettles and buttercups were common, indicating nutrient enrichment and perhaps slightly wet, compacted soil. Dock flower fragments abundant, possibly indicating an area of poorer cultivation or long-term fallow ground. It may reflect vegetation growing around a cultivated plot.

See also pp 134-5.

OGL A SS 30 Period: 6

- 718 Boundary bank. Large amounts of twig fragments but few tree buds. Seeds abundant and varied. Sedges and the usual ruderals and weeds were most abundant, but heather twigs were also common. Fruit stones of sloes, damsons/bullace and cherry were all recorded, and many of them had been nibbled by small mammals. *Prunus padus* (bird cherry) and *P. avium* (gean) were clearly present, as were the thorns from sloe. Fig and grape pips and coriander represent food plants, but bran was absent. Many small fragments of corncockle were recovered. Moderate numbers of carbonized barley and wheat grains were present.

The wood identified from this sample was all roundwood except for one oak chip. Oak, willow or poplar and Pomoideae (undifferentiated) were all recognized. The latter may well have been from a *Prunus* species, although it could have been hawthorn, apple or pear.

The taxa suggest ruderal communities in the vicinity and the deposition of some general food debris. The most interesting feature is the large amount of *Prunus* material. It is suggested that this is from a hedge on the bank which consisted of at least sloe, gean and bird cherry. Sloes, also known as quickthorn, form bushes and thickets reaching considerable size in time, but can also root effectively and grow fast in a relatively short time. Bird cherry is another thicket-former, and is most common where there are damp to heavy soils or along the edges of streams with marshy ground around. Gean is, however, a tree and is likely to have been here for some tens of years at least in order to be fruiting.

The feature may be a hedge laid in order to keep stock in or out of an area, using a rapidly-growing spiny plant along an older

boundary where there were perhaps already well established trees. Whether other species were also here is impossible to tell; it is unusual that no tree buds (of any species) were seen in the bulk flots. Only the single *Silene* seed could have been from plants that would have grown happily under a dense hedge, and this may very tentatively suggest that the hedge was neither very thick nor high.

The fact that many of the fruit stones have been nibbled is a further indication that the plants were growing here, the fruit dropping into the area or ditch below and providing a ready feast for mice and voles.

See also p 135.

OGL A SS 23 and BS 6 Period: 6

- 730 Possible surface, west of Building 674. Apart from nettles, few seeds were present; these included some sedges and weeds/ruderals.

See also p 135.

OGL A SS 27 Period: 6

- 730/31 Possible surface, west of Building 674. Moderate numbers of seeds, some showing signs of partial mineralization. Hazelnut fragments, fruit stones, nettles, annual nettles, sheep's sorrel and water crowfoot were all recorded in abundance, an unusual mixture, due possibly to differential preservation. Fragments of walnut were present, as well as several grape pips.

OGL A BS 8 Period: 6

- 732 Fill of scoops/depression associated with bank 718. The sample contained large amounts of wood fragments including alder and oak, and tree buds, with quantities of other organic material. Some bran, fly puparia, insect fragments and large numbers of earthworm egg cases were noted.

Vast numbers of seeds recovered. The most abundant taxa were the usual sedges, *Polygonum* species, nettles and buttercups, but there were equal numbers of dock seeds and hazelnut fragments. Unfortunately these cannot necessarily be related to the hedge, since their frequent and abundant occurrence is almost ubiquitous in The Lanes samples. Figs, coriander seeds and corncockle fragments are also plentiful. A moderate range of wet ground taxa, which are unlikely to have been growing *in situ*, were also recorded - taxa such as *Hydrocotyle vulgaris* and *Lycopus europaeus*; *Caltha palustris* could have been growing locally if the depression was suitably wet and nutrient-rich, but was probably growing with the other wet ground species elsewhere. Fruit stones were rare, only four being recorded.

Carbonized remains are particularly common. Although moderate numbers of barley and wheat grains were recovered, there are literally hundreds of spelt glume bases, and spelt spikelets. Three basal rachis fragments of spelt were found, and many brittle wheat rachis fragments (probably from spelt) and barley rachis internodes, some clearly from 6-row barley. Brome-grass seeds were common, and there were a few other burnt seeds of weeds along with burnt bracken frond fragments.

This material is clearly predominantly the remains of parching spelt spikelets in order to release the grain from the glumes. The few weeds recovered indicate relatively clean cereal, with the brome-grass obviously being a particularly difficult contaminant to remove, its seeds being very similar in size to the wheat. Whether the bracken represents the remains of fuel or tinder on the parching fire is unclear.

It is suggested that the depression was largely in receipt of rubbish, perhaps flooring material mixed with some food debris; it seems to be material from the living quarters of people, not animals. In addition, there seems to have been the general weedy ruderals growing around the site with, possibly, some remains of cultivation. Although the feature is associated with the bank, there is little evidence of this from the botanical assemblage.

See also p 135.

OGL A SS 26 and BS 9 Period: 6

- 737 Laminated organic deposit, at west end of site. Many varied seeds, with sedges, buttercups, *Prunella*, sheep's sorrel and water crowfoot abundant. Other taxa related to the wet fen meadow communities and to some ruderal vegetation. Cultivation indicators generally not that plentiful but present. The sloe stones were nearly all nibbled by small mammals. One olive pit and a few fig pips were recovered. Bran, cereals and grasses were lacking.

The mixture suggests some form of bedding or flooring material. Some food debris was obviously mixed with it, perhaps indicat-

ing foul material.

See also p 135.

OGL A SS 28 and BS 10 Period: 6

- 751 Drain (fill 750). Large number and variety of seeds recovered. Annual nettle seeds were particularly abundant, suggesting cultivation, but the other weeds of cultivation were not especially plentiful apart from buttercups, which could have been the creeping buttercup. The relative dearth of sedges and associated fen-rich grassland species may imply the absence of bedding or fodder.

Many sloe stones, with damsons/bullace and cherry, were present, along with figs in moderate amounts, apple/pear, walnut, olive, grape, coriander and burnt lentil. Bran fragments were also abundant in the fine fraction. Corncockle fragments were common, as were segments of radish pods. Moderate numbers of carbonized barley and wheat grains were recorded, but there was little chaff.

The drain seems to have been in receipt of some faecal material, with some food debris also being dumped. Otherwise the botanical assemblage suggests that there is cultivated or recently fallow/abandoned ground nearby. There are slight indications of hedge-edge communities with the presence of taxa such as *Torilis* and *Solanum dulcamara*, although this is very tentative.

See also p 135.

OGL A SS 29 and BS 11 Period: 6

- 751 Drain (fill 754). Stinging nettles, chickweed and persicaria were abundant, suggesting recent cultivation. Grasses were quite common, but sedges and other species of fen-rich meadows less so. Figs, coriander and grapes represent a food element, but fruit stones were rare.

Although there is some evidence for food debris being deposited here, there does not seem to have been the faecal component of the other sample (fill 750 above). There is stronger evidence for local and recent cultivation.

See also p 135.

OGL A SS 31 and BS 7 Period: 6

- 751 Drain (fill 803). Much wood and coarse organic material. Although pale persicaria is particularly abundant, other weeds are not so common, perhaps suggesting little in the way of cultivation. Moderate numbers of stinging nettle are present, but the most common native seed type is that of the perennial docks. Large numbers of the flowers or perianths are also present, and docks may have grown close by. Other such perennial ruderals are represented by sow thistle, thistle, hogweed, and mallow (with a whole head of seeds).

The most abundant category of plant is food in the form of fruit stones and fig and grape pips. Hazelnuts, blackberry pips, apples/pears, coriander seeds, parsley seeds and walnut shell fragments are all present, but the *Prunus* fruit stones are overwhelmingly dominant. They are nearly all from the sloe, *P. spinosa*, which may well have been growing nearby, but also present are bullace/damson, cherry, and almond, the first recorded for Carlisle. About 5% of these stones have been nibbled by small mammals, although the edges were sufficiently abraded to preclude identification of the nibblers.

In addition to the waterlogged assemblage, a large number of carbonized items were also recorded. Hulled barley and hexaploid wheat grains were most abundant, and one grain was tentatively identified as rye. Four of the wheat grains were considered to be bread wheat, and two of these had germinated, showing clear remains of a shoot. Several other wheat grains were crumpled as if immature when burnt, and a few retained remnants of the glumes and spikelet base; these were clearly spelt. A few barley rachis fragments were identified but none were definitely 6-row barley. The glume bases were attributable to spelt with their strong secondary venation, and other spelt rachis fragments were also recorded. Moderate numbers of more or less complete spelt spikelets were present. Brome-grass seeds were the usual and expected most common contaminant, otherwise one cleavers seed and one ribwort plantain seed were identified. One large legume seed was also present but was too poorly preserved to determine whether it had been a pea or a bean.

The wood fragments included oak chips and offcuts, and round-wood fragments of oak, hazel, birch and alder.

A pollen sample was prepared in order to check both for parasite eggs and for evidence of a nearby hedge which was certainly hypothesized from the excavations as well as from the numbers of nibbled sloe stones. Eggs of *Trichuris*, the whipworm, were abun-

dant and well preserved. The pollen sample was not counted as an absolute one and therefore the concentration of the eggs cannot be calculated. They simply indicate that some faecal material was present. Most retained both of their polar plugs; the measurements fell within the range of the human whipworm, *T. trichiura* (Beer 1976).

The pollen was dominated by grains of heather and hazel, with moderate amounts of alder and willow. Herbs were surprisingly low. There was no strong evidence for sloe (Rosaceae pollen was very low). Whether the hedge contained hazel is unclear because that shrub produces large amounts of wind-blown pollen and is always well represented when it is growing anywhere near the site of a sample. Heather is not particularly likely to have been growing in such a situation, although may have remained in somewhat undisturbed areas.

Overall the assemblage seems mainly to represent food debris, but faecal material is also present, as the large numbers of *Trichuris* eggs demonstrates, although the absence of bran is noteworthy. With the large numbers of earthworm egg cases indicating an active soil, it is possible that bran etc had been decomposed, leaving only the more robust seeds and larger vegetative material. The ruderals suggest a moderately uncultivated area.

See also p 135.

OGL A SS 48 and BS 14 Period: 6

- 777 Soil deposit, west of Building 674. Matrix predominantly wood, with some charcoal and bran. Nettles, docks and pale persicaria were dominant, with only sedges and fig pips of any other concentration. A range of other taxa were present but none were represented by more than two or three items.

The assemblage generally represents a longer-term abandoned ground which supports a perennial ruderal community, but with some more open patches allowing the persicaria to continue. Some faecal material, represented by small amounts of bran, may imply former manuring. Grassland and sedge material generally sparse, suggesting no significant dumping of organic waste.

See also p 135.

OGL A SS 36 Period: 6

- 793 Drain/gulley (fill 783). Seeds were few in number, with single occurrences only of many taxa. Buttercups were most abundant, along with wheat glume bases. No straw fragments were recovered and little in the way of other coarse organic material.

With relatively low numbers of seeds an interpretation is more difficult; it may be that the soil was sufficiently young that a seed bank had not developed, or that it remained close to the surface following incorporation into the archaeological record so that seeds were not preserved. There are hints of cultivation and ruderal communities.

See also pp 135-6.

OGL A SS 37 Period: 6

- 793 Drain/gulley (fill 792). Large grass or cereal caryopses were common, but the other taxa were present in very small numbers. Quite a few of the grasses were similar to *Molinia caerulea* but this could not be confirmed. Ruderals and weeds were rarely recorded, and the majority of taxa are referable to grassland or fen meadow species.

This fill may have contained some bedding or hay.

See also p 136.

OGL A SS 38 Period: 6

- 793 Drain/gulley (fill 806). Fill contained large amounts of coarse organic material as well as wood and bryophyte fragments. The bryophyte leaves were all highly fragmented with only stems surviving for the most part. There were moderate concretions of iron over the material. Sedges, bracken and wheat remains were common, although seeds were generally sparse. A few taxa from fen-rich grassland were present, but weeds and ruderals were rare. The usual suite was very poorly represented.

It is suggested that this fill was the remains of organic bedding/flooring or hay which had been dumped there.

See also p 136.

OGL A SS 39 Period: 6

- 799 Deposit overlying fill of ditch 1029. Very mixed matrix with organic remains. Seeds were abundant and varied, with some of the usual weeds and ruderals in abundance, including chickweeds and *Chenopodium* species but not *Polygonum* species, the latter being only

rarely recorded. Sedges and grasses were plentiful, as were corn-cockle seeds.

The assemblage suggests some cultivation but also some sedge-type material. Although the grasses may have been growing in the vicinity, this is less likely to have been the case with the sedges. This may represent the dumping of organic material, possibly as manure/compost. Little evidence for food debris was recorded.

See also p 136.

OGL A SS 35 Period: 6

- 810 Floor within Building 674, with a very woody matrix comprising moderate amounts of coarse, organic debris. Sedges, grasses and selfheal seeds dominated the assemblage, but few other taxa. One coriander seed represented the food element, and weeds and ruderals were almost absent.

This floor may have been used as a store for hay or bedding, but is not considered to have been lived on directly in view of the restricted ecological range of the assemblage.

See also p 136.

OGL A SS 40 Period: 6

- 817 Laminated organic deposit beyond the south wall of Building 674. The matrix consisted mainly of monocot remains, legume flowers and coarse organic material. Sedge, grass, selfheal and *Potentilla* seeds dominated the assemblage, and there were moderate amounts of yellow rattle and purging flax seeds. Other ecological categories are rare and it seems certain that this is a pure hay deposit.

See also p 136.

OGL A SS 42 and BS 13 Period: 6

- 858 Hearth within Building 674; sample containing only charcoal amongst the sand and gravel.

See also p 136.

OGL A SS 45 Period: 6

- 860 Deposit within Building 674; mostly charcoal fragments with a small amount of wood. Very few seeds were recovered and they were all from the usual suite of weeds and ruderals. The status of this deposit is uncertain, but if it was a floor, either it was kept clear of organic debris, or preservational conditions were poor in this part of the site at this time.

See also p 136.

OGL A SS 47 Period: 6

- 878 The earliest deposit beyond the south wall of Building 674; during excavation it was not clear whether it was an internal or external deposit. The matrix, which contained mainly charcoal fragments, incorporated wood shavings, presumably from the construction phase. Sedges and grasses were well represented, as was knotgrass, but the botanical assemblage was dominated by seeds and perianths of docks, *Rumex obtusifolius* and *R. longifolius*. These are tough plants in terms of strength of stems, and it is unusual to find such concentrations in internal deposits. It seems that someone may have cut them with the sedges and grasses to lay on the floors. Whether this was deliberate flooring material or put there for future use elsewhere is unclear.

On the face of it it seems more likely that the deposit was external, and it may be that the area lay unused for some considerable time once construction was completed.

See also p 136.

OGL A SS 46 Period: 6

- 1005 Slot (fill 1002), west end of the site. Highly organic matter consisting mainly of monocot remains. Many were clearly straw fragments, and there were numerous calyces, possibly from composites. Large fragments of bran were identified. Although the sample was highly organic, the numbers of seeds were rather low, with only chickweed, annual nettles and buttercups in any abundance. Wheat glume bases were plentiful and obviously relate to the straw of the matrix. Sedges and small grasses were quite common, as were other taxa representing hay vegetation. There were some ruderals and weeds but only in low numbers. Exotics and food plants are more or less absent.

The deposit seems to be fairly clearly straw and hay, and is probably spent animal bedding.

See also p 136.

OGL A SS 50 Period: 6

- 1005 Slot (fill 1004). Seeds were rare apart from grasses and chickweeds. The other taxa suggest both wet grassland and weeds.

See also p 136.

OGL A SS 51

Period: 6

Botanically the two samples from slot 1005 are dissimilar.

- 1029 Ditch (fill 785). Mixed matrix, with moderate amounts of organic debris, wood, charcoal and monocot fragments. Fly puparia abundant. Seeds of weeds (chickweed in particular) and ruderals were most common but never particularly abundant. Other taxa suggest a typical mixed assemblage, but with little evidence for food debris or faecal material.

See also p 136.

OGL A SS 34 Period: 6

- 1029 Ditch (fill 787). Fill very organic, with much straw. Buttercups and sedges dominant, but wheat glumes, grass caryopses of various sizes, yellow rattle seeds and other grassland taxa also abundant. Oats and brome-grass identified from the caryopses indicate good conditions of preservation. *Polygonum* species and *Chenopodium* species were present in moderate amounts, suggesting local weedy patches, but food plants were hardly represented - one coriander and a few sloe stones. Burnt grains of hexaploid wheat and hulled barley were recorded but not in any great quantity.

This deposit consists largely of straw or cereal debris and hay, and probably represents byre waste. There is a small element of probably locally-growing ruderals.

See also pp 136-7.

OGL A SS 53 and BS 15 Period: 6

Periods 7 and 7-8

Building 674 was abandoned. Extensive deposits of silts and loams (including 651 and 672, Period 7A, and 721, Period 7B) were delimited to the west by the Period 6 boundary bank which continued in use. Soil accumulations at the western end of the site (705/6, Period 7-8) continued into Period 8.

- 651 Deposit. The matrix was mixed with abundant organic remains in the form of wood, charcoal and monocot fragments. There were significant amounts of fine, amorphous organic material. Seeds were varied in numbers and taxa. Many *Potentilla* seeds, sedges and ruderals were recorded, as were numerous remains of wheat in the form of glumes, probably spelt. Heather twig fragments and bracken frond fragments abundant. Hazelnut shells common and a few sloe stones were present. Exotic taxa were rare, with the occasional grape pip and cherry stone recorded.

Carbonized material abundant, in the form of hulled barley grains, brome-grass seeds and wheat grains. Two of the latter were rather broad and blunt, and indicative of bread wheat. Chaff present but in low numbers. The carbonized remains, being large and relatively heavy, are considered likely to have been thrown on to this deposit rather than to have blown in from elsewhere.

The waterlogged material suggests the presence of roofing or bedding material in the form of heather and bracken, and this could be from demolition. That some cereal straw or similar was deposited here is clear, but there is also the suggestion of some disturbed ground with weeds/ruderals growing upon it. Docks and long-term weeds are rare, most of the species represented being annuals, suggesting cultivation or recently abandoned land.

The wood data could be interpreted to the contrary, however, because many are oak chips and offcuts. These are clearly wood-working debris and could signify a period during which building was being carried out relatively nearby, although they could, of course, have been brought here and dumped as rubbish.

See also p 137.

OGL A SS 19 and BS 2 Period: 7A

- 672 Deposit, equivalent to 651. Moderate amounts of a variety of organic materials were recorded in the matrix. Seeds were abundant, particularly sedges and buttercups, but other taxa of grassland also frequent. Nettle seeds common, but the usual suite of cultivation indicators were only rarely recorded. There was thus a lack of chickweeds, *Polygonum* species and *Chenopodium* species. This was different from the assemblage in 651.

Only *Polygonum aviculare* (knotgrass) was at all plentiful. Although this is often a weed, it can also grow happily on trampled

and compacted ground as long as there is no dense cover provided by other plants. This community is also represented by moderate amounts of seeds from *Potentilla anserina* (silverweed).

On the whole, the taxa in this sample suggest wet ground vegetation with ruderals, although longer-term communities rather than the annual-dominated ones. Some of this could, no doubt, represent deposits of waste hay/dung and, if the context was a pit, would be interpreted as such. However, the context is a spread across the site, and at least some of these plants could well have been growing here. The nettles indicate nutrient enrichment, and the trampled element suggests some usage although probably not cultivation.

The wood was the usual mixture of oak offcuts and other roundwood, with one piece of wood from either gean or bird cherry.

See also p 137.

OGL A SS 21 and BS 4 Period: 7A

- 721 Deposit. Matrix predominantly wood and twig fragments. Bryophytes and amorphous, coarse organic material were quite common. Various species of *Polygonum* dominated the seed assemblage, with large numbers of sedges. A variety of sedges were present, including *Carex panicea*, a species of damp to wet acid grassland. It is possible that sedge-rich material, for example bedding or flooring, was deposited here on ground that had been cultivated relatively recently. Apart from nettles, longer-term ruderals were uncommon.

See also p 137.

OGL A SS 24 Period: 7B

- 705/6 Deposit. Much charcoal and some wood. Grape and fig pips and hazelnut fragments were the most abundant; otherwise the taxa were sparsely represented by low numbers of seeds only. The general suite of sedges, buttercups and weeds with ruderals were present. A moderate amount of carbonized debris was recovered, in the form of hulled barley grains, hexaploid wheat grains and brome-grass seeds.

Although food debris is clearly indicated, there is no indication of bran fragments. Whilst cess material may not be represented, it is perhaps more likely that the delicate bran has not been preserved. The food remains may have been the contents of a kitchen bin which were dumped on the deposit.

See also p 137.

OGL A SS 22 and BS 5 Period: 7B-8C

Period 8

The Periods 8A and 8B metallated area and other features were covered with silts including wood shavings and twigs (459, 463, Period 8C).

- 459 Deposit, overlying 463. Mineral-rich, with only low amounts of organic debris; this may be due to poor preservation here. The seeds were disappointingly low, with only one or two occurrences of most taxa. The taxa themselves suggest grassland, ruderals and wet ground, with some weeds.

See also p 137.

OGL A SS 84 Period: 8C

- 463 Deposit. Highly minerogenic matrix with some charcoal but few other organic remains. Seeds of sedge and purging flax and *Sphagnum* leaves are the most abundant, a strange combination which does not indicate any clear interpretation for this deposit. There are few other seeds, reflecting a background assemblage.

See also p 137.

OGL A SS 85 Period: 8C

Period 13

Period 13 comprised medieval pits (including 4, 6, 8, 10, 11, 16, 20, 25), a well (1237; top fill or an overlying feature is 308), and some soil spreads (including 11).

- 4 Pit (fill 3). Matrix mainly mineral with some wood and charcoal but otherwise very little organic material. Seeds were very sparse, with single occurrences of the widespread background taxa only. Carbonized oats were present but only in low numbers.

This pit does not seem to have been in receipt of any organic rubbish.

See also p 137.

OGL A SS 1 Period: 13

- 6 Pit (fill 5.1). Matrix predominantly mineral with some charcoal, but almost no seeds.

See also p 137.

OGL A SS 7 Period: 13

- 6 Pit (fill 5.2). This layer was considerably more organic, suggesting that the lack of seeds in fill 5.1 was genuine and not a feature of poor preservation. The coarse organic material contained monocot debris, straw and grass stems, in abundance. Seeds from a wide range of taxa, predominantly sedges, grasses, buttercups, *Chenopodium* species, docks and nettles. There was thus a mixture of grass/sedge-land material and some ruderals or even a little poor cultivation. The grasses were a mixture of Körber-Grohne's IIA and IIB classes with some class I, although it was not clear whether these were A or B. Evidence of food remains was low - a few sloe/damson stones, fig pips and a raspberry pip. There were very few fragments of cereal bran in the fine fraction and therefore, at least in this layer, the fill of the pit was not mainly faecal material or food refuse.

See also p 137.

OGL A SS 8 Period: 13

- 6 Pit (fill 5.3). Mostly coarse organic material but some monocots, wood and tree buds. Considerable numbers of bran fragments present, and a selection of these were all identified as *Triticum/Secale*. Moderate numbers of corncockle seed fragments were recovered, both as moderate-sized and tiny fragments amongst the bran; it would appear that at least some had been eaten. The seeds were probably a contaminant of the grain.

The seeds present were, as usual, from a wide variety of taxa, but those from weeds were particularly abundant. The knotweeds, annual nettles and chickweed were particularly well represented, but there were also surprisingly high numbers of corn marigold. This, as well as the corncockle, is a weed of cereals on predominantly dry, sandy soils - the classic cereal weeds. They are not likely to have grown in northern England to any extent, and thus may indicate that at least some of the grain was being imported at this time. Carbonized oats and spelt were present.

See also p 137.

OGL A SS 10 Period: 13

- 6 Pit (fill 5.5). An extremely minerogenic layer with charcoal fragments. The few seeds present are representative of the background suite only.

See also p 137.

OGL A SS 13 Period: 13

- 6 Pit (fill 5.6). Silty material with wood fragments and some charcoal. Seeds were not particularly abundant compared with some of the other layers from this pit. These comprised mainly representatives of cultivated ground, chickweed, knotgrass and annual nettles. Henbane (*Hyoscyamus niger*) was particularly abundant. This may have been either one of the ruderal suite or perhaps indicative of medicinal plants, although given the lack of other ingested taxa, the ruderal indication is preferred. Henbane may well have been growing with the stinging nettles, which were also moderately common. An interesting taxon is *Euphorbia helioscopia* (sun spurge), now a weed or ruderal in lowland Britain only.

See also p 137.

OGL A SS 15 Period: 13

- 6 Pit (fill 5.7). A mixed matrix. Moss shoots (*Polytrichum* species) were common, and some of the monocots were apparently chopped, which is sometimes evidence for herbivore dung. The seeds were moderate in numbers and varied in taxa. Grassland taxa were well represented, although the traditional hay meadow plant of yellow rattle was not in evidence. Seeds of stinging nettles were abundant, as were those of knotgrass. Weed seeds, although varied, were not common.

See also p 137.

OGL A SS 14 Period: 13

- 6 Pit (fill 5.8). Minerogenic layer, with only two seeds of knotgrass.

See also p 137.

OGL A SS 17 Period: 13

- 6 Pit (fill 5.9). Minerogenic layer, with only one carbonized bromegrass seed.

See also p 138.

OGL A SS 18

Period: 13

Overall, the various layers in pit 6 suggest that it was either in use for some time, or that it was filled rapidly but with material from a variety of localities. It does not seem to have been a cess pit, although small amounts of faecal material are present in a few layers. Most of the time it seems to have been in receipt of general organic rubbish such as waste bedding, with possible evidence for herbivore dung, or in receipt of soil.

Ruderals and weeds are generally quite well represented. This could mean that the pit remained open and seeds from locally-growing plants were naturally deposited within it. The clear mineral layers may suggest some disposal of building rubble-type material, but could simply indicate that the sides of the pit were not too stable and occasionally collapsed a little.

- 8 Pit (fill 7.1). Moderate numbers of bran fragments in the fine fraction; the coarse fraction consisted mainly of wood fragments. *Chenopodium* species, persicaria, chickweed, sheep's sorrel and corn marigold were abundant. This is highly reminiscent of layer 5.3 in pit 6. There was a little further evidence for food debris, in the form of strawberry pips, a fig pip and a few blackberry pips.

See also p 138.

OGL A SS 2

Period: 13

- 8 Pit (fill 7.2). Highly mineral matrix with little wood or organic material. The range of taxa was generally similar to that of fill 7.1, although with less corn marigold, and corncockle fragments were abundant.

See also p 138.

OGL A SS 6

Period: 13

These two layers suggest the presence of ruderals and weeds, hence some cultivated ground, in the vicinity of pit 8, but some faecal material also seems to have found its way into the pit. The wood was presumably put into the pit deliberately for disposal.

- 10 Pit (fill 9). Predominantly mineral matrix. It is surprising that no bran was recovered, because otherwise the material looks similar to that expected for a cess pit. Only seeds of blackberry and nipplewort were abundant, with relatively few other taxa present. These also hint at food waste, and perhaps preservation was poor in this area.

See also p 138.

OGL A SS 3

Period: 13

- 11 Deposit. Mostly mineral material; a few carbonized spelt grains were recovered, one of which had produced a short sprout prior to being burnt.

See also p 138.

OGL A SS 4

Period: 13

- 16 Pit (fill 15.2). Mineral layer, with moderate numbers of nettle seeds but little else.

See also p 138.

OGL A SS 5

Period: 13

- 20 Pit (fill 19). Mostly mineral material but some organic remains, covered in mineral concretions. Seeds were not abundant, with the exception of nettles and *Chenopodium* species. The taxa suggest a nutrient-enriched vegetation, but whether this was growing in the area of the pit or had been in material dumped into the pit is unclear. The former explanation is perhaps more likely, as the taxa are exclusively from ruderal/weed communities with no evidence for grassland, wet ground or food debris.

See also p 138.

OGL A SS 12

Period: 13

- 25 Pit (fill 24). Minerogenic layer, with few whole seeds. Several hundreds of corncockle fragments, but little else, were found in the fine fraction, suggesting faecal material although other supporting

evidence is lacking. Despite being toxic, corncockle seeds could have been eaten in quantity in bread made from contaminated grain.

OGL A SS 9

Period: 13

- 308.2 Top fill of well 1237 or overlying feature. Matrix mainly mineral, with very few seeds.

See also p 138.

OGL A SS 80

Period: 13

- 1237.1 Well fill, uppermost spit. Minerogenic with a little coarse organic material and some charcoal, but no seeds.

See also p 138.

OGL A SS 73

Period: 13

- 1237.2 Well fill. Similar to 1237.1 but some seeds recovered, from ruderals and nettles with one fig pip and one elderberry seed.

See also p 138.

OGL A SS 74

Period: 13

- 1237.3 Well fill. This flot contained some wood and charcoal and a few fly puparia. Waterlogged seeds were not common, and represented the usual ruderal and weed taxa with some indications of wet ground but no evidence for food debris. Some carbonized cereal grains were recovered, but they were mainly too abraded to facilitate identification. Bread wheat, rye, hulled barley and oats were all clearly present, but in low numbers.

OGL A BS 31

Period: 13

- 1237.4 Well fill. Very coarse organic material but still with relatively few seeds, although considerably more than in the samples from the overlying spits (1237.1-1237.3). Grassland taxa predominated, small grass, ox-eye daisies, yarrow, buttercups, sheep's sorrel etc, indicating a dry grassland unlike the sedge-rich vegetation of earlier features. Ruderals were not that common and weeds surprisingly rare, although moderate numbers of corn marigold were present. Food debris was minimal. A few carbonized cereal grains were recovered.

This layer, at least, shows definite evidence for material having been dumped into the well. It indicates the disposal of grassland taxa which may have been in the form of hay but could also represent herbivore dung.

See also p 138.

OGL A SS 76 and BS 32

Period: 13

- 1237.5 Well fill. Large amounts of fine organic debris and some bran. Sedges as well as the small grasses were dominant, and it seems that fen-type vegetation is represented here. Indications of ruderals and weeds, and corn marigold is present although not abundant. One carbonized seed was thought to be *Panicum* (millet), which would be a new record for Carlisle, and indicate the importation of a further cereal staple. The seed was almost round with a large hollow where the embryo had been, and was reminiscent of *Danthonia decumbens* although larger and more rounded.

This layer, too, seems to have been in receipt of organic waste, perhaps a further dump of hay or dung, but originally from different habitats.

See also p 138.

OGL A SS 77 and BS 33

Period: 13

- 1237.6 Well fill. Coarse organic material, with a seed assemblage dominated by weeds such as the usual chickweeds and *Polygonum* species. Grasses were well represented, as were cereal caryopses. The dry grassland taxa were again present, with fewer representatives of fen-rich vegetation.

This layer also seems to have been hay or dung from dry grassland, plus cereal straw.

See also p 138.

OGL A SS 78 and BS 34

Period: 13

- 1237.7 Well fill, lowest level. Coarse organic material with moderate amounts of wood chips. Weeds, ruderals and dry grassland taxa were well represented, and more hay or dung seems to be indicated.

See also p 138.

OGL A SS 79 and BS 35

Period: 13

The samples from 1237.1 and 1237.2 appear to be the final filling layers of sealing material. The sample from 1237.3 suggests some small incorporation of organic rubbish. The lower levels are clearly organic rubbish which was mostly

hay/flooring/bedding-type material; the well was not used for the disposal of faecal material in any quantity.

Old Grapes Lane Trench B

Period 3

An extensive deposit of soil (including 290) contained numerous wood fragments, which may relate to the destruction of Period 2 or the construction of Building 674 in Period 4.

- 290 Deposit, mainly wood fragments. Buttercups, sheep's sorrel and knotgrass dominated the seed assemblage. *Iris pseudacorus* (yellow flag) was quite common, presumably cut with the sedges. Although weeds and ruderals are present, suggesting mainly soil, the fact that the deposit seems to consist mainly of wood fragments cannot be ignored. It may be that the soil as such has been washed away, leaving only the coarser organic material. It seems that little else in the way of hay etc was spread here.

See also pp 138-9.

OGL B SS 9 and BS 3 Period: 3

Period 4

Period 4E is represented by soil deposits and a shallow gully (229). Period 4F includes the possible collapsed wall (211) of Building 674.

- 229 Gully fill. Rich in wood fragments, with a few seeds of the usual suite, ruderals and grassland.

See also p 139.

OGL B SS 8 Period: 4E

- 211 Possible remains of wattle and cob wall. Matrix varied and mainly organic. Seeds were moderate in number and type, mostly representatives of the classic hay group. A few weed seeds were present. It is speculated that the grassland taxa represent material chopped up and mixed with clay to make the cob wall, although nothing was noted about the form of the organic debris. If it had been regularly chopped, this should have been apparent, as it has been elsewhere when animal dung was hypothesized.

See also p 139.

OGL B SS 7 Period: 4F

Period 5A

This period includes extensive soil deposits (186, 188). A well (184) cut 186.

- 184 Well fill. Flot was mainly wood fragments, and contained large numbers of seeds from sedges, hay plants and weeds. A small number of coriander and fig pips may possibly indicate the incorporation of some food debris. In general, soil and hay are indicated.

OGL B BS 1

Period: 5A

- 184.1 Well fill. Wood fragments predominated. Apart from *Ranunculus sceleratus*, seeds were sparse. The buttercup could have been growing locally in wet places at the edges of ditches or such, but could also have been brought to the site on muddy feet.

See also p 139.

OGL B SS 1 Period: 5A

- 184.2 Well fill. Monocot fragments and coarse organic debris, but with no wood. Seeds were predominantly sedges and grasses with associated grassland taxa. Ruderals and weeds were almost absent. This layer was apparently a deposit of hay or similar material, and relatively pure. It was presumably covered up in a short time and with little mixing with other layers.

See also p 139.

OGL B SS 5 Period: 5A

- 184.3 Well fill. Wood fragments and fine organic debris. Sedges and grassland taxa again predominated, and few ruderals or weeds were

present. A further layer of sedge material is indicated. The wood may represent brushwood etc thrown in.

See also p 139.

OGL B SS 6 Period: 5A

- 186 Deposit. Seeds were not particularly abundant, but a wide variety of taxa were represented, although in low numbers. Grassland taxa are the most plentiful. Weeds are rare.

At first sight this deposit would appear to have been an established layer with grassland upon it; if this is so, then it must have been of relatively long standing for so few ruderals and weeds to be represented. It could, of course, simply represent a dump of hay or dung, and not represent any local vegetation at all.

OGL B SS 2 Period: 5A

- 188 Deposit. Very few seeds. The most common plant represented was corncockle, with large numbers of seed fragments. There was some slight mineralization but otherwise no indication of faecal material.

See also p 139.

OGL B SS 4 Period: 5A

Period 5B

On the eastern side was an extensive soil deposit, 173.

- 173 Deposit. Matrix largely minerogenic, with little organic material and very few seeds. The flot contained considerable amounts of woody fragments, however, as well as a varied botanical assemblage. Sedge and fen-rich grassland predominated, along with weeds. The deposit seems to have consisted of cultivated soil but with some organic rubbish being incorporated.

See also pp 139-40.

OGL B SS 3 and BS 2 Period: 5B

Old Grapes Lane Trench C

Period 2

Considerable activity, including the construction and use of buildings, took place. Contexts include north-south slot 34, wall/fence line 10 and soil deposit 4.

- 4 Deposit. All 11 fragments of wood identified were oak offcuts. Wood only Period: 2
- 10 Wall/fence line. The wood identified was oak roundwood, probably the remains of stakes or posts. They ranged in age from 4-7 years old and in diameter from 32-61mm. Wood only Period: 2
- 34 Slot (fill 31). Matrix includes wood and charcoal fragments. Nettles and figs well represented, but few other seeds were present. These suggest high nutrient levels and food debris, possibly infiltrating the slot from elsewhere. No sample number Period: 2

Old Grapes Lane Trench J

Period Post-2

The section showed a sequence of road surfaces (including 11) and deposits (including 14).

- 11, 14 Road and deposit. A small amount of wood; all oak woodworking offcuts, with one hazel roundwood. Wood only Period: Post-2

Lewthwaite's Lane Trench A

The plant remains

Samples from 23 contexts were analysed. The samples were

from deposits, with a few pit or gully fills. To this extent Lewthwaite's Lane compares with the adjacent Old Bush Lane, in which ditch and gully fills were predominant. Table 9 presents a summary of the ecological date by period; Periods 3 and 5 have been grouped together as they produced so little material, and the number of samples from Period 8 includes an extra specialist sample taken from one context (502).

Carbonized plant remains are scattered throughout most of the samples but are only abundant in pit 651, Period 8C. The carbonized items are mainly the remains of cereal grains and chaff, with the occasional weed seed. Barley and hexaploid wheat grains are most often found; the latter is probably spelt, but specific distinction of wheat grains is difficult. The wheat chaff is mainly spelt glume bases, and these were certainly abundant in pit 651. Hazelnut fragments are sparsely scattered throughout, and one burnt lentil was recovered. Apart from pit 651, the carbonized material is typical background material for an urban site. By contrast, pit 651 is considered to have received some cereal-processing debris.

Waterlogged taxa are varied. Arable weeds are scarce generally in terms of numbers, although they occur in all phases; it is only in a few contexts that numbers become considerable. The most common are those relating to the heavier and wetter soils rather than the classic arable weeds of cereal crops. Species such as *Stellaria media* and *Urtica urens* are two good examples, and are abundant in some contexts. Various *Polygonum* species are superabundant in some contexts, and clearly these are related to cultivated soils, although ones with very weedy patches.

Exotic taxa are represented, but generally in single occurrences or very low numbers only. Seeds of dill, coriander, fig, flax, olive and grape are all present, but only coriander is in any quantity. From the quantities of coriander in dump deposit 550, Period 7A, it is possible that there were small patches of it being grown in the vicinity. There is certainly little or no evidence that faecal material was being disposed of on this site, nor that the pits present were cess pits.

Grassland taxa are only abundant in a few contexts, where

they may represent the deliberate dumping of herbage in the form of spoilt hay, dung or bedding. The mixture of species suggests a moderately calcareous community, but some of these could also be growing at the edges of well-established waste ground. This would include taxa such as *Centaurea nigra* (hardheads) and *Torilis/Chaerophyllum*. Ruderals are most abundant in terms of numbers of taxa and numbers of seeds.

There is a group of taxa which are perennials, and their presence in abundance suggests long-term waste ground. In particular these include the docks (various *Rumex* species) and hemlock (*Conium maculatum*). They are particularly abundant during Period 7, during which featureless dumps were accumulating. Woodland and scrubland taxa are not abundant, although representatives are scattered throughout the contexts. Walnut shell fragments were present, as were the ubiquitous hazelnut shells. Strawberry seeds, rose, elderberry, sloe and blackberry seeds were scattered throughout, and could have been eaten, either by humans or birds.

Taxa representative of wet ground were abundant in some contexts, and were largely indicative of sedge-rich vegetation such as that present in so-called fen meadows. These are species-rich communities with a wide variety of herbs - *Lychnis flos-cuculi*, *Hydrocotyle vulgaris*, *Filipendula ulmaria*, *Succisa pratensis*, *Iris pseudacorus* and *Stellaria graminea*. A few species are indicative of standing water (*Apium* species), and *Ranunculus sceleratus* and *R. flammula* with *Menyanthes trifoliata* also indicating more acidic conditions. Some of these may have been growing in the immediate vicinity, but since most of them will not tolerate much disturbance and still flower successfully, it is considered more likely that they were being brought into Carlisle for some specific purpose and then disposed of in convenient places. They are communities that would have provided flooring material and bedding as well as some fodder for livestock. Their concentration in limited contexts supports the idea that they are simply being disposed of at The Lanes.

Although much of the botanical material present in Lewthwaite's Lane is considered to have been deliberately

Table 9
LEL A: percentage occurrence of ecological categories by period

Category	1	2	3 + 5	6	7	8	11	21	No of taxa
Carbonized	-	10	3	4	9	13	-	-	18
Waterlogged arable	13	32	22	9	25	13	12	6	16
exotic	-	17	-	-	10	10	-	-	6
grassland	-	10	13	-	38	18	50	25	8
heathland	-	-	33	-	26	20	33	-	3
maritime	-	-	-	-	20	-	-	-	1
ruderals	-	17	7	10	27	19	33	7	15
woodland	11	36	11	6	29	13	11	-	9
wet ground	15	19	15	9	26	22	33	14	20
unclassified	9	22	32	14	55	22	50	10	11
Number of samples	1	5	2	4	5	5	1	1	

Table 10
LEL A: summary of wood data by species and wood type

Wood type	<i>Alnus</i> /cf <i>Alnus</i>	<i>Betula</i>	cf <i>Carpinus</i>	<i>Corylus</i>	<i>Fraxinus</i>	<i>Quercus</i>	<i>Salix</i> / <i>Populus</i>	<i>Taxus</i>	Unidentified
Bark	-	-	-	-	-	2	-	-	-
Block	-	-	-	-	1	21	-	1	-
Chip	1	-	-	1	-	105	-	1	1
Chunk	3	-	-	-	-	18	-	-	1
Flake	-	-	-	-	-	7	-	-	1
Offcut	-	-	-	-	-	1	-	-	-
Peg	-	-	-	-	-	1	-	-	-
Plank	-	-	-	-	-	21	-	-	-
Post	-	-	-	-	-	1	-	-	-
Roundwood	31	2	1	31	1	29	1	-	1
Wedge	-	-	-	-	-	5	-	-	-
Totals	35	2	1	32	2	211	1	2	4

dumped, there are elements of ruderals and long-term waste ground taxa that suggest an area not actively cultivated to any degree, but which probably had disturbed ground, perhaps with earlier cultivation. Neither was it an area where quantities of domestic refuse and faecal material were disposed of. Some of the rubbish was apparently industrial, but much of it was simply organic debris, perhaps the remains of flooring and bedding material, and woodworking waste.

The wood

The majority of the wood pieces identified (289) were from oak, as is the case with all of The Lanes sites examined to date. Alder and hazel were the next most common, accounting for almost 25% of the material. Other species identified included birch, ash, willow/poplar, possibly hornbeam, and yew. Five pieces were unidentifiable to species.

Table 10 clearly shows that the majority of pieces are in the form of worked remnants and scrap wood, predominantly chips. Whether these are from features under construction or from general rubbish being disposed of in a convenient under-used area is not clear.

Some 31% of the identified material was from roundwood or sections of roundwood on which the bark remained attached. This was mainly from one context (fence 581, Period 6C). The low amounts of roundwood etc reflect the nature of the site as a whole in that it is not an area in receipt of large amounts of building or demolition debris, but neither is it an area where there are substantial fences, wattling and hurdling.

Period 1

Old ground surface (642), with no traces of cultivation marks.

- 642 Old ground surface. The flit comprised peaty lumps with a little wood. Seeds were scarce, with *Potentilla* and *Ranunculus repens* the

most common. There is no strong indication whether grassland or cultivated ground predominated, and no evidence for woodland.
LEL A BS 14 Period: 1

Period 2

Period 2A comprised a spread of wood chippings (641) and a small patch of burning (647). In Period 2C spreads of silty clay loams, possibly dumps, covered the site (including 606, 636 and 638, Period 2C, and 614, which may have remained exposed into Period 4).

- 641 Deposit, from which 30 pieces of wood were identified. They were all *Quercus* and were classified mainly as plank fragments or chips. They are considered to be the waste from woodworking activities.
Wood only Period: 2A

- 647 Deposit, containing only one seed.
See also p 140.
LEL A SS 20 Period: 2A

- 606 Deposit. Flot comprised charcoal and wood fragments in equal amounts. Wood largely chunks with few twigs and roundwood. Seeds varied but not abundant. Some evidence for food plants, with remains of coriander, fig, walnut and grape. Otherwise the taxa suggested weeds and ruderals with a little grassland. Some carbonized cereal grains and chaff were recovered, suggesting limited disposal of cereal waste in this deposit.

Some 52 fragments of wood were identified, mostly chips of *Quercus*. A few consisted of moderate offcut blocks, one of which was, interestingly, *Taxus* (yew). *Alnus*, *Fraxinus* and cf *Carpinus* were all recorded as roundwood only. The wood data suggest that much of the material is woodworking waste. Although the oak is perhaps from structural work, the presence of yew suggests more craft-type or artefact activity.
LEL A BS 9 Period: 2C

- 636 Deposit. Flot contained much wood and some charcoal. The wood consisted of *Quercus* flakes and chunks and one *Corylus* chip, but nothing specifically suggesting woodworking waste.

The seeds were various but with no abundant taxa. The most common were *Polygonum aviculare*, buttercups and sedges, suggesting a mixture of cultivation weeds and sedge-grassland. There

is no strong evidence for the disposal of bedding/hay and no evidence of food plants.

LEL A BS 11

Period: 2C

- 638** Deposit. Flot contained wood, some partially burnt, and charcoal. A few puparia and insect bits were present. The seeds were from the expected sedge-grassland and weed communities. Sedge nutlets of several types were abundant, and included those from *Carex rostrata*, the bottle sedge. This requires standing water most of the time and, with seeds of *Menyanthes trifoliata* (bog bean) also being recovered, probably indicates material that had been brought in from elsewhere. Both plants will tolerate moderate amounts of nutrient enrichment and are found in the area today.

Oak chips and offcut blocks again predominated in the identified wood, but a further yew offcut was identified.

LEL A BS 12

Period: 2C

For all of these deposits there are indications of deliberate dumping of material, although this is rarely in thick layers of, for example, hay/bedding. They seem to have included some soil and some woodworking debris. The latter appears to have been mostly from structural timber work (mainly oak), but that some smaller artefact craft work could also have been represented (yew).

- 614** Deposit. Flot included some wood and charcoal. A mixture of seeds from sedge-grassland and ruderal vegetation were recovered, with fig pips and an olive stone demonstrating at least some human presence at this time. The deposit may have been cultivated since the ruderals are mainly annuals or weeds of cultivation, but few seeds from longer-term weeds were recovered.

LEL A BS 10

Period: 2C-4

Period 3

This period included a possible hearth (637).

- 637** Possible hearth. Mainly mineral material with some wood and charcoal, and almost no seeds; two burnt spelt glumes were recovered.

See also p 140.

LEL A SS 19

Period: 3

Period 5

An east-west gully (619) cut across the site.

- 619** Gully (fill 599.2). Very mixed matrix, including wood, charcoal, bryophytes and other organic debris. A range of taxa were represented, but *Apium* species and *Rumex longifolius* (northern dock) perianths were particularly abundant. The former, with the additional presence of water-flea eggs, strongly suggests that water was permanently present in the gully and possibly even flowing. The latter could well have been growing along the edge of the gully if the surrounding area was not in heavy use. The other taxa are mainly weeds and ruderals, with little or no evidence for sedge-grassland.

It is suggested that the gully fill largely represents the vegetation growing in and around the gully, and that little or no rubbish was disposed of in it.

The only wood identified consisted of oak chips and offcut blocks.

See also p 140.

LEL A SS 17

Period: 5

Period 6

The division between the northern and southern halves of the trench continued in Period 6A. On the southern side was a stake fence (605), bordering a sandy clay loam (607). Overlying 607 was a deposit with wood fragments (578, Period 6B-E), which may have remained exposed into Period 6E. In the northern half of the trench in Period 6C there was a fenced

enclosure (581) and silty spreads with wood fragments (including 570). Silts with wood (including 564, Period 6D) overlay fence 581.

- 605** Fence. The stakes were very poorly preserved. Of the eight that could be identified, seven were *Alnus* or cf *Alnus* and one was *Quercus*. Wood only

Period: 6A

- 607** Deposit. Mostly chunks of wood, with few seeds. Sedge, sheep's sorrel and *Stellaria graminea* most abundant, perhaps suggesting the edge of a sedge-rich grassland.

See also p 140.

LEL A SS 18

Period: 6A

- 578** Deposit. Flot was predominantly wood with some charcoal. The wood was generally very thin and flaky with moderate amounts of bark. There was a variety of taxa, although oak was the most common. *Alnus* chunks and *Fraxinus* offcut blocks were identified, but no roundwood was recorded. The lack of roundwood suggests that wattling was not deposited here. The general appearance of the wood is of woodworking waste.

Seeds were rare, with only the background suite represented. One carbonized lentil was recovered.

See also p 140.

LEL A SS 16 and BS 8

Period: 6B-E

- 570** Deposit, dominated by wood chips, with few seeds. The wood largely consists of chips rather than roundwood, and suggests waste

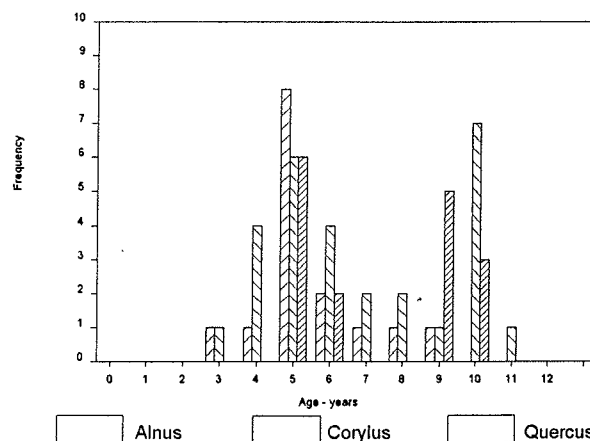


Fig 85 Age frequency plot for *Alnus*, *Corylus* and *Quercus* from fence 581, LEL A Period 6C

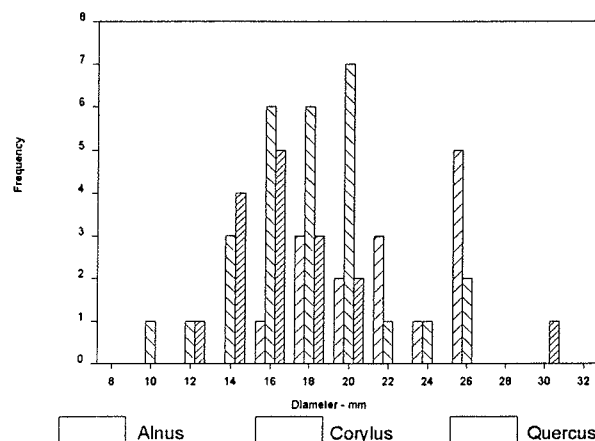


Fig 86 Diameter frequency plot for *Alnus*, *Corylus* and *Quercus* from fence 581, LEL A Period 6C

from some woodworking activities. It was probably a specific dump that was rapidly covered over, thus precluding weathering or colonization by plants.

See also p 140.

LEL A SS 15 and BS 6 Period: 6C

- 581 Fence, with wattle infill. Over 70 pieces of wood were identified. They included *Alnus*, *Corylus*, *Betula* and *Quercus*.

The age frequency plot (Fig 85) shows the three major species identified. Only one piece of *Salix/Populus* and two of *Betula* were present. Both *Corylus* and *Quercus* appear to have two peaks in age, at about five years old and about ten years old, whereas *Alnus* has one clear peak at five years old.

The diameter frequency plot (Fig 86) for the same three species shows a broad spread for *Alnus*, suggesting that it was used for the stakes as well as the wattles. This does not tie in directly with the age frequency. Alder was obviously being obtained from a variety of situations. In some of these it grew rapidly, thus producing wood of a given size in only a few years, whereas in other situations it grew less well, taking some more years to reach that size.

Oak has a rather narrow diameter range, with a peak at about 16mm, and hazel one at about 18mm. Although both of these species produced varying sizes of wood, they are from a narrow age range, and this may indicate that there was at least some management of the local woodlands. It is interesting that the species involved are oak and hazel, the two traditionally managed species from the Middle Ages onwards in Britain.

Wood only Period: 6C

- 564 Deposit, with wood fragments but few seeds.

See also p 140.

LEL A SS 12 Period: 6D

Period 7

Period 7A is characterized by substantial dump deposits (550, 553). Periods 7B and 7C are represented by further relatively featureless deposits, including silty loams 539 and 546, and turf spread 538.

- 550 Deposit. Matrix includes wood, charcoal and coarse organic material. Large numbers of seeds and a wide variety of taxa. Ruderals are most abundant, with vast numbers of dock perianths and seeds; these are from the tall, perennial docks characteristic of longer-term abandoned ground. Other taxa from this group include *Sonchus asper* (sow thistle) and *Conium maculatum* (hemlock). The other most common community represented is the nitrophilous weeds, including *Chenopodium* species and *Stellaria media*. *Urtica urens* (annual nettle) is particularly abundant. Coriander is abundant, but the only other evidence for food debris is a few fig pips.

The main indications are that the deposit was primarily a cultivated soil, but that it had probably lain abandoned/waste for some seasons. The large numbers of coriander could indicate a species which had been cultivated here.

See also pp 140-1.

LEL A SS 13 and BS 4 Period: 7A

- 553 Deposit. Mineral material and wood fragments predominant, with some charcoal. Waterlogged organic material was sparse. Seeds also sparse, with the main taxa being the expected suite of background ones. The only species in abundance were perennial docks and sheep's sorrel (*Rumex acetosa*). Interpretation is unclear but there are indications of waste ground or abandonment.

See also p 141.

LEL A SS 14 and BS 5 Period: 7A

These two deposits mark an important break in the pattern of occupation, and archaeologically they were interpreted as wide-scale dumping and certainly not slow or natural accumulations. Botanically this is not necessarily so. Given that the species represented are mainly perennial weeds, it is highly suggestive of abandonment, although of course the material could have been brought in from an area elsewhere

that had been abandoned.

- 538 Turf deposit. Matrix a mixture of sand/gravel, wood and coarse organic material. Moderate amounts of *Rhinanthus* seeds; few other taxa were recovered. They may represent damp grassland but the numbers are no more than to be expected as background.

See also p 141.

LEL A SS 9 Period: 7B

- 539 Deposit. Fine organic material with some twigs and wood and a little charcoal. Extremely low numbers of seeds recovered from the specialist sample, but the bulk sample produced considerably more. These were from what has come to be the expected suite of taxa, sedges, *Potentilla*, buttercups and some *Polygonum* species, indicating a mixture of weeds and grassland. Some numbers of *Iris pseudacorus* (yellow flag) seeds were present, suggesting that some rather wet meadow-type vegetation was cut. This would also have included such species as *Lycopus europaeus*, *Galium palustre*, and probably some of the yellow composites recorded. These would have been on slightly drier ground.

The weed seeds may have derived from plants growing on the deposit, and there may have been some standing water or muddy places in the vicinity, given the numbers of *Ranunculus flammula* achenes. However, the *Iris*/sedge plants are considered to have been brought to the deposit, and are unlikely to have been growing *in situ*.

See also p 141.

LEL A SS 8 and BS 2 Period: 7B

- 546 Deposit, with large amounts of coarse organic debris but little or no mineral material. Some of the monocot remains were clearly from cereals, but were by no means dominant. There were surprisingly few seeds in the flots and this, taken with the fact that more than half of the specialist sample remained following sieving, suggests that the deposit was largely from non-flowering material. The seeds present suggest sedge and herb-rich communities, possibly hay since quantities of yellow rattle were recovered. What is clear is that there are few seeds of weeds or ruderals, and enough taxa from wet grassland are present to suggest that this is a real lack.

The deposit is considered to represent more or less pure hay-type material, with no admixture of ruderals, weeds or faecal remains. The lack of ruderals also suggests that the deposit was rapidly covered and was not mixed with underlying material.

See also p 141.

LEL A SS 11 and BS 3 Period: 7C

Period 8

Period 8C included a large pit (651). Features in Period 8E included a gully (518), and adjacent silty loam 501, which remained exposed into 8F.

- 651 Pit (fill 530). The matrix was a mixture of wood, charcoal and, predominantly, organic material, much of which was cereal straw as evidenced by the culm nodes and spelt glume bases. A wide variety of remains in terms of seed numbers and taxa. Seeds from sedges were particularly abundant, suggesting disposal of flooring/bedding material as well as of cereal debris. All the usual taxa of wet ground, ruderals, cultivation and grassland were present in abundance, but bran and exotics were generally scarce. The pit clearly did not contain faecal material to any extent.

A little food debris was evidenced in the form of coriander seeds, dill seeds and some sloe stones. An interesting record was that for *Pastinaca sativa* (parsnip). Although native, this species does not occur in the north-west of Britain and only rarely in the north-east. Its seeds, strictly pericarps, are distinguishable from those of *Heracleum sphondylium* (hogweed), whose remains were also recovered from this context. Whether it indicates deliberate import for usage of the root as food, or the casual presence through, for example, bird droppings, has to remain in doubt since only two pericarps were recovered.

In addition to the waterlogged spelt remains, a moderate amount of charred cereal debris was also recovered. This was in the form of barley and hexaploid wheat grains, 6-row barley internodes and large quantities of spelt chaff. Brome-grass seeds were also abundant, although very few other weeds. It would seem that some cereal waste

was also deposited in this pit.

Overall, the pit appears to have acted as a general rubbish dump, with quantities of cereal waste (both waterlogged and carbonized), hay/bedding and soil all being put into it at various times.

See also p 141.

LEL A SS 7 and BS 1 Period: 8C

- 518 Gulley (upper fill 500). Mostly organic material. Seeds were not abundant apart from moderate amounts of grasses and huge amounts of *Ranunculus sceleratus* (water crowfoot). The grass caryopses were in the 2-4mm class and rather broad with very distinctive hila; they are almost certainly *Molinia caerulea*.

The deposit may have been dumps of monocot rubbish or else it may have derived from a remnant mire on the edge of the town if the gulley was an attempt to drain particularly wet ground rather than simply for carrying away water from building run-off. All of the species, without exception, could have been growing in a *Molinia*-dominated tussocky grassland of the kind often found on the edge of areas of heathland today.

See also p 141.

LEL A SS 5 Period: 8E

- 518 Gulley (lower fill 502). Two samples were taken, both very different in their constituents. Sample 2 consisted mainly of mineral material and compressed organic matter. It contained relatively few seeds but moderate amounts of bryophyte fragments, comprising a mixture of species, all of which were from relatively broad habitat tolerances. The *Grimmia/Tortella* type of moss will grow on soil and stones, whereas the *Dicranum* species and *Pleurozium* are more characteristic of woodland and grasslands respectively. A few seeds of the water crowfoot were recovered.

Sample 4, on the other hand, was dominated by bryophytes and monocot fragments, with almost no mineral material. It is much more like deposit 501 below than sample 2. The identifiable remains were dominated by *Sphagnum* leaves, with only one grass seed and one sedge nutlet.

The lack of seeds in this sample, and in deposit 501, may relate to preservational conditions, although the general nature of the matrix suggests that this is unlikely. There seems to be a genuine lack of seeds, which suggests that the lower fill of the gulley did not include much soil in which a seed bank would have built up, but rather that it represented seed-absent material which had not lain around before being buried. Such material would be expected in a gulley or drain that was regularly cleaned out, and hence the material analysed represents a relatively short period of deposition.

See also p 141.

LEL A SS 2 and SS 4 Period: 8E

Taken together, the two fills of gulley 518 indicate that, initially, the gulley was well maintained but that at some stage it fell into disuse and either became vegetated over or was deliberately filled in with rubbish. Given the restricted suite of taxa, natural colonization is considered more likely.

- 501 Deposit. Mineral material was absent. Most of the organic remains were monocot fragments and bryophyte shoots and leaves, the latter mostly from *Sphagnum*, although the ubiquitous *Hypnum cupressiforme* was moderately abundant. Only one seed, from a sedge, was recovered.

It is suggested that the material consisted largely of young, or at least non-flowering, stems and leaves of sedges and grasses, probably from an acidic area of grassland.

See also pp 141-2.

LEL A SS 3 Period: 8E-F

Overall, the various deposits from Periods 7 and 8 show some deliberate dumping of organic waste but little evidence for faecal material and food debris. They sometimes contain quantities of long-term ruderal taxa and perhaps suggest that the area was not regularly used for anything other than casual rubbish disposal. At other times they contain a relatively restricted suite of taxa, perhaps indicating an episode of dumping, which was rapidly covered over.

Period 11

Period 11, which comprised modifications to the Period 10 building (663), included a barrel-lined pit (369).

- 369 Pit (fill 365.2). Largely wood fragments with some organic material but little mineral material. The wood was mainly coniferous off-cuts and chips, suggesting woodworking debris. The offcuts may well have been from the continued building work being carried out at this stage. Some of the wood was too dried out for firm identification but may have been *Taxus*.

The seeds were indicative of damp to wet grassland with suggestions of hay/dung. There were few indications of soil or cultivation and it would seem that most of the debris was probably hay/bedding.

See also p 142.

LEL A SS 6 Period: 11

Period 21

Period 21B comprised a medieval timber building (669), and several pits (including 29).

- 29 Pit fill (15). Mainly charcoal fragments, with some sand/gravel and organic material, predominantly a fine translucent material that was not cereal bran; it may have been grass epidermis. The seed assemblage was dominated by medium-sized grass caryopses with only the occasional single occurrence of other taxa, all of which related to grassland communities.

The material may have been from herbivore dung, but not from horses which generally produce a coarsely chomped material. There was much iron staining on the charcoal, suggesting that water had lain in the pit after the organic material had been dumped in.

See also p 142.

LEL A SS 1 Period: 21B

Old Bush Lane Trench B

The plant remains

Samples from ten contexts were analysed. In general terms the material sampled was mainly from fills of negative features. There was some variety in its organic content as evidenced by the volume of material remaining after sieving. Fill 96 from ditch 111, Period 2, was extremely minerogenic, the ditch fills in general being quite minerogenic; this may reflect natural silting of ditches compared with pit fills, which were more organic.

Table 11 summarizes the botanical data in ecological terms. Carbonized material is relatively infrequent, even though bulk flots from more than half of the contexts were analysed, indicating that such material was not disposed of in any of these contexts, but more importantly that there was probably little activity in this area of Carlisle which would produce such material. People were probably not living very close to Old Bush Lane, and neither were they throwing much in the way of domestic rubbish there. This is also reflected in the general paucity of waterlogged exotic taxa, comprising a few fig pips and the occasional coriander seed.

The arable weed category is also quite poorly represented; this suggests that there was no significant cultivation in the immediate vicinity either. Ruderals are moderately well represented, with knotgrass and redshank (both *Polygonum* species) reaching abundant proportions in two contexts (ditch 111, fill 93, Period 2, and gulley 2, Period 5). They probably indicate some disturbed ground, but the former also suggests

trampling of such ground. One of these contexts (gully 2) also contains moderate amounts of perennial dock seeds, suggesting longer-term abandonment.

Sedges and other wet ground taxa, although present, are nowhere as abundant as elsewhere in The Lanes, and indeed Carlisle in general. It seems that little sedge-rich material - hay etc - was disposed of here, although one pit (95, Period 6 or later) contained large amounts of such material, cut before flowering.

In Period 2 *Potentilla* is well represented; unfortunately the species cannot be determined, although it is quite likely to have been either *P. reptans* or *P. erecta*. The former readily suggests trampled, partially open vegetation, whereas the latter is more common in acid grassland.

The wood

Table 12 presents a summary of the wood data in terms of species and the wood types present. The pattern is very similar to that from other sites in this volume, namely that oak is predominantly represented by chips and other woodworking fragments but with some roundwood present, whereas alder is the dominant roundwood species. Other hardwood taxa are generally roundwood too, whereas conifers are almost always entirely woodworking fragments. The main interest is the presence of yew, suggesting craft or artefact waste.

Period 2

This period comprised a ditch (111) and a gully (113) cut into the natural subsoil.

- 111 Ditch (fill 93). Mainly mineral matrix. The flot contained moderate amounts of wood and twig fragments, with large numbers of earthworm egg cases. Seeds were moderately abundant, with large numbers of *Potentilla* and *Polygonum aviculare* and moderate numbers of sedges, grasses and buttercups. Some sedges were clearly identified as *Carex rostrata* (the bottle sedge), a species requiring more or less persistent water. Other species indicative of wet conditions were *Iris pseudacorus* (yellow flag) and *Eleocharis* species (spikerush). Indications of muddy edges were rare.

The seeds suggest some standing water, otherwise a grassy,

ruderal community, perhaps with some scrub in the form of blackberry, whose seeds were moderately abundant. The quantities of wood and twigs could indicate that some rubbish was being disposed of, or that there were hedges/scrub in the vicinity, whose twigs etc fell into the ditch naturally.

OBL B SS 4 and BS 3 Period: 2

- 111 Ditch (fill 96). Predominantly mineral material; no seeds were recovered from this particular sample. However, the bulk flot contained large amounts of twigs with occasional insect fragments and many earthworm egg cases. A range of seeds were present, with *Chenopodium* species and *Potentilla* species dominant (both with abundant scores). Three seeds from a *Rosa* species were recorded, one of which had been nibbled by a small mammal. With blackberry seeds and an elderberry seed, there is perhaps some indication of local scrub. The other taxa were representative of the site as a whole, as are so many assemblages.

Eleven pieces of wood were analysed from the bulk sample. These were all alder roundwood and mostly about 18- to 20-year-old stems. They are probably the remains of small stakes.

OBL B SS 6 and BS 4 Period: 2

- 111 Ditch (fill 110). Silty, organic material with moderate amounts of bryophytes and some insect fragments, twigs and wood. Most of the bryophytes consisted of stems with broken leaf bases only. The few that could be identified were ubiquitous species such as *Brachythecium rutabulum*, *Eurhynchium* species and *Hypnum cupressiforme*. Seeds were not abundant, and only *Potentilla* and *Ranunculus flammula* were recovered in any quantity. The latter indicates that there was probably some water in the ditch; it is a plant that could well have been growing along the edges of such a feature.

The wood includes oak woodworking waste, chips and blocks, probably indicating building activity in the vicinity. Roundwood was also present; this was largely alder although ash and a little oak were identified. The age-diameter plot (Fig 87) shows alder and ash for fill 110. They are all considered to represent remnants of stakes. The ash grew more slowly than the alder, which is unusual in that ash is usually an extremely rapidly-growing species. There is a suggestion of two groups of ash, with one being older, although both produce material of a very similar size. Alder has apparently been chosen for size, since it has a wide age range.

OBL B SS 7 and BS 6 Period: 2

- 113 Gully fill. Matrix sand and gravel with one piece of wood; seeds were extremely rare. This may indicate that the gully was kept cleared out, or that preservation was poor at this period.

OBL B SS 9 Period: 2

In general the samples from the ditch and gully fills suggest a surrounding vegetation that was ruderal and/or wet

Table 11
OBL B: percentage occurrence of ecological categories by period

Category	2	5	6	6 or later	No of taxa
Carbonized	-	19	25	-	8
Waterlogged	22	36	12	9	11
arable	-	50	17	-	2
exotic	15	40	7	40	5
grassland	25	33	30	-	3
heathland	-	-	1	-	1
maritime	14	39	19	-	14
ruderals	25	13	12	12	8
woodland	25	50	33	15	13
wet ground	33	50	43	28	9
unclassified					
Number of samples	4	2	3	1	

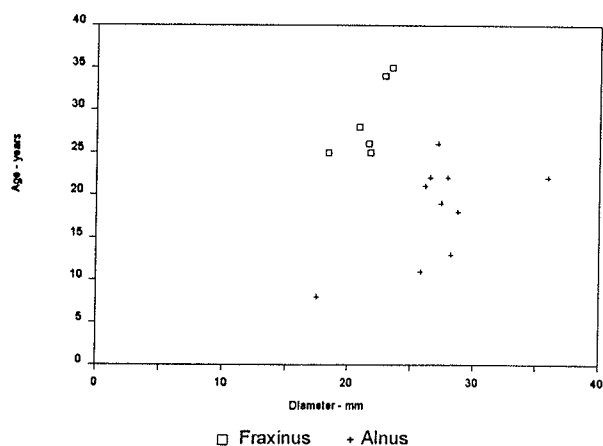


Fig 87 Age-diameter plot for ash and alder from ditch 111, OBL B Period 2

in nature, and that they probably had some standing water in them at least some of the time. There may well have been patches of scrub developing. Although the features are obviously anthropogenic, there is little other definite evidence for human occupation. It would seem that these features are on the edge of the town at this period.

Period 5

This period comprised two lines of stakes, a gulley (2) and a brown loam spread (99).

- 2 Gulley (fill 1). Largely wood debris and coarse organic material. Large numbers of earthworm egg cases, and moderate numbers of insect fragments. Small amounts of bran and fly puparial fragments were present.

The botanical assemblage was quite rich with *Polygonum* species dominant, although seeds of sedges, docks and buttercups were abundant. The moderate numbers of fig pips and coriander seeds suggest that there was some faecal material in the deposit, although this was not considered to be the main constituent. Moderate

amounts of *Apium graveolens* could either indicate standing water, or be further evidence for faecal material.

There were considerable numbers of nutlets and perianth fragments from several species of dock, including the three tall docks so characteristic of waste ground. As they are perennials and rarely flower in their first year, it is likely that the community was moderately well established and that the area had not been under intensive cultivation for a few years at least. This, of course, assumes that the seeds represent the nearby vegetation rather than having been dumped in the gulley from elsewhere. Chickweed seeds were common, indicating some more open conditions, although not necessarily cultivation.

Although some of the fill was clearly faecal and some may have been deliberately dumped, it is suggested that the seeds represent the local vegetation of longer-term waste/fallow ground.

OBL B SS 1 and BS 1 Period: 5

- 99 Deposit. The bulk flot consisted of fine fibrous organic material with bryophytes and quite a few chunks of wood offcuts, mainly conifer; some could have been *Taxus*, although having dried out, they were not clearly identifiable. The fine organic material was not bran, but there were some legume flower fragments and calyces possibly of devil's bit scabious. Some of it may have been dung, although not from horses which produce coarsely chopped material. Other taxa recorded were generally representative of ruderals and damp grassland, with sedges, buttercups and radish pod fragments most common.

OBL B BS 5 Period: 5

Period 6

Period 6 is represented by post-pits (including 4 and 6) indicating a substantial structure, and a large pit (100).

- 4 Post-pit (fill 3). The flot consisted mainly of wood with some charcoal. There were quantities of iron-staining on much of the material. Individual *Sphagnum* leaves were abundant, but there were few seeds. These were all from the general suite for the site. It is, however, suggested that the material represents packing material from around the original post, and this may have been a mixture of woodworking debris and moss, the latter packing down very firmly. OBL B SS 2 and BS 2 Period: 6
- 6 Post-pit (fill 5). Predominantly mineral; seeds were sparse. OBL B SS 3 Period: 6
- 100 Pit (fill 108). Mainly compacted silty lumps; most of the identifiable

Table 12
OBL B: summary of wood data by species and wood type

Wood type	<i>Abies</i>	<i>Alnus</i>	<i>Corylus</i>	<i>Crataegus-type</i>	<i>Fraxinus</i>	<i>Ilex</i>	<i>Pinus</i>	<i>Prunus</i>	<i>Quercus</i>	<i>Salix/Populus</i>	<i>Taxus</i>
Bark	-	-	-	-	-	-	-	-	4	-	-
Block	-	-	-	-	-	-	-	-	8	-	1
Chip	5	2	-	-	-	-	1	-	55	-	1
Chunk	-	1	-	-	-	-	-	-	7	-	-
Flake	4	1	-	-	-	-	-	-	1	-	-
Post	-	-	-	-	-	-	-	-	5	-	-
Roundwood	-	33	4	1	9	1	-	1	12	1	-
Offcut	-	-	-	-	-	-	-	-	1	-	-
Wedge	2	-	-	-	-	-	-	-	5	-	-
Totals	11	37	4	1	9	1	1	1	98	1	2

plant material was fragments of monocots or *Sphagnum* leaves. The seeds were rather scarce and from the expected suite of ruderals and wet ground taxa. One interesting occurrence was the single seed from *Bolboschoenus maritimus* (formerly *Scirpus maritimus*), the sea club-rush. It is a plant of wet muddy sites in estuaries and by the sea, such as along the Solway. Although only a single seed was recovered it does indicate that some use was probably made of the Solway marshes. Heather twigs, both burnt and waterlogged, were recovered, but not in any abundance. Carbonized grains of rye and hexaploid wheat were recovered; these probably reflect general rubbish disposal in the pit to some extent.

The fill of the pit seems to be derived from general rubbish, such as that found on floors etc, but not from faecal material, specific food debris etc.

The wood from this sample is a mixture of chips, mostly oak, and roundwood pieces from a variety of species including, interestingly, holly and poplar. Most of the roundwood is, as expected, alder. Several of the chips were also alder, perhaps material removed from stake points during shaping.

OBL B SS 8 and BS 7

Period: 6

Period 6 or later

Several features (including pit 95) may have post-dated Period 6, but their precise positions within the sequence were unclear.

- 95 Pit (fill 94). Although the bulk of the material was organic, there were only sedge seeds in any quantity. Other taxa were represented by single seeds only. Given that it was a bulk sample that was analysed, it is probable that the material really was more or less pure sedge stems and leaves. This implies cutting in the spring or very early summer before many of the plants had started to flower.

Some 41 pieces of wood were identified, and consisted mainly of chips and other woodworking waste. Although these were frequently of oak, there was a range of conifers, including *Abies* (silver fir), *Pinus* (pine) and *Taxus* (yew). The silver fir, being a native of the Mediterranean, represents imported wood. Barrels were often made of silver fir and it may be that these chips indicate the re-use of such items. The yew is not generally thought of as a structural timber, but produces an attractive wood and has been much used in the making of furniture and decorative objects.

OBL B BS 5

Period: 6 or later

CHAPTER 9 THE INSECT AND PARASITE REMAINS

by H K Kenward, E P Allison, M Dainton,
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Introduction

Unsieved soil samples ('specialist samples') were assessed by the excavator for their contextual integrity, only priority 1 material being considered worthy of biological analysis. Sub-samples of about 1kg were submitted for insect and parasite egg analysis. These were from three sites, Old Grapes Lane Trenches A and B and Lewthwaite's Lane Trench A.

A general discussion of the results and their significance can be found in the monograph (McCarthy 1994, Chapter 9).

Methodology

In the laboratory, the sub-samples were examined and their sediment type and inclusions recorded using a standard *pro-forma*. Before each sub-sample was processed for insect remains, a small amount of sediment was removed to be tested for the presence of eggs of intestinal parasites.

Insect analysis

'Test' sub-samples were processed using the methods described by Kenward *et al* (1980), in a modified form (Kenward *et al* 1986). In some cases two 'test' sub-samples were processed.

Most of the flots were examined by scan recording, now the standard method in the Environmental Archaeology Unit (Kenward 1992). In scan recording, an attempt is made to record all arthropod remains to the closest level compatible with rapid working. Adult beetles, and adults of most groups of bugs, are recorded in full and quantitatively, using a minimum number of individuals (MNI) estimate based on records of identifiable sclerites or parts thereof. Other invertebrates are generally recorded semi-quantitatively on a five-point scale (Kenward *et al* 1986); in brief, it is one, two or three individuals, or 'several' (about four to nine), or 'many' (estimated to be over nine).

Some samples were assessment-recorded (Kenward 1992). Assessment recording is designed to allow the importance of the insect remains in a sample to be determined, and to give a brief, essentially subjective, record of the abundance of the principal ecological groups represented. Some of the flots assessed in this way were then scan-recorded.

The methodological details of interpretation, that is the extraction of archaeological information, have changed over the years, but the basic approach employed is outlined by Kenward (1978), while more up-to-date accounts are given by Kenward (1988b) and Hall and Kenward (1990). These methods are applied to assemblages of adult beetles, together with most bugs.

The ecological groupings can be summarized as follows:

'outdoor' taxa, 'aquatics', damp ground/waterside taxa, plant-associated forms, moorland/heathland taxa, those associated with dead wood or moribund trees, characteristic grain pests, and 'decomposers'. The last group is subdivided into forms typically associated with relatively dry habitats, relatively moist, foul habitats, and generalists. All these ecological groups are usefully expressed as absolute numbers, percentages and concentrations. They are complementary to those used, for example, by Robinson (1981; 1983; 1991) and Hill (forthcoming).

Other parameters calculated as a matter of routine include the minimum numbers of species, and of individuals (of adult beetles and those groups of bugs included in the analysis). The latter is a minimum number estimate for the recorded fragments; the real number of individuals contributing remains is likely often to have been higher where there were many taxa represented by more than one fossil. An index of diversity (Fisher *et al* 1943) was also estimated for the whole assemblage and the 'outdoor' and decomposer components.

Important additional information comes from some other insects: fly puparia and beetle larvae, insofar as they can be identified; fleas, lice and keds; bug nymphs and scale insects; and occasionally other groups, such as honey bees. Among the non-insect arthropods, mites have much potential (see for example Schelvis 1987; 1990), but cannot as yet economically be identified as a matter of routine, while certain water flea resting eggs, ostracods and earthworm egg capsules are useful indicators.

Eggs of intestinal parasites

Analysis for the eggs of nematode gut parasites of vertebrates proceeded in two stages. In the first, a rapid semi-quantitative survey of all available samples was carried out using 'squashes' of raw sediment (Dainton 1992). For this, a small amount of sediment was homogenized in a little water, and a drop of the resulting mixture was then scanned rapidly at x60 under a transmission microscope, and the abundance of eggs recorded semi-quantitatively using a five-point scale: one; trace (estimated as two to five); few (six to ten); some (11-20); and many (probably more than 20).

In the second stage, selected samples were examined further. The technique used was essentially the modified Stoll method, based on that recommended by the Ministry of Agriculture, Fisheries and Food (1977) for examination of modern faecal samples, and employed by, for example, Kenward *et al* (1991) for archaeological material. All eggs seen were counted and measured.

Development of the 'squash' technique is in line with the trend towards rapid recording techniques for biological remains which have evolved in response to financial factors and the need for intensive surveys of sites (eg Kenward 1992; Hall

and Kenward 1990; Kenward and Hall forthcoming). Exact numbers of parasite ova are clearly unimportant, given the vagaries of deposit formation; rather, we require a rough idea of whether eggs are (apparently) absent, present in traces of uncertain origin, or numerous enough to demonstrate the presence of faeces as an important component of a deposit.

Research on The Lanes material suggests that the squash technique is perfectly adequate, and where numbers are small, it appears that the squash and modified Stoll methods are about equivalent in terms of the results obtained; eggs may be missed by either. This is not surprising bearing in mind the likely patchy distribution of eggs; indeed, examining a series of squashes may give more valid results statistically than the Stoll method. Dainton (1992) concludes that the squash method provides perfectly adequate results which are both more cost-effective and more simply interpretable than those from the modified Stoll technique:

Presentation

The results of the analyses are presented by site. Discussions of the insect and parasite remains from each site are followed by summaries of the samples, arranged by period, sub-phase where applicable, and then by numerical order of context. For each sample, the context number is listed to the left, and the specialist sample number (prefixed 'SS') is given below. Where the specialist samples were also analysed for plant and wood remains (see Chapter 8 above), page cross-references are given. Samples that were assessment-recorded only are noted; otherwise samples were scan-recorded.

Unless otherwise stated, it may be assumed that no intestinal parasite eggs were found. Where the modified Stoll method has been used, this is indicated; otherwise, only a rapid semi-quantitative survey of a 'squash' has been employed.

Full details of the insect remains and parasite eggs, together with the statistical data, are given in the technical reports prepared for Carlisle Archaeological Unit (Kenward *et al* 1992a-c), which are housed with the site archive.

Old Grapes Lane Trench A

Some 75 samples from 53 features and deposits (43 Roman and 10 medieval) were examined for insect remains and eggs of intestinal parasitic worms. All the remains were preserved by so-called 'waterlogging', ie in moist to wet, presumably anoxic, layers.

Worm eggs were generally rare or absent, with occasional records of modest numbers of *Trichurus* or *Ascaris*. They gave no good evidence for the presence of large quantities of human faeces.

Insects were present in at least small numbers in most samples of Roman date, and occasionally quite or very abundant. 'Outdoor' forms were proportionally well represented, occasionally including more aquatics than are likely to have been a part of the 'background fauna'. 'House fauna' was sometimes clearly present, but the evidence suggests that this component may have originated in stables or byres rather than in human dwellings. Certain surface deposits gave evidence,

sometimes strong, for their having formed in the open where beasts were penned. One sample included several pig lice (deposit 799, Period 6).

Overall the evidence from the invertebrates considered here suggests that the area had a strongly rural nature in the Roman period, with only a small human population and abundant domestic beasts.

Period 1

Period 1A comprises a depression (1191), possibly a tree-hole, in the natural subsoil. A buried ground surface (1159, Period 1C) survived in many places.

- 1191 The sub-sample produced only a trace flot containing a few scraps of insect cuticle, together with fragments of the large ground beetle *Harpalus rufipes*, in suspiciously good condition and probably modern.

See also p 114.

OGL A SS 70

Period: 1A

- 1159 A few scraps of unidentifiable cuticle in the trace flot, in addition to a small group of beetles. These included outdoor forms as well as some species typical of habitats created by human occupation.

No parasite eggs were found in the squashes; two *Ascaris* eggs were noted using the modified Stoll technique, however.

See also p 114.

OGL A SS 67

Period: 1C

The synanthropes indicate human settlement, but whether the remains were of prehistoric date, or were Roman insects trampled or carried down into earlier material, is uncertain.

Period 3

This period includes various pits (1118, 1141 and 1142), postholes (including 1120, 1129 and 1137), a gully (1100) and soil spreads.

- 1100 Gully. Assessment-recorded. Few insect remains, including *Oryzaephilus surinamensis* and *Sitophilus granarius*, and assorted scraps of cuticle. There was no evidence of autochthones.

OGL A SS 57

Period: 3

- 1118 Pit (fill 116). Modest numbers of insect remains, including fragments of many unidentified larvae. There were several mites. A small assemblage of beetles was present, with 48 individuals of 38 taxa. Diversity was high, and almost half of the individuals and taxa were contributed by outdoor forms, including dung beetles (four individuals of one *Aphodius*, one of a second and a single *Geotrupes*), aquatics (five individuals of four eurytopic taxa) and plant feeders (single individuals of three taxa). There were a few grain beetles.

The decomposer component was small, over a third of it consisting of forms associated with moist, foul habitats. These remains perhaps represent insects, alive and dead, present in a surface deposit used to backfill the pit. They offer no clear evidence for the inclusion of the sort of foul matter a pit may have been dug to dispose of.

Ascaris eggs were detected in the squash at 'trace' levels. The modified Stoll technique did not reveal any further eggs, however.

See also p 115.

OGL A SS 59

Period: 3

- 1118 Pit (fill 1117). Insect remains were plentiful, and there were several mites. Several fly puparia, adult flies and unidentified insect larvae were noted, together with a rather small group of beetles and a single nymph of the bug *Craspedolepta nervosa*, associated with yarrow, *Achillea millefolium* L.

The beetle assemblage was of moderately high diversity and had an appreciable outdoor component. Decomposers were relatively poorly represented, contributing considerably less than half of the individuals. There were a few grain beetles.

Assemblages of this kind are difficult to interpret, but this one may have formed in surface deposits dumped into the pit, largely as

background fauna but perhaps with a component of invaders of decomposing matter (some of which, including the fly puparia, may have become established) and a few taxa which might have exploited a disturbed open ground surface with scattered litter and perhaps a few plants.

See also p 115.

OGL A SS 60 Period: 3

- 1118 Pit (fill 1126). Assessment-recorded. Almost no identifiable insect remains.

See also p 115.

OGL A SS 62 Period: 3

- 1120 Posthole (fill 1119). The tiny flot produced a small group of insects and several mites. There were 21 individuals of 18 beetle taxa. Notable among these was a fragment of *Helophorus tuberculatus*, a terrestrial 'water beetle' (Hansen 1987, 102) which is considered a rarity in Britain at the present day (Balfour-Browne 1958, 95; Kenward 1976; Booth 1981) but which has been found in Roman archaeological deposits at Carlisle (Goodwin *et al* 1991, 23; Kenward 1984a and forthcoming) and York (Kenward 1988a; Hall and Kenward 1990).

It would not be reasonable to speculate as to the origin of this group of remains, although it resembles a random extract from Roman assemblages from the site.

See also p 115.

OGL A SS 61 Period: 3

- 1129 Posthole (fill 1128). Few insect remains. There were several fly puparia (which presumably developed from larvae able to exploit the deposit) and a total of eight beetle taxa. A group of no interpretative value.

See also p 115.

OGL A SS 63 Period: 3

- 1137 Posthole (fill 1136). Single individuals of four beetle taxa and a few other scraps of cuticle were present.

See also p 115.

OGL A SS 65 Period: 3

- 1141 Pit (fill 1147). A very small flot, consisting mostly of insect remains; there were several fly puparia, single individuals of nine beetle taxa and only a few other fragments. The flies had presumably developed in the deposit, but the beetles may have been background fauna.

One *Ascaris* egg was recorded from the squash.

See also p 115.

OGL A SS 64 Period: 3

- 1142 Pit (fill 1146). The minute flot included only traces of insect cuticle.

See also p 115.

OGL A SS 66 Period: 3

The three pits sampled were mostly rather impoverished with regard to invertebrate remains, and where insects were more numerous they suggested that the fills represented surface deposits used to backfill the pits.

Period 4

This period includes a ditch/gulley (1222), a hearth or bowl furnace (1174) with associated channel or flue (1149), and a soil spread (1097).

- 1097 Deposit. Assessment-recorded. A small group of insects, including some grain beetles. Subjectively these were considered to have been deposited where there were few autochthones.

OGL A SS 56

Period: 4

- 1149 Fill of channel or flue associated with hearth 1174. The flot was large, consisting mostly of tiny fragments of wood. A moderate number of quite well preserved beetles, together with many mites and fly puparia and several adult flies, insect larvae, spiders and Hymenoptera Parasitica. There was also a single, tentatively identified, human flea, *Pulex irritans*. Diversity of the beetle and bug assemblage was low and the outdoor component only of modest size for the present site. Decomposers, however, were quite well represented, and this component was of low diversity.

The assemblage included a very distinctive group of house fauna taxa (*sensu* Hall and Kenward 1990, 398-9), with *Cryptophagus scutellatus* (14 individuals), a second *Cryptophagus* species (10), *Xylodromus concinnus* (4) and *Lathridius minutus* group (6). This community, with some of the less numerous taxa, seems likely to have exploited somewhat damp, mouldering plant remains in a protected situation.

The presence of *Mecinus pyraister* and *Apion* and *Sitona* species offered a hint, no more, of the presence of cut vegetation, such as hay, and thus that this deposit may have included stable manure. There were a few grain pests, but only in numbers which may have had a background origin (although it might be argued that grain pests were unlikely to have been abundant as background fauna at OGL A).

See also p 115.

OGL A SS 68 Period: 4

- 1174.2 Hearth. No identifiable insect remains.

See also p 115.

OGL A SS 69 Period: 4

- 1222 Ditch/gulley (fill 1220). In addition to several mites there were small numbers of poorly-preserved beetles (10 individuals of 9 taxa).

See also p 115.

OGL A SS 71 Period: 4

- 1222 Ditch/gulley (fill 1221). The flot comprised mostly plant fibres and was not very rich in insect remains. There were only 31 adult individuals of 21 beetle taxa.

It was, however, notable for the presence of quite large numbers of abdominal apices of Elateridae larvae (wireworms). These have been identified as *Denticollis linearis*, a species also recorded in large numbers from a deposit in LEL A (gulley 518, fill 502, SS 4, p 141). There are indications in the literature that this species is able to develop in peat as well as in dead wood (Luff 1991, 228; Hansen 1966, 96). They may thus have been introduced in organic soil or peat.

An origin in cut turf or surface soil is supported by the adult beetles: there were seven individuals of a *Xantholinus* species (*X. linearis* or *gallicus*) and five of *Aphodius* ?*prodromus*. These insects seem most likely to have come from grazing-land turf. There were many mites, and several scale insects, Hymenoptera Parasitica and fly puparia. There were also fragments of black cuticle, bearing delicate, oval, opalescent scales: these seem to be remains of the chafer beetle *Hoplia philanthus*, but this requires confirmation.

See also p 115.

OGL A SS 72 Period: 4

Periods 5 and 5-6

Spreads of soil (including 1006, 1026, 1044) accumulated across the whole site; some of the deposits (1046, 1103, Period 5-6) may extend into the early part of Period 6.

- 1006 Soil deposit. Several mites, fly puparia and unidentified insect larvae, together with 44 individuals of 32 beetle taxa with a very large proportion of outdoor forms (half of the taxa and over half of the individuals). Predominant among these were two *Aphodius* species (five and three individuals). These, and much of the remaining fauna, may have been deposited in grazing-land soil (Kenward 1984b). Some grain beetles were present, suggesting scatter from buildings, unless these remains originated in the dung of animals fed spoiled grain.

See also pp 115-6.

OGL A SS 54 Period: 5

- 1026 Soil deposit; overlies 1006. Modest numbers of insects were present, including many fly puparia, several unidentified larvae and a moth cocoon. Beetles were poorly represented, with only 22 individuals of 21 taxa. Nearly half were outdoor forms, with a total of four individuals of three aquatic. Decomposers were unusually rare, making up under just a quarter of the assemblage.

A background origin for many of these remains seems possible, although at least the immatures presumably developed *in situ* or were introduced in dumped material. Possibly there was at least intermittent open water at or close to the point of deposition, to which the

aquatics were attracted; see also soil deposit 1044 below.

See also p 116.

OGL A SS 52

Period: 5

- 1044** Soil deposit. The first sub-sample was assessment-recorded; it gave a modest group of insects, with several each of *Helophorus* sp and *Ochthebius* sp, and a helminthid; there were some other outdoor forms and only a small number of decomposers and grain pests. There were many puparia. The presence of so many aquatics in a 'soil deposit' (see also 1026 above) suggests flooding, waterlogging, importation of an aquatic deposit or open water nearby - but it would be hard to establish which. The fact of organic preservation in a presumed open ground surface deposit perhaps suggests waterlogging or sudden sealing.

The second sub-sample was scan-recorded; the insect assemblage was much larger and substantially different. There were many mites, fly pupae and earthworm egg capsules, various other arthropods including *Daphnia ephippia*, and a rather large group of beetles. Almost half of the latter were outdoor forms, and aquatics were well-represented. The outdoor component was of low diversity, indicating that it was at least in part autochthonous. The dominant species was the dung beetle *Aphodius prodromus*, of which there were at least 33. Two other outdoor taxa were represented, *Ochthebius ? minimus* (7) and *Helophorus* sp (2); both are aquatics. The remaining outdoor forms may have originated, like the more abundant ones, in grazing land with some open water.

The decomposer component was moderate; nearly half were dung beetles. Taxa associated with relatively moist, foul habitats accounted for nearly two-thirds of the decomposer component, which was of low diversity. There can be little doubt that this deposit represents a surface in grazing land. Traces of house fauna were present, perhaps from nearby buildings, from scattered rubbish, or introduced in animal feed or droppings. Such may also have been the origin of the grain beetles (there were ten *Oryzaephilus surinamensis*, although no other grain pests were recorded).

These two death assemblages probably represented variations in depositional conditions in a patchy environment, perhaps with puddles or very close to open water. Insects may have been more numerous around tussocks, or corpses may have tended to become concentrated (or have been more likely to be preserved) in slightly lower areas.

See also p 116.

OGL A SS 55

Period: 5

The samples from the above 'soil deposits' together suggest grazing land with some open water.

- 1103** Deposit. Arthropod remains were quite abundant, with many mites and fly puparia and several Hymenoptera Parasitica and oligochaete (earthworm) egg capsules. There were 100 individuals of 66 bug and beetle taxa. Diversity was very high, and a third of the individuals (and two-fifths of the taxa) were outdoor forms. Grain pests were rare, and decomposers accounted for under half of the assemblage.

The most numerous species were *Megasternum obscurum* (6 individuals), *Lathridius minutus* group (5), *Cercyon analis* (4) and *Cryptolestes ferrugineus*, the first three being eurytopic decomposers, and the last a grain beetle. There were indications of the presence of some contribution from human structures, but deposition appears to have been in the open, conceivably on or near a disturbed surface with some decomposing matter and a few weeds; the foul-matter component gave a small hint that herbivore dung was present.

See also p 116.

OGL A SS 58

Period: 5-6

Period 6

This was a period of intensive activity. At the western end a ditch (1029) ran east-west; cutting the upcast from 1029 was a broad, shallow slot of uncertain purpose (1005). A number of lenses (including 799) overlay the fill of 1029. Ultimately a laminated organic deposit (737) containing patches of clay and cobbles covered the whole western end of the site.

The western end was separated from the eastern end by north-south drains and fence/hedge lines, including drain 751,

drain/gulley 793 and fence/hedge 723 set in a bank (718). To the east of this bank, and probably related to it, were shallow scoops (732).

Within Building 674 at the eastern end of the trench there was a succession of deposits and floors (including 658, 722, 810, 822, 841 and 860); internal features included a hearth (858) and a small timber-lined pit (698). The status of the area beyond the south wall is uncertain; deposits here included 817 and 878. West of the building was a cobbled surface, above which lay silty loams and possible surfaces (707, 730/31 and 777).

- 658** Accumulation on floor within Building 674. Preservation rather good; the large flot, consisting mostly of fibrous plant remains, included numerous insect fragments and seeds. There were many mites and several fly puparia, with unidentified insect larvae, adult flies, and Hymenoptera Parasitica.

A little less than half of the 70 individuals and 50 taxa were outdoor forms, and diversity was high. Decomposers were relatively poorly represented, and there was only a single grain beetle.

The assemblage can be divided into two main components: (a) a house fauna group, species likely to have occurred together within a structure (the most abundant being *Ptinus ? fur*, *Anobium punctatum* and *Lathridius minutus* group); and (b) a variety of phytophages. The latter include three *Apion* species (5 individuals), two *Sitona* species, three halictine species, and some bugs, all likely to have been imported in hay-like cut vegetation (see Hall and Kenward 1990, 400-4).

This may have been a stable, but in view of the rarity of 'stable manure' decomposers (*ibid*) it may equally have been a store, or the floor may have been sweetened with cut vegetation for human use. There were no fleas or lice to support the last hypothesis, however. The locally highly organic, reduced, nature of the sediment perhaps suggests that this was something like stable manure, in which a large breeding beetle population failed to develop for some reason, or from which most beetles emigrated.

Single *Trichuris* and *Ascaris* eggs were noted from the squash.

See also pp 116-7.

OGL A SS 20

Period: 6

- 698** Small timber-lined pit within Building 674 (upper fill 722). Only a modest group of beetles and bugs, but there were various other remains, including many mites and several Parasitica, homopteran nymphs, and fly puparia, including a rather small fragment which appeared to be of the sheep ked *Melophagus ovinus*. There were also remains of fleas, probably from at least three individuals.

None of the beetles and bugs was particularly abundant, the most numerous being *Oryzaephilus surinamensis* (5) and *Apion* sp (4). The remainder of the assemblage was varied, and of no clear origin; decomposers were rare. Subjectively, this group was a little reminiscent of some interpreted as indicating stable manure at other sites. Various other origins are possible, however; this may have been animal feed rather than manure.

See also p 117.

OGL A SS 25

Period: 6

- 698** Small timber-lined pit within Building 674 (lower fill 822). Notable for the presence of a puparium of the sheep ked *Melophagus ovinus*. There was also an unidentified louse and a flea, many mites, and various other remains. The beetle assemblage was small and of limited interpretative significance, although there was a hint of the presence of house fauna.

See also p 117.

OGL A SS 41

Period: 6

- 707** Soil deposit, west of Building 674. Insect remains quite abundant. There were many mites and unidentified insect larvae, and several fly puparia and Parasitica. A quarter of the 73 beetles and bugs were outdoor forms and diversity was high. Decomposers were poorly represented, forming a little more than a third of the assemblage. There were modest numbers of grain beetles, one of which, *Oryzaephilus surinamensis*, was the most abundant beetle present (5 individuals).

The remaining assemblage was mostly a mixture of decomposers, of no definite significance apart from the foul-matter species

Platystethus arenarius (4), and plant-feeders, with some ground beetles and aquatic.

Almost all the insects contributing to this assemblage, apart from the immatures, may have had a background origin, or have been introduced in non-decomposed organic debris, but *P. arenarius* offers a hint of the presence of foul matter.

See also p 117.

OGL A SS 30 Period: 6

- 718 Boundary bank. The rather large flot was rich in woody plant detritus. Abundant fragments of unidentified insect immatures, many mites and several fly puparia. While these presumably developed *in situ* in the deposit (or were introduced in dumped material), the 13 individuals of 13 taxa of beetles and bugs cannot be ascribed any particular origin. None, however, would be considered out of place in a typical assemblage from occupation deposits.

See also p 117.

OGL A SS 23 Period: 6

- 730 Possible surface, west of Building 674. Insects were rather rare. There were several fly puparia and unidentified larval fragments, and 25 individuals of 17 beetle and bug taxa. There were at least six *Oryzaephilus surinamensis*, but only one or two individuals of the remaining species. The record of the bug *Strophingia ericae* is worthy of note: it is a denizen of heath/moor vegetation.

These remains probably represented material accumulated in an essentially random way and offered no positive evidence of conditions at the point of deposition. The grain beetles may have been background fauna, or may possibly have originated in spoiled grain used, perhaps for animal feed, nearby.

See also p 117.

OGL A SS 27 Period: 6

- 732 Fill of scoops/depression associated with bank 718. Quite a large group of insects, including 113 individuals of 74 bug and beetle taxa. There were various other invertebrates, amongst them several mites, fly puparia and adults and Parasitica, and many unidentified immature insects. A single scale insect, *Chionaspis salicis*, was recorded.

The beetle and bug assemblage was diverse, and rich in outdoor forms. Aquatics were quite numerous (7 individuals of 3 taxa), with three *Ochthebius minimus*, generally found in weedy ponds or slow-flowing streams and rivers. These probably lived *in situ*. Decomposers were not very abundant (relative to most occupation-site assemblages), but included four species of dung beetles (3 *Aphodius* with 10 individuals and a single *Geotrupes*), and there were two *Platystethus arenarius* and *Cercyon haemorrhoidalis*.

There were thus hints that this may have been a grazing land (or stockyard) deposit, with abundant background fauna from natural and man-made habitats, and perhaps with some open water and invading decomposers.

A trace of *Trichuris* and a few *Ascaris* eggs were recorded from the squash. Using the modified Stoll technique, four *Ascaris* eggs were noted, though no *Trichuris* were seen.

See also p 117.

OGL A SS 26 Period: 6

- 737 Laminated organic deposit, at west end of site. Flot consisted mainly of yellowish plant fragments. There were several homopteran nymphs, fly puparia and adults, and unidentified insect larvae, and a very impoverished group of mostly very fragmented, but otherwise well preserved beetles and bugs. There was nothing distinctive about this assemblage.

See also pp 117-8.

OGL A SS 28 Period: 6

- 751 Drain (fill 750). Preservation was quite good; many fly puparia and unidentified insect larval fragments, several fly pupae and mites, three homopteran nymphs and an unidentified flea. There were some 70 adult beetles and bugs of 37 taxa.

This assemblage was of rather low diversity and had a fairly small proportion of outdoor forms. Grain beetles were abundant, however; there were 19 *Oryzaephilus surinamensis* and seven *Cryptolestes ferrugineus*, with two *Palorus ratzeburgi* and a single *Sitophilus granarius*. Removing this component gave a small residual assemblage (41 individuals) of higher diversity, and with a modest component of decomposers, whose significance was unclear.

Subjectively, it seems possible that the grain pests strayed from nearby, and that much of the rest of the fauna perhaps also entered

accidentally. The grain pests may, however, have come from material dumped into the ditch, with the remaining beetles having assorted origins. The fly immatures may have lived *in situ*.

See also p 118.

OGL A SS 29 Period: 6

- 751 Drain (fill 754). The small assemblage of beetles was accompanied by many unidentified larval fragments and several mites, fly puparia and adults and Parasitica. The main statistics of the beetle group were undistinguished, and its species composition gave little evidence as to ecological conditions in the surroundings.

See also p 118.

OGL A SS 31 Period: 6

- 751 Drain (fill 803). The quite large flot was rich in insect remains, including numerous fly pupae (of the order of 100), about 30 fly puparia, and many adult flies and Parasitica. There were also several mites. Other notable records were three *Trioza urticae* nymphs (this bug lives on nettles, *Urtica*), one *Craspedolepta nervosa* (found on yarrow, *Achillea millefolium* L.), and four scale insects, *Chionaspis salicis*, associated with twigs and small branches of many trees, especially *Salix*.

The substantial assemblage of beetles and adult bugs was remarkable in its similarity to that from soil deposit 777 (below). Many of the main statistics were close or identical. *Anotylus tetracarinus* (18) predominated, while there were numerous *Oryzaephilus surinamensis* and *Platystethus arenarius*. *Aphodius* dung beetles were well represented, and *Falagria* sp was present in the higher ranks in each case. This similarity extended objectively and subjectively into the lower ranks: some taxa are unusually well represented in both (eg *Phyllopertha horticola*, *Ochthebius minimus*), and where different taxa were present they appear almost to have been sampled randomly from the same population.

Assuming this not to have been a numbering error (so that the two sub-samples came from the same original sample), these two contexts must have formed under near-identical conditions, and this assemblage may indicate a stock enclosure near to buildings.

Traces of both *Ascaris* and *Trichuris* eggs were noted from the squash. Using the modified Stoll technique, single *Trichuris* and *Ascaris* eggs were seen.

See also p 118.

OGL A SS 48 Period: 6

- 777 Soil deposit, west of Building 674. A large and somewhat unusual assemblage, with 202 individuals of 94 beetle and bug taxa and assorted other remains, including many mites and fly puparia and adults, numerous fly pupae, and a human flea. Diversity of the beetles and bugs was high, and the outdoor component large. Aquatics were represented by nine individuals of four taxa, and decomposers were fairly numerous.

Much the most abundant species was *Anotylus tetracarinus* (27), a very eurytopic decomposer often abundant in dung, followed by *Platystethus arenarius* (indicative of foul matter) and the grain beetle *Oryzaephilus surinamensis* (both with 11 individuals). Other, moderately abundant, taxa were mostly eurytopes, but there were seven individuals of an *Aphodius* (perhaps *A. prodromus*) and three of *A. contaminatus*. This mixture of communities (of grain beetles and other synanthropes with rather generalized, and foul, decomposers) can be seen amongst the less abundant taxa, too.

One plausible interpretation is that this material accumulated in a stock enclosure near to buildings, with abundant dung, 'domestics' and grain pests from feed and from the structures, and a rich background fauna. There is nothing in the species list to suggest the presence of hay in this case, perhaps supporting the enclosure hypothesis rather than the possibility of dumping of stable manure.

See also p 118.

OGL A SS 36 Period: 6

- 793 Drain/gulley (fill 783). A modest number of invertebrates, only fly puparia being at all abundant, apart from the grain beetles *Oryzaephilus surinamensis* (7) and *Cryptolestes ferrugineus* (4). The remaining beetles had mixed origins but were a range of taxa typical of the present site.

See also p 118.

OGL A SS 37 Period: 6

- 793 Drain/gulley (fill 792). Two sub-samples, both assessment-recorded, supposedly taken from this sample gave such radically

different assemblages that it seems that a numbering error may have occurred, and consequently no further recording was undertaken.

See also p 118.

OGL A SS 38 Period: 6

- 793 Drain/gully (fill 806). There were several fly puparia, mites, insect larvae and Parasitica, together with two unidentified elaterid larvae. Beetles were extremely abundant, however. Almost nine-tenths of these were grain pests, with 277 *Oryzaephilus surinamensis*, 103 *Cryptolestes ferrugineus* and 14 each of *Palorus ratzeburgi* and *Sitophilus granarius*. The only other abundant taxon was *Lathridius minutus* group (30), often abundant in deposits formed in buildings. The remainder of the assemblage included other strongly synanthropic taxa (*Typhaea stercorea*, *Aglenus brunneus*, *Alphitobius diaperinus* and *Tenebrio obscurus*), giving the impression that this was a fairly pure assemblage from spoiling grain within a structure.

No parasite eggs were found in the squash; however, one *Ascaris* was noted using the modified Stoll technique.

See also p 118.

OGL A SS 39 Period: 6

- 799 Deposit overlying fill of ditch 1029. The modest assemblage of beetles and a single bug was accompanied by diverse other invertebrates, notable among which were about 50 fly puparia, many unidentified insect larvae and mites and several Parasitica. There were also several pig lice, *Haematopinus apri*, and a single *Damalinea* sp.

The beetles were dominated by grain pests. All the remaining taxa were represented by one or two individuals; they constituted a heterogeneous group of species, mostly typical of occupation deposits.

This combination of grain pests and pig lice evokes a picture of pigs feeding on spoiled grain, but restraint is necessary unless corroborative evidence is available.

See also pp 118-9.

OGL A SS 35 Period: 6

- 810 Floor within Building 674. There were several Parasitica, fly puparia and insect larvae, many mites and a single flea. Beetles and bugs were not very abundant, 53 individuals of 42 taxa being recorded. About a third of the individuals were outdoor forms. The more abundant taxa included a small group suggesting an origin in a structure (*Ptinus fur*, 5; *Anobium punctatum*, *Cryptophagus* sp and *Lathridius minutus* group, all 3), but overall this was a rather heterogeneous assemblage of uncertain origins.

See also p 119.

OGL A SS 40 Period: 6

- 817 Laminated organic deposit beyond the south wall of Building 674. There were many mites and several fly puparia and adults, and unidentified insect larvae, a single flea and three *Chionaspis salicis*. There were 46 beetle and bug taxa, with a total of 68 individuals. Diversity was quite high and almost a third of the assemblage was contributed by outdoor forms. Decomposers were rare.

The species list had echoes of that for floor 810 (above), with some differences. *Anobium punctatum*, the woodworm beetle, was the most abundant species (8 individuals), and there were five *Lathridius minutus* group, four *Oryzaephilus surinamensis* and *Apion* sp, and three *Ptinus fur*. Much of the fauna may have lived within the structure, which appears to have been clean and dry. The *Apion*, and perhaps some other taxa, may have been brought in cut vegetation. There were no more than hints of a community of decaying matter.

Perhaps this building was a store, or a stable kept well cleaned out, into whose floor only a few insect remains became trampled.

One *Trichuris* egg was noted from the squash, while no eggs were apparent using the modified Stoll technique.

See also p 119.

OGL A SS 42 Period: 6

- 841 Internal deposit within Building 674. The small flot, about half of which was made up of arthropod remains, was assessment-recorded. It contained a small group of insects of typical 'urban' flavour, with some grain pests and decomposers. There were many fly puparia, but no evidence that any other autochthones were present.

OGL A SS 44 Period: 6

- 858 Hearth within Building 674. Several mites and single individuals of

six beetle taxa.

See also p 119.

OGL A SS 45 Period: 6

- 860 Deposit within Building 674. Only a small beetle assemblage (17 individuals of 11 taxa), but it was rich in grain pests, and included three individuals of each of the common grain pests. The remaining taxa were represented by single individuals. Other invertebrate remains were rare.

See also p 119.

OGL A SS 47 Period: 6

- 878 The earliest deposit beyond the south wall of Building 674; during excavation it was not clear whether it was an internal or external deposit. A modest assemblage of insects; there were also many mites. The 66 individuals of 43 beetle and bug taxa included some grain pests and a modest probable house fauna component. There was no more than a hint of the presence of foul matter, and it is likely that the deposit was in a rather clean, dry structure.

One *Trichuris* egg was noted from the squash.

See also p 119.

OGL A SS 46 Period: 6

- 1005 Slot (fill 1002), west end of the site. There were 31 beetle taxa (39 individuals) and various other invertebrates, among which were many unidentified larval fragments and adult flies, and several mites and fly puparia. There were also many *Daphnia* ephippia (water flea resting eggs), indicating the incorporation of waterlain deposits. This was supported by the (proportional) abundance of aquatic beetles - four taxa represented by five individuals. Almost half the beetles were outdoor forms, and very few were decomposers (about a quarter). There were six *Oryzaephilus surinamensis* in this assemblage, which seems likely to have formed in the open by fairly random incorporation of insects from varied sources.

See also p 119.

OGL A SS 50 Period: 6

- 1005 Slot (fill 1004). Like the sub-sample from context 1002 above, this material included numerous *Daphnia* ephippia; in this case, about 50 were estimated to be present. Water beetles were somewhat more abundant, too, with eight taxa represented by 15 individuals (about a quarter of the assemblage of 62 individuals of 49 taxa). Almost half of the beetles were outdoor forms, and decomposers were relatively rare (only about a quarter of the assemblage).

This material appears to have been deposited within a very slow-flowing or static body of water, an interpretation supported by the nature of the sediment - pond sediments are often 'cheesy' humic silts in texture. The assemblage gave no clear indication of conditions on adjacent surfaces, being very diverse; no non-aquatic taxon was represented by more than two individuals.

See also p 119.

OGL A SS 51 Period: 6

Both the fills from slot 1005 gave invertebrate assemblages which included appreciable numbers of water fleas and aquatic beetles.

- 1029 Ditch (fill 785). Assessment-recorded. There was a small group of beetles, mostly frequently recorded 'urban' decomposers; there were no obvious ecological implications.

See also p 119.

OGL A SS 34 Period: 6

- 1029 Ditch (fill 787). Insect assemblage quite large but completely lacking in aquatic; open water was indicated only by a single water flea resting egg (*Daphnia* sp ephippium).

There were many mites, parasitica, fly puparia and insect larvae, with several adult flies and spiders. There were also many *Craspedolepta nervosa* nymphs, indicative of yarrow, and five *Chionaspis salicis*, a scale insect common on a variety of trees. Further notable records were a single louse, *Damalinea bovis*, a parasite of cattle, and a human louse, *Pediculus humanus*.

These remains suggest heterogeneous origins for the material, and this is echoed in the adult beetles and bugs. Many of them may have lived by or in a slightly damp ditch, colonizing a variety of plants. Two phytophages associated with heathland or moorland vegetation (*Ulopa reticulata* and *Lochmaea suturalis*) may have come to the site in peat, as may have a single larva of *Denticollis*

linearis. There were also synanthropes, including grain pests and *Tenebrio obscurus*. A plausible depositional environment is thus a 'dry' ditch, damp enough to slow decomposition of organic remains but not water-filled, with some scrubby vegetation along it, and receiving modest quantities of debris from nearby buildings. This, however, is a somewhat subjective reconstruction. Despite the presence of a cattle louse, the rarity of dung beetles leaves no good evidence that the ditch bounded a field of cows!

One *Trichuris* egg was noted from the squash.

See also p 119.

OGL A SS 53

Period: 6

Periods 7 and 7-8

Building 674 was abandoned. Extensive deposits of silts and loams (including 651 and 672, Period 7A, and 721, Period 7B) were delimited to the west by the Period 6 boundary bank which continued in use. Soil accumulations (705/6, Period 7-8) at the western end of the site continued into Period 8.

- 651 Deposit. A small group of beetles, together with assorted other invertebrates including many mites and insect larval fragments, several homopteran nymphs, fly puparia and adult flies, a probable louse and two kinds of cladoceran ephippium. Almost a third of the beetles were outdoor forms and about half of the assemblage consisted of decomposers.

Ecologically it was a mixed group, with grain pests, probable house fauna and fowl decomposers present in small but appreciable numbers. It might be speculated that this material originated in a stable, but the evidence is slender.

See also p 119.

OGL A SS 19

Period: 7A

- 672 Deposit. There were only single individuals of seven beetle taxa, many mites, several fly puparia and a few other remains in the flot, which consisted mostly of pale plant fibres.

See also pp 119-20.

OGL A SS 21

Period: 7A

- 721 Deposit. Flot quite large and rich in pale plant debris. Earthworm egg capsules were common, and there were several fly puparia and mites in addition to assorted other remains and a modest group of beetles and bugs (65 individuals of 45 taxa). While outdoor forms were well represented (over a quarter of the individuals), the decomposer group was strong, accounting for about two-thirds of the fauna. *Aphodius prodromus* and a *Falagria* species were the only abundant beetles, with five individuals of each. Subjectively, these and much of the rest of the fauna might have accumulated in a 'soil' with dung from grazing animals, but there were small numbers of synanthropic (domestic/storage) species, perhaps either background fauna or scattered with litter or rubbish, or both.

No parasite eggs were noted from the squash, although the modified Stoll technique yielded single *Ascaris* and *Trichuris* eggs.

See also p 120.

OGL A SS 24

Period: 7B

- 705/6 Deposit. Few beetles; only mites were at all abundant. Some of the remains were very poorly preserved. The most abundant beetles were *Carpelimus bilineatus* (5), *Oryzaephilus surinamensis* (4) and *Cercyon analis* (3); the implications of the assemblage are unclear.

See also p 120.

OGL A SS 22

Period: 7B-8C

Period 8

The Periods 8A and 8B metalled area and other features were covered with silts (459, 463, Period 8C).

- 459 Deposit. Invertebrate remains rare. There were several mites and 12 individuals of 10 beetle taxa, including a fragment of a beetle identified as probably being an *Alphitobius* species, seemingly not matching *A. diaperinus*, the species usually found in archaeological material from Roman Britain.

See also p 120.

OGL A SS 84

Period: 8C

- 463 Deposit. There were 25 beetle and bug taxa (34 individuals), several mites and a small range of other remains, including an elaterid larva. Apart from a general affinity with most of the Roman material from this site, the fauna had no special character.

One *Ascaris* egg was recorded from the squash; no parasite eggs were seen using the modified Stoll technique.

OGL A SS 85

Period: 8C

Period 13

Period 13 comprised medieval pits (including 4, 6, 8, 10, 11, 16, 20, 25 and 31), a well (1237; top fill or an overlying feature is 308), and some soil spreads (including 11).

- 4 Pit (fill 3). Assessment-recorded. Preservation was poor. Abundant insect fragments, mostly of decomposers, with hint of a fowl element as well as taxa indicating drier conditions. Fly puparia were numerous. There were a few 'natural habitat' insects, including a *Scolytus* species.

See also p 120.

OGL A SS 1

Period: 13

- 6 Pit (fill 5.1). Assessment-recorded. A small insect group, mostly decomposers or uncoded taxa, was present. There was a single *Oryzaephilus surinamensis*.

Trichuris eggs were seen at 'trace' levels in the squash, although no eggs were found using the modified Stoll technique.

See also p 120.

OGL A SS 7

Period: 13

- 6 Pit (fill 5.2). Assessment-recorded. A rather small group of insects, mostly decomposers, with outdoor forms rare. There were many fly puparia.

See also p 120.

OGL A SS 8

Period: 13

- 6 Pit (fill 5.3). Assessment-recorded. A modest-sized group of beetles, including a substantial proportion of decomposers with some fowl matter taxa. The proportion of outdoor fauna was small. A specimen of *Aphodius ?equestris* was noted (north of its present range, which runs as far north as Yorkshire: Jessop 1986, 23), and there were large numbers of fly puparia. Three larvae of the click beetle *Athous haemorrhoidalis* were recorded; they usually live in soil.

Trichuris eggs were present in the squash at a 'trace' level.

See also p 120.

OGL A SS 10

Period: 13

- 6 Pit (fill 5.5). Few arthropods, including single individuals of seven beetle taxa typical of occupation deposits.

See also p 120.

OGL A SS 13

Period: 13

- 6 Pit (fill 5.6). Only single individuals of three beetle taxa.

One *Trichuris* egg was found in the squash and five were seen using the modified Stoll technique.

See also p 120.

OGL A SS 15

Period: 13

- 6 Pit (fill 5.7). Arthropod remains included several mites, fly puparia and fly pupae, and a group of 21 beetles representing 21 taxa. Over four-fifths of the beetles were decomposers, but there was no distinct ecological grouping within this component. The most abundant species were *Anotylus complanatus* (5) and *A. nitidulus* (3). This assemblage may have been background fauna, or have included early colonists of decaying organic matter.

One *Trichuris* egg was seen in the squash; three were noted using the modified Stoll technique.

See also pp 120-1.

OGL A SS 14

Period: 13

- 6 Pit (fill 5.8). Arthropods were rare; six individuals of five beetle taxa and a few other remains were noted.

See also p 121.

OGL A SS 17

Period: 13

- 6 Pit (fill 5.9). There were several mites and fly puparia and three beetles, and a few other remains.

See also p 121.

- OGL A SS 18 Period: 13
- 8 Pit (fill 7.1). Assessment-recorded. There were abundant insects, with good preservation. Decomposers (of mixed ecological affinities) were predominant, and there was a small proportion of outdoor forms. There were numerous fly puparia, and two elaterid larvae were noted.
One *Trichuris* egg was seen in the squash.
See also p 121.
OGL A SS 2 Period: 13
- 8 Pit (fill 7.2). Assessment-recorded. Rather abundant insects, but with no clear implications. There were two larvae of the click beetle *Athous haemorrhoidalis*.
See also p 121.
OGL A SS 6 Period: 13
- 10 Pit (fill 9). Assessment-recorded. A small group of insects, including many puparia. The assemblage was rather mixed, but consisted primarily of decomposers.
In the squash a few *Trichuris* and a trace of *Ascaris* eggs were seen. Using the modified Stoll technique 15 *Trichuris* eggs and one *Ascaris* were noted. Faecal contamination thus appeared likely.
See also p 121.
OGL A SS 3 Period: 13
- 11 Deposit. Only traces of unidentifiable cuticle in the minute flot.
See also p 121.
OGL A SS 4 Period: 13
- 16 Pit (fill 15.2). Assessment-recorded. Only a small insect group, predominantly mixed decomposers of little interpretative value.
One *Trichuris* egg was found in the squash.
See also p 121.
OGL A SS 5 Period: 13
- 20 Pit (fill 19). A modest group of insects, comprising several Syrphidae sp larvae (one of the 'rat-tailed maggot' types), Coleoptera larvae, mites and fly puparia, and 33 adult individuals of 25 beetle taxa. They were ecologically mixed and of little interpretative significance.
See also p 121.
OGL A SS 12 Period: 13
- 31 Pit (fill 30). Few insects; several fly puparia, single individuals of eight beetles, and a few other scraps were noted.
OGL A SS 16 Period: 13
- 308.2 Top fill of well 1237 or overlying feature. Invertebrates very rare, with only single individuals of eight beetle taxa.
See also p 121.
OGL A SS 80 Period: 13
- 1237.1 Well fill, uppermost spit. There were several mites, fly puparia and earthworm egg capsules, and a small group of beetles and bugs (single individuals of 13 taxa). Of this group, little can be said.
See also p 121.
OGL A SS 73 Period: 13
- 1237.2 Well fill. Single individuals of nine beetle taxa and a few other invertebrates, none of any special significance.
See also p 121.
OGL A SS 74 Period: 13
- 1237.4 Well fill. Assessment-recorded. Many puparia and mites, and about 50 earthworm egg capsules. Beetles were predominantly decomposers, with a distinct house fauna group and hints of somewhat foul matter. There was a specimen of the spider beetle *Tipnus unicolor*, a species of some interest in archaeology (eg Allison and Kenward forthcoming).
From the squash a few *Trichuris* eggs and one *Ascaris* egg were noted. No eggs were evident using the modified Stoll technique.
See also p 121.
OGL A SS 76 Period: 13
- 1237.5 Well fill. A rather large beetle assemblage, which is probably representative of the samples from the various fills within well 1237. There were 131 individuals of 40 beetle taxa. Diversity was low, depressed by one very abundant and clearly autochthonous taxon, *Aglenus brunneus* (48 individuals), although this may have been a post-depositional invader (see for example Allison and Kenward

forthcoming c). Outdoor forms were absolutely and relatively rare (8 individuals). Decomposers accounted for 82% of the assemblage, and some uncoded taxa probably belonging to this group would raise the value to over 90%. 'Dry' decomposers were numerous, and 'foul' decomposers, unusually at this site, were absent. The diversity of the decomposer component was very low, again depressed sharply by *A. brunneus*.

A distinct house fauna element was present with, in addition to *A. brunneus*, an *Atomaria* sp (12), a *Cryptophagus* sp and *Lathridius minutus* group (8 each), Aleocharinae sp (probably *Crataea suturalis*, 'Aleocharinae sp X' of earlier reports, eg Hall and Kenward 1990) and *Atomaria ?nigripennis* (6 each), *Xylodromus concinnus* (4) and *Laemostenus terricola*, *Cryptophagus scutellatus* and *Mycetaea hirta* (1 each) the most characteristic of this group. There was also an adult *Blaps* sp and two larval apices believed to belong to this genus.

The whole assemblage was very reminiscent of many house fauna groups from Roman and Anglo-Scandinavian deposits (eg Hall and Kenward 1990; Kenward and Hall forthcoming). It surely originated within a building in a layer of mouldering organic matter, not so moist as to be uncomfortable for living. Other remains include a flea and a human louse (*Pediculus humanus*). There were also several beetle larvae, spiders and Parasitica, and many mites. Fly puparia were conspicuously uncommon, supporting the hypothesis that this material came originally from an acceptably dry building, quite possibly domestic.

One *Trichuris* egg was noted from the squash, but no eggs were seen using the modified Stoll technique.

See also p 121.

OGL A SS 77 Period: 13

- 1237.6 Well fill. Assessment-recorded. A small group of beetles, almost all decomposers, resembling those from associated samples. There were several *Oxytelus sculptus* (perhaps suggesting slightly foul conditions), *Aglenus brunneus*, *Atomaria* sp and *Cryptophagus* sp.
See also p 121.

OGL A SS 78 Period: 13

- 1237.7 Well fill, lowest level. Assessment-recorded. A house fauna element present, like that in 1237.5, with various other decomposers.
See also p 121.

OGL A SS 79 Period: 13

The samples from well 1237 gave strong indications of house fauna, and at least some of the material seems to have originated in a building with mouldering matter on the floor.

Otherwise the medieval material from this period rarely gave many insects. Where assemblages were large enough for interpretation, there was evidence from decomposer species that decaying matter was abundant.

Old Grapes Lane Trench B

Some eight samples from six Roman features and deposits were analysed. Insects from several of the samples gave evidence for material resembling stable manure. The fill of well 184 (Period 5A) gave groups of rather mixed nature, perhaps representing dumps. One surface deposit (188, Period 5A) was very rich in grain pests, and appears to have incorporated spoiled grain, perhaps animal feed. No more than traces of parasite eggs were recorded.

Period 3

This period comprised an extensive deposit of soil (including 290), containing numerous wood fragments, which overlay the structural features of Period 2.

- 290 Deposit. A modest group of beetles and bugs was accompanied by many mites and a few other invertebrates. The most abundant taxa were *Anotylus nitidulus* (11), *Platystethus arenarius* (5) and

Aphodius sp (3; one of the 'yellow' species), probably indicating herbivore dung or other similar material. The remaining species included some which perhaps suggest that this was stable manure.

See also p 122.

OGL B SS 9

Period: 3

Period 4

By Period 4E Building 674 may have gone out of use; Period 4E is represented by soil deposits and a shallow gully (229). Period 4F includes the possible collapsed wall (211) of Building 674.

- 229 Gully fill. Flot contained very large numbers (of the order of 100) of fly pupae, many fly puparia, a human flea, several Proctotrupoidea, about 50 mites and a few other remains, together with a rather substantial group of beetles and bugs. Grain pests made up 11% of the assemblage (there were nine *Oryzaephilus surinamensis*). Diversity was moderate, the proportion of outdoor forms large. This component of the assemblage was (ecologically) apparently quite varied, but of fairly low mathematical diversity, this statistic being depressed by the presence of a few moderately abundant taxa. The more numerous outdoor forms were the rather eurytopic dung beetle *Aphodius ?prodromus*, the water beetle *Helophorus* sp, *Phyllopertha horticola* (a chafer), and *Lesteva longoelytrata*, found by water. Other phytophages included taxa perhaps imported in cut vegetation (although of course it is hard to rule out the possibility that these insects actually lived on the site).

The most abundant decomposer was *Anotylus tetracariniatus* (11 individuals), a very abundant eurytopic species suspected of having the potential to occur in large numbers in background fauna. The same may be true of *Platystethus arenarius* (6), which favours foul material, but the presence of these species and the *Aphodius* in such numbers suggests that they may have been autochthonous, or at least have originated very near by. This view is reinforced by the presence of three *Cercyon haemorrhoidalis*.

This deposit may have contained herbivore dung, and have been invaded by some foul decomposers. Some taxa offered a hint of 'hay', and possibly the grain pests arrived in animal feed.

See also p 122.

OGL B SS 8

Period: 4E

- 211 Possible remains of wattle and cob wall. Beetles were rather abundant, but there was only a single adult bug. Other remains included several beetle larvae and fly puparia. Like the assemblage from gully 229 (above), this one was dominated by *Anotylus tetracariniatus*, but the remaining assemblage included representatives of some rather different communities.

Decomposers were well represented overall, although of quite low diversity, with the relatively dry habitat group important. There were strong hints of a house fauna element, with *Cryptophagus* sp (8), *Anobium punctatum* (7), *Xylodermus concinnus* (5), and *Lathridius minutus* group (5). There was also, however, a small community of fouler material - particularly *Platystethus arenarius* and *Cercyon atricapillus* (both 3). There were hints of a 'hay' element, from *Mecinus pyrausta* and *Gymnetron labile* (both associated with plantains, *Plantago* sp), for example.

The record of *Abax parallelepipedus* is of note; common now, it is rather rarely recorded from urban archaeological deposits.

Overall, this deposit may have come from a building and, if not of mixed origins, may once again indicate stabling.

One *Trichuris* egg was noted.

See also p 122.

OGL B SS 7

Period: 4E

Period 5A

This period includes soil deposit 188 and a well (184).

- 184.1 Well fill. Assessment-recorded. A small decomposer group with weak hints of foul material.

See also p 122.

OGL B SS 1

Period: 5A

- 184.2 Well fill. Quite a large flot, of which insects formed only a small

proportion. There were many mites and fly puparia, seven Homoptera nymphs, a few scale insects, a human flea, and an adult and a puparium of the sheep ked, *Melophagus ovinus*. There were various other invertebrates, including four kinds of Cladocera, represented by ephippia.

Beetles and bugs rather numerous; diversity was moderately high, and a large outdoor component, of relatively low diversity was present. Aquatics were quite numerous, as were phytophages. Decomposers accounted for just under half of the fauna; of these, a significant proportion was contributed by taxa from relatively dry habitats and moist, foul habitats.

This was thus an assemblage in which several communities were strongly developed. The aquatics appeared to indicate deposition in or by water, although the forms represented (three *Helophorus* species and *Hydrobius fuscipes*) are all highly migratory invaders of temporary water.

Dung beetles were sufficiently numerous to suggest a nearby origin (seven *Aphodius prodromus*), but in contrast, a likely house fauna component was evident, *Anobium punctatum* (7), *Lathridius minutus* group (7), *Cryptophagus* sp (6), *Ptinus fur* (4), and *Typhaea stercorea* (3) being the most abundant. The rich group of phytophages (and some other outdoor taxa) may have been background fauna, but the taxa represented seem quite likely to have been imported in cut 'hay'. There were weak traces of a decomposer community which might colonize stable manure.

On balance, this material appears likely (but not certainly) to have been deposited originally in a stable or animal byre, or in an open area where stock was concentrated. A small 'moorland/heathland' component was present: *Lochmaea suturalis* and *Micrelus ericae*. The three *Phyllopertha horticola* may belong to this group (it is sometimes numerous in acid turf at the transition from poor grazing to moorland), or may have come in cut vegetation, while a larva of *Denticollis linearis* may have been brought in peat.

See also p 122.

OGL B SS 5

Period: 5A

- 184.3 Well fill. There were many mites, but other arthropods were not abundant, and there were only 42 individuals of 30 beetle taxa. There was quite a large proportion of decomposers (almost three-fifths), of which well over a third were types associated with relatively dry habitats. There were five *Oryzaephilus surinamensis*, and three each of *Lathridius minutus* group and a *Corticaria* species, but only one or two individuals of the remaining taxa.

Subjectively, this group strongly resembled a small random extract from some of the other assemblages from this site, with hints of 'stable manure'.

See also p 122.

OGL B SS 6

Period: 5A

- 188 Deposit. Assessment-recorded. A very large number of insect fragments, but the great majority of the beetles were grain pests, including the species typically encountered in Roman material. There were perhaps well over 200 *Oryzaephilus surinamensis*, quite a large number of *Cryptolestes pusillus*, modest numbers of *Sitophilus granarius* and a few *Palorus ratzeburgi*. Apart from these, there may have been no more than 20 individuals of assorted ecological origins, a group of little interpretative significance. Since an attempt was made to note all taxa and their approximate frequencies, the record can be regarded as a semi-quantitative rapid scan (Kenward 1992).

This was probably a spoiling grain residue of some kind, or processually or spatially close to such material. There may have been a few invading decomposers, and just possibly some 'hay' insects, but most of these minor elements could have been strays; deposition was probably in a protected place.

See also p 122.

OGL B SS 4

Period: 5A

Period 5B

On the eastern side was an extensive soil deposit, 173.

- 173 Deposit. Insects were not very abundant, with a small assortment of remains including 30 individuals of 26 beetle taxa. Decomposers formed only a third of the assemblage, and over a quarter of the individuals were outdoor forms. The material resembled a random extract from an average assemblage for this site.

One *Trichuris* egg was recorded.
See also p 122.
OGL B SS 3 Period: 5B

Lewthwaite's Lane Trench A

Samples from 18 Roman contexts and one medieval context were analysed. Two-thirds of the samples from Roman deposits gave rather few remains, of generally fairly mixed nature but often with a substantial component of taxa from natural or semi-natural habitats. Some groups were much larger. These were of two kinds: those rich in decomposers indicative of mouldering matter, probably mostly stable manure, and those rich in moorland/heathland insects, presumably representing imported turf.

In deposits 501 and 502 (SS 4), Period 8, a very large part of the fauna appears to have originated in heathland or moorland peaty soil, and importation of cut turf from such a place seems very probable. The insects suggest that the turf was cut from heathy, *Calluna*-rich soil rather than wet bog. Both samples included substantial numbers of wireworm larvae (Elateridae); they were most probably *Denticollis linearis* (see OGL A, Period 4 ditch/gulley 1222, SS 72, p 133). The purpose of this turf is unclear.

There was little indication of human dwellings - lice and fleas were rare. Some samples strongly suggested the presence of 'stable manure' or other animal bedding. Pit 369, Period 11, produced an assemblage of beetles rich in grain pests and something rather like 'house fauna' (Hall and Kenward 1990), but this, too, may have been associated with the keeping of domestic animals rather than human habitation.

The single medieval deposit included few insects, and worm eggs were rare in all the sub-samples examined.

Period 2

Period 2A comprised a spread of wood chippings and a small patch of burning (647).

- 647 Burnt deposit. Very small flot, the only organic matter being what appeared to be rotted plant fragments.
See also p 124.
LEL A SS 20 Period: 2A

Period 3

This period included a possible hearth (637).

- 637 Possible hearth. A small assemblage of beetles (and a single bug) was recovered, together with a few other arthropods. Among the latter, only mites, of which there were several, were at all abundant. Over a third of the assemblage was contributed by outdoor forms. Other statistics were distorted by the presence of 10 individuals (a third of the assemblage) of *Anotylus nitidulus*, a species difficult to code ecologically.

The assemblage appeared to include remains of insects of various origins; some might have been brought, for example, in clay from a damp place, but all might have had more random origins.
See also p 125.

LEL A SS 19 Period: 3

Period 5

Two gulleys, one of which may have been an east-west boundary (619), cut across the site.

- 619 Gully (fill 599.2). Many dipteran pupae and mites and several adult flies and beetle larvae, a few other insects, and 30 individuals of 28 beetle and bug taxa. Nearly a third of the latter assemblage was contributed by certain or probable outdoor forms, and aquatics were sufficiently numerous to suggest that they were attracted to the point of deposition (or at least carried there in or by water). Little more can usefully be said of this group.

See also p 125.

LEL A SS 17 Period: 5

Period 6

The division between the northern and southern halves of the trench continued in Period 6A; on the southern side was a stake fence bordering a sandy clay loam (607). Overlying 607 was a deposit with wood fragments (578, Period 6B-E), which may have remained exposed into Period 6E. In the northern half of the trench in Period 6C there was a fenced enclosure and silty spreads with wood fragments (including 570). Silts with wood (including 564, Period 6D) overlay the fenced enclosure.

- 607 Deposit. Several mites were recorded. Beetles and bugs totalled 22 individuals of 20 taxa. Over a third of the individuals were outdoor forms. This was almost certainly background fauna and it would be unwise to attempt further interpretation.

See also p 125.

LEL A SS 18 Period: 6A

- 578 Deposit. Only 19 individuals of 17 beetle taxa, and a few other arthropods, were found. The probable outdoor component accounted for over half of the assemblage, and over a quarter of the fauna fell in the moist, foul habitat decomposer group. Accumulation in the open air seems certain; while there were three *Aphodius* species (5 individuals), suggesting the presence of herbivore dung not far away, the whole assemblage may have had a background origin.

See also pp 125-6.

LEL A SS 16 Period: 6B-E

- 570 Deposit. Only a very small group of insects, of no interpretative value, resembling a random extract of a typical larger assemblage from the present site.

See also p 126.

LEL A SS 15 Period: 6C

- 564 Deposit. Insects were rare, although large numbers of mites were recorded. Only a few beetles were present, but these included some unusual elements: an unfamiliar *?Cryptophagus* sp, a cossonine weevil and a *Scolytus* species. There were also two (presumed) beetle larval abdominal apices of a kind not previously recorded by HK.

Trichuris eggs were found at 'trace' level.

See also p 126.

LEL A SS 12 Period: 6D

Period 7

Period 7A is characterized by substantial dump deposits (550, 553). Periods 7B and 7C are represented by further relatively featureless deposits, including silty loams 539 and 546, and turf spread 538.

- 550 Deposit. A modest group of insects, including 68 individuals of 57 beetle and bug taxa, many fly puparia, several beetle larvae and Hymenoptera Parasitica, and assorted other remains. There were also many earthworm egg capsules.

Only *Megasternum obscurum* was represented by more than two individuals. The assemblage had no clear character. It had perhaps accumulated in 'soil', *in situ* or transported from a surface on which background fauna had accumulated, and - conceivably - on which stock had been kept.

See also p 126.

LEL A SS 13 Period: 7A

- 553 Deposit. The small flot contained no recognizable arthropod remains.

One *Trichuris* egg was noted.

See also p 126.

LEL A SS 14

Period: 7A

- 538 Turf deposit. A large flot, mostly consisting of yellowish plant debris but with abundant insects. There were many fly pupae and puparia, and a substantial group of beetles and bugs. Mites were also numerous.

Diversity of the assemblage of adult Coleoptera and Hemiptera was high, and the outdoor component large. Decomposers were moderately well represented (for material from The Lanes). The more abundant taxa included grain pests, a rather mixed group of decomposers and *Longitarsus* sp (a phytophage).

The variety of phytophages may reflect deposition in an area with herbaceous vegetation, but together with the grain pests and decomposers these insects are more likely to indicate the remains of animal feed and bedding. There was no clear indication of 'turf', although some elements represented by one or two individuals could well have been imported in such.

See also p 126.

LEL A SS 9

Period: 7B

- 539 Deposit. Arthropod remains were abundant, and included many fly pupae and puparia (at least 50 of the latter, it was estimated), and mites, several fly larvae and earthworm egg capsules, and two lice (*Pediculus humanus* and ?*Damalinea* sp). Beetles and bugs were numerous. Diversity was moderate, the outdoor component modest, and decomposers rather well represented. The upper ranks of the species list were dominated by decomposers (and *Oryzaephilus surinamensis*), perhaps representing a community of mouldering, foul, but open-textured, plant remains. There were a few heath/moor taxa.

This may have been a deposit of material similar in texture and foulness to stable manure and, subjectively, it probably was stable manure, with some hay and peat. A specimen of *Aphodius porcus* and an unfamiliar *Ptinus* species were recorded.

See also p 126.

LEL A SS 8

Period: 7B

- 546 Deposit. The flot was very large and consisted mostly of filmy fibrous decayed plant debris. Quite a large group of Hemiptera and Coleoptera was accompanied by various other insects including several fly puparia and small Hymenoptera.

Diversity of the beetle assemblage was quite low, greatly reduced by the presence of 40 individuals (counted) of a *Corticaria* species. Other taxa seem likely to have bred in the material contributing to this deposit: *Typhaea stercorea* (7) and *Cryptophagus* sp (6) and various of the less abundant species. These, and some dung beetles, *Aphodius prodromus* (4) and *A. contaminatus* (1), contributed to the substantial decomposer component, which was of low diversity.

Plant-associated taxa contributed over a quarter of the fauna, and nearly a third of the taxa. A *Longitarsus* species was well represented (9); it is quite possible that these and the other phytophages represent insects introduced in cut vegetation which was subsequently colonized by the decomposers. It seems very likely that this was 'stable manure', especially in view of its distinctive lithology. It is notable, however, that the rich community of insects able to exploit highly nitrogenous organic waste seen at some other sites (eg Tanner Row, York) was not developed, although components of it were present.

One *Ascaris* egg was recorded.

See also p 126.

LEL A SS 11

Period: 7C

Period 8

Period 8C included a large pit (651). Features in Period 8E included a gulley (518), and adjacent silty loam 501, which remained exposed into 8F.

- 51 Pit (fill 530). The minute flot contained only two earthworm egg capsules. This was surprising in view of the richly organic nature of the deposit.

One *Trichuris* egg was noted.

See also pp 126-7.

LEL A SS 7

Period: 8C

- 518 Gulley (upper fill 500). Quite a large group of beetles and bugs was recorded, together with assorted other invertebrates including many mites and fly puparia and several Proctotrupoidea and unidentified Hymenoptera Parasitica. About a quarter of the fauna was accounted for by outdoor forms. Grain pests were numerous (38 individuals), and if these were removed the proportion of outdoor insects rose to 36%; the residual assemblage was of high diversity and probably of mixed origin. The decomposers, too, appeared to have had varied origins. Aquatics were perhaps sufficiently well represented to suggest deposition in water.

See also p 127.

LEL A SS 5

Period: 8E

- 518 Gulley (lower fill 502). There were many fly puparia and remains of a few other invertebrates, together with 24 individuals of 19 beetle taxa. Almost half the individuals were outdoor forms and only two decomposers were present. Although no species were numerous, it appears most likely that this fauna was derived from turf cut in a moist area; there were six individuals of four *Helophorus* species, suggesting aquatic deposition.

See also p 127.

LEL A SS 2

Period: 8E

- 518 Gulley (lower fill 502). Arthropods were numerous and included many Hymenoptera Parasitica, of the order of 100 mites and several Aphidoidea and fly puparia. Beetle larvae were very abundant, and included many Elateridae sp, identified as *Denticollis linearis* (see OGL A, Period 4 ditch/gulley 1222, SS 72, p 133), and *Actenicerus sjaelandicus*, in the proportion of 1:2. The former is known from dead wood and peaty soil, while the latter is a soil- and peat-dweller.

There were 161 individuals of 81 bug and beetle taxa, half of the former and over half of the latter being outdoor forms. The relatively low diversity for this outdoor component, together with the species list, indicated the presence of a true community. The most abundant species were dominated by those likely to have occurred in related habitats in an area of heathland or (perhaps less probably) moorland. Particularly characteristic were the attractive bug *Macrodera micropterum* (5), the ground beetle *Bradycellus ruficollis* (5), the weevil *Micrelus ericae* (5) and *Olisthopus rotundatus* (2), but much of the remaining fauna might be found alive with these.

Undoubtedly this material was predominantly surface heath/moor peaty soil (or less probably, deeper peat). The abundant elaterid larvae were presumably imported with this turf, and they appear to be consistent with the reconstruction based on the rest of the fauna.

Decomposers were very rare (one of the lowest values ever recorded for a substantial assemblage, although some of the uncoded taxa were probably decomposers), and it appears that only a few individuals of the species typical of human settlements were able to enter the deposit.

The record of the lygaeid bug *Pachybrachius fracticollis* is notable.

This stands as a very characteristic assemblage, and may be usefully compared with that from deposit 501 (below).

See also p 127.

LEL A SS 4

Period: 8E

- 501 Deposit. Invertebrate remains were abundant and, in addition to 140 individuals of 65 beetle and bug taxa, included many Proctotrupoidea, similar numbers of other Parasitica and indeterminate Hymenoptera, many beetle larvae, about 50 mites, and several ants, Lepidoptera pupae and fly puparia. There were also 13 elaterid larvae of assorted sizes, mostly *Actenicerus sjaelandicus* but with two *Denticollis linearis*.

The beetle and bug assemblage was unusual in being of moderate diversity in combination with a very large proportion of outdoor insects and a very low proportion of decomposers. These exceptional statistics resulted from the presence of what was undoubtedly a community from heathland/moorland. Notable taxa were *Bradycellus ruficollis* (10), *Micrelus ericae* (5), *Ulopa reticulata* (3), *Macrodera micropterum* (2) and *Olisthopus rotundatus* (2), but *Lathrobium* sp (13), *Dyschirius globosus* (11), *Lesteva heeri* (6), *Euaesthetus bipunctatus* (6), *Altica* sp (4), *Pterostichus diligens* (3)

and various other taxa would have been part of the same community. Hardly any taxa which could not have been associated with these were present; examples were single individuals of two grain pests and a few decomposers, all of which may have strayed into the deposit.

This material was surely pure peat or heathland/moorland turf, the main plant species indicated being *Calluna vulgaris*. See also gulley 518 (fill 502, SS 4) above.

See also p 127.

LEL A SS 3

Period: 8E-F

Period 11

Period 11, which comprised changes in the layout of the Period 10 building (663), included a barrel-lined pit (369).

- 369 Pit (fill 365.2). Insects were very abundant: there were 304 individuals of 77 beetle and bug taxa, as well as many Chalcidoidea, other Parasitica and fly pupae, of the order of 50 fly puparia and mites, and several beetle larvae and earthworm egg capsules.

Diversity was rather low. Grain beetles accounted for 38% of the individuals. The residual assemblage after their subtraction included 42% of decomposers typical of relatively dry habitats.

The most abundant species were the grain beetles *Oryzaephilus surinamensis* (56) and *Cryptolestes ferrugineus* (46); *Palorus ratzeburgi* (6) and *Sitophilus granarius* (6) were also represented. The dry habitat decomposers included *Cryptophagus* sp (36), *Lathridus*

minutus group (26), *Typhaea stercorea* (7) and *Atomaria* sp (6). Less abundant taxa included, in the main, those likely to co-exist with these abundant ones, but the small outdoor component included some species which were probably imported with material from heathland/moorland and others conceivably introduced in hay-like cut vegetation.

This may have been organic debris from within a building, but there was nothing to suggest directly that it was animal litter.

Trace amounts of *Ascaris* were noted.

See also p 127.

LEL A SS 6

Period: 11

Period 21

Period 21B comprised a medieval timber building (669), and several pits (including 29).

- 29 Pit (fill 15). A small group of insects was recorded. There were many fly puparia and several mites. Main statistics for such a small group are of course unreliable as measures of the 'population' represented by it, but the outdoor component was strikingly small (3 individuals). The material may have been waste from within a building, but may merely have been rapidly deposited in the pit and sealed immediately.

See also p 127.

LEL A SS 1

Period: 21B

CHAPTER 10 THE ANIMAL BONES

by S M Stallibrass

Introduction

Animal bones have been recovered from Roman contexts in many parts of Carlisle, including the fort at Annetwell Street (Stallibrass 1991a and b, and forthcoming), the fort annexe at Castle Street (Rackham *et al* 1991) and the *vicus* at Blackfriars Street (Rackham 1990), all of which are located on the western side of the Roman settlement. The bones from The Lanes excavations provide a useful complementary series of assemblages.

Contexts containing animal bone were ranked. Only bones from contexts regarded as being the highest priority were examined (details of research priorities can be found in the site archive).

A general summary and discussion of the results, together with a comparison of the main domesticates at The Lanes and the Annetwell Street fort, can be found in the monograph (McCarthy 1993, Chapter 10).

Methodology

Recovery

Most of the animal bones were recovered by hand, but a significant minority were recovered from the residues from bulk samples processed through a flotation machine using 0.5mm mesh. Whenever possible, a minimum of 30 litres of sediment was processed, and many of the bulk samples contained 75 or 150 litres. The residues were initially picked through by members of the excavation team and, in effect, all bone fragments over 25mm long were recovered, together with many that were 10-25mm in maximum length. Most of the remaining residues (the 'fine fraction') were subsequently sorted in the laboratory (with the exception, due to financial constraints, of those from LEL A Periods 2 and 6 and OBL B Periods 2 and 6).

The quantities of bone recovered are given in Tables 13 and 14.

Preservation

When the animal bones were assessed, four degrees of preservation were identified:

- Excellent The bones are dense and robust, and their surfaces are as smooth as they are in life. All of their surface details such as muscle attachments, minor lesions, periosteal alterations etc, together with any *post-mortem* alterations such as fine knife cuts, carnivore toothmarks etc, are clearly visible.
- Good These bones are quite robust but have lost the 'satin-like' smoothness of their surface texture, and surface details may occasionally have been lost.
- Brittle These bones are very light in weight, and the bones are very brittle and easily broken (both in the past and during excavation and handling). In addition, the surfaces are often flaky or eroded. This surface destruction has often removed any anatomical or *post-mortem* details that might have been present. Many of the bones are encrusted with soil minerals, obscuring the shape and surface.
- Shot: These bones are almost completely 'shot to pieces', that is, minerals have infiltrated between the lamellae and have led to severe exfoliation. The outer surfaces are often missing completely. The bones are highly fragmented and are generally completely unidentifiable by eye.

For the assessment, each bag of bone was classified as belonging primarily to one of these four categories. Some contexts produced several bags, each of which was recorded individually. Weights of calcined bones were negligible and were not recorded separately.

Full details of the quantities of bones by site, period and preservation type are given elsewhere (Stallibrass 1993, table 4). Some 61% of the total is excellently preserved. Of the bone

Table 13
Weights of animal bone (in g), by site and recovery method

<i>Recovery method</i>	<i>CAL A</i>	<i>OGL A</i>	<i>OGL B</i>	<i>LEL A</i>	<i>OBL B</i>	<i>Total</i>
Hand-recovered	10,724	55,513	93,937	96,451	7,722	264,347
Sieved	2,276	11,783	980	4,163	954	20,156
Fine fraction	53	690	54	65	-	862
Totals	13,053	67,986	94,971	100,679	8,676	285,365

Table 14
Weights of animal bone (in g), by site and period

Date	CAL A		OGL A		OGL B		LEL A		OBL B		Total weight
	Period	Weight	Period	Weight	Period	Weight	Period	Weight	Period	Weight	
Prehistoric			1	44	1	313					357
Late 1st/2nd cent.	2, 3	13,053	3-6	28,713	2-4D	10,947	2-8	47,300	2, 6	8,676	108,689
Late 2nd/3rd cent.			7-10	23,782	4E-7	73,779	9-16	19,372			116,933
3rd-12th cent.			11, 12	3,452	8	3,565	17, 18	10,020			17,037
Medieval			13	11,995	9	6,367	19-22	23,987			42,349
Totals		13,053		67,986		94,971		100,679		8,676	285,365

from contexts attributed to the late first and first half of the second centuries, 95% was classified as excellent. In mid second- to third-century contexts the proportion of excellently preserved bone dropped to 56%, and the brittle element increased. All of the third- to twelfth-century material is poorly preserved. Most of the bone from medieval contexts is brittle, although small quantities are better preserved in some of the deeper contexts.

Waterlogging of the earliest levels is a consistent feature of late first- to mid second-century levels in many parts of Roman Carlisle. From the mid second century onwards, archaeological deposits become increasingly dry except for deep pits and wells. The variation in the preservation of the animal bones is entirely consistent with experience noted elsewhere.

Recording

Where possible, ovicaprid bones were identified specifically as sheep or goat. Out of a total of 762 sheep/goat bones, three (0.3%) were identified as goat whilst 199 (26%) were identified as sheep. The remaining 561 bones could not be identified to species level, but for present purposes it is assumed that the majority of these derive from sheep, and the term 'sheep' will be used on the understanding that the category may include a very few goat bones.

Only bones or fragments retaining diagnostic anatomical zones were recorded (see Stallibrass 1993, appendix 1). Vertebrae and ribs were recorded if they retained the defined zones, but could not always be identified to species level. Due to the extremely low frequency of other elements identified as horse or red deer, it is highly probable that all, or almost all, of the cattle-size vertebrae and ribs derive from cattle. Similarly, due to the extremely low frequency of identified roe deer bones, it is highly probable that all or almost all of the sheep-size vertebrae and ribs derive from sheep. Most of the pig vertebrae were identified specifically, but the ribs were

recorded as pig-size. The pig-size ribs have been ascribed to taxon on morphological grounds as well as by size, since the size ranges of sheep-size and pig-size ribs overlap, particularly when juveniles of both species are present.

Fusion evidence has been recorded as one of four stages: fused; fusing (the central portion of the epiphysis has begun to fuse with the diaphysis, but there is a gap between them around the outer edge of the bone); fusion line visible (the epiphysis is fully joined on to the diaphysis but the line of fusion is still visible, although no longer forming a gap); and unfused (the epiphysis is completely separate from the diaphysis, even if it can be refitted).

For the tables of epiphyseal fusion, unfused counts include unfused diaphyses only (whether or not refittable epiphyses are present). The numbers of any 'extra' unfused epiphyses that cannot be accounted for by unfused diaphyses are given in brackets.

All measurements have been taken in accordance with von den Driesch (1976) unless otherwise stated.

Relative numbers of identified specimens

Table 15 summarizes the numbers of fragments of animal bone identified to species. Fragments retaining zones form a small fraction of the total numbers of fragments. The collection is overwhelmingly dominated by the three major domesticates: cattle, sheep and pigs. For the rest of this chapter it is assumed that the cattle-size vertebrae and ribs derive from cattle, that the sheep-size vertebrae and ribs derive from sheep, and that the pig-size vertebrae and ribs derive from pigs.

The effects of recovery bias are documented in detail in the full report (Stallibrass 1993). It is very clear that the hand-recovered collection is biased towards the larger bones of cattle in preference to smaller bones of both sheep and pigs (even though the ratio in the sieved collection may itself be slightly inaccurate due to the small sample size). Small bird bones and fish bones have been overlooked in both the hand-

Table 15
Numbers of recorded bone fragments recovered by all three methods

<i>Site and period</i>	<i>late 1st/early 2nd cent.</i>	<i>late 2nd/3rd cent.</i>	<i>3rd-12th cent.</i>	<i>Medieval</i>	<i>Total</i>
CAL A	2, 3				
OGL A	3-6	7-10	11, 12	13	
OGL B	2-4D	4E-7	8	9	
LEL A	2-8	9-15	17, 18	19-22	
OBL B	2, 6				
<i>Species</i>					
Cattle	759	645	123	422	1949
Cattle-sized	206	125	31	69	431
Sheep/goat	330	133	19	79	561
Sheep	112	63	8	16	199
Sheep-sized	138	41	7	21	207
Goat	-	1	-	1	2
Pig	319	211	33	80	643
Pig-sized	45	38	6	13	102
Horse	10	7	2	15	34
Dog	27	16	-	3	46
Cat	-	-	-	1	1
Red deer	6	5	2	10	23
Roe deer	7	6	-	1	14
Hare	1	1	-	-	2
Bear	-	-	-	1	1
Badger	1	-	-	-	1
Large mammal, unidentified	1	-	-	-	1
Small mammal, unidentified	8	3	-	1	12
Mouse, house (<i>Mus musculus</i>)	3	-	-	-	3
Mouse, wood (<i>Apodemus</i> sp)	2	-	-	-	2
Mouse sp	1	-	-	-	1
Vole sp	1	1	-	-	2
Shrew, pygmy (<i>Sorex minutus</i>)	1	-	-	-	1
Toad (<i>Bufo</i> sp)	1	-	-	-	1
Frog/toad	4	-	-	-	4
Small vertebrate	12	2	-	-	14
Totals	1995	1298	231	733	4257

recovered and sieved collections.

Within the hand-recovered collection, two methods of analysis have been utilized to calculate the relative frequencies of the three major domestic species. The simplest method is to count the numbers of fragments recorded for the presence of diagnostic zones. This method is probably more accurate than counts of identifiable fragments regardless of whether or not they retain diagnostic zones, since it is not so subject to bias in favour of larger bones. It is not, however, entirely proof against 'double counting' of bones, as a broken cattle tibia could result in two fragments, one retaining the foramen and one retaining the distal epiphysis, and both of these fragments would be counted. In the case of a sheep tibia, however, the

bone is less likely to be broken - it forms a neater butchery unit - and so might be counted only as a single fragment, albeit one that retains both the foramen, and the midshaft and distal epiphysis.

Skeletal elements of each of the three major species have been analysed. A bone or bone fragment was only recorded if it retained at least one of the diagnostic anatomical zones listed in Stallibrass 1993, appendix 1. For most elements, several zones could be recorded. The Minimum Number of an Element has been taken to be the same as the most frequently recorded zone for that element within each data set. The number of each element has then been divided by the number expected in an entire skeleton. If the minimum number of

elements is an odd number, for an element that occurs twice in a skeleton, then it has been rounded up to an even number. The greatest of these numbers has been taken as the Minimum Number of Individuals (MNIs). The Minimum Number of each element is then expressed as a percentage of the number expected for that element given the relevant MNI, in order to compare the observed and expected frequencies of skeletal elements and study the pattern of element representation.

Comparing the MNIs for the major domestic species in the hand-recovered collections tends to give a very different ratio to that given by fragment counts (Stallibrass 1993, tables 8-9). The main effect of using MNIs compared to raw fragment counts is to reduce the emphasis on cattle bones compared to bones of sheep and pigs. Interestingly, the ratio based on the MNIs is often much closer to that based on the sieved sample, when available.

The hand-recovered collections are the only ones for which a time sequence can be studied for the group as a whole, since bulk samples (for sieving) from later periods were only taken from Old Grapes Lane. Although the actual percentages are very different to those calculated from the numbers of identified fragments, the same steady trend can be observed through time, indicating an increasing importance of cattle bones (Table 16). For the MNIs, the percentage of cattle bones increases from 38% in the late first/early second century, through 49% in the late second/early third century, to 58% in the medieval period. The corresponding percentages, using the hand-recovered fragment numbers, are 56% through 63% to 73%.

The main use of the sieved samples for checking for recovery bias in the hand-recovered collections lies with the first- to second-century material. Table 17 gives the relative proportions for cattle, sheep and pigs, using both MNIs and raw fragment counts.

In the sieved material, roughly equal proportions of cattle and sheep bones are present, with pig bones being far less numerous. The Minimum Numbers of Individuals are all very small and, therefore, subject to the bias inherent in the method that over-emphasizes the rarer species. This factor probably explains the raising of pig to joint second place, and the apparent lead of sheep over cattle. Overall, however, the ratios are not radically different between the two methods.

It seems clear that cattle are over-represented by fragment counts in the hand-recovered collection, as might be expected (Payne 1975), but the ratios given by the MNIs in the hand-recovered collection are very similar to those given by the fragment counts in the sieved collection. Again, they emphasize the equal importance of sheep and cattle (in terms of numbers of bones/individuals), with pigs in third place. The MNIs are particularly useful in this analysis because it seems that whole carcasses are represented rather than selective joints of meat or butchery waste, and given that the carcass of a cow contains several times more meat than that of a sheep, the contribution of beef to the diet was potentially several times that of mutton, although in terms of animal numbers cattle and sheep were probably approximately equal.

Material picked out from the sieved samples does not add substantially to the species list seen in the hand-recovered

Table 16
Relative proportions of cattle, sheep and pigs in the hand-recovered collections, based on MNIs

	<i>Late 1st/2nd cent.</i>		<i>Late 2nd/3rd cent.</i>		<i>Medieval</i>	
	<i>MNI</i>	<i>%</i>	<i>MNI</i>	<i>%</i>	<i>MNI</i>	<i>%</i>
Cattle	25	38	37	49	14	58
Sheep	28	43	24	32	6	25
Pigs	12	18	15	20	4	17
Totals	65		76		24	

Table 17
Relative proportions of cattle, sheep and pigs in the late 1st/early 2nd century, according to different methodologies

	<i>Hand-recovered</i>		<i>Sieved samples</i>		<i>Minimum Numbers</i>	
	<i>No of frags</i>	<i>%</i>	<i>No of frags</i>	<i>%</i>	<i>of Individuals</i>	
Cattle	674	54	104	39	25	38
Sheep	343	28	102	38	28	43
Pigs	224	18	61	23	12	18
Totals	1241		267		65	

Table 18
Cattle withers heights (in m)

	<i>1st/2nd cent.</i>	<i>2nd/3rd cent.</i>	<i>All Roman</i>	<i>Medieval</i>
Average	1.042	1.101	1.070	1.123
Minimum	0.933	0.982	0.933	1.037
Maximum	1.174	1.307	1.307	1.232
Standard Deviation	0.056	0.097	0.083	0.065
No of examples	24	21	45	7

collection. Bones of cattle, sheep and pigs comprise 96% of the number of identified fragments in the hand-recovered collection, and 97% in the sieved collection. Some of the rarer species represented in the hand-recovered collection, such as horse, roe deer, hare, bear and badger, together with most of the specifically identified birds, are absent from the smaller sieved collection. Only one species is represented in the sieved collection that was not identified in the hand-recovered collection. This is cat, one bone of which was recovered from a medieval pit at OGL B.

The material from the fine fraction, on the other hand, does add several species, including small mammals and amphibians, birds and fish. Cattle, sheep and pigs comprise only 17% of the total collection. The dominant group of identified bones in the fine fractions derive from species of fish (65% of the total), none of which were present in either the hand-recovered or the sieved collections. Birds form 11% of the collection, and bones of smaller birds are present in equal numbers to those of larger birds such as chicken (fowl) and geese. Small mammals and amphibians are represented for the first time, too: occasional bones of house mouse, woodmouse, pygmy shrew, a vole species, and toad (and possibly frog) are present. The bird and fish bones may well derive from animals eaten by people, whilst the small mammals and amphibians are more likely to have been commensals or to have lived in the open areas of the site.

Presentation

The results of the analyses are presented by species. Since statistical analysis shows that there is no significant difference between the sites, the data from all five sites have been amalgamated. Because of the very small quantities from many phases, data have been amalgamated to produce useful results. The material has been grouped, on the basis of the stratigraphic sequences, into four main periods, as set out in Tables 14 and 15: late first/early second century, late second/early third century, third-twelfth century and medieval. There is very little bone from prehistoric contexts.

Full details of the bone data, which are too lengthy to be published in full here, are given in the Ancient Monuments Laboratory Report (Stallibrass 1993) and the archive reports.

Cattle

Withers heights

Withers heights have been calculated for all complete long bones, using factors given in von den Driesch and Boessneck (1974). There are 45 bones from Roman deposits. The data are summarized in Table 18. The results show little statistical difference between the two Roman groups, indicating that there is no appreciable change through time between the early and middle Roman periods here.

There are only seven measurements from the medieval period; their mean is slightly higher, but a Student's t-test shows that this is statistically indistinguishable from the Roman sample, again indicating that there is no appreciable change in withers heights through time. It is possible that the size of cattle in this region remained stable until the deliberate changes in breeding and husbandry practices of the later Middle Ages.

Horncores

The measurements that are used here are: minimum basal diameter (= von den Driesch's oro-aboral diameter, 45), maximum basal diameter (= von den Driesch's dorso-basal diameter, 46) and outer curvature (= von den Driesch's 47). The data are summarized in Table 19.

All of the measurements fall within the usual range for the indigenous Iron Age 'Celtic shorthorn' cattle. There is no separate group of larger horncores, as there was in Roman deposits in York (O'Connor 1988).

The two third- to twelfth-century pairs of measurements both fall within the same range. At least one if not both of the horncores are almost certainly Roman (or post-Roman) rather than medieval, judging by their measurements. They are both from LEL A Period 18. The eleven pairs of medieval measurements give a slightly different picture, however. They have a rounder cross-section than the more ovoid cross-section typical of the Roman material, and the two largest pairs lie considerably beyond the range observed for the Roman horncores. Although the sample size here is too small for statistical tests to be useful, the pattern appears to be quite clear, and will be investigated further in studying the material from the northern part of The Lanes.

Table 19
Mean basal measurements of cattle horncores (in mm)

	<i>Roman</i>	<i>Medieval</i>
Mean of minimum basal diameter	31.5 (SE = 0.80)	35.0 (SE = 2.73)
Mean of maximum basal diameter	44.2 (SE = 1.08)	45.1 (SE = 3.45)
No of examples	39	11

Metacarpals

The post-cranial element with the most numerous measurable examples for cattle here is the distal metacarpal. Analysis of the distal breadth measurements (Stallibrass 1993, figs 7 and 8a) shows that the distribution is skewed towards the smaller measurements, and that the range of medieval measurements is very similar to that of the Roman bones, with the addition of one very small and one very large outlier. There is almost no difference between the means and ranges of the two Roman groups, and the pooled Roman groups have a high correlation coefficient, which may suggest that a single population is represented, with no influx of any new sized animals in the later period. The two largest of the ten medieval bones have measurements that lie beyond the range of the Roman ones, but the majority of the measurements fall within a tight cluster towards the lower end of the range.

Using sex identifications (see below), the lower end of the cluster tends to include bones thought to be from females, and the higher end of the cluster tends to include bones thought to derive from castrates as well as a few females (*ibid*, fig 8b). The fewer larger measurements tend to derive from animals thought to be either castrates or entire males. There is no clear cut-off point between the measurements of females and castrates, or between castrates and entire males, and it is evident that Howard's indices (used for sex identifications) give ambiguous results for the bones with middle range measurements.

Sex ratio

The complete metacarpals were analysed using Howard's (1962) shape indices. Both of Howard's indices have been employed (using the ratio of the midshaft diameter (SD) to the greatest length, and the ratio of the distal breadth (Bd) to the greatest length). This gives two sex 'identifications' which are not always identical. Compared to her figures for *Bos longifrons* ('Celtic shorthorns'), of the 17 complete Roman metacarpals, eight are from females (FF), six are from females/castrates (FC or CF), two from castrates/entire males (CM) and one from an entire male (MM), giving an overall ratio for females: males of 8:3, with six 'don't knows'.

One of the problems with Howard's method is the paucity of data, particularly for the castrates and entire males. Far more work is required with modern material to ascertain the degree of overlap between the measurements and measure-

ment ratios of bones from females, castrates and entire males, and to ascertain relevant ranges of measurements for past livestock. It is not clear from her published work how Howard defined *Bos longifrons*. Her data for modern *Bos taurus* show much larger measurements that may not be directly applicable to all archaeological data, particularly material predating the stock improvements in the later Middle Ages.

Only twelve pelves from Roman deposits could be measured at their acetabular rims. Of these, eight are judged to be from females and four from males. Visual assessment of pelvic fragments that could not have their rim heights measured suggest that there are a further two female, one ?female, three male and two ?male pelves in the collection. If these are added to the measured examples, the overall sex ratio for the Roman collections is ten (plus one?) females to seven (plus two?) males. This ratio is less biased towards the females than the ratio suggested by the complete metacarpals above. The discrepancy may be due to the small sample sizes involved, or may reflect a tendency for larger (probably male) metacarpals to be selectively removed for use in artefact manufacturing. There is, however, no archaeological evidence for the latter.

Dental data

The preservation conditions at The Lanes are generally excellent for the Roman period, and there are few loose teeth. Some 45 Roman cattle mandibles have complete Mandibular Wear Scores (MWSs; Grant 1982). Five mandibles from the third-twelfth centuries and three from medieval levels also have MWSs. There are no obvious pairs of jaws.

There is a clear bias towards high scores (Stallibrass 1993, fig 9a), with 35 of the Roman scores (78%) lying between 38 (when all three molars are in full wear) and 54 (at which stage all three molars are worn down to gum level). There are no MWSs from very young calves, and only five from juveniles (MWS = 16-26). The jaw at score 16 has the lower second molar (M₂) half up, and Silver (1969) puts the eruption age of this tooth at 15-18 months. Then there is a small cluster of mandibles with scores at 21-26. For the jaws at 21-23, the lower third molar (M₃) is in the crypt or visible, and for those at 22-26 the M₃ is erupting or half up. Silver puts the eruption age of M₃ at 24 months. The next small cluster of MWSs is at 33-38 and all of these jaws have M₃ in the early stages of wear (Grant's stages b-f).

Every jaw at 41 or more has all three cusps of the M₃ in full wear (Grant's stage g or beyond), with all permanent teeth (including P₄) fully erupted. Ages cannot be ascribed to these jaws, although it is clear that all of them had been in use for some time since the fourth lower premolar erupted (at about three years), and the jaw with a MWS of 54 clearly belonged to an aged animal that would not have been able to chew food for very much longer due to the particularly worn state of its teeth.

This sample shows that the majority of the cattle (in all periods) were kept well into maturity. This suggests either that there was no problem in overwintering livestock, or that juveniles were sent elsewhere for slaughter/fattening. If juveniles had been slaughtered *in situ*, it is likely that primary butchery would also have taken place, leading to the local

deposition of their jaws. Whilst the six jaws with MWSs of 21-26 may well represent animals slaughtered at the prime age for meat, it is clear that the majority of animals represented by jaws had been kept primarily for other purposes, such as breeding, milking or traction, before being killed (or suffering natural deaths).

The large sample and the remarkably consistent patterns of wear on the molar teeth permit estimations of MWSs to be made for jaws from which one molar cannot be recorded (due to loss or breakage). Figure 88 presents the MWSs from Roman deposits, including estimated scores. Because of the consistent patterns of wear observed on the complete jaws, most of the estimated scores are probably accurate to within one point. This increases the sample sizes considerably (from 45 to 75 Roman jaws). The distributions of MWSs on either side of 36 (when the P₄ erupts) are very similar for both Roman periods in the observed and estimated collections, suggesting that there has been no preferential breakage of juvenile jaws, nor any noticeable difference in rates of fragmentation between the two periods. Analysis of the increased Roman sample size, excluding the few medieval scores, serves to highlight the predominance of jaws with mature adult dentition.

Although the necessity for jaws to be more or less complete in order for MWSs to be recorded tends to favour the more robust adult jaws in preference to immature mandibles, examining all the teeth, whether *in situ* or loose, confirms the predominance of fully adult jaws. The ratio of deciduous:permanent last lower premolars for the Roman period is 15 dp₄s: 80 P₄s (19% juveniles). This is almost identical to the ratio of juveniles obtained from the more complete jaws (18%), suggesting that the predominance of mature jaws is a genuine phenomenon rather than a reflection of preservation and recovery biases.

Analysis of the wear stages of the dp₄s does show that the youngest individuals represented by dental data are not included in the Mandibular Wear Scores, however. One of the dp₄s is only half erupted and must come from a neonatal animal. Two other teeth are only just coming into wear (Grant stages a and b) and must derive from calves that died within a month or two of their births. A fourth dp₄ has a wear stage of only d; this is also likely to come from a young calf. The least worn dp₄ to be represented by a MWS has Grant's wear stage of h and a MWS of 16. This jaw was estimated to come from a calf that was 15-18 months old, since the M₂ is half erupted. The first four dp₄s, therefore, are all from animals much younger than this, three, if not all four, deriving from calves that were probably neonatal, or at most less than about six months old.

For the other periods, there are five P₄s and no dp₄s in the sample dating to the third-twelfth century, and there are four P₄s and 2 dp₄s from medieval deposits.

Congenital dental abnormalities

Sixty-eight Roman cattle mandibles retain the portion that should contain the second lower premolar (P₂). Nine of the mandibles have no alveolus present (nor any indication that it has infilled), suggesting that approximately 13% of the individuals congenitally lacked P₂.

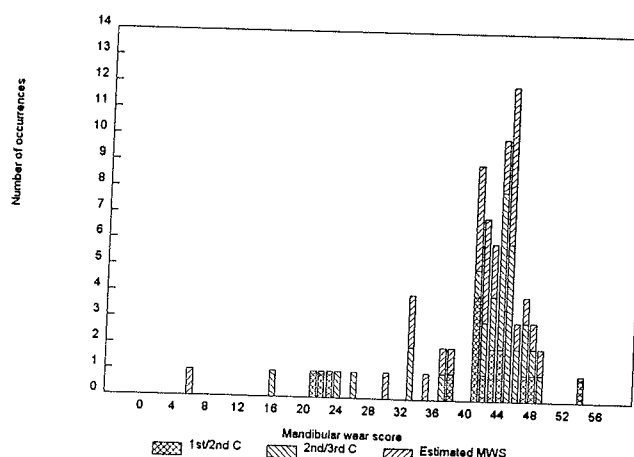


Fig 88 Roman cattle MWSs, including estimated scores

Three of the 68 Roman lower third molars (M₃s) lack their third column, whilst a further four teeth have a reduced third column, together forming 10% of the total. In addition, nine of the 68 Roman third molars lack the buccal pillar (13%), as do two of the 11 medieval teeth (18%).

An incidental effect of the lack of this pillar is the inability of the tooth wear score for affected M₃s to extend beyond Grant's stage g. It is probable, therefore, that some of the high MWSs for cattle jaws may in fact be underestimates, which would emphasize even more the importance of elderly animals in this collection.

Fusion data

Table 20 summarizes the epiphyseal fusion data for the cattle bones. The data for all three periods show very similar patterns of fusion stages, with extremely few unfused examples of early-fusing and middle-fusing metaphyses. Only in the final group of late-fusing epiphyses (mainly represented by vertebrae) are there significant percentages of unfused examples. However, even by this stage, the unfused epiphyses are in the minority. In the three data sets only 23%, 25% and 19% respectively of the epiphyseal fusion surfaces come from animals less than about four and a half to five years old at death. The fusion evidence thus confirms the dental evidence suggesting that the great majority of the cattle were killed when fully adult.

The percentage survival curves based on epiphyseal fusion data for the two Roman periods and the medieval period show that at least 77%, 75% and 81% of the cattle bones derive from animals that survived beyond the time at which epiphyseal fusion is complete, at about five years of age (Fig 89). The shape of the curve suggests that the main period for slaughter prior to about five years of age occurred between the ages of 40 and 60 months.

These estimations are very similar to the proportions derived from the Mandibular Wear Scores and from the ratio of dp₄:P₄ (see above). This close agreement between the methods suggests that the mandibular and post-cranial material may derive from the same animals. This is not always the case, since primary butchery can lead to the deposition of jaws of slaughtered animals whose post-cranial carcasses are exported

Table 20
Summary of cattle epiphyseal fusion data, by major period

Fusion stage	Late 1st/2nd cent.					Late 2nd/3rd cent.					Medieval				
	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)
7-10 months	64	-	-	2	-	92	-	-	-	-	43	-	-	-	-
12-18 months	112	2	1	1	-	111	2	-	7	(1)	69	-	-	-	-
2-2.5/3 years	67	3	2	8	(4)	84	1	2	15	-	43	-	1	2	-
3-3.5 years	23	1	1	2	(1)	13	5	1	1	(3)	18	-	2	2	-
3.5-4 years	53	8	3	19	(6)	59	6	5	27	(4)	14	1	-	7	(3)
4.5-5 years	93	13	14	78	(6)	44	10	11	74	(6)	28	-	6	32	-

F - fused; Fsg - fusing; Fvis - fusion line visible; UF - unfused; (ep) - 'extra' unfused epiphyses

and deposited elsewhere. Analyses of relative frequencies of skeletal parts are presented below.

As with the Mandibular Wear Scores, there are some bones that cannot be included in the assessments of epiphyseal fusion, due to the loss/destruction of the relevant portions of the diaphyses, which clearly derive from very young individuals. Some of these are from neonatal animals. These few bones support the dental evidence that a few neonatal and very young calves are represented in the collection, although they fail to be represented either by the Mandibular Wear Scores or by the fusion data due to taphonomic factors. They do not alter the overall interpretation of the collection, that is that the vast majority of the cattle in all three periods were fully adult when they died, but they do add credence to the notion that some of the animals were 'home-produced' rather than imported.

Cattle skeletal element representation

Expressing the Minimum Number of each element as a percentage of the number expected for that element in the Minimum Number of Individuals enables comparisons to be made of the observed and expected frequencies of elements of cattle. The hand-recovered collection of the first-second century shows an unequal distribution of percentage representation, ranging from 98% for the most frequent element, the metatarsal, to 0% for the least frequent, sesamoids (Stallibrass 1993, fig 11). Most of the poorly represented elements are either very small (such as the sesamoids and carpals) or are particularly likely to have suffered physical and chemical damage due to their high content of marrow-containing trabecular bone (such as the ribs and vertebrae). All of the major bones of the body (longbones of the forelimb and the hindlimb, together with the mandible, scapula and pelvis) are well represented, suggesting that there has been little selective deposition/redeposition of body parts.

The pattern of element representation is generally similar for the second-third century, except that the most frequent element is the scapula rather than the metatarsal. The pattern for the medieval period is again broadly similar, although there tends to be a greater spread of percentage representations. For all three periods, therefore, it is suggested that the collections consist of the remains of whole cattle carcasses, but are biased due to two factors: poor recovery of smaller

bones, and the preferential destruction of trabecular bone.

Due to small sample sizes, only the first- to second-century material can be used to investigate the relative numbers of different elements in the sieved collection. The sample size for cattle is small and a minimum of only three individuals is represented. The better recovery of smaller elements probably accounts for the presence of some carpals, phalanges etc, although the very smallest bones (sesamoids) are still almost absent. The overall pattern appears to confirm that seen in the hand-recovered collection; all parts of the body are present in roughly equal numbers, suggesting that whole carcasses are represented.

The metapodials are some of the least frequent longbones, and no scapulae are represented at all, whereas these elements were well represented, often in large fragments, in the hand-recovered collection. It is not clear whether their comparative scarcity in the sieved samples is due to a genuine scarcity, or whether it reflects a bias in their favour in the hand-recovered collection due to their large, and therefore conspicuous, fragments.

Pathological and pseudo-pathological alterations

Several cattle bones have minor lesions in their articular surfaces (see Baker and Brothwell 1980, 109-114; comparable examples from Annetwell Street are illustrated in Stallibrass 1991a, pls 3-5). It is clear that the most frequently affected articulations are the proximal metacarpal and the proximal metatarsal. In all but one case (a first phalange with Type 2), the lesions are Baker and Brothwell's Type 1.

In the first- to second-century material, these occur in five of the 36 proximal metacarpals (14%) and one of the 28 distal metacarpals (3.6%). They are also present in 10 of the 46 proximal metatarsals (22%), although none of the 31 distal ends of metatarsals are affected. There are also Type 1 lesions in one proximal and three distal articulations of first phalanges (all of them from anterior rather than posterior toes). In addition one naviculo-cuboid is affected, and one distal femur, where the lesion occurs in the medial ridge of the trochlea.

In the second- to third-century material, lesions occur in two of the 33 proximal metacarpals (6.1%) and one of the 31 distal metacarpals (3.2%), and in seven of the 39 proximal metatarsals (18%) and one of the 30 distal metatarsals (3.3%). There is also a Type 1 lesion in one anterior first phalange

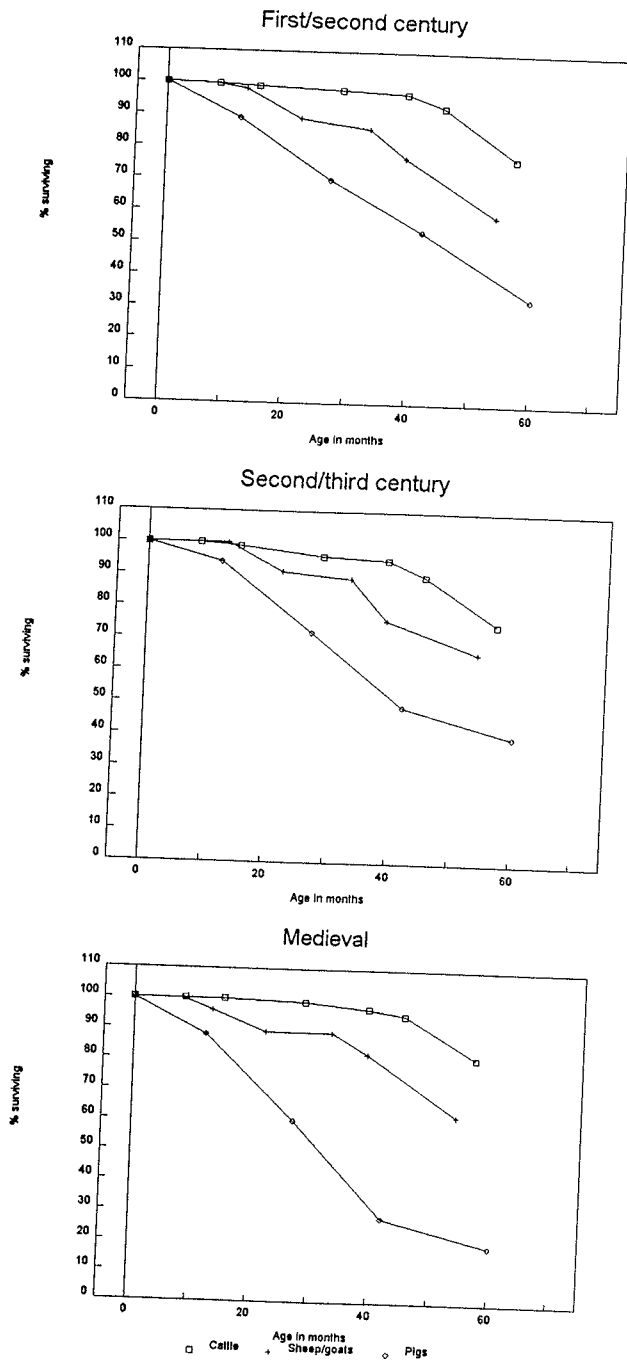


Fig 89 Percentage survival curves for cattle, sheep and pigs, based on epiphyseal fusion data

(proximal articulation) and a Type 2 lesion in the distal articulation of another anterior first phalange, and a possible Type 1 lesion in the proximal articulation of a radius.

These lesions are not restricted to the Roman material. In the third- to twelfth-century material, one proximal metacarpal and two proximal and one distal metatarsal articulations are affected (these may or may not date to the Roman period), and three proximal metatarsal articulations dating to the medieval period (20%) are also affected.

The aetiology of these minor lesions is unknown. Various suggestions have been proposed, ranging from damage to the

articular cartilages caused by stressful work or injuries, to congenital traits of no consequence. By recording the incidences of such lesions in a variety of archaeological assemblages, it may be possible to highlight periods or regions in which they are particularly common. Even if they are congenital, it is uncertain as to whether or not they are hereditary.

No lesions were observed in any articular surfaces of sheep or pigs. The only non-bovine example is the proximal articulation of a horse metatarsal.

In general there are remarkably few examples of any pathological alterations to bones, and the few examples that do exist are nearly all very minor. There are 29 affected cattle bones. The main type of pathology relates to osteoarthritis, which is not surprising considering the large proportion of very mature animals represented. Mostly, the effects consist of slight exostoses around the proximal articulations of some of the metacarpals, metatarsals and first phalanges. Only one case was severe enough to cause grooving of the bone surfaces, and there is only one case of spavin, where the naviculocuboid has become fused onto the proximal metatarsal by excessive bony growth (from LEL A, first/second century).

Several of the bones may show the effects of strenuous use, such as that related to employment as traction animals, rather than of osteoarthritis. These bones are splayed at their distal ends (metapodials) or at their proximal ends (first phalanges). Examples of both types of alteration (splaying and exostoses) are spread throughout the deposits, although they appear to be concentrated to some extent in second- to third-century deposits at OGL B. The only non-foot bone to be affected is a pelvis with exostoses on the acetabular rim, from a first- to second-century deposit at OGL A.

Otherwise, the only pathology of any of the cattle bones is occasional periodontal infection of the palate, usually beside the upper molars, but extending alongside the premolars in one case. There is one example of a lost tooth: an upper third premolar that has been lost and its alveolus infilled with new bone (CAL A, first/second century).

Sheep

Withers heights

Table 21 summarizes the evidence for withers heights of sheep, using all fully fused complete long bones and factors given in von den Driesch and Boessneck (1974). There was only one suitable bone from medieval deposits, and two from contexts dating from the third-twelfth centuries. The ranges and means of the collections from the two Roman periods are extremely similar and statistically are not significantly different. All of these bones were identified specifically as deriving from sheep rather than goats.

Metacarpals

The most frequent available pair of measurements for sheep metacarpals is the proximal breadth (Bp) and the proximal depth (Dp). There are 35 Roman and seven medieval examples. The medieval measurements all lie in the upper half of the range of Roman measurements (Stallibrass 1993, fig 13a). Most of the bones were identified specifically as sheep, and

Table 21
Sheep withers heights (in m)

	<i>1st/2nd cent.</i>	<i>2nd/3rd cent.</i>	<i>All Roman</i>
Average	0.586	0.574	0.579
Minimum	0.531	0.527	0.527
Maximum	0.658	0.650	0.658
Standard Deviation	0.035	0.027	0.031
No of examples	16	22	38

none were identified as goat.

Although there are no medieval examples retaining fusion evidence, some of the Roman metacarpals are complete enough to retain fusion evidence for the distal epiphysis (*ibid*, fig 13b). There are 11 fused and seven unfused bones, and one bone where the distal epiphysis is fused but the fusion line is still visible, suggesting that the fusion had only recently been completed when the animal died.

The young bones that are distally unfused probably derive from animals that died before they reached 1.5-2 years. It is immediately clear that their proximal measurements cover the same range as those of the fully fused bones. In fact, six of the seven unfused bones have measurements in the upper half of the range of measurements from fully fused bones. This may suggest that some, at least, of the unfused bones derive from young males, which might be expected to reach larger adult sizes than most of the females.

Tibiae

Distal breadth (Bd) and depth (Dd) measurements for Roman sheep tibiae are summarized in Table 22. Three of four medieval pairs of measurements, together with one third- to twelfth-century example, fall just beyond the range of the Roman measurements, at the higher end (Stallibrass 1993, fig 14a).

Silver (1969) gives the age of fusion of the distal tibia as 1.5-2 years, that is, the same as for the distal metacarpal. All of the examples given in Table 22 are fused or in the process of fusing. They should, therefore, complement the distribution of metacarpals with unfused distal epiphyses. Thirty-seven of

the bones are fully fused distally, one of the medieval examples is in the process of fusing, and six of the Roman bones have the fusion line still visible, suggesting that the animals died relatively soon after the epiphysis became fully fused on to the diaphysis (Stallibrass 1993, fig 14b). There is no evidence for the proximal fusion status of any of the bones that retain their distal epiphysis.

It is clear that most if not all of the younger bones (those with the fusion line still visible, plus the one example still fusing) derive from bones that fall within the upper half of the range of measurements. Again, it is tempting to suggest that these may derive from young male animals, slaughtered at about, or soon after, 1.5-2 years of age.

Sex ratio

Thirteen Roman and four medieval sheep pelves could be measured for acetabular rim heights, and the measurements give a good correlation with the visual assessments. There appear to be approximately equal numbers of males and females represented by pelves in all three of the major periods. Most of the male pelves are thought to derive from castrates rather than entire males due to the degree of definition of the ilio-pectineal ridge. Visual assessments were also made on some fragments that could not have their rim heights measured; all of these are thought to derive from males or possible males, due to the length of the ilial shaft together with its degree of curvature (Boessneck 1969). Less reliance is made on these assessments, however, than on those made from the shape and height of the acetabula.

The midshaft diameter of the ilial shaft does not appear to

Table 22
Sheep tibia distal breadth (Bd) and depth (Dd) measurements (in mm)

	<i>1st/2nd cent.</i>		<i>2nd/3rd cent.</i>		<i>All Roman</i>	
	<i>Dd</i>	<i>Bd</i>	<i>Dd</i>	<i>Bd</i>	<i>Dd</i>	<i>Bd</i>
Average	17.9	22.7	17.9	22.6	17.9	22.6
Minimum	16.0	20.9	15.8	20.0	15.8	20.0
Maximum	20.1	24.7	19.7	24.5	20.1	24.7
Standard Deviation	1.071	1.196	1.100	1.290	1.088	1.253
No of examples	17	17	24	24	41	41

correlate with the results of the acetabular method. Studies of modern bones from sheep of known sexes are required to investigate whether or not the midshaft diameter of the ilium has any relationship with the sex of an individual.

Very few fragments of sheep horncore and/or skull were recovered, so nothing can be said concerning ratios of polled to horned individuals (which might or might not relate to sex ratios).

Dental data

Some 67 Roman and nine medieval sheep mandibles could be scored for Mandibular Wear (Grant 1982). The Roman sheep scores are more widely distributed than those for the cattle jaws, ranging from 2 to 48. All of the dp4s are from sheep not goats, indicating that all of the young animals are sheep. The older mandibles have not been assessed for species identification.

Using the tooth eruption data for these jaws in conjunction with Silver's (1969) modern data, the mandibles with MWS = 2-4 derive from lambs that died before M₁ had fully erupted (ie less than three months). The MWSs at 7-13 derive from animals that died as M₂ was in the process of forming in the crypt and erupting. This puts the age at death at less than or up to approximately 9-12 months. A large group of mandibles have MWSs = 17-27. At MWS = 17-25, the M₃ is concealed or visible in the crypt. At MWS = 17-19 this coincides with the M₂ just coming into wear (probably at approximately 12 months of age, or slightly later). A few mandibles have M₃ beginning to erupt, at MWS = 26-27. Silver puts the eruption age of M₃ at 18-24 months. There is then a very tight group of Mandibular Wear Scores of 30-32. These all have the M₃ erupted, but only just in wear (Grant's stages b and c). These probably derive from animals that died at or just beyond two years of age.

The M₃ is fully in wear (with all three cusps showing some dentine on their occlusal surfaces) at Grant's stage e. This coincides with MWS 34. All of the mandibles with MWSs of 34 or more are, therefore, from dentally mature animals over two years old at death. However, it is noticeable that even within this group, there is a bias towards lower scores (34-42), with only one mandible scoring more than 42. For the 67 Roman mandibles, there are equal proportions of jaws suggesting age at death of below (N = 34) and above (N = 33) the age of two years. Only in the small medieval collection is the ratio imbalanced, with two jaws of less than two years and seven jaws of over two years.

Grant's (1982) method of recording tooth wear stages does not calibrate the lengths of time that a tooth may remain at one stage, and it is thought that some stages are comparatively short-lived. Too much should not be made of the absence of teeth at certain wear stages, therefore (for instance, there are no M₃s with the wear stage d, although there are seven at b, four at c, and six at e). Evidence for seasonal slaughter would require a pattern of clear peaks of closely-aged jaws separated by gaps in which no/very few jaws occur. The data given above do not rule out the possibility that sheep tended to be slaughtered during a restricted part of the year, although they are not definitive, partly because of the problem inherent in Grant's method. However, the large numbers of jaws that

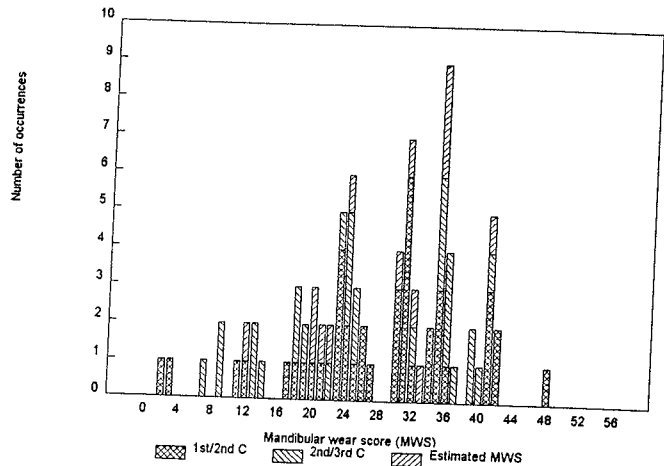


Fig 90 Roman sheep MWSs, including estimated scores

contain either M₂ or M₃ in the process of forming in the crypt or erupting do suggest that at least a notable proportion of the young animals were dying towards the end of either their first or second year.

Because we do not have modern data to indicate how long the teeth take to form in the crypt prior to eruption, it is not possible to narrow down the season(s) of death. Those jaws with a tooth actually in the process of erupting probably derive from animals that died in the winter, but those that have the tooth still in the crypt might have died during the autumn or early winter (given a spring season for birth). It is not usually economical to slaughter animals at the end of the winter, since they have usually lost a lot of condition by then. Males killed towards the end of their second year need not have been castrated, but would have had to have been kept away from the ewes at tupping time if they were not wanted for breeding purposes.

It is not possible to say whether these were accidental or deliberate deaths, or a mixture of the two. Far more animals died towards the end of their second rather than their first year of life. For male animals, slaughter at the later age is an economical use of animals that have attained a reasonable size for sale for meat carcasses and have provided one wool clip, but are not required for future breeding purposes. For females, a death at just under two years might relate to problems during their first pregnancy (either problems relating to the pregnancy/birth itself, or to deficiencies in nutrition) causing natural deaths, or to the culling of ewes that had failed to become pregnant. As with the males, they would, at least, have provided one wool clip during their lives. Deaths towards the end of the first year of life, on the other hand, are more likely to relate to deliberate culling of unwanted/poor quality livestock, to selective slaughter of specific animals deemed suitable for eating at some special occasion, and to unintentional deaths caused by accidents, ill health or malnutrition.

The large sample size and the consistent patterns of wear on the molars permit MWS estimates to be made for jaws for which one of the molars cannot be recorded directly. Figure 90 plots the Roman wear scores, including the estimated scores. Nearly all of the estimated scores are likely to be accurate to within one point, and the few remaining scores are

Table 23
Summary of sheep epiphyseal fusion data, by major period

Fusion stage	Late 1st/2nd cent.					Late 2nd/3rd cent.					Medieval				
	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)
6-10 months	50	1	1	-	-	13	-	-	-	-	11	-	-	-	-
10-16 months	38	3	-	4	-	29	1	-	-	-	8	-	1	1	-
1.5-2/2.5 years	38	4	-	25	(2)	39	7	-	15	-	4	-	1	3	-
2.5-3 years	5	-	2	5	(1)	-	-	-	2	(1)	1	-	-	-	(2)
3-3.5 years	7	1	2	23	-	6	1	-	21	(4)	3	-	1	3	-
4-5 years	12	1	2	47	(8)	9	-	1	15	-	5	2	1	10	-

F - fused; Fsg - fusing; Fvis - fusion line visible; UF - unfused; (ep) - 'extra' unfused epiphyses

probably within two points. The Roman sample sizes are thus increased from 67 to 81. As with the cattle jaws, the inclusion of estimated wear scores does not alter the ratio of jaws above and below the age at which P₄ erupts, but serves to highlight the pattern already demonstrated by the directly observed jaws. Again, this suggests that preservation conditions were good, even for young jawbones.

In the Roman collection as a whole (including all teeth, whether or not *in situ*, and whether or not a MWS can be counted) there are almost equal numbers of deciduous and permanent last lower premolars (51 dp_{4s}:50 P_{4s}), reinforcing the evidence from the Mandibular Wear Scores for equal numbers of juveniles and adults (the P₄ erupts at about two years). As with the MWSs, the even distribution is the same in both Roman periods. The excellent preservation of the sheep jaws is illustrated by the fact that only three loose teeth are included in these counts.

In the medieval collection, the ratio favours the older jaws (2 dp_{4s}:10 P_{4s}). This is similar to the ratio of jaws with MWSs and dental eruption stages indicating age at death of below and above two years.

Fusion data

Table 23 summarizes the epiphyseal fusion data for sheep, and the data are plotted as percentage survival curves in Figure 89. The sample numbers are considerably smaller than those for cattle.

In the Roman deposits, there are almost no unfused examples of metaphyses that fuse before 10-16 months (using Silver's modern comparisons: Silver 1969). But almost one-third (31%) of the epiphyses in the next group (expected to be fused by 1.5-2/2.3 years) are unfused. There are extremely few examples (14) of epiphyseal fusion locations (64% unfused) in the group expected to be fused by 3-3.5 years. Of the vertebral epiphyses, expected to fuse between 4-5 years, 75% are unfused. These figures of unfused metaphyses are clearly much higher than those encountered for the cattle bones.

The shape of the percentage survival curve (Fig 89) demonstrates a slight loss of sheep in their second year, followed by a major loss in their third and fourth years. The patterns for the two Roman periods are extremely similar, and even the small sample from the medieval period shows the same dis-

tribution. This pattern is broadly similar to that seen in the dental data, except that there are no very young animals represented by fusion data equivalent to the MWS = 2-4. The numbers of sheep dying in their first year are very small, and the relative proportions of sheep dying before and after reaching two years of age are very different.

Some of the youngest post-cranial bones could not be included in the fusion table, since their relevant metaphyses had not survived. However, some of these bones are clearly from very young animals. There are no very young bones from medieval deposits, but this could be due to the small sample size. These examples of bones from neonatal and very young lambs and/or kids suggest that the lack of very young bones in the fusion data is an artefact of preservation and the methods used, rather than a genuine reflection of a lack of post-cranial material to go with the youngest Mandibular Wear Scores (eg MWS = 2-4). Similarly, the lack of post-cranial evidence for animals dying towards the end of their first year may be due to preferential destruction of unfused epiphyses, for example by scavenging canids or by other mechanical or chemical taphonomic agents.

The fusion evidence suggests that only 10% of the metaphyses come from animals that died at less than two years, whereas the dental data suggested that the proportion was 50%. This discrepancy might be due to problems relating the two methods, or might be a genuine reflection of the dental and post-cranial elements deriving from different, or overlapping, populations of carcasses. One indication of this might be differential representation of the relevant skeletal elements.

Sheep skeletal element representation

As with the cattle bones, smaller elements or bones that contain a high proportion of cancellous tissue are particularly poorly represented. Sheep bones are considerably smaller than their counterparts in the bovine skeleton, rendering them even more susceptible to recovery bias and to destruction by physical and chemical agents.

Apart from the poor representation of susceptible elements, two trends are apparent in the hand-recovered collections (Stallibrass 1993, fig 16): in all three periods, the major limb bones from all parts of the skeleton are represented approximately equally (there is more variation in the medieval

collection, but this may be due to the much smaller numbers of elements involved); and in both Roman periods, the tibia is exceptionally well represented. This is frequently noted in sheep bone collections from archaeological sites (eg Gidney 1991) and is probably due to the robust nature of the element, together with its relatively large size, rather than any cultural factor. In addition, in the first- to second-century collection the mandible is extremely well represented compared to all other elements apart from the tibia; whether this is due to chance is difficult to assess. The mandible is, like the tibia, a relatively large and robust element, but its relative frequency in the early Roman period is not matched in the collections from the other two periods.

Primary butchery waste of carcasses usually results in the deposition of unwanted heads and feet. In the case of the foot bones, these would not be expected to have been recovered in large numbers due to their small size, but the comparative paucity of sheep skulls in this collection does not support the suggestion of primary butchery waste. Whilst an over-representation of mandibles might, therefore, support the suggestion made from the ageing data that some young sheep are represented only by dental material that does not have any corresponding post-cranial material in these collections, the skeletal element evidence is ambiguous. Whilst it is possible, of course, that skulls were disposed of elsewhere, this would require special pleading to support a primary butchery hypothesis that is otherwise unsubstantiated.

Overall, it would appear that whole carcasses are represented in all three periods, the main causes of skeletal imbalances being hand-recovery bias against small bones, preservation bias against trabecular bone, and the commonly-observed, but not fully understood, good preservation and recovery of sheep tibiae.

Only the first- to second-century material can be used to investigate the relative numbers of different elements in the sieved collection. The collection of sheep bones here is of a similar small size to that of cattle bones. Greater numbers of smaller bones were recovered from the sieved collection, confirming that small bones were biased against in hand-recovery. Otherwise, the pattern is very similar to that seen for the hand-recovered elements, that is, whole carcasses are represented, save for some of the small and susceptible elements.

Pathological alterations

No lesions were observed in any articular surfaces of sheep bones. There is only one example of a pathological sheep bone. This is a radius from a first- to second-century deposit at OGL A, which has a bony exostosis on the lateral edge of the proximal articulation. This is often described as 'penning elbow', and is thought to relate to knocking of the joint against a hard surface (as might happen in a confined space), but the aetiology is not really proven.

Pigs

None of the bones were fully fused, and so no withers heights have been calculated. Although no data on post-cranial measurements are presented here, it was clear during the cataloguing of the material that all of the bones appear to derive from

small domestic pigs. Only 23 lower second and third molars were measurable; none of the teeth are particularly large, again suggesting that no wild animals are represented.

Dental data

There is a range of Mandibular Wear Scores, from very young piglet (MWS = 1) to young adult (MWS = 40) (Fig 91). There are no scores from mature adults. This emphasizes the juvenile ages of the pigs compared to the cattle and sheep.

'Calibrating' the MWSs with Silver's (1969) modern data on tooth eruption, the mandibles with MWS = 1-5 have the first molar (M₁) either not yet erupted or just completing its eruption. This puts the age at death at less than, or approximately equal to, 4-6 months. A further group of jaws has scores of 8-12. In all of these the M₁ is just coming into wear (Grant's stage a or b), and/or M₂ is visible in its crypt. Silver gives the age of eruption of M₂ as 7-13 months, so these jaws derive from animals that were probably in the second half of their first year when they died. There is a group of mandibles with MWS = 19-20/22. These all have M₂ just coming into wear (Grant's stages a and b) plus M₃ visible in its crypt. Silver gives an eruption age for M₃ of 17-22 months. This puts the group at more than 7-13 months but less than 17 months old. A small group of mandibles have MWSs of 25-27, and these all have the M₃ half up or up-but-unworn, suggesting an age of less than or equal to 17-22 months. The mandibles with WMS = 32 and 33 have the M₃ up, with the anterior cusps just in wear (stages a and b), suggesting that the pigs were about two years old when they died.

The most worn tooththrow has a MWS = 40. Even this jaw comes from a relatively young adult, since the M₃ was still only in light wear (Grant's stage c), suggesting that the pig was only about two years old when it died. Pigs are sexually mature at six months, and so it is possible that some of the animals may have been used to produce one or two litters before they died, but there is a notable absence of any mature breeding stock. Seasonality of death cannot be estimated, since pigs do not have a very restricted season of birth.

Using the observed Mandibular Wear Scores for complete jaws, scores have been estimated for jaws in which one of the molars cannot be observed. The estimates are not as accurate as those for the cattle and sheep, being probably only accurate to within two points, as the sample size is smaller, which means that there are gaps in the observed scores, and the rates of wear are not so consistent. In particular, the earlier-erupting molars (M₁ and M₂) show greater degrees and ranges of wear prior to the eruption of the later teeth (M₂ and M₃) than in the cattle and sheep. For instance, the pig mandible with a MWS = 40 has M₃ at Grant's stage c, whereas the sheep jaws at MWS = 40 have M₃ at stage g and the cattle jaws have M₃ at g or h.

Figure 91 presents the MWSs for Roman pig jaws including the estimated scores. Including these increases the Roman sample size from 21 to 26 and alters the ratio of Wear Scores on either side of 19 (when P₄ erupts at about 12 months). All of the estimated scores fall within the range of observed scores, and lie between 20 and 38 (corresponding to ages at death of approximately one to two years). The apparent greater fragmentation of the 'older' jaws may relate simply to

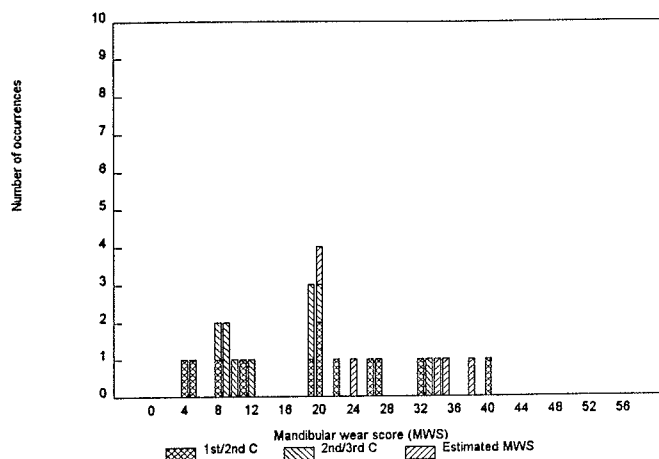


Fig 91 Roman pig MWSs, including estimated scores

their greater size compared to the very young jaws, or may be an artefact of sample size.

A comparison of deciduous and permanent last premolars supports the ratio given by the observed Mandibular Wear Scores rather than the combined group of observed and estimated scores, however. The ratio of deciduous:permanent lower last premolars is not suitable for comparing juvenile with adult pigs, since P₄ erupts before M₃ (at 12-16 months). The P₄ is already erupted at MWS = 19 in this collection. The ratio of 18 dp₄s:22 P₄s (45:55%) is therefore comparing animals on either side of one year, rather than juveniles to adults. It correlates exactly with the ratio shown by the observed MWSs (11 at less than 13, and 14 at more than 18; 44:56%). For the Roman material only, the same pattern can be observed (16:19 dp₄s:P₄s; 46:54%; and 9 at less than 13, 12 at more than 18; 43:57%; for the MWSs).

The medieval collection is extremely small and only contains two deciduous and two permanent fourth premolars.

Sex ratio

Lower permanent canine teeth have been used to assess the sex ratio of the pigs in the Roman levels. There are eight female and 16 male teeth *in situ*, plus a further four female and three male mandibles in which the teeth have fallen out of their alveoli (*post mortem*), giving an overall female:male ratio of 12:19 (39:61%). In the medieval layers, there are four mandibles retaining adult male canines.

In the Roman collection, using the canines to allocate sexual identification to the jaws, more of the mandibles with dp₄ present derive from females than from males (8:4 females:males). Since P₄ erupts at approximately 12-16 months, this suggests that approximately twice as many females of less than or about one year of age were killed than males. They may have been surplus stock, killed for meat, or may have been culled because of failure to get in pig. In the older age group, with P₄ present (ie older than 12-16 months), the corresponding ratio is 3:8 females:males, possibly suggesting that females kept beyond one year tended to be kept alive, whilst the larger males were slaughtered for meat. Where the bones of the older females were eventually deposited is unknown. Given a sex ratio at birth of approximately 50:50, and the need to keep sows on for breeding in order to maintain the livestock, some older sows must have been kept, but there is no evidence here for their final disposal.

Fusion data

Table 24 presents the epiphyseal fusion data for pigs. The pattern of fused and unfused epiphyses contrasts strongly with those for cattle and sheep. For the two Roman periods, 29% and 18% of the metaphyses in the youngest age group (less than 12 months) are unfused. This trend of early deaths continues in the next age groups (less than 2-2.5 years: 76% and 62% unfused); by the less than 3.5 years and 4-7 years groups, all collections are 100% unfused. In both the Roman periods there is one example of a vertebral epiphysis in the process of fusing (at 4-7 years); these are the only post-cranial indications of the presence of adults in the entire collection.

The percentage survival curves for pigs (Fig 89) show that animals died throughout the period from birth to skeletal maturity, but with a pattern of persistent slaughter of young pigs that fits that shown by the Mandibular Wear Scores. In contrast to the cattle (77% and 75% surviving for the two Roman periods) and sheep (59% and 66% surviving), maximum possible percentages of only 33% and 40% of the pig bones derive from animals that might have survived beyond the age at which their vertebral epiphyses fuse (about five years). Since none of the recorded vertebrae are fused, the actual percentage surviving beyond five years may well be zero, but the fused examples of early-fusing epiphyses cannot be aged precisely.

In addition to the bones retaining metaphyses that could be used in the fusion tables, several bones of very young

Table 24
Summary of pig epiphyseal fusion data, by major period

Fusion stage	Late 1st/2nd cent.					Late 2nd/3rd cent.					Medieval				
	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)	F	Fsg	Fvis	UF	(ep)
By 12 months	39	1	3	13	(2)	37	-	1	7	-	6	-	-	5	(1)
2-2.5 years	6	3	-	28	(4)	14	6	3	29	-	2	-	-	12	-
By 3.5 years	-	-	-	24	(4)	-	-	-	32	(3)	-	-	-	14	(2)
4-7 years	-	-	1	29	-	-	-	1	12	-	-	-	-	4	-

F - fused; Fsg - fusing; Fvis - fusion line visible; UF - unfused; (ep) - 'extra' unfused epiphyses

piglets, ranging from foetal/neonatal to weeks old, were also found. None appears to be from a complete or partial carcass.

Pig skeletal element representation

As with the sheep elements, small and/or trabecular bones are particularly scarce, probably due to biases of recovery and preservation. Although the actual percentages vary quite a lot, there is no obvious pattern of preferential recovery of any of the major elements (Stallibrass 1993, fig 19). Upper and lower bones from both fore- and hindlimbs are well represented, together with the girdle bones (the scapula and pelvis) and the mandible. This suggests that the elements recovered represent the remains of whole carcasses.

Pathological alterations

No lesions were observed in any articular surfaces of pig bones. There are five examples of pathological pig bones. Two of them are damaged lateral metapodials: one a healed midshaft fracture, the other a periosteal infection of the midshaft, possibly relating to bruising. There are also two cases of radii with unusual shapes. Both are unfused distally and one is also unfused proximally. This latter bone is particularly short and stocky and may derive from a runt. Its slightly splayed distal end might be related to rickets, in which case it may indicate the custom of keeping some pigs indoors in sties rather than allowing them to roam freely through the streets. The other radius is particularly slender-waisted, although the length and proximal and distal widths appear normal. The fifth affected bone is a maxilla with a minor rotation of the upper third premolar.

Horses

Occasional horse bones (34 bones) occurred throughout the deposits, almost equally dispersed between Roman and medieval levels. All parts of the body are represented, although metapodials and phalanges are particularly frequent. These may relate to the deposition of remains removed during tanning, but other elements (such as the scapula and the pelvis) cannot be interpreted in this way. At least one bone (a metacarpal from a medieval deposit at OGL B) shows signs of having been worked.

A group of horse bones was found in pit 100 (fill 108) at OBL B (late first/second century), and these probably derive from a single individual, although none of them articulate. The teeth show that the animal was definitely a horse rather a mule or donkey. Some of the bones have cut marks on them; the right mandible has been chopped through from the inside and bears knife scraping marks on the horizontal ramus, indicating the removal of the cheek meat. The right scapula has a possible knife mark running along the length of the spine on the dorsal border. The left tibia and right metatarsal both have fine knife cuts and/or scrape marks on their proximal shafts; the marks on both bones are more likely to be associated with meat removal than skinning. Horseflesh was not usually eaten by people in Roman Britain (Hyland 1990), but this deposit indicates that at least some horse meat was consumed (possibly by dogs as well as/or by humans).

The metatarsal has slight osteoarthritic creasing and polishing of the proximal articulation. The fusion states of the epiphyses indicate that the horse was between 4.5 and 5 years old when it died. This is young for an adult horse to die, and the animal may have had an accidental death. Alternatively, it may have had to be slaughtered due to a lack of food (either for the horse or for the people who possibly ate it). If it were a ritual killing, the skeleton might have been expected to have been buried complete, whereas the pit appears to have only contained selected parts of the carcass.

The sizes of the horse bones from The Lanes vary slightly, but none are particularly large or small. Five longbones retain their full lengths. Using Kiesewalter's factors given in von den Driesch and Boessneck (1974), these convert to withers heights of 1.35m and 1.36m (for what is possibly one individual, from OBL B pit 100, fill 108), 1.19m (a first- to second-century context at CAL A), 1.35m (a first- to second-century context at OGL B) and 1.28m (a medieval context at OGL B, the trimmed metacarpal). These would today all be called ponies rather than horses, with withers heights of between 12 and 13-14 hands.

All epiphyses are fused. There are three pathological horse bones, two being Roman metatarsals showing minor osteoarthritic exostoses. Apart from the metatarsal from OBL B pit 100, there is a late second- to third-century metatarsal from OGL B that shows slight indications of arthritic lesions around its proximal articulation. This could be a sign of old age rather than of any overstraining due to hard physical work, although in the case of the OBL B partial skeleton the animal was still quite young when it died. There is also a medieval metatarsal with a damaged periosteum, possibly related to bruising or a slight infection.

Overall, the horse bones give us little information concerning the uses of live horses, but indicate that some horses were used, that their flesh was sometimes eaten, and that occasional bones were deposited at the site, some of them in connection with the work of artisans.

Dogs

Dog bones were similarly widely distributed (36 fragments), although nearly all of them come from Roman rather than medieval deposits. All parts of the body are represented. Although no complete or partial skeletons were found, there is a pair of scapulae from OGL A 1019 (Period 6), and two metacarpals from CAL A 75 (Period 3B) articulate.

A mixture of ages is present. At LEL A, all seven of the bones with metaphyses are fully fused, as are the three at CAL A, but at OGL A and B nearly half of the metaphyses are unfused, and three more are only just fused.

Only two longbones are complete enough for shoulder height calculations: a radius from OGL A 750 (late first/second century) and an ulna from OGL B 184 (late second/third century). Using Harcourt's factors, these give shoulder heights of 302mm and 515mm respectively (Harcourt 1974). In addition, a damaged femur from LEL A 599 (late first/second century) could be measured approximately, giving a shoulder height of approximately 386mm. The sizes of Romano-British dogs vary greatly (*ibid*), and these shoulder heights are unremarkable. Some sites have bones of dogs the

size of Jack Russell Terriers or smaller, which are thought to have been lap dogs of wealthy people, but no particularly small bones were found at The Lanes.

Only one dog skull was complete enough for Harcourt's measurements, from CAL A 71 (late first/second century). The Cephalic Index is 57.4, the Snout Index is 48.7 and the Snout Width Index is 42.7. These index values are all middle of the range for Romano-British dogs. In addition, a partial skull from OGL B 197 (late second/third century) has a broad snout and notably well worn teeth.

One dog metapodial from a second- to third-century deposit at OGL B has a healed midshaft fracture. Healed fractures of dog bones are common on Romano-British sites (personal observation), where dogs appear to have suffered blows from people, stones, or other animals. Dogs used for herding cattle are particularly susceptible to being hurt by kicks from the hind legs of cattle.

Cat

Only one cat bone, an adult tibia, was recovered. It was found in a medieval pit (1) at OGL B. Cat bones are often scarce on Romano-British sites.

Red deer

Twenty-two fragments of red deer bone (not including antler) were found, with almost equal numbers from the Roman and medieval periods. Eighteen of the pieces came from LEL A.

Most of the elements represented are lower limb bones, especially of the hindlimb (this is particularly true for the medieval material). One tibia has heavy defleshing-knife slice marks on it. Although some of the bones may indicate that venison was eaten, the predominance of metatarsals and tibiae may suggest that some of the bones were collected for craft-working rather than as joints of meat.

Fragments of antler, all showing signs of having been worked (Fasc 2, Chapter 21), were recovered from all the sites.

Roe deer

Fourteen bones of roe deer were recovered, but no roe deer antler; almost all of the bones come from Roman contexts. Nearly all of them are foot bones or bones of the hindlimb. This may indicate that many of the bones were brought to the site in association with skin- or bone-working, although the pelvis and femur, and possibly the radius and tibia, may have been used as meat sources. One of the metatarsals, from OGL A Period 6, has fine knife marks, which probably relate to skinning, just below the proximal articulation.

A tibia from OGL B has a slight pathological alteration on the shaft, possibly due to infection or bruising.

Hare

Two hare bones (a radius and a tibia) were found, both in Roman contexts at OGL A. Hare bones are usually present in low numbers on Romano-British sites.

Badger

One badger bone, a complete, fully fused tibia, was found in soil spread 550 at LEL A (Period 7A). Badgers can be used for meat and skins, although they are not commonly found on archaeological sites. No cut marks were observed. The preservation condition is similar to that of the rest of the material from this context, and the bone does not appear to be intrusive.

Bear

The single occurrence of a bear bone is a complete mandible from probable robber trench 72 (fill 28) in LEL A Period 21A. The jaw is from an adult animal, with quite worn M₁ and M₂ but very little wear on the P₄ and M₃. Since the jaw is an isolated find, it is possible that this mandible was a curiosity that had been kept for some time before being deposited amongst otherwise ordinary bone refuse.

The fill of the robber trench dates to the twelfth century. At this time, wild bears were extremely scarce in Britain, and the jaw may have been saved from a captive 'show' bear. There are no signs of any cut marks anywhere on the bone.

Small mammals and amphibians

Remains of small mammals and amphibians were only recovered from the fine fractions. Identified species include the commensal house mouse, woodmouse (which can be either commensal or wild, or alter seasonally between the two), and wild pygmy shrew. Other bones could only be referred to mouse sp. and vole sp. Amongst the amphibian bones, only toad could be specifically identified.

Perhaps the most interesting aspect of this collection is its paucity, both in terms of numbers of bones and numbers of species present. If the area was relatively open ground, with hedges, banks and ditches, a small rodent and shrew population would be expected to flourish, but few of their bodies have been trapped in the sampled deposits. None of the small vertebrate bones look like the remains of owl pellets; the concentrations are too low and lack the distinctive damage to skulls indicative of owl predation.

The lack of rat bones may be significant and may indicate a lack of grain storage on the site, but given the extremely low numbers of any rodent bones, their absence may simply be due to sample size. Black rats like warm dry conditions, and the buildings in this part of The Lanes may not have provided suitable habitats for them.

Estimates of meat weights

Calculations of meat weights from archaeological animal bones are fraught with inaccuracies. Some very crude estimates are provided here, to highlight the relative importance of beef in the meat part of the diet of people living in this part of The Lanes, and the minimal reliance on wild species.

Estimates of meat weights have been based on estimates of Minimum Numbers of Individuals (MNI) and average carcase weights for modern animals with comparable-sized

skeletons. For minor species for which carcase weights were not available, a dressing-out percentage of 60% has been used; this is the difference between live weight and carcase weight. Average weights have had to be taken for males and females. Actual meat (ie flesh) weights have not been used, as these data are not easily available. For the major species, the proportion of bone weight to carcase weight is broadly similar (Gerrard 1945).

There are two major problems. Firstly, the use of MNIs and average carcase weights relies on the assumption that whole carcasses are represented here. The analyses of skeletal elements for cattle, sheep and pig bones show that this assumption is probably a fair one. For the more scarcely-represented species, however, such as horse, red deer, roe deer etc, this assumption cannot be tested and may be false. These species, therefore, may be over-represented in the calculated meat weights if the bones represent partial skeletons, skins or individual joints of meat rather than whole carcasses.

The second major problem is deciding which species were eaten by people. It has been assumed here that the meat from dogs, cats and the bear was not consumed by people, since there is no evidence for any butchery of these bones. Whether or not horseflesh was eaten by people is more controversial. Due to the large size of a horse, the inclusion of carcase weights does affect the overall analyses, especially in respect of the role of mutton and pork in the diet. Since the role of horseflesh is debatable and the numbers of bones are so small that whole carcasses are unlikely to be represented, horseflesh has been left out of the analyses presented here.

Table 25 shows the relative contribution of meat (ie carcase) weights to the total for each of the three main periods (Stallibrass 1993, fig 22). Because of the small quantities, all of the bird, fish and wild mammal data have been combined. It can be seen that cattle contributed by far the greatest proportion of meat to the diet in all three periods. There is no evidence for any change of emphasis to mutton in the medieval period. Although they were still of minor importance, species other than the three main domesticates contributed a greater proportion of the diet in the medieval period than they did in either of the Roman periods. The species of birds and fish present also indicate a greater degree of fish and wildfowl exploitation during the Middle Ages.

The data for the three major domesticates, excluding the minor species, in the first/second century can be compared with those for the fort at Annetwell Street during Period 3 (Stallibrass 1991a). Minimum Numbers of Individuals for cattle at Annetwell Street are a slight problem, however, since the number calculated from the scapulae was twice that calculated from the next most frequent element (the mandible). At the southern part of The Lanes, a non-military area, the relative proportions of meat weight contributed by cattle, sheep and pigs were approximately 85%, 7% and 7% respectively. At Annetwell Street (using the lower MNI from the mandibles), the equivalent contributions were 87%, 6% and 6%. These ratios are extremely similar. It would be invalid to use the extra scapulae to represent whole carcase weights, but they did presumably represent some addition to the quantities represented by the rest of the skeletal material. If they had been whole carcasses, then the ratios would change to 93%, 3% and 4%. The 'real' ratios probably lie somewhere between these

Table 25
Crude estimates of meat weights, expressed as percentages

<i>Species</i>	<i>1st/2nd cent.</i>	<i>2nd/3rd cent.</i>	<i>Medieval</i>
Cattle	82.6	87.5	85.3
Sheep	8.4	5.2	3.3
Pig	6.5	5.8	4.0
Other species	2.4	1.5	7.4

two sets of figures.

It is interesting that although there may have been a slightly greater emphasis on beef at the fort, the dependence on beef at the non-military site was so great that the differences are minimal. Whether or not this was due to the proximity of the military settlement cannot be judged until material is available from local 'native' sites for comparison.

An emphasis on beef in the Romano-British diet is documented elsewhere. At the town of Baldock in Hertfordshire, for example, in a phase dated to AD 43-150, cattle, sheep and pigs contributed a ratio of 84%, 11% and 5% respectively to the total meat weight provided by the three major species (Chaplin and McCormick 1986). The average meat weights used are slightly different to those used here, but the results would be very similar if they were used (ie 83%, 12% and 5%). Although the relative contributions made by sheep and pigs are slightly different, the overall dominance of beef in the diet is extremely similar.

Interesting contexts

It is noticeable at The Lanes that pits are more likely to have 'non-ordinary' collections of bones, perhaps suggesting that particularly noxious waste or artisan's waste tended to be disposed of in a different manner to ordinary domestic waste.

At Old Grapes Lane, the distributions of animal bones appear to have varied in relation to the quantities of pottery whilst different buildings were in use. A full discussion of these distributions can be found in the archive report.

Although most of the bones recovered from Lewthwaite's Lane, Crown and Anchor Lane and Old Bush Lane appear to be ordinary domestic waste and refuse deposits, there are occasional deposits that appear to be more specialized. At LEL A in Period 19B (probably twelfth century), post-pit 85 contained several foot bones (metapodials, astragali etc) of red deer, roe deer and cattle mixed in with more 'ordinary' refuse. In the same period, cobbled surface 87 also produced a horse metapodial and three cattle astragali mixed in with ordinary refuse. These small concentrations of foot bones from four large species may represent waste from a tanner's workshop. There were no associated offcuts or worked bones, so it is less likely that the bones derived from a bone workshop.

Other unusual deposits have been noted in the site archive reports, such as pit 100 (fill 108) at OBL B that contained large numbers of cattle scapulae and sheep mandibles. Some of these cattle scapulae have been trimmed around the glenoid cavity and/or perforated in the centre of the blade, possibly for

hanging by a hook to cure or smoke the meat (see below).

Interesting treatments of bone

Several Roman cattle bones show signs of charring. This tends to follow a pattern noticed on cattle bones at the Annetwell Street fort, that is, the charring is located midshaft on a longbone, usually a metapodial (Stallibrass 1991a, pl 2). The degree of charring varies considerably. In all cases, the surface of the bone is dry and cracked, with the cracks tending to run parallel to the longitudinal axis. The cracks are very fine and close together, and small flakes of surface bone may be fully or partially detached. In severe cases of charring, the bone surface is discoloured to very dark brown or black (whereas the usual colour for the bones is rufous brown), but in less severe cases the surface colour may hardly have been altered.

In the first- to second-century deposits, six of the 36 midshaft metacarpals (17%) and three of the 49 midshaft metatarsals (6.1%) are charred to varying degrees. Other charred cattle bones include one mandible (charred on the diastema) and one tibia (charred just above the unfused distal metaphysis). In the second- to third-century deposits, four of the 36 metacarpals (11%) and three of the 47 metatarsals (6.4%) are charred at their midshafts. In addition, one mandible is charred at its symphysis and two tibiae are charred or scorched on their distal shafts. There are also some forelimb bones showing charring along their midshafts, although the charring is less localized: four of the 44 radii (9%) and two of the 42 humeri (4.8%). There are only three other cattle bones showing signs of burning: one charred first phalange, one charred and calcined first phalange, and one calcined second phalange; these seem to be incidental occurrences.

The charring of cattle bones at their midshafts appears to have been deliberate. Many of the bones are broken at the charred location, although it cannot be judged whether or not this was a desired or accidental effect of the process. Occasionally, chop marks also occur in the same location. Significantly, there are no bones of sheep or goat showing the same pattern of charring. Although occasional bones of both species are burnt, all of them are either charred at an end, or calcined. These would all appear to be accidental burnings or the result of being thrown on to a fire as fuel or refuse.

The purpose of charring these longbones is unknown, but the relative frequency with which it occurs, together with the fact that the same behavioural pattern was observed at Annetwell Street, does suggest that the practice was deliberate, and part of the Roman culture in Carlisle.

The recovery from OBL B pit 100 (Period 6) of cattle scapulae trimmed around the glenoid cavity and/or with holes in their blades has been mentioned above; these alterations may result from hanging by a hook to smoke or cure the meat. Both of these patterns of alteration were noted at Annetwell Street (Stallibrass 1991a, pl 1; 1991b), where cattle scapulae were far more numerous than any other cattle skeletal element, and are thought to have been imported to the site for processing or ready processed.

A cattle skull from posthole LEL A 639 (Period 4) shows very clear signs of having been poleaxed, indicating not only that it was deliberately slaughtered, but also the method of

slaughter.

Food and faecal remains

Many of the fragments in the fine fraction show signs of having been digested by carnivores/omnivores. This evidence takes two forms. Some of the fragments appear to have been etched by acids; sometimes the internal trabecular bone has been exposed and sometimes the outermost remaining layer of bone is shiny. Since only some of the fragments in a sample show this acid etching, which is often quite severe, whilst the rest of the material appears to be well-preserved, it seems unlikely that the etching is due to soil acids and more likely that it relates to digestive juices. Some of the fragments, usually those also displaying acid etching, also have patches of black 'glazing' on their surfaces. J Huntley (pers comm) has noticed that these black deposits are associated with the presence of bran in the botanical material from the same samples. These acid-etched and/or black-glazed fragments, all of which are less than 10mm in maximum dimension, are interpreted as being the remains of material that has passed through a carnivore's gut. Some of the fragments are also crushed or bear tooth marks. This type of material includes bones of mammals, birds and fish.

It cannot be estimated from the bone material whether it was digested by humans, dogs or pigs (or any combination of the three species). The presence of bran probably implies that associated digested bones were passed by humans (J Huntley, pers comm), and the crushed eel and small flatfish vertebrae may also have been eaten by people, whereas some of the larger salmonid vertebrae may have been eaten by dogs or pigs (p 164). Particularly large numbers of this type of fragment were recovered from certain contexts in OGL A. Most of these contexts (737, 750 and 803) are related to a boundary hedge and gully behind the Period 6 building. Pit 1126 in Period 3 also had several faecal bones associated with bran, grape pips, fig pips etc. These contexts are all likely to have contained human ordure.

In addition to the bones that appear to have been digested, several of the bones have been chewed. This is particularly true of the smaller fragments and the fish bones.

Foetal bones

Many of the bones of two of the three major domestic species found in the fine fractions, especially those of pigs but also some of sheep/goats, are from foetal or neonatal animals. No young bones of calves were found. Several of the foetal and neonatal bones also show signs of having been chewed and/or digested. All parts of the body of these very young animals are represented. The presence of the foetal bones suggests that these animals died unintentionally (abortions, stillbirths etc), which would support the suggestion that this site was a producer site. Although neonatal bones can indicate a high status site, where newborn animals could be bought in for special occasions, the combination of foetal and neonatal bones with the lack of artefactual evidence for high status suggests that this was not the case at The Lanes.

CHAPTER 11 THE BIRD BONES

by E P Allison

Introduction and methodology

A total of 306 fragments of bird bone were recovered from Lewthwaite's Lane Trench A and Old Grapes Lane Trenches A and B. Some bird bones were retrieved by hand during excavation, but the majority came from sieving the coarser residues and the fine fraction yielded by the bulk samples (see p 143). The quantities produced by each recovery method are given in Table 26. The amalgamation of sites and phases into broader general chronological periods follows that used in Chapter 10 (p 147).

Measurements of bones of domestic fowl and geese follow von den Driesch (1976). The measurements of goose bones were used as an aid to identification by comparison with measurements of specimens in the collections of the British Museum (Natural History) and the Environmental Archaeology Unit, University of York, and with dimensions given by Bacher (1967). Full details of bird bone measurements can be found in the archive report.

Discussion

The species recorded are shown in Table 27. The assemblages from the three sites were very similar in composition, and are considered together here.

Bones of domestic fowl and wild geese dominated the assemblages dated to the Roman period. The wild geese were mainly small species, and a number of bones could be attributed tentatively to barnacle goose (*Branta leucopsis*). A few bones of male black grouse (*Lyrurus tetrix*) and mallard (*Anas platyrhynchos*), and single bones of teal (*Anas crecca*), crow or rook (*Corvus corone* or *frugilegus*) and starling (*Sturnus vulgaris*) were recorded, together with five fragmentary bones of at least one other small passerine species.

Knife marks were present on the proximal end of a goose carpometacarpus. Two pathological specimens, both tibiotarsi

of domestic fowl, showed the excessive thickening of the shaft typical of avian osteopetrosis.

Little can be said of the few bones obtained from layers dated to the third to twelfth centuries. A small wild goose and domestic fowl are represented.

The majority of the medieval bones were obtained by sieving material from well 1237 at OGL A. Apart from a mandible fragment, possibly of a crane (*Grus grus*), a crow or rook ulna, and single bones of grey heron (*Ardea cinerea*), swan (*Cygnus* sp) and woodcock (*Scolopax rusticola*), the rest of the identifiable medieval bones were of domestic fowl and several species of goose. The numbers of individuals represented by the goose bones are small, however, the high fragment count being due to the recovery of a large number of phalanges from the well. The remains of several tarsometatarsi were also present, which suggests that feet of a small number of geese had been disposed of after the carcasses had been dressed on the site. One of the goose bones belonged to a domestic bird, and two other bones were large and comparable in size to domestic birds. Two fragments were small enough to have belonged to a barnacle or whitefronted goose (*Anser albifrons*). The size of the rest of the goose bones ranged between these extremes, and the measurements indicate that at least some of them belonged to either greylag or bean goose (*Anser anser* or *fabalis*). Knife marks were present on two of the goose bones, the distal ends of a humerus and a tibiotarsus.

One pathological specimen was noted: the tarsometatarsus of a large domestic cock from OGL B which had an oblique longitudinal split in the spur, extending approximately half the length of the spur (the tip of the spur had been broken *post mortem*). The bone within the split was smooth and regular, and healing appeared to have taken place. The split may have been made deliberately with a sharp knife to hold a metal spur extension, such as was used in cock-fighting.

Table 26
Numbers of bird bone fragments, by period and recovery method

Site	Late 1st/early 2nd cent.		Late 2nd/3rd cent.		3rd-12th cent.		Medieval	
	H	S	H	S	H	S	H	S
OGL A	20	44	10	5	2	-	6	144
OGL B	1	1	12	2	1	-	6	-
LEL A	16	15	1	-	1	-	19	-
Totals	37	60	23	7	4	-	31	144

H - hand-recovered; S - recovered by sieving

Table 27
Bird bone fragments

<i>Species</i>	<i>Late 1st/early 2nd cent.</i>	<i>Late 2nd/3rd cent.</i>	<i>3rd-12th cent.</i>	<i>Medieval</i>
Grey heron (<i>Ardea cinerea</i>)	-	-	-	1
Swan (<i>Cygnus</i> sp)	-	-	-	1
Domestic goose	-	-	-	3
Domestic/greylag goose (<i>Anser anser</i>)	-	-	-	18
Greylag/bean goose (<i>A. anser/fabalis</i>)	-	-	-	6
Whitefronted/barnacle goose (<i>A. albifrons/Branta leucopsis</i>)	1	2	-	-
Barnacle goose (<i>B. leucopsis</i>)	?6	1	-	-
<i>Anser</i> sp(p)	1	-	-	73
Small wild goose	4+?1	-	1	3
Inderminate goose	?1	-	-	28
Teal (<i>Anas crecca</i>)	-	1	-	-
Mallard (<i>Anas platyrhynchos</i>)	1	2	-	-
Domestic fowl (<i>Gallus</i>)	24	14	2	31
Black grouse (<i>Lyrurus tetrix</i>)	2+?1	1	-	-
Domestic fowl/black grouse	2	2	-	-
Medium galliform (Galliformes)	4	-	-	-
Woodcock (<i>Scolopax rusticola</i>)	-	-	-	1
Crane (<i>Grus grus</i>)	-	-	-	?1
Starling (<i>Sturnus vulgaris</i>)	1	-	-	-
Small passerine sp(p) (Passeridae)	5	-	-	-
Crow/rook (<i>Corvus corone/frugilegus</i>)	1	-	-	1
Number of identified fragments	55	23	3	167
Indeterminate fragments	42	7	1	8

Conclusions

The range of species is very similar to that noted at Annetwell Street, Castle Street and Blackfriars Street (Allison 1991a and b, and in Rackham 1990) and adds little to the list of species for Roman Britain assembled by Parker (1988).

There is no evidence that the majority of the bird bones are anything other than the remains of food. Exceptions to this may be the passerines (crow or rook, starling, and one or more smaller species), which are likely to have been living on and around the site and may have become incorporated into the deposits by natural causes.

Domestic fowl, which account for some 44% of the early Roman bones and 49% of the Roman bird bones overall, were the most significant source of bird meat at that time. Geese accounted for 22% of the total Roman bird bones and 78% of the medieval bones. Although the numbers of bones are too

small for any reliable conclusions to be drawn, and they are not an indicator of the numbers of individuals present, they are nevertheless of interest in terms of the relative proportions of wildfowl present in Roman and medieval deposits. The differences between the two may be a reflection of the degree to which the fish and wildfowl resources of the Solway Firth and its two main rivers, the Eden and the Esk, were not apparently exploited to any significant extent in Roman times. The medieval assemblage, by contrast, is broadly consistent with the well-known medieval appetite for fish and birds.

The black grouse bones recovered were all of males, as was observed at Annetwell Street and other sites. This might be a reflection of the method and time of capture (Allison 1991a).

Possible evidence for the fitting of metal spurs for cock-fighting was obtained from medieval deposits at Old Grapes Lane Trench B.

CHAPTER 12 THE FISH BONES

by R A Nicholson

Introduction and methodology

Some 640 identifiable fragments of fish bone were recovered, from Crown and Anchor Lane Trench A, Old Grapes Lane Trenches A and B and Lewthwaite's Lane Trench A. In addition there were large numbers of indeterminate fragments.

Most of the fish bones were from Roman deposits, with later fish remains only from one post-Roman pit, CAL A 64, and a medieval well, OGL A 1237. All the bones were collected from the residues of the wet-sieved bulk samples (p 143), and so may be considered representative of those bones surviving in the ground. The total number of bones was surprisingly small for an urban site with waterlogged deposits, however, an indication that fish may have played an unimportant role in the diet of the Romano-British population.

The fish bones were identified by reference to the modern comparative collection held in the Environmental Archaeology Unit, University of York. Nomenclature for skeletal elements follows Wheeler and Jones (1989). All bones were identified to species where possible, but otherwise to genus or family. Very few bones were large enough or complete enough to allow measurement, and for this reason in most cases the size of the fish has been estimated by visual comparison with modern bones from fish of known length. Unidentified fragments were counted where less than 50, but larger quantities were estimated by counting a fraction, multiplying up and rounding to the nearest five. Full details of the fish bone identifications and measurements can be found in the archive report.

Bone preservation was fairly good in almost all cases. Bones from a number of contexts appeared to have been

Table 28
Fish bone fragments

Species	Late 1st/2nd cent.	Late 2nd/3rd cent.	3rd-12th cent.	Medieval
Elasmobranch	-	-	-	1
Shad (<i>Alosa</i> sp)	1	-	-	-
Herring (<i>Clupea harengus</i>)	-	-	-	2
Salmon (<i>Salmo salar</i>)	20†	5	-	-
Trout (<i>Salmo trutta</i>)	1	-	-	-
Salmonid (Salmonidae)	56	10	14	-
?Salmonidae	4	-	1	-
Pike (<i>Esox lucius</i>)	-	-	9	1
?Pike	10	1	-	-
Eel (<i>Anguilla anguilla</i>)	348	7	106	-
?Eel	-	1	-	-
Cod (<i>Gadus morhua</i>)	1	-	-	2
Cod/saithe (<i>G. morhua</i> / <i>Pollachius virens</i>)	-	-	-	1
Haddock (<i>Melanogrammus aeglefinus</i>)	2	-	-	-
Cod family (Gadidae)	1	-	-	-
?Gadidae	1	-	-	-
Bass (<i>Dicentrarchus labrax</i>)	-	-	-	1
Mackerel (<i>Scomber scombrus</i>)	1	-	-	-
Plaice (<i>Pleuronectes platessa</i>)	1	-	-	-
Plaice/flounder (<i>P. platessa</i> / <i>Platichthys flesus</i>)	2	-	1	-
Right-sided flatfish (Pleuronectidae)	12	3	2	5
?Pleuronectidae	1	1	-	1
Flatfish, indeterminate	2	1	-	-
Number of identified fragments	464	29	133	14
Indeterminate fragments	797*	121	404*	24

* - includes estimated number; † - includes fragments of vertebral centrum

chewed, however, as evidenced by a large proportion of laterally compressed vertebral centra (Jones 1986; Nicholson forthcoming). In most cases the chewed bones were from eel and small flatfish, which may suggest a human consumer. In several cases, however, examples of badly fragmented salmon vertebrae occurred in the same contexts, and it is possible that these too were chewed, which would indicate that dogs or pigs were more likely to be the consumers (p 160). Contexts containing numbers of chewed bones included CAL A soil spread 52 (Period 4A), LEL A soil spread 550 (Period 7A), OGL A pit 1181 (fill 1126; Period 3), drain 751 (fill 803; Period 6) and medieval well 1237 (Period 13).

No examples of cut bones were observed; most fish were small, however, and the few larger bones were generally vertebrae.

Discussion

The species recorded are shown in Table 28. The amalgamation of sites and phases into broader general chronological periods follows that used in Chapter 10 (p 147).

In common with other excavated Roman urban settlements where sieving has been employed to aid bone recovery, such as Exeter (Wilkinson 1979, 79), York (O'Connor 1988, 115-6) and Worcester (Nicholson and Scott, in prep), and notwithstanding the numbers of fragments listed in Table 28, which are a function of the numbers of samples analysed, fish seem to have been far less important in the diet and economy than in later periods.

The range of fish at The Lanes appears to have been extremely limited. Salmonids (Salmonidae) and eel (*Anguilla anguilla*) were by far the most commonly represented species; many of the salmonid bones were from small fish, probably *Salmo trutta*, of less than 200mm in length, although large salmon, *Salmo salar*, of about 0.9m was also present. Both in the paucity of bones and in the dominance of salmonids and eel, the similarity between the fish remains from the non-military settlement at The Lanes and from the Annetwell Street fort (A K G Jones, *in litt*) is striking.

There was very little evidence for the exploitation of marine or estuarine resources. Mackerel (*Scomber scombrus*) was represented by a single vertebra, and only flatfish, mainly

plaice or flounder (*Pleuronectes platessa* and *Platichthys flesus*, from the family Pleuronectidae) were represented by more than occasional bones. Apart from one haddock cleithrum fragment in OGL A Period 6 (drain 751, fill 803), gadid bones in Roman deposits were only present at OGL B, where at least one cod of over 0.75m in length was represented. In general, bones from large marine species are unusual on Roman sites, and their presence at OGL B (if not intrusive), together with the absence of other species more typical of Roman deposits, may at least provide a tentative indication of specialization in food preparation.

One vertebra from shad, *Alosa* sp, indicates that some fishing took place in the estuary, and some of the flatfish bones may belong to flounder, another estuarine species. Eels and salmonids may also have been caught in the Solway Firth, but were more likely to have been caught in local rivers such as the Eden, or in lakes, together with pike, *Esox lucius*. There was no evidence of a generalized exploitation of local freshwater resources, however, in contrast to the situation in Roman York, where a range of freshwater species seem to have been commonly fished (O'Connor 1988, 115).

The post-Roman assemblage from pit 64 at CAL A is dominated by eel bones, with a few bones of salmonids, pike and flatfish (see p 112 for the plant remains recovered from this pit).

In common with other urban sites, the range of fish present in the medieval deposits at The Lanes suggests the utilization of a much wider resource base than during the Roman period. Although the medieval sample here is very small, the range of species indicates that freshwater and marine fish were available, and that large marine fish were favoured. Unusually, herring (*Clupea harengus*), which, with eel, often dominates medieval assemblages, was represented by only two bones, and eel was absent; the small sample size may account for this anomaly, however. One large elasmobranch vertebra may have come from a large ray (Rajidae) or from a smallish shark such as the tope (*Galeorhinus galeus*). A large bass (*Dicentrarchus labrax*) of over 0.65m in length was represented by one maxilla, and would have provided excellent eating. Bass are often found in large estuaries, although today most are caught to the south of the British Isles.

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